SECURITY TARGET LITE OF IDEAL CITIZ V2.15I ON INFINEON M7892 B11 EMBEDDING MICAO BAC 1.3.69 APPLICATION

Reference: 2017_2000030233

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1 ST INTRODUCTION

The aim of this document is to describe the Security Target for the Machine Readable Travel Document (MRTD) with the ICAO application, Basic Access Control and Active Authentication on the IDEMIA IDealCitiz 2.1.1 Java Card Platform.

1.1 ST IDENTIFICATION

Title	SECURITY TARGET LITE OF IDEAL CITIZ V2.15I ON INFINEON M7892 B11 EMBEDDING MICAO BAC 1.3.69 APPLICATION
Reference	2017_2000030233
Version	1.0
Date	13/09/2017
Certification Body	ANSSI
Author	IDEMIA
CC Version	3.1 Revision 5
Assurance Level	EAL4 augmented with ALC_DVS.2
Protection Profile	Common Criteria Protection Profile - Machine Readable Travel Document with „ICAO Application", Basic Access Control, BSI-PP-0055, Version 1.10, 25th March 2009 [BAC-PP]

1.2 TOE REFERENCE

TOE name	MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration
Commercial name	IDeal Citiz V2.15i on Infineon M7892 B11 embedding MICAO BAC Application
TOE Reference	OFFICIEL_MICAO_BAC_1_3_69_IDealCitiz_SLE78CLFX4000PM_2_1_5_0_R2
TOE version number	1.3.69
Name of Platform	IDealCitiz 2.1.1 open platform [PLTF-ST]
Platform Reference	OFFICIEL_IDealCitiz_SLE78CLFX4000PM_2_1_1_0_R2
Platform Ref. Certificate	ANSSI-CC-2017/59
IC Identifiers	Infineon M7892 B11 [ST-IC]
Chip Ref. Certificate	M7892 B11: BSI-DSZ-CC-0782-V2-2015-RA-01 [CR-IC]

1.3 TOE DOCUMENTATION

Reference	Description
[AGD_PRE]	2016_2000018607 – MICAO – AGD_PRE
[AGD_OPE]	2016_2000021834 – MICAO – AGD_OPE

1.4 TOE OVERVIEW

The Security Target (ST) defines the security objectives and requirements for the contactless and contact chip of machine readable travel documents (MRTD) based on the requirements and recommendations of the International Civil Aviation Organization (ICAO). It addresses the advanced security method Basic Access Control and Active Authentication in the 'ICAO Doc 9303' [ICAO-9303].
Therefore, the main features and their origin are the following:

- Authentication by the Basic Access Control (BAC),
  using the Document Basic Access Key Derivation Algorithm according to 'ICAO Doc 9303' [ICAO-9303], Normative Appendix 5.
- Active Authentication (AA),
  to protect the MRTD's chip against chip substitution according to 'ICAO Doc 9303' [ICAO-9303], Volume II, Section IV, 5.6.2. It prevents copying the LDS Security Object (SO_D) and proves that the SO_D has been read from the authentic chip.

1.5 TOE DESCRIPTION

1.5.1 TOE Definition

The Target of Evaluation (TOE) is a contact or contactless integrated circuit chip of machine readable travel documents (MRTD's chip) programmed according to the Logical Data Structure (LDS) and providing Basic Access Control according to the ICAO document [ICAO-9303] and the protection profile [BAC-PP]. Additionally to the [BAC-PP] the TOE provides Active Authentication according to [ICAO-9303].

The TOE (MICAO on IDealCitiz 2.1.1; BAC configuration) is composed of

- the IDealCitiz 2.1.1 open platform, comprising of
  - the circuitry of the MRTD's chip (the Infineon Security Controller M7892 B11 integrated circuit, IC) with hardware for the contact and contactless interface;
  - the IC Dedicated Software with the parts IC Dedicated Test Software and IC Dedicated Support Software;
  - the IC Embedded Software (operating system): IDealCitiz 2.1.1 java card platform;
- the MRTD application MICAO on IDealCitiz 2.1.1, BAC configuration Applet loaded in FLASH;
- the associated guidance documentation.

MICAO 1.3.69 Application is a set of Java card services intended to be used on the IDealCitiz 2.1.1 java card Platform, which is certified according to CC EAL 5+ [PLTF-ST]. This Platform is based on the Infineon M7892 B11 IC security controller, which is itself certified according to CC EAL 6+ [ST-IC], [CER-IC].

A schematic overview of the TOE is shown in Figure 1:

- The MRTD's chip circuitry and the IC dedicated software forming the Smart Card Platform (Hardware Platform and Hardware Abstraction Layer);
- The IC embedded software running on the Smart Card Platform consisting of
  - Java Card virtual machine, ensuring language-level security;
  - Java Card runtime environment, providing additional security features for Java card technology enabled devices;
  - Java card API, providing access to the card's resources for the Applet;
  - Global Platform Card Manager, responsible for management of Applets on the card.
  - Native Mifare application; for this TOE the Mifare application is disabled.
- The Applet Layer is the **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet.

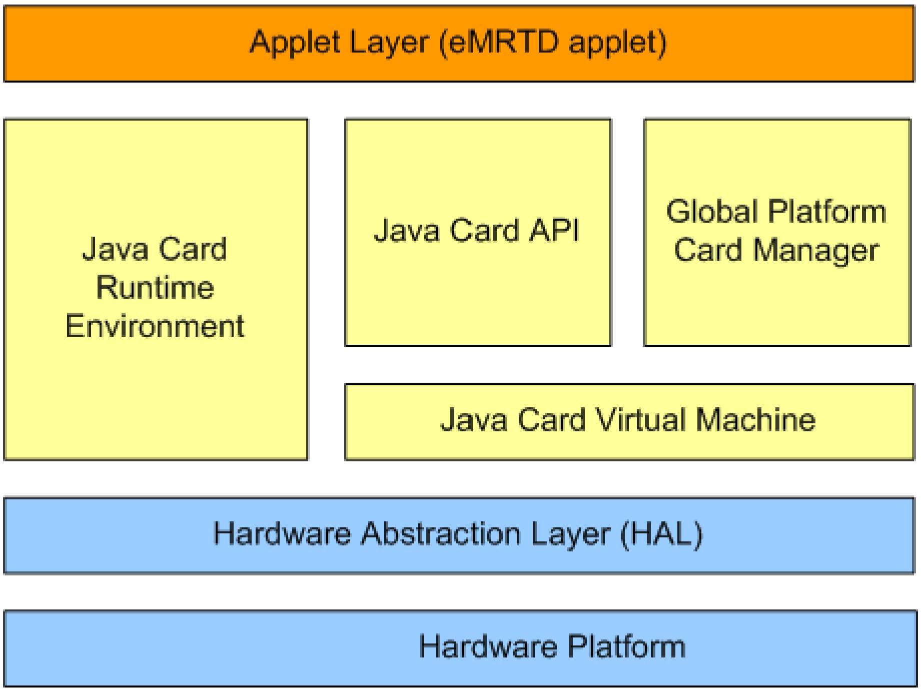
Applet Layer (eMRTD applet)
Java Card Runtime Environment
Java Card API
Global Platform Card Manager
Java Card Virtual Machine
Hardware Abstraction Layer (HAL)
Hardware Platform

Figure 1: TOE Perimeter

1.5.2 TOE usage and security features for operational use

A State or Organisation issues a MRTD to be used by the holder for international travel. The traveler presents its MRTD to the inspection system to prove his or her identity. The MRTD in the context of this security target contains:

i. visual (eye readable) biographical data and portrait of the holder,

ii. a separate data summary (MRZ data) for visual and machine reading using OCR methods in the Machine readable zone (MRZ) and

iii. data elements on the MRTD's chip according to the LDS for contactless and contact based machine reading.

The authentication of the traveler is based on:

i. the possession of a valid MRTD personalized for a holder with the claimed identity as given on the biographical data page and

ii. optional biometrics using the reference data stored in the MRTD.

The issuing State or Organization ensures the authenticity of the data of genuine MRTDs. The receiving State trusts genuine MRTDs of the issuing State or Organization.
The security functionality of the TOE will be externally available to the user by APDU commands according to the access conditions specified by the according policies considering the life cycle state, user role and security state.
For this security target, the MRTD is viewed as unit of

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

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

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

   (3) the printed portrait.

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

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

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

   (3) the biometric reference data of finger(s) (EF.DG3) or iris image(s) (EF.DG4) or both[1]

   (4) the other data according to LDS (EF.DG5 to EF.DG16) and

   (5) the Document security object.

The issuing State or Organization implements security features of the MRTD to maintain the authenticity and integrity of the MRTD and their data. The MRTD as the passport book and the MRTD's chip is uniquely identified by the document number.
The physical MRTD is protected by physical security measures (e.g. watermark on paper, security printing), logical (e.g. authentication keys of the MRTD's chip) and organizational security measures (e.g. control of materials, personalization procedures) [ICAO-9303]. These security measures include the binding of the MRTD's chip to the passport book.
The logical MRTD is protected in authenticity and integrity by a digital signature created by the document signer acting for the issuing State or Organization and the security features of the MRTD's chip.
The ICAO defines the baseline security method Passive Authentication and the optional advanced security methods Basic Access Control to the logical MRTD, Active Authentication of the MRTD's chip, Extended Access Control to the logical MRTD and the Data Encryption of sensitive biometrics as optional security measure in the ICAO document [ICAO-9303]. The Passive Authentication Mechanism and the Data Encryption are performed completely and independently of the TOE by the TOE environment.
This security target addresses the protection of the logical MRTD

i. in integrity by write-only-once access control and by physical means, and

ii. in confidentiality by the Basic Access Control Mechanism, and

iii. in authenticity by the Active Authentication of the MRTD's chip.

[1] These additional biometric reference data are optional. Existing data are protected by means of extended access control.

This security target does not address the Extended Access Control as optional security mechanism.
The Basic Access Control is a security feature which is mandatorily supported by the TOE. The inspection system

(i) optically reads the MRTD,

(ii) authenticates itself as inspection system by means of the Document Basic Access Keys.

After successful authentication of the inspection system the MRTD's chip provides read access to the logical MRTD by means of private communication (secure messaging) with this inspection system [ICAO-9303], normative appendix 5.
The Active Authentication is provided by the following steps:

i. the inspection system communicates by means of secure messaging established by Basic Access Control,

ii. the inspection system reads the LDS Document Security Object (SOD) from the MRTD

iii. the inspection system reads the public key required for Active Authentication from LDS DG15 and verifies by means of the Passive Authentication the authenticity of the MRTD's Active Authentication Public Key using the Document Security Object,

iv. the inspection system submits the TOE's Active Authentication command and includes a generated 8 bytes random number as challenge data.

v. The TOE signs this challenge with the MRTD's Active Authentication Private Key and returns the signed challenge response (authentication data),

vi. the inspection system reads the signed challenge response and verifies its signature.

1.5.3 TOE life cycle

The TOE life cycle is described in terms of its four life cycle phases. (With respect to the [SIC-PP], the TOE life-cycle is additionally subdivided into 7 steps in the PP. These steps are denoted too in the following, although the sequence of the steps differs for the TOE life cycle).

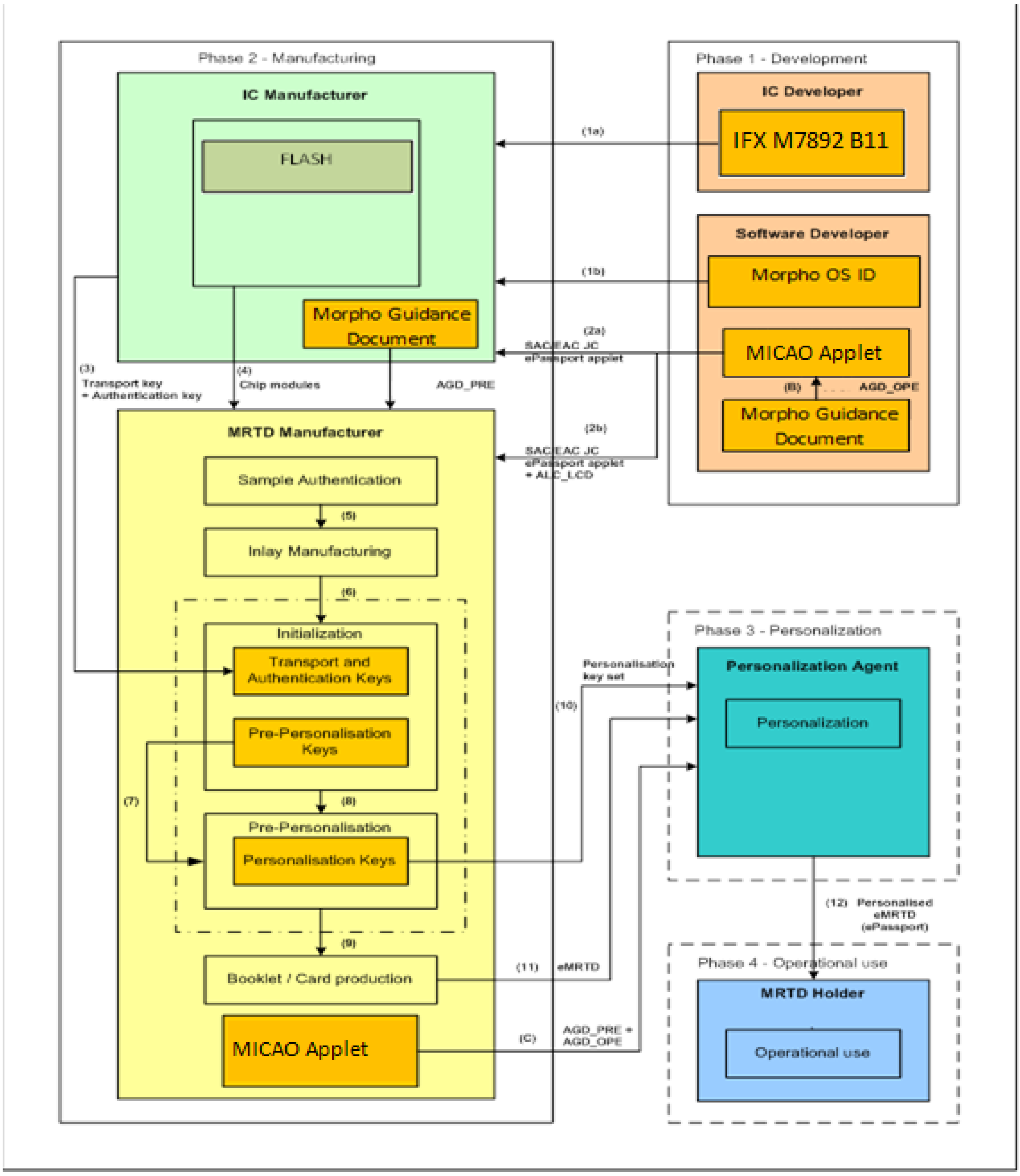

Figure 2: TOE life-cycle

Actors :

IC Developer, IC Manufacturer	Infineon
Software Developer	IDEMIA (Osny)
Travel document manufacturer	Infineon or IDEMIA (Ostrava)

1.5.3.1 PHASE 1 "DEVELOPMENT"

(Step 1) 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.

(Step 2) The software developer uses the guidance documentation for the integrated circuit and the guidance documentation for relevant parts of the IDEMIA Embedded Software (IDealCitiz 2.1.1 platform) and develops the ePassport application and the guidance documentation associated with these TOE components.
The MICAO application is integrated either in ROM or in EEPROM of the chip. Depending on the intention

(a) the ePassport application is securely delivered directly from the software developer (IDEMIA) to the IC manufacturer (Infineon). The applet code will be integrated into the FLASH code by the IC manufacturer, or

(b) the ePassport application and the guidance documentation is securely delivered directly from the software developer (IDEMIA) to the travel document manufacturer (IDEMIA).

1.5.3.2 PHASE 2 "MANUFACTURING"

(Step 3) In a first step, the TOE integrated circuit is produced containing the travel document's chip Dedicated Software, the parts of the travel document's chip Embedded Software, and in case of alternative a) the ePassport application in the non-volatile non-programmable memories (FLASH). The IC manufacturer writes the IC Identification Data onto the chip to control the IC as travel document material during the IC manufacturing and the delivery process to the travel document manufacturer. The IC is securely delivered from the IC manufacturer to the travel document manufacturer.
If necessary, the IC manufacturer adds parts of the IC Embedded Software in the non-volatile programmable memories (for instance EEPROM).

(Step 4) The travel document manufacturer combines the IC with hardware for the contact based / contactless interface in the travel document unless the travel document consists of the chip only.

(Step 5) The travel document manufacturer

1. in case of alternative b), adds the ePassport application in the non-volatile programmable memories (for instance FLASH) if necessary,
2. creates the ePassport application and
3. equips travel document's chips with pre-personalization Data.

BAC PP Application note 1: Creation of the application for this TOE implies Applet instantiation.

FOR THIS SECURITY TARGET THE FOLLOWING NAME MAPPINGS TO THE PROTECTION PROFILE [BAC-PP] APPLY:

- MRTD's chip Dedicated SW = Low level IC libraries
- travel document's chip Embedded Software = IDealCitiz 2.1.1 java card platform.
- ePassport application = the **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet run time code or an instantiation of it.

- Pre-personalization Data = Personalization Agent Key Set and Card Production Life Cycle (CPLC) data.

Both the underlying platform and the **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet provide configuration and life-cycle management functions required for TOE preparation. TOE preparation steps are performed in the manufacturing phase and consist of the following 2 activities:

1. Platform initialisation
2. Pre-personalisation

Platform initialization

Platform initialization consists of the configuration of the IDealCitiz 2.1.1 platform in accordance with requirements specified in the IDealCitiz 2.1.1 platform administrator guidance [PLTF-PRE] by using the dedicated platform commands. Furthermore, the Pre-Personalisation Agent key set is installed and (a part of) the CPLC data is updated.

Pre-personalisation

The pre-personalisation consists of the following steps:

a. IC (chip) Authentication and getting chip access with the pre-personalisation key set.
b. [optional] In case the **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet runtime code does not reside in FLASH, it is loaded into FLASH.
c. Create applet instance for **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet (i.e. installation of the **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet);
d. Set the MRTD irreversibly in its PERSONALISATION life-cycle state by installation of the Personalisation Agent specific personalisation key set.

During step c the CPLC data with the IC Identifier is configured in the ePassport application instance. The last step (d) finalizes the TOE. This is the moment the TOE starts to exist and is ready for delivery to the Personalisation Agent. The guidance documentation for the Personalisation Agent is [AGD_PRE].

The pre-personalised travel document together with the IC Identifier is securely delivered from the travel document manufacturer to the Personalisation Agent. The travel document manufacturer also provides the relevant parts of the guidance documentation to the Personalisation Agent.

1.5.3.3 PHASE 3 "PERSONALISATION OF THE TRAVEL DOCUMENT"

(Step 6) The personalization of the MRTD includes

i. the survey of the MRTD holder's biographical data,
ii. the enrolment of the MRTD holder's biometric reference data (i.e. the digitized portraits and the optional biometric reference data),
iii. the printing of the visually readable data onto the physical MRTD,
iv. the writing of the TOE User Data and TSF Data into the logical MRTD and
v. the writing of the TSF Data into the logical MRTD and 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 (AGD_OPE) for TOE use if necessary) is handed over to the MRTD holder for operational use.

