Public Security Target

CombICAO v3.1 on Cosmo X²

(BAC and CA Configuration)

Reference: FQR 151 007 - 427

DOCUMENT EVOLUTION

Date	Version	Name	Revision
16/09/2025	Ed 1	INSI	Initial version
10/11/2025	Ed 2	INSI	Updates sites in 4.2 section

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1 Security Target Introduction

1.1 ST Identification

Title	CombICAO v3.1 in BAC and CA configuration on Cosmo X^2 Public Security Target
ST Identification	FQR 151 007 – 427 Ed2
CC Version	3.1 revision 5
Assurance Level	EAL4 augmented with ADV_FSP.5, ADV_INT.2, ADV_TDS.4, ALC_CMS.5, ALC_DVS.2, ALC_TAT.2, and ATE_DPT.3
ITSEF	SERMA
Certification Body	ANSSI
Compliant to Protection Profile	[PP_BAC]

NB: the underlying platform full name is "**ID-One Cosmo X^2**". Please note that in the all the document the diminutive "**Cosmo X^2**" will be used instead.

1.2 TOE Reference

TOE Commercial Name	CombICAO v3.1 in BAC and CA configuration on Cosmo X^2
Applet Code Versions (SAAAAR Code)	'20 38 21 FF'
Applet Internal Version	'01 03 04 11'
Platform Name	Cosmo X^2
Platform Certificate	[PTF_CERT]
Guidance Documents	[AGD_PRE], [AGD_OPE], [PTF_AGD_OPE], [PTF_AGD_PRE], [PTF_AGD_ALP]

2 Technical Terms, Abbreviations and Associated References

2.1 Technical Terms

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-03110-3].
Advanced Inspection Procedure (with PACE)	A specific order of authentication steps between a travel document and a terminal as required by [TR-03110-3], namely (i) PACE, (ii) Chip Authentication v1, (iii) Passive Authentication with SO_D and (iv) Terminal Authentication v1. 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.
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 travel document's chip to store the Initialisation Data and Pre-personalisation Data.
Authenticity	Ability to confirm the travel document and its data elements on the travel document's chip were created by the issuing State or Organization
Basic Access Control	Security mechanism defined in [ICAO_9303] by which means the travel document'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).
Biographical data (bio data).	The personalised details of the bearer of the travel document appearing as text in the visual and machine readable zones on the biographical data page of a travel document [ICAO_9303].
Biometric reference data	Data stored for biometric authentication of the travel document holder in the travel document's chip as (i) digital portrait and (ii) optional biometric reference data.

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-03110-3].
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-03110-3]. 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.

Term	Definition
	However, even in this case, separate key pairs must be used for different roles, see [TR-03110-3].
Current date	The maximum of the effective dates of valid CVCA, DV and domestic Inspection System certificates known to the TOE. It is used the validate card verifiable certificates.
CV Certificate	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 travel document’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 travel document’s chip. It may carry the Document Signer Certificate (CDS). [ICAO_9303]
Document Signer (DS)	An organisation enforcing the policy of the CSCA and signing the Document Security Object stored on the travel document for passive authentication. A Document Signer is authorised by the national CSCA issuing the Document Signer Certificate (CDS), see [ICAO_9303].

Term	Definition
	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-03110-3]. 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 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 travel document's chip and the inspection system to gain the data on the travel document's chip.
Enrolment	The process of collecting biometric samples from a person and the subsequent preparation and storage of biometric reference templates representing that person's identity. [ICAO_9303]
travel document (electronic)	The contact based or contactless smart card integrated into the plastic or paper, optical readable cover and providing the following application: ePassport.
ePassport application	[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

[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
	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 travel document's chip (i) verifies the authentication of the inspection systems authorized to read the optional biometric reference data, (ii) controls the access to the optional biometric reference data and (iii) protects the confidentiality and integrity of the optional biometric reference data during their transmission to the inspection system by secure messaging. The Personalisation Agent may use the same mechanism to authenticate themselves with Personalisation Agent Authentication Private Key and to get write and read access to the logical travel document 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 specifications for placement of both eye-readable and machine readable data in all travel document's. [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.

Term	Definition
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 travel document material (IC identification data).
Inspection	The act of a State examining an travel document presented to it by a traveller (the travel document's holder) and verifying its authenticity. [ICAO_9303]
Inspection system (IS)	A technical system used by the border control officer of the receiving State (i) examining an travel document presented by the traveller and verifying its authenticity and (ii) verifying the traveller as travel document holder.
Integrated circuit (IC)	Electronic component(s) designed to perform processing and/or memory functions. The travel document's chip is an integrated circuit.
Integrity	Ability to confirm the travel document and its data elements on the travel document's chip have not been altered from that created by the issuing State or Organization
Issuing Organization	Organization authorized to issue an official travel document (e.g. the United Nations Organization, issuer of the Laissez-passer). [ICAO_9303]]
Issuing State	The Country issuing the travel document. [ICAO_9303]
Logical Data Structure (LDS)	The collection of groupings of Data Elements stored in the optional capacity expansion technology [ICAO_9303]. The capacity expansion technology used is the travel document's chip.

Term	Definition
Logical Data Structure 2 (LDS2)	The file structures required to support the ICAO LDS2 [9303-10_LDS2] consisting of LDS file structure with three additional and optional applications: • Travel records (stamps); • Visa records; and • Additional biometrics.
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) personal data of the travel document holder the digital Machine Readable Zone Data (digital MRZ data, EF.DG1), the digitized portraits (EF.DG2), the biometric reference data of finger(s) (EF.DG3) or iris image(s) (EF.DG4) or both and the other data according to LDS (EF.DG5 to EF.DG16). 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 travel document or MRP Data Page or, in the case of the TD1, the back of the travel document, containing mandatory and optional data for machine reading using OCR methods. [ICAO_9303].
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-03110-3]. The metadata of a CV certificate comprise the following elements: - Certificate Profile Identifier, - Certificate Authority Reference, - Certificate Holder Reference,

Term	Definition
	- Certificate Holder Authorisation Template, - Certificate Effective Date, - Certificate Expiration Date.
Optional biometric reference data	Data stored for biometric authentication of the travel document holder in the travel document's chip as (i) encoded finger image(s) (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.
Password Authenticated Connection Establishment (PACE)	A communication establishment protocol defined in [ICAO_9303] part 11. 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 п). 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_9303] part 11 or a user PIN or PUK as specified in [TR-03110-3]
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 1.7.4.3, 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: ICAO travel document (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,

Term	Definition
	(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. individual-related data (biographic and biometric data) of the travel document holder, dedicated document details data and 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.
Personalisation 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 by the Personalisation Agent to prove his identity and get access to the logical travel document.
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) biographical data, data of the machine-readable zone, photographic image and other data.
Pre-personalisation	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-personalisation Data	Any data that is injected into the non-volatile memory of the TOE by the travel document Manufacturer (Phase 2) for traceability of non-personalised travel document's and/or to secure shipment within or between life cycle phases 2 and 3. It contains (but is not limited to) the Personalisation Agent Key Pair and Chip Life-Cycle Production data (CPLC data).