BAC PP Application note 2

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), the Basic Authentication Control Key and (for this Security Target) the Active Authentication Key.

BAC PP Application note 3:

This Security Target 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.

The Personalization Agent authenticates by using two symmetric keys (MAC and ENC). In Personalisation life-cycle state, the TOE enforces mutual authentication between Personalisation Agent and TOE based on either of the following symmetric key authentication mechanism:

- ICAO BAC authentication mechanism and secure messaging protocol defined in [ICAO-9303] for 112 bits 3DES with pre-installed MAC, ENC (and KEK) keys as Personalisation Agent Key set.
- ISO18013 BAP authentication mechanism defined in [ISO18013-3] for AES-128, 192 or 256 bits using AES secure messaging (CMAC, IV value, tags etc.) as specified in EAC TR-03110 [TR-03110-1] with pre-installed MAC, ENC (and KEK) keys as Personalisation Agent Key set.

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1.5.3.4 PHASE 4 "OPERATIONAL USE"

(Step 7) The TOE is used as MRTD's 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.

BAC PP Application note 4: 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.

BAC PP Application note 5: The intention of this Security Target is to consider at least the phases 1 and parts of phase 2 (i.e. Step 1 to Step 3) 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 has to outline the split up of P.Manufact, P.Personalization and the related security objectives into aspects relevant before vs. after TOE delivery.

1.5.3.5 NON-TOE HARDWARE/SOFTWARE/FIRMWARE REQUIRED BY THE TOE

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

2 CONFORMANCE CLAIMS

2.1 CC CONFORMANCE CLAIM

This security target claims to be conformant to the Common Criteria version 3.1, which comprises

- Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and General Model; CCMB-2017-04-001, Version 3.1, Revision 5, April 2017 [CC-1]
- Common Criteria for Information Technology Security Evaluation, Part 2: Security Functional Requirements; CCMB-2017-04-002, Version 3.1, Revision 5, April 2017 [CC-2]
- Common Criteria for Information Technology Security Evaluation, Part 3: Security Assurance Requirements; CCMB-2017-04-003, Version 3.1, Revision 5, April 2017 [CC-3]

as follows:

- Part 2 extended with
  - FAU_SAS Audit data storage
  - FCS_RND Generation of random numbers
  - FIA_API Authentication proof of identity
  - FMT_LIM Limited capabilities and availability
  - FPT_EMSEC TOE emanation

- Part 3 conformant

The Common Methodology for Information Technology Security Evaluation (CEM), Evaluation Methodology; CCMB-2017-04-004, Version 3.1, Revision 5, April 2017 [CEM] has been taken into account.

2.2 PP CLAIM

This security target claims strict conformance to:

- Common Criteria Protection Profile - Machine Readable Travel Document with „ICAO Application", Basic Access Control, BSI-PP-0055, Version 1.10, 25th March. 2009 [BAC-PP]

2.3 PACKAGE CLAIM

This ST is conforming to assurance package EAL4 augmented with ALC_DVS.2 defined in CC part 3 [CC-3].

2.4 PP CONFORMANCE RATIONALE

This ST is claimed to be strictly conformant to the above mentioned PP [BAC-PP]. A detailed justification is given in the following.

2.4.1 Main aspects

- The TOE description (ch. 1.4) is based on the TOE description of [BAC-PP, 2]. It was only enhanced by product specific details.
- All definitions of the security problem definition in [BAC-PP, 3] have been taken exactly from the PP in the same wording.
- All security objectives have been taken exactly from [BAC-PP, 4] in the same wording with one exception (see ch. 2.3.2 below)
- The part of extended components definition has been taken originally from [BAC-PP, 5].
- All SFRs for the TOE have been taken originally from the [BAC-PP, 5.1] added by according iterations, selections and assignments.
- The security assurance requirements (SARs) have been taken originally from the PP.

2.4.2 Overview of differences between the PP and the ST

Assets

As a feature that can be optionally configured, the TOE supports **Active Authentication** which according to [ICAO-9303] prevents copying the SO_D and proves that it has been read from the authentic chip. It proves that the chip has not been substituted.

Threats

The threat **T.Counterfeit** has been added to describe an unauthorized copy or reproduction of a genuine MRTD's chip.

T.Counterfeit ***MRTD's Chip***

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

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

Asset: authenticity of logical MRTD data

Assumptions

One assumption was added to cover Active Authentication during Personalization:

A.PERS_AGENT_AA PERSONALIZATION OF THE MRTD'S CHIP (ACTIVE AUTHENTICATION)

Additionally to A.Pers_Agent the Personalization Agent ensures the correctness of the Active Authentication Public Key (EF.DG15) if stored on the MRTD's chip.

Security objectives for the TOE

The **OT.Chip_Auth_Proof** was added to also cover Active Authentication as follows:

OT.Chip_Auth_Proof Proof of MRTD'S chip authenticity

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

Security Objectives for the Environment

The **OE.Auth_Key_MRTD** was added to consider the AA Key pair.
The **OE.AA_MRTD** has been added by the Basic and General inspection systems.
These additions to the original objectives of the PP do not contradict with any other objective nor mitigate a threat (or part of a threat) meant to be addressed by security objectives for the TOE in the PP.

Their definitions are:

OE.Auth_Key_MRTD MRTD Authentication Key

The issuing State or Organization has to establish the necessary public key infra-structure in order to

i. generate the MRTD's Active Authentication Key Pair,

ii. store the Active Authentication Private Key, and store the Active Authentication Public Key in the Active Authentication Public Key data in EF.DG15 (if generated), and

iii. support inspection systems of receiving States or Organizations to verify the authenticity of the MRTD's chip used for genuine MRTDs by certification of the Active Authentication Public Key by means of the Document Security Object.

OE.Exam_MRTD Examination of the MRTD passport book

The inspection system of the Receiving State must examine the MRTD presented by the traveler to verify its authenticity by means of the physical security measures and to detect any manipulation of the physical MRTD. The Basic Inspection System for global interoperability

i. includes the Country Signing Public Key and the Document Signer Public Key of each issuing State or Organization, and

ii. implements the terminal part of the Basic Access Control [ICAO-9303]. .

OE.AA_MRTD Active Authentication – Inspection Systems

An Active Authentication (Basic, General or Extended) Inspection system performs all the functions of the Basic, General or Extended Inspection System respectively, and verifies the IC authenticity with an RSA or ECDSA signature generated by the MRTD (if available).

Security functional requirements

The Security Target enhances the following security functional requirements to support Active Authentication:

- FDP_ACF.1 Security attribute based access control- Basic Access Control
- FMT_MTD.1/KEY_WRITE Management of TSF data – Key Write
- FMT_MTD.1/KEY_READ Management of TSF data – Key Read
- FPT_EMSEC.1/ TOE Emanation

- FMT_SMR.1 Security roles

This Security Target adds the following security functional requirements to support Active Authentication:

- FCS_COP.1/SIG_GEN Cryptographic operation – RSA or ECDSA Signature
- FIA_API.1/AA Authentication proof of identity

3 SECURITY PROBLEM DEFINITION

3.1 ASSETS

The assets to be protected by the TOE include the User Data on the MRTD's chip.

Logical MRTD Data

The logical MRTD data consists of the EF.COM, EF.DG1 to EF.DG16 (with different security needs) and the Document Security Object EF.SOD according to LDS [ICAO 9303]. These data are user data of the TOE. The EF.COM lists the existing elementary files (EF) with the user data. The EF.DG1 to EF.DG13 and EF.DG16 contain personal data of the MRTD holder. The Active Authentication Public Key (EF.DG15) is used by the inspection system for Active Authentication of the chip. The Chip Authentication Public Key (EF.DG14) is used by the inspection system for the Chip Authentication. The EF.SOD is used by the inspection system for Passive Authentication of the logical MRTD.

Due to interoperability reasons as the "ICAO Doc 9303" [ICAO-9303] the TOE described in this security target specifies only the BAC mechanisms with resistance against enhanced basic attack potential granting access to

- Logical MRTD standard User Data (i.e. Personal Data) of the MRTD holder (EF.DG1, EF.DG2, EF.DG5 to EF.DG13, EF.DG16),
- Chip Authentication Public Key in EF.DG14,
- Active Authentication Public Key in EF.DG15,
- Document Security Object (SOD) in EF.SOD,
- Common data in EF.COM.

The TOE prevents access to sensitive User Data

- Sensitive biometric reference data (EF.DG3, EF.DG4).

Authenticity of the MRTD's chip

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

3.2 USERS / SUBJECTS

This security target considers the following subjects:

Manufacturer

The generic term for the IC Manufacturer producing the integrated circuit and the MRTD Manufacturer completing the IC to the MRTD's chip. The Manufacturer is the default user of the TOE during the manufacturing life cycle phase (Phase 2). The TOE itself does not distinguish between the IC Manufacturer and MRTD Manufacturer using this role Manufacturer.

Personalization Agent

The agent is acting on behalf of the issuing State or Organization to personalize the MRTD for the holder by some or all of the following activities (i) establishing the identity the holder for the biographic data in the MRTD, (ii) enrolling the biometric reference data of the MRTD holder i.e. the portrait, the encoded finger image(s) and/or the encoded iris image(s) (iii) writing these data on the physical and logical MRTD for the holder as defined for global, international and national interoperability, (iv) writing the initial TSF data and (v) signing the Document Security Object defined in [ICAO 9303].

Terminal

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

Inspection system (IS)

A technical system used by the border control officer of the receiving State (i) examining an MRTD presented by the traveler and verifying its authenticity and (ii) verifying the traveler as MRTD holder. The Basic Inspection System (BIS) (i) contains a terminal for the contactless/contact based communication with the MRTD's chip, (ii) implements the terminals part of the Basic Access Control Mechanism and (iii) gets the authorization to read the logical MRTD under the Basic Access Control by optical reading the MRTD or other parts of the passport book providing this information. (iv) is recommend to perform Active Authentication (AA). AA verifies the identity and authenticity of the MTRD's chip as part of a genuine MRTD issued by a known State of organization.

The General Inspection System (GIS) is a Basic Inspection System which implements additionally the Chip Authentication Mechanism. The Extended Inspection System (EIS) in addition to the General Inspection System (i) implements the Terminal Authentication Protocol and (ii) is authorized by the issuing State or Organization through the Document Verifier of the receiving State to read the sensitive biometric reference data.

The security attributes of the EIS are defined of the Inspection System Certificates.

MRTD Holder

The rightful holder of the MRTD for whom the issuing State or Organization personalized the MRTD.

Traveler

Person presenting the MRTD to the inspection system and claiming the identity of the MRTD holder.

Attacker

A threat agent trying (i) to identify and to trace the movement of the MRTD's chip remotely (i.e. without knowing or optically reading the printed MRZ data), (ii) to read or to manipulate the logical MRTD without authorization, or (iii) to forge a genuine MRTD.

3.3 THREATS

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

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

T.Chip_ID

Identification of MRTD's chip

Adverse action: An attacker trying to trace the movement of the MRTD by identifying remotely the MRTD's chip by establishing or listening to communications through the contactless/contact based communication interface.

Threat agent: having enhanced basic attack potential, not knowing the optically readable MRZ data printed on the MRTD data page in advance.

Asset: Anonymity of user.

T.Skimming

Skimming the logical MRTD

Adverse action: An attacker imitates an inspection system trying to establish a communication to read the logical MRTD or parts of it via the contactless/contact based communication channel of the TOE.

Threat agent: having enhanced basic attack potential, not knowing the optically readable MRZ data printed on the MRTD data page in advance.

Asset: confidentiality of logical MRTD data.

T.Eavesdropping

Eavesdropping to the communication between TOE and inspection system

Adverse action: An attacker is listening to an existing communication between the MRTD's chip and an inspection system to gain the logical MRTD or parts of it. The inspection system uses the MRZ data printed on the MRTD data page but the attacker does not know these data in advance.

Threat agent: having enhanced basic attack potential, not knowing the optically readable MRZ data printed on the MRTD data page in advance

Asset: confidentiality of logical MRTD data

T.Forgery

Forgery of data on MRTD's chip

Adverse action: An attacker alters fraudulently the complete stored logical MRTD or any part of it including its security related data in order to deceive on an inspection system by means of the changed MRTD holder's identity or biometric reference data. This threat comprises several attack scenarios of MRTD forgery. The attacker may alter the biographical data on the biographical data page of the passport book, in the printed MRZ and in the digital MRZ to claim another identity of the traveler. The attacker may alter the printed portrait and the digitized portrait to overcome the visual inspection of the inspection officer and the automated biometric authentication mechanism by face recognition. The attacker may alter the biometric reference data to defeat automated biometric authentication mechanism of the inspection system. The attacker may combine data groups of different logical MRTDs to create a new forged MRTD, e.g. the attacker writes the digitized portrait and optional biometric reference finger data read from the logical MRTD of a traveler into another MRTD's chip leaving their digital MRZ unchanged to claim the identity of the holder this MRTD. The attacker may also copy the complete unchanged logical MRTD to another contactless/contact based chip.

Threat agent: having enhanced basic attack potential, being in possession of one or more legitimate MRTDs

Asset: authenticity of logical MRTD data

Application Note:

This threat comprises several attack scenarios of MRTD forgery. The attacker may alter the biographical data on the biographical data page of the passport book, in the printed MRZ and in the digital MRZ to claim another identity of the traveler. The attacker may alter the printed portrait and the digitized portrait to overcome the visual inspection of the inspection officer and the automated biometric authentication mechanism by face recognition. The attacker may alter the biometric reference data to defeat automated biometric authentication mechanism of the inspection system. The attacker may combine data groups of different MRTDs to create a new forged MRTD, e.g. the attacker writes the digitized portrait and optional biometric reference finger data read from the MRTD of a traveler into another MRTD's chip leaving their digital MRZ unchanged to claim the identity of the holder this MRTD. The attacker may also copy the complete unchanged MRTD to another contactless chip.

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 MRTD holder.

Threat agent: having enhanced basic attack potential, being in possession of a legitimate MRTD

Asset: confidentiality and authenticity of logical MRTD and TSF data, correctness of TSF

T.Information_Leakage

Information Leakage from MRTD's chip

Adverse action: An attacker may exploit information which is leaked from the TOE during its usage in order to disclose confidential TSF data. The information leakage may be inherent in the normal operation or caused by the attacker. 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/contact based 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 the Differential Electromagnetic Analysis (DEMA) and the Differential Power Analysis (DPA). Moreover the attacker may try actively to enforce information leakage by fault injection (e.g. Differential Fault Analysis).

Threat agent: having enhanced basic attack potential, being in possession of a legitimate MRTD

Asset: confidentiality of logical MRTD and TSF data

Application Note:

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

T.Phys-Tamper

Physical Tampering

Adverse action: An attacker may perform physical probing of the MRTD's chip in order (i) to disclose TSF Data or (ii) to disclose/reconstruct the MRTD's chip Embedded Software. An attacker may physically modify the MRTD's chip in order to (i) modify security features or functions of the MRTD's chip, (ii) modify security functions of the MRTD's chip Embedded Software, (iii) modify User Data or (iv) to modify TSF data. The physical tampering may be focused directly on the disclosure or manipulation of TOE User Data (e.g. the biometric reference data for the inspection system) or TSF Data (e.g. authentication key of the MRTD's chip) 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 direct interaction with the MRTD's chip internals. Techniques commonly employed in IC failure analysis and IC reverse engineering efforts may be used. Before that, the hardware security mechanisms and layout characteristics need to be identified. Determination of software design including treatment of User Data and 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.

Threat agent: having enhanced basic attack potential, being in possession of a legitimate MRTD

Asset: confidentiality and authenticity of logical MRTD and TSF data, correctness of TSF

Application Note:

Physical tampering may be focused directly on the disclosure or manipulation of the user data (e.g. the biometric reference data for the inspection system) or the TSF data (e.g.authentication key of the MRTD) 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 MRTD's internals. Techniques commonly employed in IC failure analysis and IC reverse engineering efforts may be used. Before that, hardware security mechanisms and layout characteristics need to be identified. Determination of software design including treatment of the user data and the TSF data may also be a pre-requisite. The modification may result in the deactivation of a security function. Changes of circuitry or data can be permanent or temporary.

T.Malfunction

Malfunction due to Environmental Stress

Adverse action: An attacker may cause a malfunction of TSF or of the MRTD'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 MRTD outside the normal operating conditions, exploiting errors in the MRTD's Embedded Software or misusing administrative functions. To exploit these vulnerabilities an attacker needs information about the functional operation.

Threat agent: having enhanced basic attack potential, being in possession of a legitimate MRTD

Asset: confidentiality and authenticity of logical MRTD and TSF data, correctness of TSF

Application Note:

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

T.Counterfeit

MRTD's chip

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

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

Asset: authenticity of logical MRTD data

3.4 ORGANISATIONAL SECURITY POLICIES

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

P.Manufact

Manufacturing of the MRTD's chip

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

P.Personalization

Personalization of the MRTD by issuing State or Organization only

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

P.Personal_Data

Personal data protection policy

The biographical data and their summary printed in the MRZ and stored on the MRTD's chip (EF.DG1), the printed portrait and the digitized portrait (EF.DG2), the biometric reference data of finger(s) (EF.DG3), the biometric reference data of iris image(s) (EF.DG4) and data according to LDS (EF.DG5 to EF.DG13, EF.DG16) stored on the MRTD's chip are personal data of the MRTD holder. These data groups are intended to be used only with agreement of the MRTD holder by inspection systems to which the MRTD is presented. The MRTD's chip shall provide the possibility for the Basic Access Control to allow read access to these data only for terminals successfully authenticated based on knowledge of the Document Basic Access Keys as defined in [ICAO 9303].

Application Note:

The organizational security policy P.Personal_Data is drawn from the ICAO 'ICAO Doc 9303' [ICAO 9303]. Note that the Document Basic Access Key is defined by the TOE environment and loaded to the TOE by the Personalization Agent.

3.5 ASSUMPTIONS

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

A.MRTD_Manufact

MRTD manufacturing on steps 4 to 6

It is assumed that appropriate functionality testing of the MRTD is used. It is assumed that security procedures are used during all manufacturing and test operations to maintain confidentiality and integrity of the MRTD and of its manufacturing and test data (to prevent any possible copy, modification, retention, theft or unauthorized use).

A.MRTD_Delivery

MRTD delivery during steps 4 to 6

Procedures shall guarantee the control of the TOE delivery and storage process and conformance to its objectives:

- Procedures shall ensure protection of TOE material/information under delivery and storage.
- Procedures shall ensure that corrective actions are taken in case of improper operation in the delivery process and storage.

- o Procedures shall ensure that people dealing with the procedure for delivery have got the required skill.

A.Pers_Agent

Personalization of the MRTD's chip

The Personalization Agent ensures the correctness of (i) the logical MRTD with respect to the MRTD holder, (ii) the Document Basic Access Keys, (iii) the Chip Authentication Public Key(EF.DG14) if stored on the MRTD's chip, (iv) the Active Authentication Public Key (EF.DG15) if stored on the MRTD’s chip, and (v) the Document Signer Public Key Certificate (if stored on the MRTD's chip). The Personalization Agent signs the Document Security Object. The Personalization Agent bears the Personalization Agent Authentication to authenticate himself to the TOE by symmetric cryptographic mechanisms.

A.Pers_Agent_AA

Personalization of the MRTD’s chip (Active Authentication)

Additionally to A.Pers_Agent the Personalization Agent ensures the correctness of the Active Authentication Public Key (EF.DG15) if stored on the MRTD’s chip.

A.Insp_Sys

Inspection Systems for global interoperability

The Inspection System is used by the border control officer of the receiving State (i) examining a MRTD presented by the traveler and verifying its authenticity and (ii) verifying the traveler as MRTD holder. The Basic Inspection System for global interoperability (i) includes the Country Signing CA Public Key and the Document Signer Public Key of each issuing State or Organization, and (ii) implements the terminal part of the Basic Access Control [ICAO 9303]. The Basic Inspection System reads the logical MRTD under Basic Access Control and performs the Passive Authentication to verify the logical MRTD.

Application Note:

According to [ICAO-9303] the support of the Passive Authentication mechanism is mandatory whereas the Basic Access Control is optional. This ST does not address Primary Inspection Systems therefore the BAC is mandatory within this ST.

A.BAC-Keys

Cryptographic quality of Basic Access Control Keys

The Document Basic Access Control Keys being generated and imported by the issuing State or Organization have to provide sufficient cryptographic strength. As a consequence of the 'ICAO Doc 9303' [ICAO 9303], the Document Basic Access Control Keys are derived from a defined subset of the individual printed MRZ data. It has to be ensured that these data provide sufficient entropy to withstand any attack based on the decision that the inspection system has to derive Document Access Keys from the printed MRZ data with enhanced basic attack potential.

Application Note:

When assessing the MRZ data resp. the BAC keys entropy potential dependencies between these data (especially single items of the MRZ) have to be considered and taken into account. E.g. there might be a direct dependency between the Document Number when chosen consecutively and the issuing date.

4 SECURITY OBJECTIVES

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

4.1 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.

OT.AC_Pers

Access Control for Personalization of logical MRTD

The TOE must ensure that the logical MRTD 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 MRTD data in EF.DG1 to EF.DG16 and the TSF data may be written only during and cannot be changed after its personalisation. The Document security object can be updated by authorized Personalization Agents if data in the data groups EF.DG3 to EF.DG16 are added.

Application Note:

The OT.AC_Pers implies that

- The data of the LDS groups written during personalisation for MRTD holder (at least EF.DG1 and EF.DG2) can not be changed using write access after personalisation.
- The Personalization Agents may (i) add (fill) data into the LDS data groups not written yet, and (ii) update and sign the Document Security Object accordingly. The support for adding data in the "Operational Use" phase is optional.

OT.Data_Int

Integrity of personal data

The TOE must ensure the integrity of the logical MRTD stored on the MRTD's chip against physical manipulation and unauthorized writing. The TOE must ensure that the inspection system is able to detect any modification of the transmitted logical MRTD data.

OT.Data_Conf

Confidentiality of personal data

The TOE must ensure the confidentiality of the logical MRTD data groups EF.DG1 to EF.DG16. Read access to EF.DG1 to EF.DG16 is granted to terminals successfully authenticated as Personalization Agent. Read access to EF.DG1, EF.DG2 and EF.DG5 to EF.DG16 is granted to terminals successfully authenticated as Basic Inspection System. The Basic Inspection System shall authenticate itself by means of the Basic Access Control based on knowledge of the Document Basic Access Key. The TOE must ensure the confidentiality of the logical MRTD data during their transmission to the Basic Inspection System.

Application Note:

The traveler grants the authorization for reading the personal data in EF.DG1, EF.DG2 and EF.DG5 to EF.DG16 to the inspection system by presenting the MRTD. The MRTD's chip shall provide read access to these data for terminals successfully authenticated by means of the Basic Access Control based on knowledge of the Document Basic Access Keys.

The security objective OT.Data_Conf requires the TOE to ensure the strength of the security function Basic Access Control Authentication. The Document Basic Access Keys are derived from the MRZ data defined by the TOE environment and are loaded into the TOE by the Personalization Agent. Therefore the sufficient quality of these keys has to result from the MRZ data's entropy. Any attack based on decision of the 'ICAO Doc 9303' [ICAO-9303] that the inspection system derives Document Basic Access is ensured by OE.BAC-Keys. Note that the authorization for reading the biometric data in EF.DG3 and EF.DG4 is only granted after successful Enhanced Access Control not covered by this protection profile. Thus the read access must be prevented even in case of a successful BAC Authentication.

OT.Identification

Identification and Authentication of the TOE

The TOE must provide means to store IC Identification and Pre-Personalization Data in its nonvolatile memory. The IC Identification Data must provide a unique identification of the IC during Phase 2 'Manufacturing' and Phase 3 'Personalization of the MRTD'. The storage of the Pre- Personalization data includes writing of the Personalization Agent Key(s). In Phase 4 'Operational Use' the TOE shall identify itself only to a successful authenticated Basic Inspection System or Personalization Agent.

Application Note:

The TOE security objective OT.Identification addresses security features of the TOE to support the life cycle security in the manufacturing and personalization phases. The IC Identification Data are used for TOE identification in Phase 2 'Manufacturing' and for traceability and/or to secure shipment of the TOE from Phase 2 'Manufacturing' into the Phase 3 'Personalization of the MRTD'. The OT.Identification addresses security features of the TOE to be used by the TOE manufacturing. In the Phase 4 'Operational Use' the TOE is identified by the Document Number as part of the printed and digital MRZ. The OT.Identification forbids the output of any other IC (e.g. integrated circuit card serial number ICCSN) or MRTD identifier through the contactless interface before successful authentication as Basic Inspection System or as Personalization Agent.

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

OT.Chip_Auth_Proof

Proof of MRTD’S chip authenticity

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

OT.Prot_Abuse-Func

Protection against Abuse of Functionality

After delivery of the TOE to the MRTD Holder, the TOE must prevent the abuse of test and support functions that may be maliciously used to (i) disclose critical User Data, (ii) manipulate critical User Data of the IC Embedded Software, (iii) manipulate Soft-coded ICEmbedded Software or (iv) bypass, deactivate, change or explore security features or functions of the TOE.

Details of the relevant attack scenarios depend, for instance, on the capabilities of the Test Features provided by the IC Dedicated Test Software which are not specified here.

OT.Prot_Inf_Leak

Protection against Information Leakage

The TOE must provide protection against disclosure of confidential TSF data stored and/or processed in the MRTD's chip

- 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 and
- by forcing a malfunction of the TOE and/or
- by a physical manipulation of the TOE.

Application Note:

This objective pertains to measurements with subsequent complex signal processing due to normal operation of the TOE or operations enforced by an attacker. Details correspond to an analysis of attack scenarios which is not given here.

OT.Prot_Phys-Tamper

Protection against Physical Tampering

The TOE must provide protection of the confidentiality and integrity of the User Data, the TSF Data, and the MRTD's chip Embedded Software. This includes protection against attacks with enhanced-basic attack potential by means of

- measuring through galvanic contacts which is direct physical probing on the chips surface except on pads being bonded (using standard tools for measuring voltage and current) or
- measuring not using galvanic contacts but other types of physical interaction between charges (using tools used in solid-state physics research and IC failure analysis)
- manipulation of the hardware and its security features, 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 functions.

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.

Application Note:

A malfunction of the TOE may also be caused using a direct interaction with elements on the chip surface. This is considered as being a manipulation (refer to the objective OT.Prot_Phys-Tamper) provided that detailed knowledge about the TOE's internals.

4.2 SECURITY OBJECTIVES FOR THE OPERATIONAL ENVIRONMENT

4.2.1 Issuing State or Organisation

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

OE.MRTD_Manufact

Protection of the MRTD Manufacturing

Appropriate functionality testing of the TOE shall be used in step 4 to 6.

During all manufacturing and test operations, security procedures shall be used through phases 4, 5 and 6 to maintain confidentiality and integrity of the TOE and its manufacturing and test data.

OE.MRTD_ Delivery

Protection of the MRTD delivery

Procedures shall ensure protection of TOE material/information under delivery including the following objectives:

- non-disclosure of any security relevant information,
- identification of the element under delivery,
- meet confidentiality rules (confidentiality level, transmittal form, reception acknowledgment),
- physical protection to prevent external damage,
- secure storage and handling procedures (including rejected TOE's),
- traceability of TOE during delivery including the following parameters:
  - origin and shipment details,
  - reception, reception acknowledgement,
  - location material/information.

Procedures shall ensure that corrective actions are taken in case of improper operation in the delivery process (including if applicable any non-conformance to the confidentiality convention) and highlight all non-conformance to this process.

Procedures shall ensure that people (shipping department, carrier, reception department) dealing with the procedure for delivery have got the required skill, training and knowledge to meet the procedure requirements and be able to act fully in accordance with the above expectations.

OE.Personalization

Personalization of logical MRTD

The issuing State or Organization must ensure that the Personalization Agents acting on behalf of the issuing State or Organization (i) establish the correct identity of the holder and create biographical data for the MRTD, (ii) enroll the biometric reference data of the MRTD holder i.e. the portrait, the encoded finger image(s) and/or the encoded iris image(s) and (iii) personalize the MRTD for the holder together with the defined physical and logical security measures to protect the confidentiality and integrity of these data.

OE.Pass_Auth_Sign

Authentication of logical MRTD by Signature

The issuing State or Organization must (i) generate a cryptographic secure Country Signing CA Key Pair, (ii) ensure the secrecy of the Country Signing CA Private Key and sign Document Signer Certificates in a secure operational environment, and (iii) distribute the Certificate of the Country Signing CA Public Key to receiving States and Organizations maintaining its authenticity and integrity. The issuing State or Organization must (i) generate a cryptographic secure Document Signer Key Pair and ensure the secrecy of the Document Signer Private Keys, (ii) sign Document Security Objects of genuine MRTD in a secure operational environment only and (iii) distribute the Certificate of the Document Signer Public Key to receiving States and Organizations. The digital signature in the Document Security Object relates all data in the data in EF.DG1 to EF.DG16 if stored in the LDS according to [ICAO 9303].

OE.BAC-Keys

Cryptographic quality of Basic Access Control Keys

The Document Basic Access Control Keys being generated and imported by the issuing State or Organization have to provide sufficient cryptographic strength. As a consequence of the 'ICAO Doc 9303' [ICAO 9303] the Document Basic Access Control Keys are derived from a defined subset of the individual printed MRZ data. It has to be ensured that these data provide sufficient entropy to withstand any attack based on the decision that the inspection system has to derive Document Basic Access Keys from the printed MRZ data with enhanced basic attack potential.

OE.Auth_Key_MRTD

The issuing State or Organization has to establish the necessary public key infra-structure in order to

i. generate the MRTD’s Active Authentication Key Pair,

ii. store the Active Authentication Private Key, and store the Active Authentication Public Key in the Active Authentication Public Key data in EF.DG15 (if generated), and

iii. support inspection systems of receiving States or organizations to verify the authenticity of the MRTD’s chip used for genuine MRTD by certification of the Chip and Active Authentication Public Key by means of the Document Security Object.

4.2.2 Receiving State or Organisation

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

OE.Exam_MRTD

Examination of the MRTD passport book

The inspection system of the receiving State or Organization must examine the MRTD presented by the traveler to verify its authenticity by means of the physical security measures and to detect any manipulation of the physical MRTD. The Basic Inspection System for global interoperability (i) includes the Country Signing Public Key and the Document Signer Public Key of each issuing State or Organization, and (ii) implements the terminal part of the Basic Access Control [ICAO 9303].

OE.AA_MRTD

Active Authentication - Inspection Systems

An Active Authentication (Basic, General or Extended) Inspection system performs all the functions of the Basic, General, respectively Extended Inspection System, and verifies the IC authenticity with an RSA or ECDSA signature generated by the MRTD (if available).

OE.Passive_Auth_Verif

Verification by Passive Authentication

The border control officer of the receiving State uses the inspection system to verify the traveler as MRTD holder. The inspection systems must have successfully verified the signature of Document Security Objects and the integrity data elements of the logical MRTD before they are used. The receiving States and Organizations must manage the Country Signing Public Key and the Document Signer Public Key maintaining their authenticity and availability in all inspection systems.

OE.Prot_Logical_MRTD

Protection of data of the logical MRTD

The inspection system of the receiving State or Organization ensures the confidentiality and integrity of the data read from the logical MRTD. The receiving State examining the logical MRTD being under Basic Access Control will use inspection systems which implement the terminal part of the Basic

Access Control and use the secure messaging with fresh generated keys for the protection of the transmitted data (i.e. Basic Inspection Systems).

4.3 SECURITY OBJECTIVES RATIONALE

4.3.1 Threats

T.Chip_ID addresses the trace of the MRTD movement by identifying remotely the MRTD's chip through the contactless communication interface. This threat is countered as described by the security objective OT.Identification by Basic Access Control using sufficiently strong derived keys as required by the security objective for the environment OE.BAC-Keys.

T.Skimming address the reading of the logical MRTD trough the contactless interface or listening the communication between the MRTD's chip and a terminal. This threat is countered by the security objective OT.Data_Conf 'Confidentiality of personal data' through Basic Access Control using sufficiently strong derived keys as required by the security objective for the environment OE.BAC-Keys.

T.Eavesdropping address the reading of the logical MRTD trough the contactless interface or listening the communication between the MRTD's chip and a terminal. This threat is countered by the security objective OT.Data_Conf 'Confidentiality of personal data'.

T.Forgery addresses the fraudulent alteration of the complete stored logical MRTD or any part of it. The security objective OT.AC_Pers 'Access Control for Personalization of logical MRTD' requires the TOE to limit the write access for the logical MRTD to the trustworthy Personalization Agent (cf. OE.Personalization). The TOE will protect the integrity of the stored logical MRTD according the security objective OT.Data_Int 'Integrity of personal data' and OT.Prot_Phys-Tamper 'Protection against Physical Tampering'. The examination of the presented MRTD passport book according to OE.Exam_MRTD 'Examination of the MRTD passport book' shall ensure that passport book does not contain a sensitive contactless/contact based chip which may present the complete unchanged logical MRTD. The TOE environment will detect partly forged logical MRTD data by means of digital signature which will be created according to OE.Pass_Auth_Sign 'Authentication of logical MRTD by Signature' and verified by the inspection system according to OE.Passive_Auth_Verif 'Verification by Passive Authentication'.

T.Abuse-Func addresses attacks using the MRTD's chip as production material for the MRTD and misuse of the functions for personalization in the operational state after delivery to MRTD holder to disclose or to manipulate the logical MRTD. This threat is countered by OT.Prot_Abuse-Func 'Protection against Abuse of Functionality'. Additionally this objective is supported by the security objective for the TOE environment: OE.Personalization 'Personalization of logical MRTD' ensuring that the TOE security functions for the initialization and the personalization are disabled and the security functions for the operational state after delivery to MRTD holder are enabled according to the intended use of the TOE.

T.Information_Leakage is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threats is addressed by the directly related security objective OT.Prot_Inf_Leak 'Protection against Information Leakage'.

T.Phys-Tamper is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threats is addressed by the directly related security objectives OT.Prot_Inf_Leak "Protection against Information Leakage", objective OT.Prot_Phys-Tamper "Protection against Physical Tampering" and OT.Prot_Malfunction "Protection against Malfunctions".

T.Malfunction is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threats is addressed by the directly related security objective OT.Prot_Malfunction 'Protection against Malfunctions'.

T.Counterfeit The threat T.Counterfeit "MRTD's chip" addresses the attack of unauthorized copy or reproduction of the genuine MRTD chip. This attack is thwarted by chip identification and authenticity proof required by OT.Chip_Auth_Proof "Proof of MRTD's chip authentication" using an authentication key pair to be generated by the issuing state or organization. The Active Authentication Public Key has to be written into EF.DG15 as demanded by OE.Auth_Key_MRTD "MRTD Authentication Key". According to OE.AA_MRTD "Active Authentication - Inspection Systems" and OE.Exam_MRTD "Examination of the MRTD passport book" the Inspection system has to perform the Active Authentication Protocol to verify the authenticity of the MRTD's chip.

4.3.2 Organisational Security Policies

P.Manufact requires a unique identification of the IC by means of the Initialization Data and the writing of the Pre-personalization Data as being fulfilled by OT.Identification.

P.Personalization addresses the (i) the enrolment of the logical MRTD by the Personalization Agent as described in the security objective for the TOE environment OE.Personalization 'Personalization of logical MRTD', and (ii) the access control for the user data and TSF data as described by the security objective OT.AC_Pers 'Access Control for Personalization of logical MRTD'. Note the manufacturer equips the TOE with the Personalization Agent Key(s) according to OT.Identification 'Identification and Authentication of the TOE'. The security objective OT.AC_Pers limits the management of TSF data and management of TSF to the Personalization Agent.

P.Personal_Data requires the TOE (i) to support the protection of the confidentiality of the logical MRTD by means of the Basic Access Control and (ii) enforce the access control for reading as decided by the issuing State or Organization. This policy is implemented by the security objectives OT.Data_Int 'Integrity of personal data' describing the unconditional protection of the integrity of the stored data and during transmission. The security objective OT.Data_Conf 'Confidentiality of personal data' describes the protection of the confidentiality.

4.3.3 Assumptions

A.MRTD_Manufact "MRTD manufacturing on step 4 to 6" is covered by the security objective for the TOE environment OE.MRTD_Manufact 'Protection of the MRTD Manufacturing' that requires to use security procedures during all manufacturing steps.

A.MRTD_Delivery "MRTD delivery during step 4 to 6" is covered by the security objective for the TOE environment OE.MRTD_ Delivery 'Protection of the MRTD delivery' that requires to use security procedures during delivery steps of the MRTD.

A.Pers_Agent The assumptions A.Pers_Agent "Personalization of the MRTD's chip" and A.Pers_Agent_AA "Personalization of the MRTD's chip (Active Authentication)" are covered by the security objective for the TOE environment OE.Personalization "Personalization of logical MRTD" including the enrolment, the protection with digital signature and the storage of the MRTD holder personal data.

A.Insp_Sys is covered by the security objectives for the TOE environment OE.Exam_MRTD 'Examination of the MRTD passport book' which requires the inspection system to examine physically the MRTD, the Basic Inspection System to implement the Basic Access Control, and the General Inspection Systems and Extended Inspection Systems to implement and to perform the Active Authentication Protocol to verify the Authenticity of the presented MRTD's chip. The security objectives for the TOE environment OE.Prot_Logical_MRTD 'Protection of data from the logical MRTD' will require the Basic Inspection System to implement the Basic Access Control and to protect the logical MRTD data during the transmission and the internal handling.

A.BAC-Keys is directly covered by the security objective for the TOE environment OE.BAC-Keys 'Cryptographic quality of Basic Access Control Keys' ensuring the sufficient key quality to be provided by the issuing State or Organization.