Term	Definition
Pre-personalised travel document's chip	travel document's chip equipped with a unique identifier.
Receiving State	The Country to which the travel document 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.
Skimming	Imitation of the inspection system to read the logical travel document or parts of it via the contactless communication channel of the TOE without knowledge of the printed MRZ data.
Standard Inspection Procedure	A specific order of authentication steps between an travel document and a terminal as required by [ICAO_9303] and [TR-03110-1], namely PACE or BAC and Passive Authentication with SO_D.
Inspection Procedure for multi-application travel document's	This section describes an inspection procedure designed for travel document's containing one or more applications besides the travel document's application ("LDS2-documents"): [LDS2_TR] Annex A2.
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 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

Term	Definition
	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.
Traveller	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 [CC1]).
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.
User data	All data (being not authentication data) stored in the context of the ePassport application of the travel document as defined in [5] and being allowed to be read out solely by an authenticated terminal. 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 [CC1]). 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 [CC2]).
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]

Term	Definition
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.

2.2 Abbreviations

Acronym	Definition
AA	Active Authentication
BAC	Basic Access Control
BAP	Basic Access Protection
BIS	Basic Inspection System
CA	Chip Authentication
CAN	Card Access Number
CC	Common Criteria
CLFDB	Ciphered Load File Data Block
DER	Distinguished Encoding Rules
DES	Data Encryption Standard
DF	Dedicated File
DH	Diffie Hellman
DSK	Dump Secret Key
EAC	Extended Access Control
EAL	Evaluation Assurance Level
EF	Elementary File
FID	File identifier
GP	Global Platform
IC	Integrated Chip
ICAO	International Civil Aviation Organization
ICC	Integrated Chip card
ICCSN	Integrated Circuit Card Serial Number.
IFD	Interface Device
IS	Inspection System
IDL	ISO-compliant Driving Licence
LSK	Load Secure Key
MAC	Message Authentication code
MF	Master File
MRTD	Machine Readable Travel Document
MRZ	Machine readable zone
OE	Security Objectives for the Operational Environment
OSP	Organisational security policy
OT	Security Objectives for the TOE
PACE	Password Authenticated Connection Establishment
PCD	Proximity Coupling Device
PICC	Proximity Integrated Circuit Chip
PIN	Personal Identification Number

PKI	Public Key Infrastructure
PP	Protection Profile
PS	Personalisation System
PT	Personalisation Terminal
RF	Radio Frequency
ROM	Read Only Memory
RSA	Rivest Shamir Adleman
RSA CRT	Rivest Shamir Adleman – Chinese Remainder Theorem
SAI	Scanning Area Identifier
SAR	Security Assurance Requirement
SCP	Secure Channel Procotol
SFR	Security functional requirement
SHA	Secure Hashing Algorithm
SIP	Standard Inspection Procedure
ST	Security Target
TA	Terminal Authentication
TOE	Target Of Evaluation
TSF	TOE Security Functions

2.3 References

Reference	Description
[ADDENDUM]	20190821-Module-PP0056 - v1.1
[AGD_OPE]	FQR 220 1760 Ed 2 CombICAO v3.1 on Cosmo X^2 - Operational User Guidance (AGD_OPE)
[AGD_PRE]	FQR 220 1759 Ed 2 CombICAO v3.1 on Cosmo X^2 - Preparative Procedures (AGD_PRE)
[PTF_AGD_OPE]	Cosmo X^2 Reference Guide, FQR 110 A334
[PTF_AGD_PRE]	Cosmo X^2 Pre-Perso Guide, FQR 110 A335
[PTF_AGD_ALP]	Cosmo X^2 Application Loading Protection Guidance, FQR 110 A336
[CC1]	Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and general model. Version 3.1. Revision 5. April 2017. CCMB-2017-04-001.
[CC2]	Common Criteria for Information Technology Security Evaluation, Par 2: Security functional requirements. Version 3.1. Revision 5. April 2017. CCMB-2017-04-002.
[CC3]	Common Criteria for Information Technology Security Evaluation, Part 3: Security assurance requirements. Version 3.1. Revision 5. April 2017. CCMB-2017-04-003.
[CEM]	Common Methodology for Information Technology Security Evaluation, Evaluation Methodology. Version 3.1. Revision 5. April 2017. CCMB-2017-04-004.
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[FIPS_186_3]	FIPS 186-3, Federal Information Processing Standards Publication (FIPS PUB) 186-3, Digital Signature Standard (DSS), June 2009
[FIPS_197]	FIPS 197, Federal Information Processing Standards Publication (FIPS PUB 197), Advanced Encryption Standard (AES)

Reference	Description
[FIPS_46_3]	FIPS 46-3, Federal Information Processing Standards Publication (FIPS PUB) 46-3, Data Encryption Standard (DES), 1999 October 25
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[GPC_SPE_034]	"GlobalPlatform Card Specification" Version 2.3.1 Public Release - March 2018
[ICAO_9303]	International Civil Aviation Organization, ICAO Doc 9303, Machine Readable Travel Documents – 7th and 8th edition.
[ISO_18013-3]	ISO/IEC 18013-3: Information technology — Personal identification — ISO-compliant driving licence. Part 3: Access control, authentication and integrity validation, April 2017.
[ISO_TR_19446]	ISO/IEC TR 19446:2015 Differences between the driving licences based on the ISO/IEC 18013 series and the European Union specifications
[ISO_9796-2]	ISO/IEC 9796-2:2002 - Information technology - Security techniques - Digital signature schemes giving message recovery - Part 2: Mechanisms using a hash-function
[ISO_9797_1]	ISO/IEC 9797-1 Information technology – Security techniques – Message Authentication codes (MACs) – part 1: Mechanisms using a block cipher, Second edition 2011-03-01
[ISO11770-2]	ISO/IEC 11770-2. Information Technology – Security techniques – Key management – part 2: Mechanisms using symmetric techniques, 1996
[ISO11770-3]	ISO/IEC 11770-3. Information Technology – Security techniques – Key management – part 3: Mechanisms using asymmetric techniques, 2015
[ISO14443]	ISO/IEC 14443 Identification cards -- Contactless integrated circuit cards -- Proximity cards, 2016
[ISO7816]	ISO/IEC 7816: Identification cards — Integrated circuit cards.
[NIST_800_38A]	NIST Special Publication 800-38A: 2001, *Recommendation for Block Cipher Modes of Operation: Methods and Techniques*, December 2001