4.3.4 SPD and Security Objectives

Threats	Security Objectives	Rationale
T.Chip_ID	OT.Identification, OE.BAC-Keys	Section 4.3.1
T.Skimming	OT.Data_Conf, OE.BAC-Keys	Section 4.3.1
T.Eavesdropping	OT.Data_Conf	Section 4.3.1
T.Forgery	OT.AC_Pers, OT.Data_Int, OT.Prot_Phys-Tamper, OE.Pass_Auth_Sign, OE.Exam_MRTD, OE.Passive_Auth_Verif, OE.Personalization	Section 4.3.1
T.Abuse-Func	OT.Prot_Abuse-Func, OE.Personalization	Section 4.3.1
T.Information_Leakage	OT.Prot_Inf_Leak	Section 4.3.1
T.Phys-Tamper	OT.Prot_Phys-Tamper, OT.Prot_Inf_Leak, OT.Prot_Malfunction	Section 4.3.1
T.Malfunction	OT.Prot_Malfunction	Section 4.3.1
T.Counterfeit	OT.Chip_Auth_Proof, OE.Auth_Key_MRTD, OE.Exam_MRTD, OE.AA_MRTD	Section 4.3.1

Table 1 Threats and Security Objectives - Coverage

Security Objectives	Threats	Rationale
OT.AC_Pers	T.Forgery	
OT.Data_Int	T.Forgery	
OT.Data_Conf	T.Skimming, T.Eavesdropping	
OT.Identification	T.Chip_ID	
OT.Chip_Auth_Proof	T.Counterfeit	
OT.Prot_Abuse-Func	T.Abuse-Func	
OT.Prot_Inf_Leak	T.Information_Leakage, T.Phys-Tamper	
OT.Prot_Phys-Tamper	T.Forgery, T.Phys-Tamper	

OT.Prot_Malfunction	T.Phys-Tamper, T.Malfunction	
OE.MRTD_Manufact		
OE.MRTD_ Delivery		
OE.Personalization	T.Forgery, T.Abuse-Func	
OE.Pass_Auth_Sign	T.Forgery	
OE.BAC-Keys	T.Chip_ID, T.Skimming	
OE.Auth_Key_MRTD	T.Counterfeit	
OE.Exam_MRTD	T.Forgery, T.Counterfeit	
OE.AA_MRTD	T.Counterfeit	
OE.Passive_Auth_Verif	T.Forgery	
OE.Prot_Logical_MRTD		

Table 2 Security Objectives and Threats - Coverage

Organisational Security Policies	Security Objectives	Rationale
P.Manufact	OT.Identification	Section 4.3.2
P.Personalization	OT.AC_Pers, OT.Identification, OE.Personalization	Section 4.3.2
P.Personal_Data	OT.Data_Conf, OT.Data_Int	Section 4.3.2

Table 3 OSPs and Security Objectives - Coverage

Security Objectives	Organisational Security Policies	Rationale
OT.AC_Pers	P.Personalization	
OT.Data_Int	P.Personal_Data	
OT.Data_Conf	P.Personal_Data	
OT.Identification	P.Manufact, P.Personalization	
OT.Chip_Auth_Proof		
OT.Prot_Abuse-Func		
OT.Prot_Inf_Leak		
OT.Prot_Phys-Tamper		
OT.Prot_Malfunction		
OE.MRTD_Manufact		
OE.MRTD_ Delivery		
OE.Personalization	P.Personalization	
OE.Pass_Auth_Sign		
OE.BAC-Keys		

OE.Auth_Key_MRTD		
OE.Exam_MRTD		
OE.AA_MRTD		
OE.Passive_Auth_Verif		
OE.Prot_Logical_MRTD		

Table 4 Security Objectives and OSPs - Coverage

Assumptions	Security Objectives for the Operational Environment	Rationale
A.MRTD_Manufact	OE.MRTD_Manufact	Section 4.3.3
A.MRTD_Delivery	OE.MRTD_ Delivery	Section 4.3.3
A.Pers_Agent	OE.Personalization	Section 4.3.3
A.Pers_Agent_AA	OE.Personalization	Section 4.3.3
A.Insp_Sys	OE.Exam_MRTD, OE.Prot_Logical_MRTD	Section 4.3.3
A.BAC-Keys	OE.BAC-Keys	Section 4.3.3

Table 5 Assumptions and Security Objectives for the Operational Environment - Coverage

Security Objectives for the Operational Environment	Assumptions	Rationale
OE.MRTD_Manufact	A.MRTD_Manufact	
OE.MRTD_ Delivery	A.MRTD_Delivery	
OE.Personalization	A.Pers_Agent, A.Pers_Agent_AA	
OE.Pass_Auth_Sign		
OE.BAC-Keys	A.BAC-Keys	
OE.Auth_Key_MRTD		
OE.Exam_MRTD	A.Insp_Sys	
OE.AA_MRTD		
OE.Passive_Auth_Verif		
OE.Prot_Logical_MRTD	A.Insp_Sys	

Table 6 Security Objectives for the Operational Environment and Assumptions - Coverage

5 EXTENDED REQUIREMENTS

5.1 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.

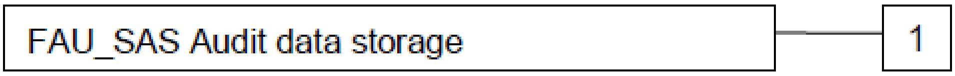
The family "Audit data storage (FAU_SAS)" is specified as follows.

5.1.1 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 provide the possibility to store audit data.

Management: FAU_SAS.1
There are no management activities foreseen.

Audit: FAU_SAS.1
There are no actions defined to be auditable.

FAU_SAS.1 Audit Storage

Hierarchical to: No other components.

Dependencies: No dependencies.

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

5.2 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.

5.2.1 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 Generation of random numbers
1

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].

5.3 DEFINITION OF THE FAMILY FIA_API

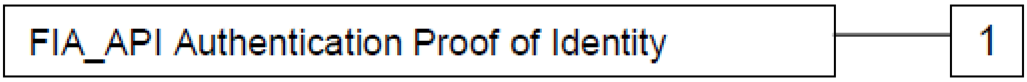
To describe the IT security functional requirements of the TOE a sensitive family (FIA_API) of the Class FIA (Identification and authentication) is defined here. This family describes the functional requirements for the proof of the claimed identity for the authentication verification by an external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

5.3.1 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 levelling:



FIA_API.1 Authentication Proof of Identity.
Management: FIA_API.1

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

Audit: There are no actions defined to be auditable.

FIA_API.1 Authentication Proof of Identity

Hierarchical to: No other components.

Dependencies: No dependencies.

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

5.4 DEFINITION OF THE FAMILY FMT_LIM

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

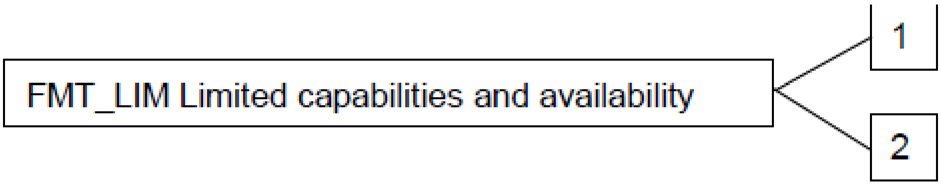
The family "Limited capabilities and availability (FMT_LIM)" is specified as follows.

5.4.1 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 lifecycle.

Management: FMT_LIM.1, FMT_LIM.2

There are no management activities foreseen.

Audit: FMT_LIM.1, FMT_LIM.2
There are no actions defined to be auditable.

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

The TOE Functional Requirement "Limited capabilities (FMT_LIM.1)" is specified as follows.

FMT_LIM.1 Limited Capabilities

Hierarchical to: No other components.

Dependencies: FMT_LIM.2 Limited availability.

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

The TOE Functional Requirement "Limited availability (FMT_LIM.2)" is specified as follows.

FMT_LIM.2 Limited Availability

Hierarchical to: No other components.

Dependencies: FMT_LIM.1 Limited capabilities.

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

5.5 DEFINITION OF THE FAMILY FPT_EMSEC

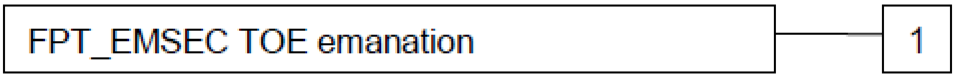
The sensitive family FPT_EMSEC (TOE Emanation) of the Class FPT (Protection of the TSF) is defined here to describe the IT security functional requirements of the TOE. The TOE shall prevent attacks against the TOE and other secret data where the attack is based on external observable physical phenomena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

The family "TOE Emanation (FPT_EMSEC)" is specified as follows.

Family behavior

This family defines requirements to mitigate intelligible emanations.

Component leveling:



FPT_EMSEC.1 TOE emanation has two constituents:

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

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

Management: FPT_EMSEC.1
There are no management activities foreseen.

Audit: FPT_EMSEC.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 SECURITY REQUIREMENTS

6.1 SECURITY FUNCTIONAL REQUIREMENTS

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

Definition of security attributes:

security attribute	Values	meaning
terminal authentication status	none (any Terminal)	default role (i.e. without authorisation after start-up)
	Basic Inspection System	Terminal is authenticated as Basic Inspection System after successful Authentication in accordance with the definition in rule 2 of FIA_UAU.5.2.
	Personalisation Agent	Terminal is authenticated as Personalisation Agent after successful Authentication in accordance with the definition in rule 1 of FIA_UAU.5.2.

6.1.1 Class FAU Security Audit

The TOE shall meet the requirement "Audit storage (FAU_SAS.1)" as specified below. For the extended components definition refer to [BAC-PP] chapter 4.

FAU_SAS.1 Audit Storage

FAU_SAS.1.1 The TSF shall provide **the Manufacturer** with the capability to store **IC Identification Data** in the audit records.

Application Note:

The Manufacturer role is the default user identity assumed by the TOE in the Phase 2 Manufacturing. The IC manufacturer and the MRTD manufacturer in the Manufacturer role write the Initialization Data and/or Pre-personalization Data as TSF Data of the TOE. The audit records are write-only-once data of the MRTD's chip (see FMT_MTD.1/INI_DIS).

6.1.2 Class Cryptographic Support (FCS)

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

FCS_CKM.1 Cryptographic key generation

FCS_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **Document Basic Access Key Derivation Algorithm** and specified cryptographic key sizes **112 bit** that meet the following: **[ICAO-9303], Volume 2, Section IV, Appendix 5**.

Application Note:

The TOE is equipped with the Document Basic Access Key generated and downloaded by the Personalization Agent. The Basic Access Control Authentication Protocol described in [ICAO 9303], normative appendix 5, A5.2, produces agreed parameters to generate the Triple- DES key and the Retail-MAC message authentication keys for secure messaging by the algorithm in [ICAO 9303], Normative appendix A5.1. The algorithm uses the random number RND.ICC generated by TSF as required by FCS_RND.1.

FCS_CKM.4 Cryptographic key destruction

FCS_CKM.4.1 The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method **physically overwriting the keys** that meets the following: **none**.

Application Note:

The TOE shall destroy the Triple-DES encryption key and the Retail-MAC message authentication keys for secure messaging.

FCS_COP.1/SHA Cryptographic operation

FCS_COP.1.1/SHA The TSF shall perform **hashing** in accordance with a specified cryptographic algorithm **SHA-1, SHA-224, SHA-256, SHA-384, SHA-512** and cryptographic key sizes **none** that meet the following: **FIPS 180-4 [NIST-180-4]**.

Application Note:

This SFR requires the TOE to implement the hash function SHA-1 for the cryptographic primitive of the Basic Access Control Authentication Mechanism (see also FIA_UAU.4) according to [ICAO 9303].

FCS_COP.1/ENC Cryptographic operation

FCS_COP.1.1/ENC The TSF shall perform **secure messaging (BAC) - encryption and decryption** in accordance with a specified cryptographic algorithm **Triple-DES in CBC mode** and cryptographic key sizes **112 bit** that meet the following: **FIPS 46-3 [FIPS46] and [ICAO-9303], Volume 2, normative appendix 5, A5.3**.

Application Note:

This SFR requires the TOE to implement the cryptographic primitive for secure messaging with encryption of the transmitted data. The keys are agreed between the TOE and the terminal as part of the Basic Access Control Authentication Mechanism according to the FCS_CKM.1 and FIA_UAU.4.

FCS_COP.1/AUTH Cryptographic operation

FCS_COP.1.1/AUTH The TSF shall perform **symmetric authentication - encryption and decryption**

in accordance with a specified cryptographic algorithm **Triple-DES and AES** and cryptographic key sizes **112 bit for Triple-DES and 128, 192 and 256 bit for AES** that meet the following: **FIPS 46-3 [FIPS46] for Triple-DES and [NIST-197]**.

Application Note:

This SFR requires the TOE to implement the cryptographic primitive for authentication attempt of a terminal as Personalization Agent by means of the symmetric authentication mechanism (cf. FIA_UAU.4).

FCS_COP.1/MAC Cryptographic operation

FCS_COP.1.1/MAC The TSF shall perform **secure messaging - message authentication code**

in accordance with a specified cryptographic algorithm **Retail MAC** and cryptographic key sizes **112 bit** that meet the following: **ISO 9797 (MAC algorithm 3, block cipher DES, Sequence Message Counter, padding mode 2)**.

Application Note:

This SFR requires the TOE to implement the cryptographic primitive for secure messaging with encryption and message authentication code over the transmitted data. The key is agreed between the TSF by the Basic Access Control Authentication Mechanism according to the FCS_CKM.1 and FIA_UAU.4.

FCS_COP.1/SIG_GEN Cryptographic operation

FCS_COP.1.1/SIG_GEN The TSF shall perform **digital signature generation** in accordance with a specified cryptographic algorithm **ECDSA and RSA** and cryptographic key sizes **192, 224, 256 and 320 bits for ECDSA and 1024, 1536, 1792 and 2048 bits for RSA** that meet the following: **ISO15946-2 specified in [ISO15946-2] for ECDSA and ISO9796-2 specified in [ISO9796-2] for RSA, in combination with SHA1, SHA224, SHA256, SHA384 and SHA512 digest algorithms specified in [NIST-180-4] for both ECDSA and RSA signatures**.

Application Note:

This SFR has been added to this ST in order to support the signing of challenges generated by the Inspection System as part of the optional Active Authentication protocol specified in [ICAO-9303].

6.1.3 Random Number Generation (FCS_RND.1)

FCS_RND.1 Quality Metric for Random Numbers

FCS_RND.1.1 The TSF shall provide a mechanism to generate random numbers that meet **Class PTG.2 according to AIS31 [AIS31]**.

Application Note:

Application Note: This SFR was added to the standard set of SFRs to address the requirements of the PACE protocol. The random number generation is provided by the underlying platform.

6.1.4 Class FIA Identification and Authentication

Application note: The following Table provides an overview on the authentication mechanisms used.

Name	SFR for the TOE	Algorithms and key sizes according to [ICAO 9303], normative appendix 5, and [20]
Basic Access Control Authentication Mechanism	FIA_UAU.4 and FIA_UAU.6	Triple-DES, 112 bit keys (cf. FCS_COP.1/ENC) and Retail-MAC, 112 bit keys (cf. FCS_COP.1/MAC)
Active Authentication	FIA_API.1/AA	RSA and ECDSA (cf. FCS_COP.1/SIG_GEN); RSA: 1536, 1792 and 2048 bits; ECDSA: 192, 224, 256 and 320 bits
Symmetric Authentication Mechanism for Personalization Agents	FIA_UAU.4	either Triple-DES with 112 bit keys or AES with 128 up to 256 bit keys (cf. FCS_COP.1/AUTH)

FIA_UID.1 Timing of identification

FIA_UID.1.1 The TSF shall allow

- **to read the Initialization Data in Phase 2 'Manufacturing',**
- **to read the random identifier in Phase 3 'Personalization of the MRTD',**
- **to read the random identifier in Phase 4 'Operational Use'**

on behalf of the user to be performed before the user is identified.

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

Application Note:

The IC manufacturer and the MRTD manufacturer write the Initialization Data and/or Pre-personalization Data in the audit records of the IC during the Phase 2 'Manufacturing'. The audit records can be written only in the Phase 2 Manufacturing of the TOE. At this time the Manufacturer is the only user role available for the TOE. The MRTD manufacturer may create the user role Personalization Agent for transition from Phase 2 to Phase 3 'Personalization of the MRTD'. The users in role Personalization Agent identify themselves by means of selecting the authentication key. After personalization in the Phase 3 (i.e. writing the digital MRZ and the Document Basic Access Keys) the user role Basic Inspection System is created by writing the Document Basic Access Keys. The Basic Inspection System is identified as default user after power up or reset of the TOE i.e. the TOE will use the Document Basic Access Key to authenticate the user as Basic Inspection System.

In the 'Operational Use' phase the MRTD must not allow anybody to read the ICCSN, the MRTD identifier or any other unique identification before the user is authenticated as Basic Inspection System (cf. T.Chip_ID). Note that the terminal and the MRTD's chip use a (randomly chosen) identifier for the communication channel to allow the terminal to communicate with more then one RFID. If this identifier is randomly selected it will not violate the OT.Identification. If this identifier is fixed the ST writer should consider the possibility to misuse this identifier to perform attacks addressed by T.Chip_ID.

FIA_UAU.1 Timing of authentication

FIA_UAU.1.1 The TSF shall allow

- **to read the Initialization Data in Phase 2 'Manufacturing',**
- **to read the random identifier in Phase 3 'Personalization of the MRTD',**
- **to read the random identifier in Phase 4 'Operational Use'**

on behalf of the user to be performed before the user is authenticated.

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

Application Note:

The Basic Inspection System and the Personalization Agent authenticate themselves.

FIA_UAU.4 Single-use authentication mechanisms

FIA_UAU.4.1 The TSF shall prevent reuse of authentication data related to

- **Basic Access Control Authentication Mechanism,**
- **Authentication Mechanism based on Triple-DES**.

Application Note:

The authentication mechanisms may use either a challenge freshly and randomly generated by the TOE to prevent reuse of a response generated by a terminal in a successful authentication attempt. However, the authentication of Personalisation Agent may rely on other mechanisms ensuring protection against replay attacks, such as the use of an internal counter as a diversifier.

The Basic Access Control Mechanism is a mutual device authentication mechanism defined in [ICAO 9303]. In the first step the terminal authenticates itself to the MRTD's chip and the MRTD's chip authenticates to the terminal in the second step. In this second step the MRTD's chip provides the terminal with a challenge-response-pair which allows a unique identification of the MRTD's chip with some probability depending on the entropy of the Document Basic Access Keys. Therefore the TOE shall stop further communications if the terminal is not successfully authenticated in the first step of the protocol to fulfill the security objective OT.Identification and to prevent T.Chip_ID.

FIA_UAU.5 Multiple authentication mechanisms

FIA_UAU.5.1 The TSF shall provide

- **Basic Access Control Authentication Mechanism**
- **Symmetric Authentication Mechanism based on Triple-DES and AES**

to support user authentication.

FIA_UAU.5.2 The TSF shall authenticate any user's claimed identity according to the

- **the TOE accepts the authentication attempt as Personalization Agent by one of the following mechanism(s):**
  - **the Basic Access Control Authentication Mechanism with the Personalization Agent Keys**
  - **the Symmetric Authentication Mechanism with the Personalization Agent Key.**
- **The TOE accepts the authentication attempt as Basic Inspection System only by means of the Basic Access Control Authentication Mechanism with the Document Basic Access Keys**.

Application Note:

The Basic Access Control Mechanism includes the secure messaging for all commands exchanged after successful authentication of the inspection system. The Personalization Agent may use Symmetric Authentication Mechanism without secure messaging mechanism as well if the personalization environment prevents eavesdropping to the communication between TOE and personalization terminal. The Basic Inspection System may use the Basic Access Control Authentication Mechanism with the Document Basic Access Keys.

FIA_UAU.6 Re-authenticating

FIA_UAU.6.1 The TSF shall re-authenticate the user under the conditions **each command sent to the TOE during a BAC mechanism based communication after successful authentication of the terminal with Basic Access Control Authentication Mechanism**.

Application Note:

The Basic Access Control Mechanism specified in [ICAO 9303] includes the secure messaging for all commands exchanged after successful authentication of the Inspection System. The TOE checks by secure messaging in MAC_ENC mode each command based on Retail-MAC whether it was sent by the successfully authenticated terminal (see FCS_COP.1/MAC for further details). The TOE does not execute any command with incorrect message authentication code. Therefore the TOE re-authenticates the user for each received command and accepts only those commands received from the previously authenticated BAC user.

FIA_AFL.1 Authentication failure handling

FIA_AFL.1.1 The TSF shall detect when **an administrator configurable positive integer within one to 32767** unsuccessful authentication attempts occur related to **BAC authentication**.

FIA_AFL.1.2 When the defined number of unsuccessful authentication attempts has been **met and surpassed**, the TSF shall **wait an administrator configurable time before the next authentication attempt can be performed**.

Application Note:

The ST writer may consider the following example for such operations and refinement: FIA_AFL.1.1 The TSF shall detect when an administrator configurable positive integer within range of acceptable values 1 to 10 consecutive unsuccessful authentication attempts occur related to BAC authentication protocol. FIA_AFL.1.2 When the defined number of unsuccessful authentication attempts has been met or surpassed, the TSF shall wait for an administrator configurable time between the receiving the terminal challenge eIFD and sending the TSF response eICC during the BAC authentication attempts. The terminal challenge eIFD and the TSF response eICC are described in [20], Appendix C. The refinement by inclusion of the word 'consecutive' allows the TSF to return to normal operation of the BAC authentication protocol (without time out) after successful run of the BAC authentication protocol. The unsuccessful authentication attempt shall be stored non-volatile in the TOE thus the 'consecutive unsuccessful authentication attempts' are count independent on power-on sessions but reset to zero after successful authentication only.

FIA_API.1/AA Authentication Proof of Identity

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

6.1.5 Class FDP User Data Protection

Application note: FDP_UCT.1 and FDP_UIT.1 require the protection of the User Data transmitted from the TOE to the terminal by secure messaging with encryption and message authentication codes after successful authentication of the terminal. The authentication mechanisms as part of Basic Access Control Mechanism include the key agreement for the encryption and the message authentication key to be used for secure messaging.

FDP_ACC.1 Subset access control

FDP_ACC.1.1 The TSF shall enforce the **Basic Access Control SFP** on **terminals gaining write, read and modification access to data in the EF.COM, EF.SOD, EF.DG1 to EF.DG16 of the logical MRTD**.

FDP_ACF.1 Security attribute based access control

FDP_ACF.1.1 The TSF shall enforce the **Basic Access Control SFP** to objects based on the following:

- **Subjects:**
  - **Personalization Agent,**
  - **Basic Inspection System,**
  - **Terminal,**
- **Objects:**
  - **data EF.DG1 to EF.DG16 of the logical MRTD,**
  - **data in EF.COM,**
  - **data in EF.SOD,**
- **Security attributes**
  - **authentication status of terminals**.

FDP_ACF.1.2 The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

- **the successfully authenticated Personalization Agent is allowed to write and to read the data of the EF.COM, EF.SOD, EF.DG1 to EF.DG16 of the logical MRTD,**
- **the successfully authenticated Basic Inspection System is allowed to read the data in EF.COM, EF.SOD, EF.DG1, EF.DG2 and EF.DG5 to EF.DG16 of the logical MRTD *and perform Active Authentication***.

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

FDP_ACF.1.4 The TSF shall explicitly deny access of subjects to objects based on the following additional rules:

- **Any terminal is not allowed to modify any of the EF.DG1 to EF.DG16 of the logical MRTD.**
- **Any terminal is not allowed to read any of the EF.DG1 to EF.DG16 of the logical MRTD.**
- **The Basic Inspection System is not allowed to read the data in EF.DG3 and EF.DG4**.

FDP_UCT.1 Basic data exchange confidentiality

FDP_UCT.1.1 The TSF shall enforce the **Basic Access Control SFP** to **transmit and receive** user data in a manner protected from unauthorised disclosure.

FDP_UIT.1 Data exchange integrity

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

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

6.1.6 Class FMT Security Management

Application note: The SFR FMT_SMF.1 and FMT_SMR.1 provide basic requirements to the management of the TSF data.

Application note: The SFR FMT_LIM.1 and FMT_LIM.2 address the management of the TSF and TSF data to prevent misuse of test features of the TOE over the life cycle phases.

FMT_SMF.1 Specification of Management Functions

FMT_SMF.1.1 The TSF shall be capable of performing the following management functions:

- **Initialization,**
- **Pre-personalization,**
- **Personalization**.

FMT_SMR.1 Security roles

FMT_SMR.1.1 The TSF shall maintain the roles

- **Manufacturer,**
- **Personalization Agent,**
- **Basic Inspection System**.

FMT_SMR.1.2 The TSF shall be able to associate users with roles.

FMT_LIM.1 Limited Capabilities

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**

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

FMT_LIM.2 Limited Availability

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**

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

Application Note:

The formulation of 'Deploying Test Features' in FMT_LIM.2.1 might be a little bit misleading since the addressed features are no longer available (e.g. by disabling or removing the respective functionality). Nevertheless the combination of FMT_LIM.1 and FMT_LIM.2 is introduced provide an optional approach to enforce the same policy. Note that the term 'software' in item 3 of FMT_LIM.1.1 and FMT_LIM.2.1 refers to both IC Dedicated and IC Embedded Software.

FMT_MTD.1/INI_ENA Management of TSF data

FMT_MTD.1.1/INI_ENA The TSF shall restrict the ability to **write** the **the Initialization Data and Prepersonalization Data** to **Manufacturer**.

Application Note:

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

FMT_MTD.1/INI_DIS Management of TSF data

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**.

Application Note:

According to P.Manufact the IC Manufacturer and the MRTD Manufacturer are the default users assumed by the TOE in the role Manufacturer during the Phase 2 'Manufacturing' but the TOE is not requested to distinguish between these users within the role Manufacturer. The TOE may restrict the ability to write the Initialization Data and the Prepersonalization Data by (i) allowing to write these data only once and (ii) blocking the role Manufacturer at the end of the Phase 2. The IC Manufacturer may write the Initialization Data which includes but are not limited to the IC Identifier as required by FAU_SAS.1. The Initialization Data provides a unique identification of the IC which is used to trace the IC in the Phase 2 and 3 'personalization' but is not needed and may be misused in the Phase 4 'Operational Use'. Therefore the external read access shall be blocked. The MRTD Manufacturer will write the Pre-personalization Data.

FMT_MTD.1/KEY_WRITE Management of TSF data

FMT_MTD.1.1/KEY_WRITE The TSF shall restrict the ability to **restrict the ability to write** the **Document Basic Access Keys *and the Active Authentication keys*** to **the Personalization Agent**.

FMT_MTD.1/KEY_READ Management of TSF data

FMT_MTD.1.1/KEY_READ The TSF shall restrict the ability to **restrict the ability to read** the **Document Basic Access Keys, *the Active Authentication Private Key* and Personalization Agent Keys** to **none**.

Application Note:

The Personalization Agent generates, stores and ensures the correctness of the Document Basic Access Keys.

6.1.7 FPT Protection of the Security Functions

The TOE shall prevent inherent and forced illicit information leakage for User Data and TSF Data. The security functional requirement FPT_EMSEC.1 addresses the inherent leakage. With respect to the forced leakage they have to be considered in combination with the security functional requirements 'Failure with preservation of secure state (FPT_FLS.1)' and 'TSF testing (FPT_TST.1)' on the one hand and 'Resistance to physical attack (FPT_PHP.3)' on the other. The SFRs 'Limited capabilities (FMT_LIM.1)', 'Limited availability (FMT_LIM.2)' and 'Resistance to physical attack (FPT_PHP.3)' together with the SAR 'Security architecture description' (ADV_ARC.1) prevent bypassing, deactivation and manipulation of the security features or misuse of TOE functions.

FPT_EMS.1 TOE Emanation

FPT_EMS.1.1 The TOE shall not emit **variations in power consumption or timing during command execution** in excess of **non-useful information** enabling access to **Personalization Agent Key(s)** ***and Active Authentication Private Key*** and **none**.

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 **Personalization Agent Key(s)** ***and Active Authentication Private Key*** and **none**.

Application Note:

The TOE shall prevent attacks against the listed secret data where the attack is based on external observable physical phenomena of the TOE. Such attacks may be observable at the interfaces of the TOE or may be originated from internal operation of the TOE or may be caused by an attacker that varies the physical environment under which the TOE operates. The set of measurable physical phenomena is influenced by the technology employed to implement the smart card. The MRTD's chip has to provide a smart card contactless interface but may have also (not used by the terminal but maybe by an attacker) sensitive contacts according to ISO/IEC 7816-2 as well. Examples of measurable phenomena include, but are not limited to variations in the power consumption, the timing of signals and the electromagnetic radiation due to internal operations or data transmissions

FPT_FLS.1 Failure with preservation of secure state

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

- **Exposure to out-of-range operating conditions where therefore a malfunction could occur,**
- **failure detected by TSF according to FPT_TST.1**.

FPT_TST.1 TSF testing

FPT_TST.1.1 The TSF shall run a suite of self tests **during initial start-up** to demonstrate the correct operation of **the TSF**.

FPT_TST.1.2 The TSF shall provide authorised users with the capability to verify the integrity of **TSF data**.

FPT_TST.1.3 The TSF shall provide authorised users with the capability to verify the integrity of **stored TSF executable code**.

FPT_PHP.3 Resistance to physical attack

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.

Application Note:

The TOE will implement appropriate measures to continuously counter physical manipulation and physical probing. Due to the nature of these attacks (especially manipulation) the TOE can by no means detect attacks on all of its elements. Therefore, permanent protection against these attacks is required ensuring that the TSP could not be violated at any time. Hence, 'automatic response' means here (i) assuming that there might be an attack at any time and (ii) countermeasures are provided at any time.

6.2 SECURITY ASSURANCE REQUIREMENTS

The Evaluation Assurance Level is EAL4 augmented with ALC_DVS.2.

6.3 SECURITY REQUIREMENTS RATIONALE

6.3.1 Objectives

6.3.1.1 SECURITY OBJECTIVES FOR THE TOE

OT.AC_Pers addresses the access control of the writing the logical MRTD. The write access to the logical MRTD data are defined by the SFR FDP_ACC.1 and FDP_ACF.1 as follows: only the successfully authenticated Personalization Agent is allowed to write the data of the groups EF.DG1 to EF.DG16 of the logical MRTD only once.

The authentication of the terminal as Personalization Agent shall be performed by TSF according to SRF FIA_UAU.4 and FIA_UAU.5. The Personalization Agent can be authenticated either by using the BAC mechanism (FCS_CKM.1, FCS_COP.1/SHA, FCS_RND.1 (for key generation), and FCS_COP.1/ENC as well as FCS_COP.1/MAC) with the personalization key or for reasons of interoperability with the [BSI-PP-0056, Version 1.10, 25th March 2009] by using the symmetric authentication mechanism (FCS_COP.1/AUTH).

In case of using the BAC mechanism the SFR FIA_UAU.6 describes the re-authentication and FDP_UCT.1 and FDP_UIT.1 the protection of the transmitted data by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1, FCS_COP.1/SHA, FCS_RND.1 (for key generation), and FCS_COP.1/ENC as well as FCS_COP.1/MAC for the ENC_MAC_Mode.

The SFR FMT_SMR.1 lists the roles (including Personalization Agent) and the SFR FMT_SMF.1 lists the TSF management functions (including Personalization) setting the Document Basic Access Keys according to the SFR FMT_MTD.1/KEY_WRITE as authentication reference data. The SFR FMT_MTD.1/KEY_READ prevents read access to the secret key of the Personalization Agent Keys and ensure together with the SFR FCS_CKM.4, FPT_EMS.1, FPT_FLS.1 and FPT_PHP.3 the confidentially of these keys.

OT.Data_Int requires the TOE to protect the integrity of the logical MRTD stored on the MRTD's chip against physical manipulation and unauthorized writing. The write access to the logical MRTD data is defined by the SFR FDP_ACC.1 and FDP_ACF.1 in the same way: only the Personalization Agent is allowed to write the data of the groups EF.DG1 to EF.DG16 of the logical MRTD (FDP_ACF.1.2, rule 1) and terminals are not allowed to modify any of the data groups EF.DG1 to EF.DG16 of the logical

MRTD (cf. FDP_ACF.1.4). The SFR FMT_SMR.1 lists the roles (including Personalization Agent) and the SFR FMT_SMF.1 lists the TSF management functions (including Personalization). The authentication of the terminal as Personalization Agent shall be performed by TSF according to SRF FIA_UAU.4, FIA_UAU.5 and FIA_UAU.6 using either FCS_COP.1/ENC and FCS_COP.1/MAC or FCS_COP.1/AUTH.

The security objective OT.Data_Int requires the TOE to ensure that the inspection system is able to detect any modification of the transmitted logical MRTD data by means of the BAC mechanism. The SFR FIA_UAU.6, FDP_UCT.1 and FDP_UIT.1 requires the protection of the transmitted data by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1, FCS_COP.1/SHA, FCS_RND.1 (for key generation), and FCS_COP.1/ENC and FCS_COP.1/MAC for the ENC_MAC_Mode. The SFR FMT_MTD.1/KEY_WRITE requires the Personalization Agent to establish the Document Basic Access Keys in a way that they cannot be read by anyone in accordance to FMT_MTD.1/KEY_READ.

OT.Data_Conf requires the TOE to ensure the confidentiality of the logical MRTD data groups EF.DG1 to EF.DG16. The SFR FIA_UID.1 and FIA_UAU.1 allow only those actions before identification respective authentication which do not violate OT.Data_Conf. In case of failed authentication attempts FIA_AFL.1 enforces additional waiting time prolonging the necessary amount of time for facilitating a brute force attack. The read access to the logical MRTD data is defined by the FDP_ACC.1 and FDP_ACF.1.2: the successful authenticated Personalization Agent is allowed to read the data of the logical MRTD (EF.DG1 to EF.DG16). The successful authenticated Basic Inspection System is allowed to read the data of the logical MRTD (EF.DG1, EF.DG2 and EF.DG5 to EF.DG16). The SFR FMT_SMR.1 lists the roles (including Personalization Agent and Basic Inspection System) and the SFR FMT_SMF.1 lists the TSF management functions (including Personalization for the key management for the Document Basic Access Keys).

The SFR FIA_UAU.4 prevents reuse of authentication data to strengthen the authentication of the user. The SFR FIA_UAU.5 enforces the TOE to accept the authentication attempt as Basic Inspection System only by means of the Basic Access Control Authentication Mechanism with the Document Basic Access Keys. Moreover, the SFR FIA_UAU.6 requests secure messaging after successful authentication of the terminal with Basic Access Control Authentication Mechanism which includes the protection of the transmitted data in ENC_MAC_Mode by means of the cryptographic functions according to FCS_COP.1/ENC and FCS_COP.1/MAC (cf. the SFR FDP_UCT.1 and FDP_UIT.1). (for key generation), and FCS_COP.1/ENC and FCS_COP.1/MAC for the ENC_MAC_Mode. The SFR FCS_CKM.1, FCS_CKM.4, FCS_COP.1/SHA and FCS_RND.1 establish the key management for the secure messaging keys. The SFR FMT_MTD.1/KEY_WRITE addresses the key management and FMT_MTD.1/KEY_READ prevents reading of the Document Basic Access Keys.

Note, neither the security objective OT.Data_Conf nor the SFR FIA_UAU.5 requires the Personalization Agent to use the Basic Access Control Authentication Mechanism or secure messaging.

OT.Identification addresses the storage of the IC Identification Data uniquely identifying the MRTD's chip in its non-volatile memory. This will be ensured by TSF according to SFR FAU_SAS.1.

Furthermore, the TOE shall identify itself only to a successful authenticated Basic Inspection System in Phase 4 'Operational Use'. The SFR FMT_MTD.1/INI_ENA allows only the Manufacturer to write Initialization Data and Pre-personalization Data (including the Personalization Agent key). The SFR FMT_MTD.1/INI_DIS allows the Personalization Agent to disable Initialization Data if their usage in the phase 4 'Operational Use' violates the security objective OT.Identification. The SFR FIA_UID.1 and FIA_UAU.1 do not allow reading of any data uniquely identifying the MRTD's chip before successful authentication of the Basic Inspection Terminal and will stop communication after unsuccessful authentication attempt. In case of failed authentication attempts FIA_AFL.1 enforces additional waiting time prolonging the necessary amount of time for facilitating a brute force attack.

OT.Chip_Auth_Proof The security objective OT.Chip_Auth_Proof "Proof of MRTD's chip authenticity" is ensured by Active Authentication provided by FIA_API.1/AA proving the identity of the TOE.

The Active Authentication defined by FCS_COP.1/SIG_GEN for the generation of the RSA and ECDSA Signature is performed using a TOE internally stored confidential private key as required by FMT_MTD.1/KEY_WRITE and FMT_MTD.1/KEY_READ. According to FDP_ACF.1, only the successfully authenticated Basic, Generic and Extended Inspection Systems are allowed to request active authentication (FDP_ACF.1.2, rule 2).

OT.Prot_Abuse-Func is ensured by the SFR FMT_LIM.1 and FMT_LIM.2 which prevent misuse of test functionality of the TOE or other features which may not be used after TOE Delivery.

OT.Prot_Inf_Leak requires the TOE to protect confidential TSF data stored and/or processed in the MRTD's chip against disclosure

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

OT.Prot_Phys-Tamper is covered by the SFR FPT_PHP.3.

OT.Prot_Malfunction is covered by (i) the SFR FPT_TST.1 which requires self tests to demonstrate the correct operation and tests of authorized users to verify the integrity of TSF data and TSF code, and (ii) the SFR FPT_FLS.1 which requires a secure state in case of detected failure or operating conditions possibly causing a malfunction.