Reference	Description
[NIST_800_38B]	NIST Special Publication 800-38B: 2005, *Recommendation for Block Cipher Modes of Operation: The CMAC Mode for Authentication*, May 2005
[PKCS#3]	PKCS #3: Diffie-Hellman Key-Agreement Standard, An RSA Laboratories Technical Note, Version 1.4 Revised November 1, 1993
[PP_BAC]	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
[PP_EAC]	EAC- Machine readable travel documents with “ICAO Application”, Extended Access control – BSI-PP-0056 v1.10 25th march 2009
[PP_EACwPACE]	Common Criteria Protection Profile Machine Readable Travel Document with “ICAO Application”, Extended Access Control with PACE (EAC PP), BSI-CC-PP0056-V2-2012-MA-02, version 1.3.2, 5th December 2012
[PP_IC]	Security IC Platform Protection Profile with Augmentation Packages Version 1.0, Registered and Certified by Bundesamt für Sicherheit in der Informationstechnik (BSI) under the reference BSI-CC-PP-0084-2014.
[PP_PACE]	Machine Readable Travel Document using Standard Inspection Procedure with PACE, BSI-CC-PP-0068-V2-2011-MA-01, Version 1.01, 22 July 2014
[PP-SSCD2]	Protection profiles for secure signature creation device — Part 2: Device with key Generation, EN 419211-2:2013, CEN/TC 224, BSI-CC-PP-0059-2009-MA-02, Version 2.0.1, June 30 2016
[PP-SSCD3]	Protection profiles for secure signature creation device – Part3: Device with key import, EN 419211-3:2013, CEN/TC 224, BSI-CC-PP-0075-2012-MA-01, Version 1.0.2, June 30 2016
[PP-SSCD4]	Protection profiles for secure signature creation device — Part 4: Extension for device with key generation and trusted communication with certificate generation application, EN 419211-4:2013, CEN/TC 224, BSI-CC-PP-0071-2012-MA-01, Version 1.0.1, June 30 2016

Reference	Description
[PP-SSCD5]	Protection profiles for secure signature creation device — Part 5: Extension for device with key generation and trusted communication with signature creation application, EN 419211-5:2013, CEN/TC 224, BSI-CC-PP-0072-2012-MA-01, Version 1.0.1, June 30 2016
[PP-SSCD6]	Protection profiles for secure signature creation device – Part6: Extension for device with key import and trusted communication with signature-creation application, EN 419211-6:2013, CEN/TC 224, BSI-CC-PP-0076-2013-MA-01, Version 1.0.4, June 30 2016
[PTF_CERT]	NSCIB-2400104-01
[RGS2_B1]	GUIDE DES MÉCANISMES CRYPTOGRAPHIQUES RÈGLES ET RECOMMANDATIONS CONCERNANT LE CHOIX ET LE DIMENSIONNEMENT DES MÉCANISMES CRYPTOGRAPHIQUES, Version 2.04 du 01 Janvier 2020
[ST_PTF]	Security Target Lite Cosmo X², FQR 110 A329
[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 2.20, 26.02.2015 by BSI
[TR-03110-2]	Technical Guideline TR-03110-2, Advanced Security Mechanisms for Machine Readable Travel Documents –Part 2 – Extended Access Control Version 2 (EACv2),Password Authenticated Connection Establishment (PACE),and Restricted Identification (RI), Version 2.21, 21.12.2016 by BSI
[TR-03110-3]	TR-03110-3 Advanced Security Mechanisms for Machine Readable Travel Documents – Part 3: Common Specifications, version 2.21, 21-12-2016 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
[X9.92]	AMERICAN NATIONAL STANDARD X9.92-2017: Public Key Cryptography For The Financial Services Industry (rDSA), 02.02.2017
[PP_JAVACARD]	Java Card System - Open Configuration Protection Profile, Version 3.0.5 December 2017, BSI-CC-PP-0099-2017

3 TOE Overview and Description

3.1 TOE Overview

The TOE is a composite product that consist of an IN Smart Identity applet named CombICAO v3.1 loaded on Cosmo X² Global Platform and Java Card Operating system. The product is contact and/or contactless smart card security controller in **BAC and CA configuration** Products.

The Basic Access Control is a security feature which is mandatory supported by the TOE.

The inspection system

(i) Reads optically the MRTD,

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

(iii) 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].

The Chip Authentication defined in [TR_03110-3] and [ICAO_9303] is a security feature, which is optionally supported by the TOE.

The Chip Authentication is provided by the following steps:

(i) The inspection system communicates by means of secure messaging established by Basic Access Control,

(ii) The inspection system reads and verifies by means of the Passive Authentication the authenticity of the MRTD's Chip Authentication Public Key using the Document Security Object,

(iii) The inspection system generates an ephemeral key pair,

(iv) The TOE and the inspection system agree on two session keys for secure messaging in ENC_MAC mode according to the Diffie-Hellman Primitive and

(v) The inspection system verifies by means of received message authentication codes whether the MRTD's chip was able or not to run this protocol properly (i.e. the TOE proves to be in possession of the Chip Authentication Private Key corresponding to the Chip Authentication Public Key used for derivation of the session keys). The Chip Authentication requires collaboration of the TOE and the TOE environment.

This TOE addresses the Chip Authentication as an alternative to the Active Authentication stated in [ICAO_9303].

Within the scope of this ST, the TOE can be configured as a stand-alone application or as a combination of the following official ID document applications:

- ICAO eMRTD and
- EU/ISO Driving Licence compliant to [ISO_18013-3] or [ISO_TR_19446].

The TOE may be used as an ISO Driving Licence (IDL) as both eMRTD and IDL applications share the same protocols and data structure organization

The CombICAO v3.1V3.1 is also evaluated in other configurations as mentioned in the Table below.

This ST considers the CombICAO v3.1in the **BAC and CA configuration**.