6.3.2 Rationale tables of Security Objectives and SFRs

Security Objectives	Security Functional Requirements	Rationale
OT.AC_Pers	FPT_EMS.1, FCS_CKM.4, FCS_RND.1, FMT_MTD.1/KEY_READ, FMT_SMF.1, FIA_UAU.6, FIA_UAU.4, FIA_UAU.5, FMT_SMR.1, FMT_MTD.1/KEY_WRITE, FCS_CKM.1, FCS_COP.1/SHA, FCS_COP.1/ENC, FCS_COP.1/AUTH, FCS_COP.1/MAC, FDP_ACC.1, FDP_ACF.1, FDP_UCT.1, FDP_UIT.1, FPT_PHP.3, FPT_FLS.1	Section 6.3.1
OT.Data_Int	FCS_RND.1, FMT_SMF.1, FCS_COP.1/SHA, FIA_UAU.6, FIA_UAU.4, FIA_UAU.5, FDP_UCT.1, FDP_UIT.1, FMT_SMR.1, FCS_CKM.1, FDP_ACC.1, FDP_ACF.1, FCS_COP.1/ENC, FCS_COP.1/AUTH, FCS_COP.1/MAC, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/KEY_READ	Section 6.3.1
OT.Data_Conf	FCS_CKM.4, FCS_RND.1, FMT_SMF.1, FIA_UAU.1, FIA_UAU.6, FIA_UAU.4, FIA_UAU.5, FDP_UCT.1, FDP_UIT.1, FMT_SMR.1, FCS_CKM.1, FIA_UID.1, FDP_ACC.1, FDP_ACF.1, FCS_COP.1/SHA, FCS_COP.1/ENC, FCS_COP.1/MAC, FIA_AFL.1, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/KEY_READ	Section 6.3.1

OT.Identification	FAU_SAS.1, FMT_MTD.1/INI_ENA, FMT_MTD.1/INI_DIS, FIA_UID.1, FIA_AFL.1, FIA_UAU.1	Section 6.3.1
OT.Chip_Auth_Proof	FCS_COP.1/SIG_GEN, FIA_API.1/AA, FDP_ACF.1, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/KEY_READ	Section 6.3.1
OT.Prot_Abuse-Func	FMT_LIM.1, FMT_LIM.2	Section 6.3.1
OT.Prot_Inf_Leak	FPT_EMS.1, FPT_TST.1, FPT_FLS.1, FPT_PHP.3	Section 6.3.1
OT.Prot_Phys-Tamper	FPT_PHP.3	Section 6.3.1
OT.Prot_Malfunction	FPT_TST.1, FPT_FLS.1	Section 6.3.1

Table 7 Security Objectives and SFRs - Coverage

Security Functional Requirements	Security Objectives	Rationale
FAU_SAS.1	OT.Identification	
FCS_CKM.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FCS_CKM.4	OT.AC_Pers, OT.Data_Conf	
FCS_COP.1/SHA	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FCS_COP.1/ENC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FCS_COP.1/AUTH	OT.AC_Pers, OT.Data_Int	
FCS_COP.1/MAC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FCS_COP.1/SIG_GEN	OT.Chip_Auth_Proof	
FCS_RND.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FIA_UID.1	OT.Data_Conf, OT.Identification	
FIA_UAU.1	OT.Data_Conf, OT.Identification	
FIA_UAU.4	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FIA_UAU.5	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FIA_UAU.6	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FIA_AFL.1	OT.Data_Conf, OT.Identification	
FIA_API.1/AA	OT.Chip_Auth_Proof	
FDP_ACC.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FDP_ACF.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FDP_UCT.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FDP_UIT.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FMT_SMF.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FMT_SMR.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FMT_LIM.1	OT.Prot_Abuse-Func	

FMT_LIM.2	OT.Prot_Abuse-Func	
FMT_MTD.1/INI_ENA	OT.Identification	
FMT_MTD.1/INI_DIS	OT.Identification	
FMT_MTD.1/KEY_WRITE	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FMT_MTD.1/KEY_READ	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FPT_EMS.1	OT.AC_Pers, OT.Prot_Inf_Leak	
FPT_FLS.1	OT.AC_Pers, OT.Prot_Inf_Leak, OT.Prot_Malfunction	
FPT_TST.1	OT.Prot_Inf_Leak, OT.Prot_Malfunction	
FPT_PHP.3	OT.AC_Pers, OT.Prot_Inf_Leak, OT.Prot_Phys-Tamper	

Table 8 SFRs and Security Objectives

6.3.3 Dependencies

6.3.3.1 SFRS DEPENDENCIES

Requirements	CC Dependencies	Satisfied Dependencies
FAU_SAS.1	No Dependencies	
FCS_CKM.1	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_CKM.4, FCS_COP.1/ENC, FCS_COP.1/MAC
FCS_CKM.4	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2)	FCS_CKM.1
FCS_COP.1/SHA	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4
FCS_COP.1/ENC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.1, FCS_CKM.4
FCS_COP.1/AUTH	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	
FCS_COP.1/MAC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.1, FCS_CKM.4
FCS_COP.1/SIG_GEN	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.1, FCS_CKM.4
FCS_RND.1	No Dependencies	
FIA_UID.1	No Dependencies	
FIA_UAU.1	(FIA_UID.1)	FIA_UID.1
FIA_UAU.4	No Dependencies	
FIA_UAU.5	No Dependencies	

FIA_UAU.6	No Dependencies	
FIA_AFL.1	(FIA_UAU.1)	FIA_UAU.1
FIA_API.1/AA	No Dependencies	
FDP_ACC.1	(FDP_ACF.1)	FDP_ACF.1
FDP_ACF.1	(FDP_ACC.1) and (FMT_MSA.3)	FDP_ACC.1
FDP_UCT.1	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1
FDP_UIT.1	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1
FMT_SMF.1	No Dependencies	
FMT_SMR.1	(FIA_UID.1)	FIA_UID.1
FMT_LIM.1	No Dependencies	
FMT_LIM.2	No Dependencies	
FMT_MTD.1/INI_ENA	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/INI_DIS	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/KEY_WRITE	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/KEY_READ	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FPT_EMS.1	No Dependencies	
FPT_FLS.1	No Dependencies	
FPT_TST.1	No Dependencies	
FPT_PHP.3	No Dependencies	

Table 9 SFRs Dependencies

6.3.3.1.1 RATIONALE FOR THE EXCLUSION OF DEPENDENCIES

The dependency FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2 of FCS_COP.1/SHA is discarded. The hash algorithm required by the SFR FCS_COP.1/SHA does not need any key material. Therefore neither a key generation (FCS_CKM.1) nor an import (FDP_ITC.1/2) is necessary.

The dependency FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2 of FCS_COP.1/AUTH is discarded. The SFR FCS_COP.1/AUTH uses the symmetric Personalization Key permanently stored during the Pre-Personalization process (cf. FMT_MTD.1/INI_ENA) by the manufacturer. Thus there is neither the necessity to generate or import a key during the addressed TOE lifecycle by the means of FCS_CKM.1 or FDP_ITC. Since the key is permanently stored within the TOE there is no need for FCS_CKM.4, too.

The dependency FCS_CKM.4 of FCS_COP.1/AUTH is discarded. The SFR FCS_COP.1/AUTH uses the symmetric Personalization Key permanently stored during the Pre-Personalization process (cf. FMT_MTD.1/INI_ENA) by the manufacturer. Thus there is neither the necessity to generate or import a key during the addressed TOE lifecycle by the means of FCS_CKM.1 or FDP_ITC. Since the key is permanently stored within the TOE there is no need for FCS_CKM.4, too.

The dependency FMT_MSA.3 of FDP_ACF.1 is discarded. The access control TSF according to FDP_ACF.1 uses security attributes which are defined during the personalization and are fixed over the whole life time of the TOE. No management of these security attribute (i.e. SFR FMT_MSA.1 and FMT_MSA.3) is necessary here.

The dependency FTP_ITC.1 or FTP_TRP.1 of FDP_UCT.1 is discarded. The SFR FDP_UCT.1 requires the use secure messaging between the MRTD and the BIS. There is no need for SFR FTP_ITC.1, e.g. to require this communication channel to be logically distinct from other communication channels since there is only one channel. Since the TOE does not provide a direct human interface a trusted path as required by FTP_TRP.1 is not applicable here.

The dependency FTP_ITC.1 or FTP_TRP.1 of FDP_UIT.1 is discarded. The SFR FDP_UIT.1 requires the use secure messaging between the MRTD and the BIS. There is no need for SFR FTP_ITC.1, e.g. to require this communication channel to be logically distinct from other communication channels since there is only one channel. Since the TOE does not provide a direct human interface a trusted path as required by FTP_TRP.1 is not applicable here.

6.3.3.2 SARS DEPENDENCIES

Requirements	CC Dependencies	Satisfied Dependencies
ADV_ARC.1	(ADV_FSP.1) and (ADV_TDS.1)	ADV_FSP.4, ADV_TDS.3
ADV_FSP.4	(ADV_TDS.1)	ADV_TDS.3
ADV_IMP.1	(ADV_TDS.3) and (ALC_TAT.1)	ADV_TDS.3, ALC_TAT.1
ADV_TDS.3	(ADV_FSP.4)	ADV_FSP.4
AGD_OPE.1	(ADV_FSP.1)	ADV_FSP.4
AGD_PRE.1	No Dependencies	
ALC_CMC.4	(ALC_CMS.1) and (ALC_DVS.1) and (ALC_LCD.1)	ALC_CMS.4, ALC_DVS.2, ALC_LCD.1

ALC_CMS.4	No Dependencies	
ALC_DEL.1	No Dependencies	
ALC_DVS.2	No Dependencies	
ALC_LCD.1	No Dependencies	
ALC_TAT.1	(ADV_IMP.1)	ADV_IMP.1
ASE_CCL.1	(ASE_ECD.1) and (ASE_INT.1) and (ASE_REQ.1)	ASE_ECD.1, ASE_INT.1, ASE_REQ.2
ASE_ECD.1	No Dependencies	
ASE_INT.1	No Dependencies	
ASE_OBJ.2	(ASE_SPD.1)	ASE_SPD.1
ASE_REQ.2	(ASE_ECD.1) and (ASE_OBJ.2)	ASE_ECD.1, ASE_OBJ.2
ASE_SPD.1	No Dependencies	
ASE_TSS.1	(ADV_FSP.1) and (ASE_INT.1) and (ASE_REQ.1)	ADV_FSP.4, ASE_INT.1, ASE_REQ.2
ATE_COV.2	(ADV_FSP.2) and (ATE_FUN.1)	ADV_FSP.4, ATE_FUN.1
ATE_DPT.1	(ADV_ARC.1) and (ADV_TDS.2) and (ATE_FUN.1)	ADV_ARC.1, ADV_TDS.3, ATE_FUN.1
ATE_FUN.1	(ATE_COV.1)	ATE_COV.2
ATE_IND.2	(ADV_FSP.2) and (AGD_OPE.1) and (AGD_PRE.1) and (ATE_COV.1) and (ATE_FUN.1)	ADV_FSP.4, AGD_OPE.1, AGD_PRE.1, ATE_COV.2, ATE_FUN.1
AVA_VAN.3	(ADV_ARC.1) and (ADV_FSP.4) and (ADV_IMP.1) and (ADV_TDS.3) and (AGD_OPE.1) and (AGD_PRE.1) and (ATE_DPT.1)	ADV_ARC.1, ADV_FSP.4, ADV_IMP.1, ADV_TDS.3, AGD_OPE.1, AGD_PRE.1, ATE_DPT.1

Table 10 SARs Dependencies

6.3.4 Rationale for the Security Assurance Requirements

The EAL4 was chosen to permit a developer to gain maximum assurance from positive security engineering based on good commercial development practices which, though rigorous, do not require substantial specialist knowledge, skills, and other resources. EAL4 is the highest level at which it is likely to be economically feasible to retrofit to an existing product line. EAL4 is applicable in those circumstances where developers or users require a moderate to high level of independently assured security in conventional commodity TOEs and are prepared to incur sensitive security specific engineering costs.

6.3.5 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.

7 TOE SUMMARY SPECIFICATION

7.1 TOE SUMMARY SPECIFICATION

This section provides a description of the security functions and assurance measures of the TOE that meet the TOE security requirements.

The TOE provides security features which can be associated into following groups:

- Identification and Authentication mechanisms
- Cryptographic functions support
- Access control /Storage and protection of logical MRTD data
- Secure messaging
- Security and Life-cycle management

Moreover the TOE will protect itself against interference, logical tampering and bypass. The security functionality of the TOE respectively the MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration applet will be externally available to the user by APDU commands according to the access conditions specified by the according policies considering the life cycle state, user role and security state.

Remark: The numbering of the security functions is consistent with the Security Target [ST-SAC-EAC], where its supports in addition to BAC and Active Authentication also PACEV2 and Extended Access Control (EACv1) in accordance with respectively [ICAO-SAC] and [TR-03110-1] and [TR-03110-3].

7.1.1 SF.IA Identification and Authentication

The different authentication mechanisms are supported by APDU commands and parameters using the cryptographic functions provided by the platform. The authentication mechanisms are enforced by protocols and APDU methods as specified in the functional specification.

The TOE supports the following authentication mechanisms:

- Basic Access Control Authentication mechanism (BAC)
- Authentication of the Personalization Agent with a personalisation key set based on a symmetric authentication mechanism.
- Active Authentication

7.1.2 SF.CF Cryptographic functions support

Cryptographic function support is provided by the underlying IDealCitiz 2.1.1 platform, i.e. the TOE relies on the underlying platform for performing its required cryptographic operations.

SF.CF Cryptographic functions include:

- 3DES and AES cipher operations for secure messaging
- Digest calculations (SHA-1, SHA-224, SHA-256, SHA-384 and SHA-512)
- Signature generation (ECDSA, RSA)
- Cryptographic key generation

- Key Destruction
- True Random Number generation

7.1.3 SF.ILTB Protection against interference, logical tampering and bypass

SF.ILTB.1

Protection against interference, logical tampering and bypass

Security domains are supported by the Java Card platform used by the TOE underlying IDealCitiz 2.1.1 open platform. The IDealCitiz 2.1.1 platform provides protection against physical attack and performs self-tests as described in [PLTF-ST].

The platform protects the TOE against malfunctions that are caused by exposure to operating conditions that may cause a malfunction. This includes hardware resets and operation outside the specified norms.

The MICAO on IDealCitiz 2.1.1, BAC configuration Applet uses transient memory where a hardware reset always reverts the MICAO on IDealCitiz 2.1.1, BAC configuration Applet into an unauthenticated state.

7.1.4 SF.AC Access control / Storage and protection of logical travel document data

SF.AC.1

Access control / Storage and protection of logical travel document data

The TOE provided access control, storage and protection of logical travel document data including access control to MRTD data. The TOE implements the subjects, objects, security attributes and rules according to the security attribute based access control. Access control is enforced by the APDU methods as specified in the interface defined in the functional specification.

7.1.5 SF.SM Secure Messaging

SF.SM.1

Secure Messaging

Secure messaging MAC and ENC operations are performed by the TOE's platform.

In PERSONALISATION life-cycle state the TOE supports 3DES or AES secure messaging in ENC_MAC mode, after a successful mutual authentication between TOE and Personalisation Agent terminal have been accomplished (see SF.I&A.4):

- ICAO secure messaging protocol defined in [ICAO-9303] for 112 bits 3DES with pre-installed MAC, ENC (and KEK) keys as Personalisation Agent Key set.
- ISO18013 BAP secure messaging defined in [ISO18013-3] for AES-128, 192 or 256 bits using AES secure messaging (CMAC, IV value, tags etc.) as specified in EAC TR-03110 [TR-03110-1] with pre-installed MAC, ENC (and KEK) keys as Personalisation Agent Key set.

In OPERATIONAL life-cycle state the TOE runs secure messaging in ENC_MAC mode uses 112 bit Triple-DES in CBC mode only after successful BAC authentication. The MAC is calculated according to the Retail MAC cryptographic algorithm specified in [ISO9797], MAC algorithm 3, block cipher DES, Sequence Message Counter, padding mode 2. Secure messaging in ENC_MAC mode is established during BAC and is based on SF.CF.

SF.SM.2

Secure Messaging – Re-authentication

In OPERATIONAL life-cycle state, the Retail MAC for 3DES is part of every APDU command/response when secure messaging is active after a successful BAC authentication has been accomplished. Re-authentication after reset of the SM protocol is assured by accepting only valid mandatory MAC cryptograms.

In PERSONALISATION life-cycle state either the Retail MAC for 3DES or the CMAC for AES are part of every APDU command/response when secure messaging is active after a successful mutual authentication between TOE and Personalisation Agent has been accomplished. Re-authentication after reset of the SM protocol is assured by accepting only valid (mandatory) MAC or CMAC cryptograms.

7.1.6 SF.LCM Security and life cycle management

For the MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration the following life-cycle phases have been identified:

- 1. Manufacturing phase
- 2. Personalisation phase
- 3. Operational phase
- 4. Termination phase

The life-time phases are reflected within the MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration applet by an internal life-cycle state machine and supports the following life-cycle states:

- 1. Not instantiated (applet resides in EEPROM or ROM)
- 2. PRE-PERSONALISATION state
- 3. PERSONALISATION state
- 4. OPERATIONAL state
- 5. TERMINATED state (irreversibly)

Each life-cycle phase (or state) has its typical user acting as role holder.

Life cycle phase	**Life-cycle state (maintained by applet)**	**Role**
Manufacturing phase	- (Applet not instantiated)	IC Manufacturer
Manufacturing phase	- (Applet not instantiated)	MRTD Manufacturer (Platform initialisation)
Manufacturing phase	PRE-PERSONALISATION	MRTD Manufacturer (Pre-Personalisation)
Personalisation phase	PERSONALISATION	Personalisation Agent
Operational phase	OPERATIONAL	Basic or Extended Inspection System
Terminated phase	TERMINATED	None

All role holders in Manufacturing, Pre-Personalisation and Personalisation phases are identified by cryptographic authentication keys. In Operational phase the BAC password is required to authenticate the Basic or Extended Inspection System in order to get access to the non-sensitive ICAO LDS datagroups.

The MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration Applet maintains the internal life-cycle state the moment that the applet is installed. This state, together with the access control mechanisms force the Terminal into a specific role, for the pre-personalisation and subsequent, personalisation and operational phases. The phases (and corresponding life-cycle states) are controlled by APDU commands. The life-cycle phase and state transitions are irreversible.

SF.LCM.1

Management of phases, roles and MRTD life-cycle states – Manufacturing phase

This security feature supports the management of roles and life-cycle state during Manufacturing phase.

SF.LCM.2

Management of phases, roles and MRTD life-cycle states – Personalisation phase

This security feature supports the management of roles and life-cycle state during Personalisation phase.

SF.LCM.4

Protection of test features

The MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration Applet does not have any dedicated test features implemented. The test features of the IDealCitiz 2.1.1 platform are protected by ways described in [PLTF-ST] and guidance documentation.

SF.LCM.5

Protection of keys and PACE passwords

In PRE-PERSONALISATION life-cycle state personalisation Agent Key Set is installed on the TOE's platform and protected by the platform. In all TOE life-cycle states the Personalization Agent Key set (MAC, ENC, KEK), the BAC keys (derived from MRZ) and the Active Authentication Private Key are also protected from disclosure. The MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration Applet only stores keys in Java Card specified Key structures, which are protected by IDealCitiz 2.1.1 platform.

SF.LCM.6

IC Identification data

During initialisation the MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration Applet is installed and initiated with the Pre-Personalisation Agent key and the IC Identification data. The INSTALL for INSTALL method of the IDealCitiz 2.1.1 platform will be used to store the IC Identification data.

7.2 SFRS AND TSS

7.2.1 SFRs and TSS - Rationale

7.2.1.1 TOE SUMMARY SPECIFICATION

7.2.1.1.1 SF.IA IDENTIFICATION AND AUTHENTICATION

The implementation of BAC contributes to:

- FIA_UID.1 Timing of Identification
- FIA_UAU.1 Timing of Authentication
- FIA_UAU.4 Single-use authentication of the Terminal by the TOE
- FIA_UAU.5 Multiple authentication mechanisms
- FIA_UAU.6 Re-authenticating of Terminal by the TOE
- FMT_SMR.1 Security Roles
- FCS_COP.1/AUTH
- FIA_AFL.1 Authentication Failure Handling

The implementation of the Personalisation Agent Auhtentication contributes to

- FIA_UID.1 Timing of Identification
- FIA_UAU.1 Timing of authentication
- FIA_UAU.4 Single-use authentication of the Terminal by the TOE
- FIA_UAU.5 Multiple authentication mechanisms
- FMT_SMR.1 Security Roles

The implementation of Active Authentication contributes to

- FIA_API.1/AA Authentication Proof of Identity – MRTD
- FMT_MTD.1/KEY_WRITE, Management of TSF data – Key Write
- FMT_MTD.1/KEY_READ, Management of TSF data – Key Read
- FCS_COP.1/SIG_GEN, Cryptographic operation – Signature generation by travel document (RSA and ECDSA)

7.2.1.1.2 SF.CF CRYPTOGRAPHIC FUNCTIONS SUPPORT

The implementation of this security function contributes to:

- FCS_COP.1/ ENC Cryptographic operation – Encryption / Decryption Triple DES
- FCS_COP.1/ MAC Cryptographic operation Retail MAC
- FCS_COP.1/SIG_GEN
- FIA_API.1/AA
- FCS_COP.1/SHA Cryptographic operation – Hash for Key Derivation by MRTD and according the application in this ST
- FCS_CKM.4 Cryptographic key destruction
- FCS_RND.1 Quality metric for random numbers

7.2.1.1.3 SF.ILTB PROTECTION AGAINST INTERFERENCE, LOGICAL TAMPERING AND BYPASS

SF.ILTB.1 The implementation of this security function contributes to:

- FPT_FLS.1 Failure with preservation of secure state
- FPT_TST.1 TSF testing
- FPT_PHP.3 Resistance to physical attack

7.2.1.1.4 SF.AC ACCESS CONTROL / STORAGE AND PROTECTION OF LOGICAL TRAVEL DOCUMENT DATA

SF.AC.1 The implementation of this security function contributes to:

- FDP_ACC.1 Subset access control - Basic Access Control
- FDP_ACF.1 Security attribute based access control - Basic Access Control
- FDP_UIT.1 Data exchange integrity - MRTD
- FDP_UCT.1 Basic data exchange confidentiality – MRTD

7.2.1.1.5 SF.SM SECURE MESSAGING

SF.SM.1 The implementation of this security function contributes to::

- FCS_COP.1/ENC: Encryption/Decryption 3DES
- FCS_COP.1/MAC: Cryptographic operation – Retail MAC
- FDP_UCT.1 Basic data exchange confidentiality
- FDP_UIT.1 Data exchange integrity

SF.SM.2 The implementation of this security function contributes to:

- FIA_UAU.6 Re-authenticating – Re-authenticating of Terminal by the TOE

7.2.1.1.6 SF.LCM SECURITY AND LIFE CYCLE MANAGEMENT

SF.LCM.1 The implementation of this security function contributes to:

- FMT_SMF.1 Specification of Management Functions (Initialization part)
- FMT_SMR.1.1 Security roles (Manufacturer)
- FMT_MTD.1/INI_ENA Management of TSF data – Writing of Initialization Data and Pre-personalization Data
- FMT_MTD.1/INI_DIS Management of TSF data – Disabling of Read Access to Initialization Data and Pre-personalization Data

SF.LCM.2 The implementation of this security function contributes to:

- FMT_SMF.1 Specification of Management Functions (Personalization)
- FMT_SMR.1.1 Security roles (Personalization Agent)
- FMT_MTD.1/KEY_WRITE (Management of TSF data – Key Write) Restriction of the ability to write (load) the Active Authentication Private Key, the BAC keys or refresh the Personalisation Agent Key Set to the Personalisation Agent in PERSONALISATION life-cycle state.

SF.LCM.4 The platform implementation provides this security function and contributes to:

- FMT_LIM.1 Limited capabilities
- FMT_LIM.2 Limited availability

SF.LCM.5 The implementation of this security function contributes to:

- FMT_MTD.1/KEY_READ Management of TSF data – Key Read
- FPT_EMS.1 TOE Emanation

SF.LCM.6

- FAU_SAS.1 Audit storage The audit records are usually write-only-once data of the travel document (see FMT_MTD.1/INI_ENA, FMT_MTD.1/INI_DIS).

8 STATEMENT OF COMPATIBILITY CONCERNING COMPOSITE SECURITY TARGET

8.1 SEPARATION OF THE PLATFORM TSF

This section describes the separation of relevant security functionality described in the ST of the platform (IDealCitiz 2.1.1 [PLTF-ST]) being used by this ST.

The following table confronts the relevant security functionality of the platform with those of the composite TOE defined in the present ST

IDealCitiz 2.1.1 Functionnalities in [PLTF-ST]	**Usage by TOE**
F.OPEN	*Not relevant*
F.CARD_MANAGER	*Relevant SF* *Used by SF.LCM.1, SF.LCM.2, SF.LCM.4, SF.LCM.5 and SF.LCM.6*
F.JAVA_CARD_SYSTEM	*Not relevant*
F.JAVA_API	*Relevant SF* *Used by SF.ILTB.1*
F.AUTHENTICATION	*Relevant SF* *Used by SF.IA and SF.SM.1, SF.SM.2*
F.MEMORY_PROGRAMMING	*Not relevant*
F.SECURE_DATA_MANAGER	*Relevant SF* *Used by SF.LCM.5 and SF.AC.1*
F.SECRET_DATA_MANAGER	*Relevant SF* *Used by SF.AC.1*
F.SYSTEM_MANAGER	*Not relevant*
F.CRYPTOGRAPHIC_OPERATIONS	*Relevant SF* *Used by SF.CF, SF.SM.1 and SF.SM.2*
F.MEMORY_ACCESS	*Not relevant*
F.MEMORY_CONTROLLER	*Not relevant*
F.INPUT/OUTPUT_LAYER	*Not relevant*
F.TRANSPORT_LAYER	*Not relevant*
F.CRYPTOGRAPHY_SERVICES	*Relevant SF* Used by SF.CF, and SF.LCM.4
F.SECURITY_CONFIGURATION	Not relevant
F.CPU_MANAGER	Not relevant

IDealCitiz 2.1.1 Functionnalities in [PLTF-ST]	**Usage by TOE**
F.SECURITY_AUDIT	*Not relevant*
F.CRYPTOGRAPHIC_LIBRARY	*Not relevant*
F.INTEGRATED_CIRCUIT	*Relevant SF* Used by SF.ILTB.1

Table 11: Compatibility between platform Functionnalities and the composite ST

The following tables specify the compatibility between SFRs of the platform ST and the composite ST. It indicates to what extend the IDealCitiz 2.1.1 platform SFRs are used by the TOE to meet the security requirements of this composite ST.

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	**Usage by TOE / Not used**	**References /Remarks**
1. Firewall Policy		
FDP_ACC.2/FIREWALL Complete Access Control	The Firewall policy rules are indirectly used by the applet to prevent the **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** applet from accidentally changing the state of the JCRE.	-
FDP_ACF.1/FIREWALL Security Attribute based Access Control		
FDP_IFC.1/JCVM Subset Information Flow Control		
FDP_IFF.1/JCVM Simple Security Attributes		
FDP_RIP.1/OBJECTS Subset Residual Information Protection		
FMT_MSA.1/JCRE Management of Security Attributes		
FMT_MSA.1/JCVM Management of Security Attributes		
FMT_MSA.2/FIREWALL_JCVM Secure Security Attributes		
FMT_MSA.3/FIREWALL Static Attribute Initialisation		
FMT_MSA.3/JCVM Static Attribute Initialisation		
FMT_SMF.1 Specification of Management Functions		
FMT_SMR.1 Security roles		

Table 12: Compatibility between platform SFRs and the composite ST – Firewall Policy

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Used by Applet Not used	References /Remarks
2. Application Programming Interface The following SFRs are related to the Java Card API		
FCS_CKM.1 Cryptographic Key Generation	Used by TOE for : - FCS_CKM.1 Not used for RSA key generation	SF.CF
FCS_CKM.2 Cryptographic Key Distribution	Used to implement: - FCS_CKM.1 - FCS_COP.1/SIG_GEN - FCS_COP.1.1/ENC - FCS_COP.1.1/MAC - FMT_MTD.1/WRITE Remark: TOE uses platform method "set keys and components" for assigning 3DES, RSA, RSA CRT secure messaging and EC keys.	This functionality is not provided at the external interface of the TOE.
FCS_CKM.3 Cryptographic Key Access	Used to implement: - FCS_CKM.1 - FCS_COP.1/SIG_GEN - FCS_COP.1.1/ENC - FCS_COP.1.1/MAC - FMT_MTD.1/KEY_WRITE - FMT_MTD.1/KEY_READ The TOE uses the platform provided management of DES, RSA, RSA-CRT and EC-keys is used in accordance with cryptographic key access methods/commands defined in packages javacard.security of [JAVA-3.0.1] and [PLTF-OPE] for proprietary classes.	This functionality is not provided at the external interface of the TOE.
FCS_CKM.4 Cryptographic Key Destruction	Used by TOE for: - FCS_CKM.4	
FCS_COP.1 Cryptographic Operation:	Used by TOE for: - FCS_COP.1/SIG_GEN - FCS_COP.1/SHA - FCS_COP.1/ENC - FCS_COP.1/MAC	Chapter 7
FDP_RIP.1/ABORT Subset Residual Information Protection	Not directly used by TOE. TOE relies on this platform SFR. Note: **MICAO 1.3.69 on IDealCitiz 2.1.1, BAC configuration** Applet has its	-

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Used by Applet Not used	References /Remarks
	own additional implementation of FDP_RIP.1 in this ST A deselect by JCRE of Applet instance occurs in case of re-select of the Applet by re-issuing a SELECT BY NAME with ICAO AID. The IDealCitiz 2.1.1 platform clears the transient memory after the applets deselect() method has been called.	
FDP_RIP.1/APDU Subset Residual Information Protection	Not directly used. TOE relies on this platform SFR.	-
FDP_RIP.1/bArray Subset Residual Information Protection	Not directly used. TOE relies on this platform SFR.	-
FDP_RIP.1/KEYS Subset Residual Information Protection	Not directly used by TOE’ s implementation of FDP_RIP.1. TOE relies on this platform SFR.	-
FDP_RIP.1/TRANSIENT Subset Residual Information Protection	Not directly used by TOE’ s implementation of FDP_RIP.1. TOE relies on this platform SFR.	-
FDP_ROL.1/FIREWALL Basic Rollback	Used by TOE during TA trust point update.	-

Table 13: Compatibility between platform SFRs and the composite ST – Application Programming Interface

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
3. Card Security Management		
FAU_ARP.1 Security Alarms	Not directly used	SF.ILTB.1[1]
FDP_SDI.2 Stored Data Integrity Monitoring and Action	Not directly used.	SF.ILTB.1
FPR_UNO.1 Unobservability	Not directly used.	SF.ILTB.1
FPT_FLS.1 Failure with Preservation of Secure State	Not directly used.	SF.ILTB.1
FPT_TDC.1 Inter-TSF basic TSF data consistency	Not used.	-

Table 14: Compatibility between platform SFRs and the composite ST – Card Security Management

[1] SFR indirectly supports FMT_LIM.1, FMT_LIM.2, and FPT_FLS.1.

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
4. AID Management This group consists of the SFRs related to the management of Application Identifiers.		
FIA_ATD.1/AID User Attribute Definition	Not directly used by TOE. Only used during TOE initialisation.	SF.LCM.2
FIA_UID.2/AID User Identification before any Action	Not directly used by TOE.	
FIA_USB.1/AID User-Subject Binding	Not directly used by TOE.	
FMT_MTD.1/JCRE Management of TSF Data	Not directly used by TOE.	
FMT_MTD.3/JCRE Secure TSF Data	Not directly used by TOE.	

Table 15: Compatibility between platform SFRs and the composite ST – AID Management

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
5. INSTG Security Functional Requirements This group consists of the SFRs related to the installation of the applets, which addresses security aspects outside the runtime.		
FDP_ITC.2/Installer Import of User Data with Security Attributes	Not used	-
FMT_SMR.1/Installer Security roles		
FPT_FLS.1/Installer Failure with preservation of secure state		
FPT_RCV.3/Installer Automated recovery without undue loss		

Table 16: Compatibility between platform SFRs and the composite ST – INSTG Security Functional Requirements

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
6. ADELG Security Functional Requirements This group consists of the SFRs related to the deletion of applets and/or packages, enforcing the applet deletion manager (ADEL) policy on security aspects outside the runtime.		
FDP_ACC.2/ADEL Complete access control	Not used	-
FDP_ACF.1/ADEL Security attribute based access control		
FDP_RIP.1/ADEL Subset residual information protection		
FMT_MSA.1/ADEL Management of security attributes		
FMT_MSA.3/ADEL Static attribute Initialisation		
FMT_SMF.1/ADEL Specification of Management Functions		
FMT_SMR.1/ADEL Security roles		
FPT_FLS.1/ADEL Failure with preservation of secure state		

Table 17: Compatibility between platform SFRs and the composite ST – ADELG Security Functional Requirements

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
7. ODELG Security Functional Requirements This group describes the object deletion mechanism. This mechanism is triggered by the applet that owns the deleted objects by invoking a specific API method.		
FDP_RIP.1/ODEL Subset residual information protection	Not used by applet.	-
FPT_FLS.1/ODEL Failure with preservation of secure state	Not used by applet.	-

Table 18: Compatibility between platform SFRs and the composite ST – ODELG Security Functional Requirements

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
8. CARG Security Functional Requirements This group includes requirements for preventing the installation of packages that has not been byte code verified, or that has been modified after byte code verification.		
FCO_NRO.2/CM Enforced proof of origin	Not directly used. The applet has passed byte code verifier.	-
FDP_IFC.2/CM Complete information flow control		
FDP_IFF.1/CM Simple security attributes		
FDP_UIT.1/CM Data exchange integrity		
FIA_UID.1/CM Timing of identification		
FMT_MSA.1/CM Management of security attributes		
FMT_MSA.3/CM Static attribute initialisation		
FMT_SMF.1/CM Specification of Management Functions		
FMT_SMR.1/CM Security roles		
FTP_ITC.1/CM Inter-TSF trusted channel		

Table 19: Compatibility between platform SFRs and the composite ST – CARG Security Functional Requirements

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
9. PACE Functional Requirements		
FCS_CKM.2/PACE Cryptographic key distribution	Not directly used.	
FCS_CKM.3/PACE Cryptographic key access	Not directly used.	
FCS_COP.1/PACE Cryptographic operation	Not directly used.	

Table 20: Compatibility between platform SFRs and the composite ST – PACE Functional Requirements

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
10. OSG Security Functional Requirements		
FPT_RCV.3/OS Automated recovery without undue loss	Not used	-
FPT_RCV.4/OS Function recovery	Not used	-
FPT_FLS.1/OS Failure with preservation of secure state	Not used	-
FPT_PHP.3/OS Resistance to physical attack	Not used	

Table 21: Compatibility between platform SFRs and the composite ST - OSG Security Functional Requirements

IDealCitiz 2.1.1-SFRs in [PLTF-ST]	Usage by TOE / Not used	References /Remarks
11. CardLifeCycleManagement Security Functional Requirements		
FDP_ACC.1/CardLifeCycleManagement Subset Access Control	Used during TOE initialisation for installing pre-personalisation key set. Not used by applet.	SF.LCM.2
FDP_ACF.1/CardLifeCycleManagement Security Attribute based Access Control	Used during TOE initialisation for adjusting GP state to SECURED. Used by applet to move GP state to TERMINATED in case of physical detected attacks detected by applet. (see SFR FPT_PHP.3)	SF.LCM.2
FMT_MSA.1/CardLifeCycleManagement Management of Security Attributes	Not directly used.	-
FMT_MSA.3/CardLifeCycleManagement Static Attribute Initialisation	Not directly used.	-
FTP_ITC.1/CardLifeCycleManagement Inter-TSF trusted channel	Not directly used.	-

Table 22: Compatibility between platform SFRs and the composite ST - LifeCycle Security Functional Requirements

8.2 COMPATIBILITY BETWEEN THE COMPOSITE SECURITY TARGET AND THE PLATFORM SECURITY TARGET

The following mapping demonstrates the compatibility between the Composite Security Target (the document at hand) and the Platform Security Target [PLTF-ST] regarding security environments, security objectives, and security requirements. There is no conflict between security environments, security objectives, and security requirements of the Composite Security Target and the Platform Security Target.

IDealCitiz 2.1.1 Definition	Pendent in this ST	Remarks
Security objectives for the TOE		
Platform objectives	Pendant in this ST with similar aim	Remarks
O.SID	-	No contradictions
O.FIREWALL	-	No contradictions
O.GLOBAL_ARRAYS_CONFID	-	No contradictions
O.GLOBAL_ARRAYS_INTEG	-	No contradictions
O.NATIVE	-	No contradictions
O.OPERATE	OT.Prot_Malfunction	No contradictions
O.REALLOCATION	-	No contradictions
O.RESOURCES	-	No contradictions
O.ALARM	-	No contradictions
O.CIPHER	OT.Sens_Data_Conf	No contradictions
O.PIN-MNGT	-	No contradictions
O.KEY-MNGT	OT.AC_Pers, OT.Data_Integrity, OT.Sens_Data_Conf, OT.Chip_Auth_Proof	No contradictions
O.TRANSACTION	-	No contradictions
O.DELETION	-	No contradictions
O.LOAD	-	No contradictions
O.INSTALL	-	No contradictions
O.CARD-MANAGEMENT	OT.Prot_Phys-Tamper	No contradictions
O.SCP.RECOVERY	-	No contradictions
O.SCP.SUPPORT	-	No contradictions
O.SCP.IC	OT.Prot_Phys-Tamper	No contradictions
O.BIO-MNGT	-	No contradictions
O.OBJ-DELETION	-	No contradictions
Relevant threats of the Platform ST vs. threats of the Composite-ST.		
Threats of Platform ST	According threats of comp. ST	
T.CONFID-APPLI-DATA	T.Read_Sensitive_Data,	No contradictions

IDealCitiz 2.1.1 Definition	**Pendent in this ST**	**Remarks**
T.CONFID-JCS-DATA	-	No contradictions
T.INTEG-JCS-DATA	-	No contradictions
T.INTEG-APPLI-DATA	T.Phys-Tamper, T.Forgery	No contradictions
T.INTEG-APPLI-CODE.LOAD	T.Phys-Tamper, T.Forgery	No contradictions
T.INTEG-APPLI-DATA.LOAD	T.Phys-Tamper, T.Forgery	No contradictions
T.CONFID-JCS-CODE	-	No contradictions
T.INTEG-APPLI-CODE	-	No contradictions
T.INTEG-JCS-CODE	-	No contradictions
T.APP_DATA_INTEGRITY	-	No contradictions
T.SID.1	-	No contradictions
T.SID.2	-	No contradictions
T.EXE-CODE.1	-	No contradictions
T.EXE-CODE.2	-	No contradictions
T.NATIVE	-	No contradictions
T.RESOURCES	-	No contradictions
T.DELETION	-	No contradictions
T.INSTALL	-	No contradictions
T.OBJ-DELETION	-	No contradictions
T.UNAUTH_CARD_MNGT	-	No contradictions
T.LIFE_CYCLE	-	No contradictions
T.UNAUTH_ACCESS	-	No contradictions
T.PHYSICAL	T.Phys-Tamper	No contradictions
Assumptions (platform) significant for Composite-ST		
Assumptions of Platform ST	Relevancy for Composite-ST	
A.APPLET	Guidance of the Platform-Developer for the Applet Developer has to be applied	No contradiction to this ST
A.VERIFICATION	Guidance of the Platform-Developer for the Applet Developer has to be applied	No contradiction to this ST
A.PRODUCTION	Guidance of the Platform-Developer for the Applet Developer has to be applied	No contradiction to this ST
Platform security objectives for the environment and relevancy for the Composite ST		
OE of platform ST	Matching aspects in Composite-ST	Remarks
OE.CODE-EVIDENCE	-	No contradictions
OE.SECURITY-DOMAINS	-	No contradictions

IDealCitiz 2.1.1 Definition	Pendent in this ST	Remarks
OE.QUOTAS	-	No contradictions
OE.SHARE-CONTROL	-	No contradictions
OE.KEY_GENERATION	-	No contradictions
OE.PRODUCTION	-	No contradictions
OE.VERIFICATION	Guidance of the Platform-Developer for the Applet Developer has to be applied	No contradictions
OE.APPLET	-	No post-issuance of the applet is intended. No contradictions

Platform organizational security policies for the environment and relevancy for the Composite ST		
OSP of platform ST	Matching aspects in Composite-ST	Remarks
OSP.VERIFICATION	Guidance of the Platform-Developer for the Applet-Developer and recommandations related to the isolation property of the platform have to be applied in the application code Not contradictory to any threats of composite ST	No contradictions
OSP.SECURITY_DOMAINS	No correspondence Not contradictory to any threats of composite ST	No contradictions
OSP.QUOTAS	No correspondence Not contradictory to any threats of composite ST	No contradictions
OSP.KEY_GENERATION	Guidance of the Platform-Developer for the Applet-Developer and recommandations related to the Key Generation have to be applied in the application code Not contradictory to any threats of composite ST	No contradictions
OSP.SHARE-CONTROL	Guidance of the Platform-Developer for the Applet-Developer and recommandations related to the Shareable interface functionality have to be applied in the application code	No contradictions

	Not contradictory to any threats of composite ST	

Table 23: Compatibility between platform and composite ST

8.3 COMPATIBILITY OF ASSURANCE REQUIREMENTS

The level of assurance of the:

- TOE is EAL4 augmented with ALC DVS.2
- Platform is EAL5 augmented with ALC DVS.2 and AVA VAN.5

This shows that the Assurance Requirements of the TOE matches the Assurance Requirements of the underlying Platform.