Configuration	PP Conformity	Extensions to the PP
BAC and CA	**[PP_BAC]**	- **Active Authentication (AA)** - **Chip Authentication Protocol (v1)** - **Restart secure messaging in AES128, AES192 or AES256 secure messaging (in addition to 3DES) after Chip Authentication Protocol (v1)**
EAC in combination with BAC	[PP_EAC]	- Active Authentication (AA) - Enhanced protection over Sensitive biometric data reading
EAC with PACE	[PP_PACE]	- Active Authentication (AA) - Automatic BAC phasing out - Enhanced protection over Sensitive biometric data reading
	[PP_EACwPACE]	
EAC with PACE for French ID	[PP_PACE]	- [ADDENDUM] - Active Authentication (AA) - Automatic BAC phasing out - Enhanced protection over Sensitive biometric data reading
	[PP_EACwPACE]	
SSCD	Config#1 [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], and [PP-SSCD6]	- ADMIN role - Integrity token - EAC v1 (Chip Authentication v1 and Terminal Authentication v1) - PACE
	Config#2 [PP-SSCD2], [PP-SSCD3], [PP-SSCD4]	
	Config#3 [PP-SSCD2], [PP-SSCD3]	

Table 1 Different evaluated configurations of the CombICAO v3.1 application

3.2 TOE Description

The TOE in the BAC configuration encompasses the following features:

- In Personalisation phase:
  - authentication protocol for personalisation agent authentication;
  - 3DES, AES128, AES192 and AES256 Global Platform secure messaging;
  - access control;
  - Creation and configuration of application instances and their logical data structure;
  - Secure data loading;
  - Secure import and/or on-chip generation of Chip Authentication key pairs for CAv1;
  - Secure import and/or on-chip generation of the AA key pair;
  - life-cycle phase switching to operational phase;

- In operational phase:
  - BAC;
  - Active Authentication (AA);
  - Chip Authentication v1 (CAv1);
  - After CAv1: restart ICAO secure messaging in 3DES, AES128, AES192 or AES256 cipher mode;
  - CA Key Renewal;
  - Key Usage Counter;

Note: Active Authentication and Chip Authentication are optional security features.

3.2.1 Physical scope of the TOE

The TOE is physically made up of several components hardware and software.

Once constructed, the TOE is a bare microchip with its external interfaces for communication.

The physical medium on which the microchip is mounted is not part of the target of evaluation as it does not alter nor modify any security functions of the TOE.

The TOE may be used on several physical medium within an inlay, or eCover; in a plastic card are not part of the TOE.

The physical form of the module is depicted in Figure below. The cryptographic boundary of the module is the surface and edges of the die and associated bond pads, shown as circles in the following figure :

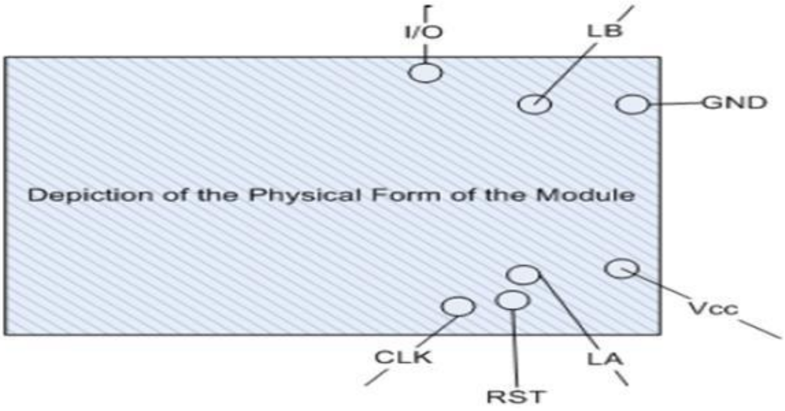


Figure 3 Physical form of the module

3.2.2 Logical scope of the TOE

The TOE is composed of:

- Circuitry of the MRTD's chip (the IC)
- Cosmo X² Platform
  Combicao v3.1

The pre-personalisation and personalisation are performed by the Manufacturer and the Personalisation Agent, which controls the TOE. All along this phase, the TOE is self-protected, as it requires the authentication of the Manufacturer and the Personalisation Agent prior to any operation.

By being authenticated, the Personalisation Agent gets the rights (access control) for

(1) reading and writing data,
(2) instantiating the application, and
(3) writing of personalisation data. The Personalisation Agent can so create the file structure (MF / ADF) required for this configuration.

A schematic overview of the TOE's logical architecture is shown in below figure:

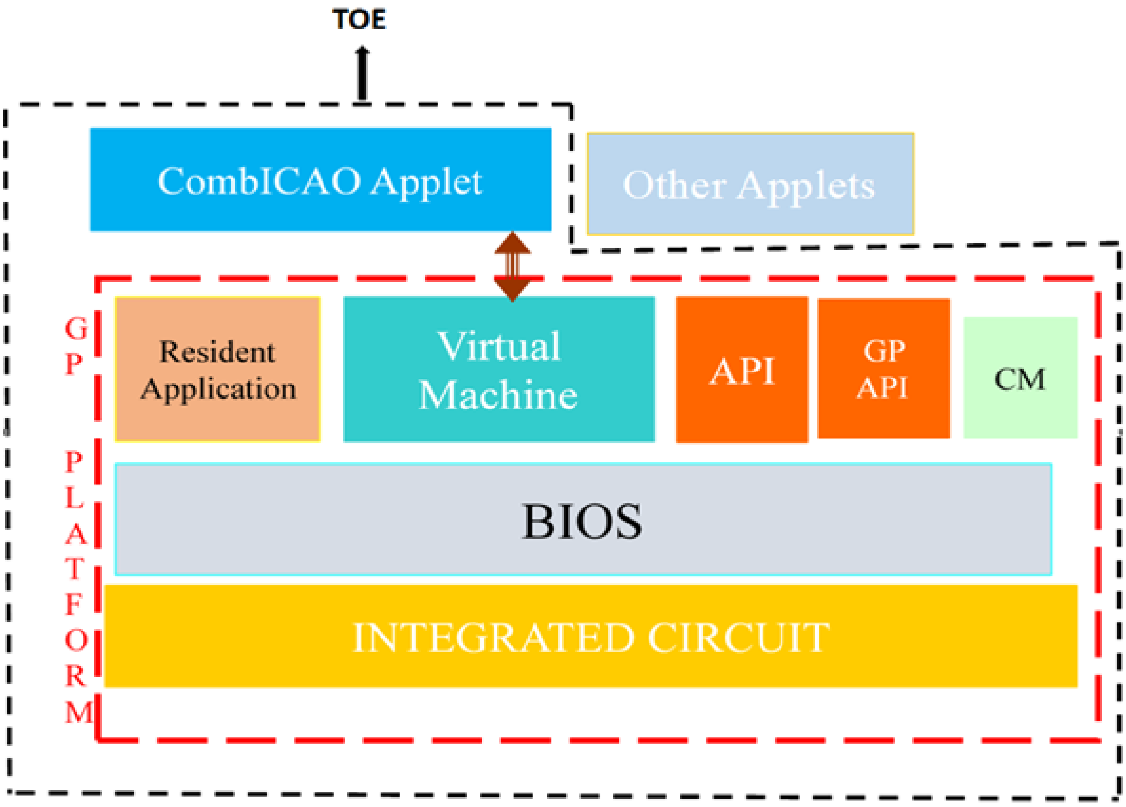


Figure 1 TOE's logical architecture

The following guidance documents will be provided with the TOE:

Guidance	Audience	Form Factor of Delivery
[AGD_PRE]	Personalising Agent	Electronic Version
[AGD_OPE]	End user of the TOE	

An ST Lite version of this Security Target will also be provided along with above-mentioned documents.

Platform related guidance documents are mentioned in [ST_PTF].

"Life Cycle" section in this ST provides more details about the TOE delivery for the different options.

3.3 Required non-TOE hardware/Software/firmware

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

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

3.4 TOE Usage and major security features of the TOE

A State or Organization issues MRTDs to be used by the holder for international travel. The travel document presenter presents a MRTD to the inspection system to prove his or her identity.

The MRTD in context of this Security Target contains

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

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

iii. data elements on the MRTD's chip according to LDS for contactless machine reading. The authentication of the travel document presenter is based on (i) the possession of a valid MRTD personalised 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 MRTD's. The receiving State trusts a genuine MRTD of an issuing State or Organization.

The MRTD is viewed as unit of

(a) the **physical MRTD** as travel document in form of paper, plastic and chip. It presents visual readable data including (but not limited to) personal data of the MRTD holder
   (1) the biographical data on the biographical data page of the passport book,
   (2) the printed data in the Machine-Readable Zone (MRZ) and
   (3) the printed portrait.

(b) the **logical MRTD** as data of the MRTD holder stored according to the Logical Data Structure [ICAO_9303] as specified by ICAO on the contactless integrated circuit. It presents contactless readable data including (but not limited to) personal data of the MRTD holder
   (1) the digital Machine Readable Zone Data (digital MRZ data, EF.DG1),
   (2) the digitized portraits (EF.DG2),
   (3) the optional biometric reference data of finger(s) (EF.DG3) or iris image(s) (EF.DG4) or both
   (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, personalisation procedures) [ICAO_9303]. These security measures include the binding of the MRTD's chip to the passport book.

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

The ICAO defines the baseline security methods Passive Authentication and the optional advanced security methods Basic Access Control to the logical MRTD, Extended Access Control to and the Data Encryption of additional sensitive biometrics as optional security measure in the 'ICAO Doc 9303' [ICAO_9303]. The Passive Authentication Mechanism and the Data Encryption are performed completely and independently on the TOE by the TOE environment.

Mutatis mutandis, the TOE may also be used as an ISO driving licence, compliant to [ISO_18013-3] or [ISO_TR_19446] supporting BAP-1 (the same protocol as BAC but used in the context of driving licence), AA and CA, as both applications (MRTD and IDL) share the same protocols and data structure organization. Therefore, in the rest of the document, the word "MRTD" MAY be understood either as a MRTD in the sense of ICAO, or a driving licence compliant to [ISO_18013-3] or [ISO_TR_19446] depending on the targeted usage envisioned by the issuer.

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

MRTD	ISO-compliant Driving Licence
MRTD	IDL
ICAO	ISO/IEC
ICAO 9303	[ISO_18013-3] or [ISO_TR_19446]
BAC	BAP-1
DG3	DG7
DG4	DG8
DG15	DG13
MRZ or CAN	MRZ or SAI
Traveller	Holder

3.4.1 Active Authentication (AA)

Active Authentication is an authentication mechanism ensuring the chip is genuine. It uses a challenge-response protocol between the IS and the chip.
Active Authentication is realised with the INTERNAL AUTHENTICATE command. The key and algorithms supported are the following:

RSA ISO/IEC 9796-2 with a key length of 1024, 1536 and 2048, bits and hashing algorithm of SHA1 or SHA2 (i.e. SHA256, SHA384 and SHA512).

ECDSA over prime field curves with hashing algorithm of SHA1 or SHA2 (i.e. SHA256, SHA384 and SHA512) and the key sizes 192 to 521.

3.4.2 Basic Access Control (BAC)

The protocol for Basic Access Control is specified by [ICAO_9303]. Basic Access Control checks that the terminal has physical access to the MRTD's data page. This is enforced by requiring the terminal to derive an authentication key from the optically read MRZ of the MRTD. The protocol for Basic Access Control is based on [ISO11770-2] key establishment mechanism 6. This protocol is also used to generate session keys that are used to protect the confidentiality (and integrity) of the transmitted data.

The Basic Access Control (BAC) is a security feature that is supported by the TOE. The inspection system reads the printed data on the document (MRZ), authenticates itself as inspection system by means of keys derived from MRZ data. After successful 3DES based authentication, the TOE provides read access to data requiring BAC rights by means of a private communication (secure messaging) with the inspection system.

The purpose of this mechanism is to ensure that the holder gives access to the IS to the logical MRTD (data stored in the chip); It is achieved by a mutual authentication.

Once the mutual authentication is performed, a secure messaging is available to protect the communication between the chip and the IS.

This table lists the supported configurations for BAC protocol:

Configuration	Key Algo	Key Length	Hash Algo	MAC Algo
BAC	3DES 2Key	16-bytes	SHA-1	Retail MAC

Table 2 BAC Configuration

3.4.3 Chip Authentication Protocol (v1)

The Chip Authentication Protocol is an ephemeral-static Diffie-Hellman key agreement protocol that provides secure communication and unilateral authentication of the MRTD chip.

The protocol establishes Secure Messaging between an MRTD chip and a terminal based on a static key pair stored on the MRTD chip. Chip Authentication is an alternative to the optional ICAO Active Authentication, i.e. it enables the terminal to verify that the MRTD chip is genuine but has two advantages over the original protocol:

- Challenge Semantics are prevented because the transcripts produced by this protocol are non-transferable.
- Besides authentication of the MRTD chip this protocol also provides strong session keys.

CAv1 provides implicit authentication of both the MRTD chip itself and the stored data by performing Secure Messaging using the new session keys.

3.4.4 *Other features*

3.4.4.1 Key Usage Counter

The TOE supports an optional feature that allows the issuing country to limit the number of times a key may be used in the field, in particular the Chip Authentication key, the BAC key and the generated secure messaging key.

When configured, the corresponding Key Usage Counter is decremented for every operation the key is used and once the counter reaches zero (i.e. key is blocked), the key can no longer be used.

3.4.4.2 CA Key Renewal / Invalidation

When configured, the Chip Authentication key may be renewed or invalidated. This operation is protected by the Administration Agent key.

3.5 TOE delivery

The TOE is composed of:

- Circuitry of the MRTD's chip (the IC)
- IC Dedicated Software with the parts IC Dedicated Test Software and IC Dedicated Support Software
- Cosmo X²: see [ST_PTF] and [PTF_CERT]
- CombICAO v3.1 application: the application can be delivered as part of the OS and loaded in the flash or as Cap-file that can be loaded using the GP-mechanisms implemented
- Associated guidance documentation (delivered in electronic version)

The current Public ST Lite version will also be provided as a guidance document along with above-mentioned documents

TOE Component	Identification	Form Factor of Delivery	Delivery method
CombICAO v3.1 applet	20 38 21 FF	ID1 or ID3 Passport booklets ID1 cards or ID3 holder pages	Pre-Personalistion and personalisation tool is used in the case of an Image delivery.

TOE Component	Identification	Form Factor of Delivery	Delivery method
		Antenna[1] inlays Chip in modules on a reel	Otherwise, trusted courier is used.
CombICAO v3.1 guidance	[AGD_PRE] [AGD_OPE]	PDF Electronic doc	PGP-encrypted parts on USB or CD media, off-line registered distribution by trusted courier
Underlying platform guidance	[PTF_AGD_OPE] [PTF_AGD_PRE] [PTF_AGD_ALP]		

[1] The inlay production including the application of the antenna is not part of the TOE

4 Life Cycle

The TOE life cycle in the following figure distinguishes stages for development, production, preparation and operational use in accordance with the standard smart card life cycle [PP_IC].

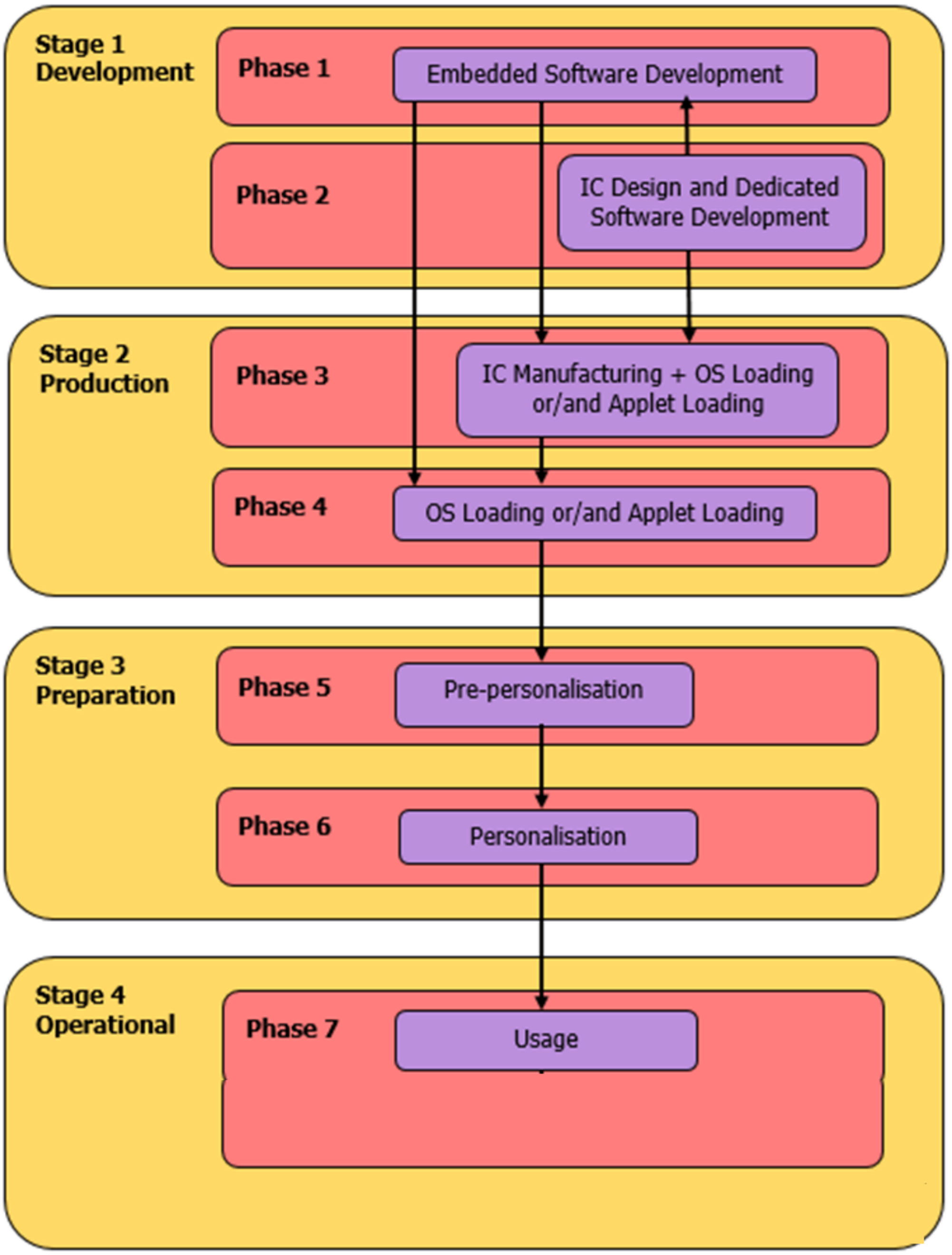


Figure 2 Life cycle Overview

4.1 Development Environment

In this environment, the following two phases take place:

- Phase 1: IC Embedded Software Development (Java Card Open Platform components and CombICAO v3.1)
- Phase 2: IC Development

The IC Embedded Software Developer is in charge of the specification, development and validation of the software (Java Card Open Platform and CombICAO v3.1).

The IC Developer designs the IC, develops the IC dedicated software and provides information, software or tools to the IC embedded software developer.