9 ANNEX

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-03110-1].
Advanced Inspection Procedure (with PACE)	A specific order of authentication steps between a travel document and a terminal as required by [ICAO-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 ST 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 MTRD's chip proves and the inspection system verifies the identity and authenticity of the MTRD's chip as part of a genuine MRTD issued by a known State of organization.
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 (cf. CC part 1, section B.2.7).
Audit records	Write-only-once non-volatile memory area of the MRTDs chip to store the Initialisation Data and Pre-personalization Data.
Authenticity	Ability to confirm the MRTD and its data elements on the MRTD's chip were created by the issuing State or Organization
Basic Access Control	Security mechanism defined in [ICAO-9303] by which means the MTRD's chip proves and the inspection system protect their communication by means of secure messaging with Basic Access Keys (see there).
Basic Inspection System (BIS)	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.
Biographical data (bio data).	The personalized details of the bearer of the document appearing as text in the visual and machine readable zones on the biographical data page of a passport book or on a travel card or visa.
Biometric reference data	Data stored for biometric authentication of the MRTD holder in the MRTD's chip as (i) digital portrait and (ii) optional biometric reference data.

Term	Definition
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.
Country Signing CA Certificate (C_{CSCA})	Self-signed certificate of the Country Signing CA Public Key ($K_{Pu\ CSCA}$) issued by CSCA stored in the inspection system.
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 documents and creates the Document Signer Certificates within this PKI. The CSCA also issues the self-signed CSCA Certificate (CCSCA) having to be distributed by strictly secure diplomatic means, see. [ICAO-9303], 5.5.1. The Country Signing Certification Authority issuing certificates for Document Signers (cf. [6]) 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-03110-1].
Country Verifying Certification Authority (CVCA)	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-03110-1]. 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 ST. The Country Signing Certification Authority (CSCA) 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-03110-1].
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.

Term	**Definition**
CV 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.
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.
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 Basic Access Keys	Pair of symmetric Triple-DES keys used for secure messaging with encryption (key KENC) and message authentication (key KMAC) of data transmitted between the MRTD's chip and the inspection system [ICAO-9303]. It is drawn from the printed MRZ of the passport book to authenticate an entity able to read the printed MRZ of the passport book.
Document Security Object (SO$_D$)	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 MRTD'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-03110-1] 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-03110-1]. 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 ST. There can be Domestic and Foreign DV: A domestic DV is acting under the policy of the domestic CVCA being run by the travel

Term	**Definition**
	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) [1] [2]
Eavesdropper	A threat agent with low attack potential reading the communication between the MRTD's chip and the inspection system to gain the data on the MRTD'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]
ePassport application	[PP-SAC] definition 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-03110-1]. [PP-EAC] definition Non-executable data defining the functionality of the operating system on the IC as the travel document's chip. It includes • the file structure implementing the LDS [ICAO-9303], • 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 • the TSF Data including the definition the authentication data but except the authentication data itself.
Extended Access Control	Security mechanism identified in [ICAO-9303] by which means the MTRD'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. The Personalization Agent may use the same mechanism to authenticate themselves with Personalization Agent Authentication Private Key and to get write and read access to the logical MRTD and TSF data.
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 Organization 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.
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

[1] The form of such an agreement may be of formal and informal nature; the term 'agreement' is used in the current ST in order to reflect an appropriate relationship between the parties involved.

[2] Existing of such an agreement may be technically reflected by means of issuing a CCVCA-F for the Public Key of the foreign CVCA signed by the domestic CVCA.

Term	Definition
	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.
Improperly documented 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 (TOE life-cycle, Phase 2 Manufacturing, Step 3).
Initialisation 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 MRTD's material (IC identification data).
Inspection	The act of a State examining an MRTD presented to it by a traveler (the MRTD 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 MRTD presented by the traveler and verifying its authenticity and (ii) verifying the traveler as MRTD holder.
Integrated circuit (IC)	Electronic component(s) designed to perform processing and/or memory functions. The MRTD's chip is an integrated circuit.
Integrity	Ability to confirm the MRTD and its data elements on the MRTD's chip have not been altered from that created by the issuing State or Organization
Issuing Organization	Organization authorized to issue an official travel document (e.g. the United Nations Organization, issuer of the Laissez-passer). [ICAO-9303]]

Term	Definition
Issuing State	The Country issuing the MRTD. [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 MRTD'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 based/contactless integrated circuit. It presents contact based/contactless readable data including (but not limited to) 1. personal data of the travel document holder 2. the digital Machine Readable Zone Data (digital MRZ data, EF.DG1), 3. the digitized portraits (EF.DG2), 4. the biometric reference data of finger(s) (EF.DG3) or iris image(s) (EF.DG4) or both and 5. the other data according to LDS (EF.DG5 to EF.DG16). 6. EF.COM and EF.SOD
Machine readable travel document (MRTD)	Official document issued by a State or Organization which is used by the holder for international travel (e.g. passport, visa, official document of identity) and which contains mandatory visual (eye readable) data and a separate mandatory data summary, intended for global use, reflecting essential data elements capable of being machine read. [ICAO-9303]
Machine readable zone (MRZ)	Fixed dimensional area located on the front of the MRTD or MRP Data Page or, in the case of the TD1, the back of the MRTD, containing mandatory and optional data for machine reading using OCR methods. [ICAO-9303] The MRZ-Password is a restricted-revealable secret that is derived from the machine readable zone and may be used for PACE.
Machine-verifiable biometrics feature	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]
Manufacturer	Generic term for the IC Manufacturer producing integrated circuit and the travel document Manufacturer completing the IC to the travel document. The Manufacturer is the default user of the TOE during the manufacturing life phase. The TOE itself does not distinguish between the IC Manufacturer and travel document Manufacturer using this role Manufacturer.
Metadata of a CV Certificate	Data within the certificate body (excepting Public Key) as described in [TR-03110-1]. The metadata of a CV certificate comprise the following elements: - Certificate Profile Identifier, - Certificate Authority Reference, - Certificate Holder Reference, - Certificate Holder Authorisation Template, - Certificate Effective Date, - Certificate Expiration Date.
Optional biometric reference data	Data stored for biometric authentication of the MRTD holder in the MRTD's chip as (i) encoded finger image(s) (DG3) or (ii) encoded iris image(s) (DG4) or (iii) both. Note that the European commission decided to use only finger print and not to use iris images as optional biometric reference data.

Term	Definition
Password Authenticated Connection Establishment (PACE)	A communication establishment protocol defined in [ICAO-SAC]. The PACE Protocol is a password authenticated Diffie-Hellman key agreement protocol providing implicit password-based authentication of the communication partners (e.g. smart card and the terminal connected): i.e. PACE provides a verification, whether the communication partners share the same value of a password π). Based on this authentication, PACE also provides a secure communication, whereby confidentiality and authenticity of data transferred within this communication channel are maintained.
PACE 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-SAC],
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.
Personalisation	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. paragraph 1.5.3.3, TOE life-cycle, Phase 3, Step 6).
Personalisation Agent	An organisation acting on behalf of the travel document Issuer to personalise the travel document for the travel document holder by some or all of the following activities: (i) establishing the identity of the travel document holder for the biographic data in the travel document, (ii) enrolling the biometric reference data of the travel document holder, (iii) writing a subset of these data on the physical travel document (optical personalisation) and storing them in the travel document (electronic personalisation) for the travel document holder as defined in [TR-03110-1], (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. 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.

Term	Definition
Personalization Agent Authentication Information	TSF data used for authentication proof and verification of the Personalisation Agent.
Personalisation Agent Key	Symmetric cryptographic key or key set (MAC, ENC) used (i) by the Personalisation Agent to prove his identity and get access to the logical travel document and (ii) by the MRTD's chip to verify the authentication attempt of a terminal as Personalization Agent according to the SFR FIA_UAU.1/PACE, FIA_UAU.4/PACE, FIA_UAU.5/PACE.
Physical part of the 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-personalization	Process of writing Pre-Personalisation Data (see below) to the TOE including the creation of the travel document Application (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 MRTD Manufacturer (Phase 2) for traceability of non-personalized MRTD's and/or to secure shipment within or between life cycle phases 2 and 3. It contains (but is not limited to) the Personalization Agent Key Pair and Chip Life-Cycle Production data (CPLC data).
Pre-personalised travel document's chip	Travel document's chip equipped with a unique identifier.
Receiving State	The Country to which the MRTD holder 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 [ISO14443].
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 [ISO7816]
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 MRTD 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-SAC], namely (i) PACE or BAC and

Term	Definition
	(ii) Passive Authentication with SO_D. SIP can generally be used by BIS-PACE and BIS-BAC.
Terminal	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. In this ST 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).
Terminal Authorization	Intersection of the Certificate Holder Authorizations of the Inspection System Certificate, the Document Verifier Certificate and Country Verifier Certification Authority which shall be 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 (electronic)	The contact based or contactless smart card integrated into the plastic or paper, optical readable cover and providing the following application: *ePassport*.
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 [15] and programmed according to the Logical Data Structure as specified by ICAO, [ICAO-9303], sec III.
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 Initialisation Data and Pre-personalisation Data as delivered to the Personalisation Agent from the Manufacturer.

Term	**Definition**
User data	All data (being not authentication data) (i) stored in the context of the ePassport application of the travel document as defined in [5] and (ii) being allowed to be read out solely by an authenticated terminal acting as Basic Inspection System with PACE. CC give the following generic definitions for user data: Data created by and for the user that does not affect the operation of the TSF (CC part 1 [CC-1]). Information stored in TOE resources that can be operated upon by users in accordance with the SFRs and upon which the TSF places no special meaning (CC part 2 [CC-2]).
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.

Abbreviations

CC	Common Criteria, see [CC]
EAL	Evaluation Assurance Level
PP	Protection Profile
ST	Security Target
SEF	Security Enforcing Functions
SOF	Strength Of Function
TOE	Target of Evaluation
TSF	TOE Security Functions

References

Reference	Description
[AIS20V1]	Funktionalitätsklassen und Evaluationsmethodologie für deterministische Zufallszahlengeneratoren, Version 2.0, 02.12.1999
[AIS20V2]	Anwendungshinweise und Interpretationen zum Schema, AIS 20: Funktionalitaetsklassen und Evaluationsmethodologie fuer deterministische Zufallszahlengeneratoren, Version 2.1, 02.12.2011, Bundesamt fuer Sicherheit in der Informationstechnik.
[AIS31]	BSI - Functionality classes and evaluation methodology for physical random number generators AIS31, Version 3, 2013-05-15
[ANSSI-FRP256V1]	Avis relatif aux paramètres de courbes elliptiques définis par l'Etat français NOR: PRMD1123151V (Le 18 avril 2012)- ANSSI (http://www.ssi.gouv.fr/).
[BAC-PP]	Common Criteria Protection Profile Machine Readable Travel Document with „ICAO Application", Basic Access Control, BSI-CC-PP-0055-2009, Version 1.10, 25th March 2009
[CC-1]	Common Criteria for Information Technology Security Evaluation, Part 1:Introduction and General Model; CCMB-2017-04-001, Version 3.1, Revision 5, April 2017
[CC-2]	Common Criteria for Information Technology Security Evaluation, Part 2:Security Functional Requirements; CCMB-2017-04-002, Version 3.1, Revision 5, April 2017
[CC-3]	Common Criteria for Information Technology Security Evaluation, Part 3:Security Assurance Requirements; CCMB-2017-04-003, Version 3.1, Revision 5, April 2017
[CEM]	The Common Methodology for Information Technology Security Evaluation (CEM), Evaluation Methodology; CCMB-2017-04-004, Version 3.1, Revision 5, April 2017
[DH]	Rescorla, Eric, RFC 2631: Diffie-Hellman key agreement method, 1999
[EAC-PP-V2]	Common Criteria Protection Profile Machine Readable Travel Document with „ICAO Application", Extended Access Control with PACE (EAC PP) BSI-CC-PP-0056-V2-2012, Version 1.3.2, December 5th 2012, BSI
[ICAO-9303]	International Civil Aviation Organization, ICAO Doc 9303, Machine Readable Travel Documents – Machine Readable Passports, Version Sixth Edition, 2006 (this includes the latest supplemental for ICAO Doc 9303 which also should be considered)
[ICAO-SAC]	International Civil Aviation Organization, ICAO MACHINE READABLE TRAVEL DOCUMENTS, TECHNICAL REPORT, Supplemental Access Control for Machine Readable Travel Documents, Version 1.02, 8 March 2011
[ISO14443]	ISO/IEC 14443 Identification cards -- Contactless integrated circuit cards -- Proximity cards, 2008-11
[ISO15946-1]	ISO/IEC 15946-1. Information technology – Security techniques – Cryptographic techniques based on elliptic curves – Part 1: General, 2002
[ISO15946-2]	ISO/IEC15946-2. Information technology – Security techniques –

Reference	Description
	Cryptographic techniques based on elliptic curves – Part 2: Digital signatures, 2002.
[ISO15946-3]	ISO/IEC 15946: Information technology — Security techniques — Cryptographic techniques based on elliptic curves — Part 3: Key establishment, 2002
[ISO18013-3]	ISO/IEC 18013-3: Information technology — Personal identification — ISO-compliant driving licence. Part 3: Access control, authentication and integrity validation, 2009-03-01 Including ISO/CEI 18013-3/AC1:2011, TECHNICAL CORRIGENDUM 1, Published 2011-12-01
[ISO7816]	ISO/IEC 7816: Identification cards — Integrated circuit cards, Version Second Edition, 2008
[ISO9796-2]	ISO/IEC 9796-2: 2002, Information Technology - Security Techniques - Digital Signature Schemes giving message recovery - Part 2: Integer factorization based mechanisms
[ISO9797]	ISO/IEC 9797-1:1999, Information technology —Security techniques — Message Authentication Codes (MACs) — Part 1: Mechanisms using a block cipher.
[JAVA-3.0.1]	Application Programming Interface Java Card(tm) Platform, Version 3.0.1, Classic Edition, May 2009, Sun Microsystems, Inc.
[PLTF-PRE]	2015_20000011704 - PRE - IDealCitiz_v2_1_1 - Preparative Procedures
[PLTF-ST]	2016_2000022486 Security Target -IDealCitiz 2.1.1 open platform
[PLTF-OPE]	2015_20000011705 - OPE - IDealCitiz_v2_1_1 - Operational User Guidance
[KS2011]	A proposal for: Functionality classes for random number generators, Version 2.0, September 18, 2011 - W. Killmann, W. Schindler
[NIST-180-4]	NIST. FIPS 180-4, Secure Hash Standard, February 2011.
[NIST-186-3]	NIST. Digital Signature Standard (DSS), FIPS 186-3, 2009
[NIST-197]	NIST. Specification for the Advanced Encryption Standard (AES), FIPS PUB 197, 2001
[NIST-800-38B]	NIST. Recommendation for Block Cipher Modes of Operation: The CMAC Mode for Authentication, Special Publication 800-38B, 2005
[PACE-PP]	Machine Readable Travel Document using Standard Inspection Procedure with PACE, BSI-CC-PP-0068-V2-2011, Version 1.0, 2nd November 2011, BSI
[RFC-5639]	Lochter, Manfred; Merkle, Johannes. Elliptic Curve Cryptography (ECC) Brainpool Standard Curves and Curve Generation, RFC 5639, 2010
[RSA-PKCS#3]	PKCS #3: Diffie-Hellman Key-Agreement Standard, An RSA Laboratories Technical Note, Version 1.4, Revised November 1, 1993
[SIC-PP]	Security IC Platform Protection Profile; registered and certified by BSI (Bundesamt für Sicherheit in der Informationstechnik) under the reference BSI-PP-0035-2007, Version 1.0, June 2007 – BSI
[ST-SAC-EAC]	2016_2000021669 - Security Target MICAO on IDealCitiz 2.1.1, SAC-EAC configuration

Reference	Description
[ST-IC]	Infineon, Security Target Lite, M7892 B11, Recertification, Including optional Software Libraries RSA - EC - SHA- 2 - Toolbox, Common Criteria CC v3.1 EAL6 augmented (EAL6+)
[CR-IC]	BSI, Certification Report, BSI-DSZ-CC-0782-V2-2015-RA-01 for Infineon Security Controller M7892 B11 with optional RSA2048/4096 v1.02.013, EC v1.02.013, SHA-2 v1.01 and Toolbox v1.02.013 libraries and with specific IC dedicated software (firmware), April 2017
[TR-02102]	TR-02102 Technische Richtlinie Kryptographische Algorithmen und Schlüssellängen, Version 2013.02, January 9th 2013 by BSI
[TR-03110-1]	Technical Guideline TR-03110-1, Advanced Security Mechanisms for Machine Readable Travel Documents –Part 1 – eMRTDs with BAC/PACEv2 and EACv1, Version 2.10, 20.03.2012 by BSI
[TR-03110-3]	TR-03110-3 Advanced Security Mechanisms for Machine Readable Travel Documents – Part 3: Common Specifications, version 2.10, 2012-03-07 by 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