Roles, actors, sites and coverage for this environment of the product life-cycle are listed in the table below:

Role	Actor	Site	Covered by
CombICAO v3.1v3.1 Developer	IN Smart Identity	MANILA, SOPHIA and COURBEVOIE R&D sites	ALC
Embedded Software Developer (Java Card Open Platform)	IN Smart Identity	Platform Developer Refer to [ST_PTF]	ALC
Redaction and Review of Documents	IN Smart Identity	MANILA and COURBEVOIE R&D sites	ALC
IC Developer	STARCHIP	IC Manufacturer Refer to [ST_PTF]	ALC

Table 3 : Development R&D Sites

4.2 Production Environment

In this environment, the following two phases take place:

- Phase 3: IC Manufacturing
- Phase 4: Cosmo X² Platform loading and CombICAO v3.1 loading

The CombICAO v3.1 run time code is integrated in the FLASH memory of the chip.

Depending on the intention, the following different loading options are supported. Details on delivery methods for each option are provided in the **[AGD_PRE].**

IN Smart Identity and IDEMIA CC Audited Production Sites are listed below:

IN Smart Identity and IDEMIA CC Audited Production Sites/Plants	Country
Haarlem	Netherlands
Noida	India
Ostrava	Czech Republic
Shenzhen	China
Vitré	France

Table 4 : Audited Production Sites

(Option 1) Image Loading audited IC Manufacturer site

FLASH image containing both the " Cosmo X²" Java Card Platform OS along with the CombICAO v3.1 is securely delivered directly from the software developer (IN Smart Identity R&D Audited Site) to the **IC Manufacturer** (Starchip CC Audited Site) to be loaded into FLASH memory. The FLASH image is always encrypted.

TOE Delivery point (i.e. point in time where the TOE starts to exist):

- The TOE delivery point occurs in Phase 4, as soon as the loading of the image with Cosmo X² Platform + CombICAO v3.1 by the IC Manufacturer has been completed.

Package	Actor for FLASH image loading	Site For FLASH image loading	Covered by CC
FLASH image containing Cosmo X² Platform + CombICAO v3.1	IC Manufacturer	IC Manufacturer CC Audited Production Plants specified in [ST_PTF]	ALC

Table 5 Option 1: Both Platform and Applet packages are loaded at IC Manufacturer Site

(Option 2) Image loading at IN Smart Identity or IDEMIA Audited sites

FLASH image containing both Cosmo X² Platform along with CombICAO v3.1 is securely delivered directly from the software developer (IN Smart Identity R&D Audited Site) for loading to **CC Audited IN Smart Identity or IDEMIA Production Sites** (Refer Audited Production Sites Table).

TOE Delivery point:

- Loading of Cosmo X² Platform + CombICAO v3.1 is performed in Audited IN Smart Identity or IDEMIA Production Sites, then TOE delivery is considered at the end of Phase 4.

Package	Actor for FLASH image loading	Site for FLASH image loading	Covered by CC
FLASH image containing the Cosmo X² Platform + CombICAO v3.1	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC

Table 6 Option 2: Both Platform and Applet packages are loaded at CC Audited IN Smart Identity or IDEMIA Sites

(Option 3) Platform loaded by IC Manufacturer, Applet loaded by IN Smart Identity or IDEMIA or 3rd party
Only the Cosmo X² Platform is delivered to the IC Manufacturer (Starchip Audited Sites) to be loaded.

With the Cosmo X² Platform already loaded (i.e. present) on the chip, the following options (**3a or 3b or 3c**) can be chosen for loading the CombICAO v3.1.

(Option 3a) Applet loading using GP CLFDB mechanism.

The CombICAO v3.1 along with the TOE's guidance documentation is securely delivered directly from the Software Developer (IN Smart Identity R&D Audited Site) to **Audited IN Smart Identity or IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IN Smart Identity or IDEMIA Sites** or **External Sites**.

Loading of the CombICAO v3.1 on top of the already present Cosmo X² Platform GP Java Card OS in any of these sites is accomplished by using a GP CLFDB decryption Key.

TOE Delivery points:

- If loading of the CombICAO v3.1 on top of already loaded Cosmo X² Platform (as described below) is done in a CC Audited IN Smart Identity or IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.

- If loading of the CombICAO v3.1 on top of already loaded Cosmo X² Platform (as described below) is done in Non-Audited IN Smart Identity or IDEMIA Production Sites or External Sites then, TOE delivery is considered after phase 4.

Package	Actor	Site	Covered by
Image containing only Cosmo X² Platform	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF-CERT]	ALC
CombICAO v3.1 loaded through GP mechanism using CLFDB Key	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IN Smart Identity or IDEMIA Sites or External Sites	AGD

Table 7 Option 3(a): Platform package is loaded at IC Manufacturer Site and Applet package is loaded at Audited IN Smart Identity or IDEMIA Sites or Non-Audited IN Smart Identity or IDEMIA Sites or External Sites through GP Mechanism

(Option 3b) Applet loading using the IN Smart Identity Resident Application

CombICAO v3.1 along with the guidance documentation is securely delivered directly from the Software Developer (IN Smart Identity R&D Audited Site) to **Audited IN Smart Identity or IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IN Smart Identity or IDEMIA Sites** or **External Sites**.

CombICAO v3.1 package is securely loaded via LSK on top of the present Cosmo X² Platform Java Card OS in any of these sites. This loading is accomplished by using the IN Smart Identity "Resident Application" of the Cosmo X² Platform.

TOE Delivery points:

- If loading of Applet package on top of already loaded Cosmo X² Platform (as described below) is done in Audited IN Smart Identity or IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.
- If loading of Applet package on top of already loaded Cosmo X² Platform (as described below) is done in Non-Audited IN Smart Identity or IDEMIA Production Sites or External Sites then, TOE delivery after Phase 4.

Package	Actor	Site	Covered by
Image containing only Cosmo X^{2} Platform	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF-CERT]	ALC
3b CombICAO v3.1 loaded through Resident Application using LSK format	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IN Smart Identity or IDEMIA Sites or External Sites	AGD

Table 8 Platform package is loaded at IC Manufacturer Site and Applet package is loaded through resident application using LSK format in Ciphered format is loaded

(Option 3c) Applet loading in plain (unprotected) format using GP
CombICAO v3.1 along with the guidance documentation is securely delivered directly from the Software Developer (IN Smart Identity R&D Audited Site) to **CC Audited IN Smart Identity Production Sites** (Refer Audited Production Sites Table).

Here, there is a provision for loading the applet in plain format in **Common Criteria Audited IN Smart Identity Sites only,** on top of the platform already loaded by IC Manufacturer (Starchip). This applet loading in plain format is not allowed in Non-Audited IN Smart Identity Sites or External Sites.

TOE Delivery points:

- The loading of CombICAO v3.1 on top of already loaded Cosmo X^{2} Platform is done in plain (unprotected) format in Common Criteria Audited IN Smart Identity Production Sites. The TOE delivery is considered at the end of Phase 4.

Package	Actor	Site	Covered by
Image containing only Cosmo X² Platform	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF-CERT]	ALC
CombICAO v3.1 in Plain Format	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC

Table 9 Option 3(c): Platform package is loaded at IC Manufacturer Site and Applet package in plain format is loaded at Audited IN Smart Identity Sites only

(Option 4) Platform loaded only by IN Smart Identity or IDEMIA Audited sites and Applet loaded by IN Smart Identity or IDEMIA or 3rd party

Only Cosmo X² Platform is securely delivered directly from the software developer (IN Smart Identity R&D Audited Site) for loading to **CC Audited IN Smart Identity or IDEMIA Production Sites** (Refer Audited Production Sites Table)

The following options (**4a or 4b or 4c**) can be chosen for loading applets on top of the already loaded platform.

(Option 4a) Applet loading using GP CLFDB mechanism CombICAO v3.1 along with the guidance documentation is securely delivered directly from the Software Developer (IN Smart Identity R&D Audited Site) to **Audited IN Smart Identity or IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IN Smart Identity or IDEMIA Sites** or **External Sites**.

Loading of Applet in any of these sites is done through GP mechanism using CLFDB Key on top of the platform already loaded by **CC Audited IN Smart Identity or IDEMIA Production Sites** or **Non-Audited IN Smart Identity or IDEMA Sites** or **External Sites**.

TOE Delivery points:

- If loading of the CombICAO v3.1 on top of already loaded Cosmo X² Platform (as described below) is done in CC Audited IN Smart Identity or IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.
- If loading of the CombICAO v3.1 onto the already loaded Cosmo X² Platform (as described below) is done in Non-Audited IN Smart Identity or IDEMIA Production Sites or External Sites then, TOE delivery is considered after Phase 4.

Package	Actor	Site	Covered by
Image containing only Cosmo X² Platform	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
CombICAO v3.1 loaded through GP mechanism using CLFDB Key	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IN Smart Identity or IDEMIA Sites or External Sites	AGD

Table 10 Option 4(a): Platform package is loaded at Audited IN Smart Identity or IDEMAI Sites and Applet package is loaded at Audited IN Smart Identity or IDEMIA Sites or Non-Audited IN Smart Identity or IDEMIA Sites or External Sites through GP Mechanism

(Option 4b) Applet loading using the IN Smart Identity Resident Application

CombICAO v3.1 along with the guidance documentation is securely delivered directly from the Software Developer (IN Smart Identity R&D Audited Site) to **Audited IN Smart Identity** or IDEMIA **Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IN Smart Identity** or IDEMIA **Sites** or **External Sites**.

Secure loading of CombICAO v3.1 is done via LSK on top of the present Cosmo X² Java Card OS (already loaded by **Audited IN Smart Identity** or IDEMIA **Production Sites)** in any of these sites. This loading is accomplished by using the IN Smart Identity "Resident Application" of the Cosmo X² Platform OS

TOE Delivery points:

- If loading of Applet package on top of already loaded Cosmo X² Platform (as described below) is done in Audited IN Smart Identity or IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.
- If loading of Applet package on top of already loaded Cosmo X² Platform (as described below) is done in Non-Audited IN Smart Identity or IDEMIA Production Sites or External Sites then, TOE delivery is considered after Phase 4.

Package	Actor	Site	Covered by
Image containing only Cosmo X^2 Platform	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
4b CombICAO v3.1 package loaded through Resident Application using LSK format	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IN Smart Identity or IDEMIA Sites or External Sites	AGD

Table 11 Platform package is loaded at Audited IN Smart Identity or IDEMIA Sites and Applet package is loaded at Audited IN Smart Identity or IDEMIA Sites or Non-Audited sites or External Sites through Resident application using LSK format

(Option 4c) Applet loading in plain (unprotected) format using GP
CombICAO v3.1 along with the guidance documentation is securely delivered directly from the Software Developer (IN Smart Identity R&D Audited Site) to **Audited IN Smart Identity Production Sites** (Refer Audited Production Sites Table).

Here, there is a provision of loading the applet in plain format in Audited IN Smart Identity Sites **only,** on top of the platform already loaded by Audited IN Smart Identity Production Sites. This applet loading in plain format is not allowed in Non-Audited IN Smart Identity Sites or External Sites.

TOE Delivery points:

- Here, since the loading of Applet package on top of already loaded Cosmo X^2 Platform (as described below) is done in Plain format in CC Audited IN Smart Identity Production Sites, so TOE delivery is considered at the end of Phase 4.

Package	Actor	Site	Covered by
Image containing only Platform	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC
CombICAO v3.1 in Plain Format	IN Smart Identity Authorized Entity	Refer Audited Production Sites Table	ALC

Table 12 Option 4(c): Platform package is loaded at Audited IN Smart Identity or IDEMIA Sites and Applet package in plain format is loaded at Audited IN Smart Identity Sites only

4.3 Preparation Environment

In this environment, the following two phases take place:

- Phase 5: Pre-personalisation of the applet
- Phase 6: Personalisation

The preparation environment may not necessarily take place in a manufacturing site, but may be performed anywhere. All along these two phases, the TOE is self-protected as it requires the authentication of the pre-personalisation agent or personalisation agent prior to any operation.

The CombICAO v3.1 is pre-personalised and personalised according to [AGD_PRE].

These two phases are covered by [AGD_PRE] tasks of the TOE and Guidance tasks of [ST_PTF].

4.4 Operational Environment

Phase 7: Use Phase

The TOE is used as a travel document's chip by the traveller and the inspection systems in the "Operational Use" phase. The user data can be read according to the security policy of the issuing State or Organisation and can be used according to the security policy of the issuing State but they can never be modified for eMRTD application.
Note that applications can be loaded onto the Cosmo X² platform during this phase.

During this phase, the TOE may be used as described in [AGD_OPE] of the TOE.

This phase is covered by [AGD_OPE] tasks of the TOE and Guidance tasks of [ST_PTF].

5 Conformance claims

5.1 Common Criteria Conformance Claim

This security target claims conformance to the Common Criteria version 3.1, revision 5 [CC2] and [CC3].

The conformance to the CC is claimed as follows:

CC	Conformance rationale
Part 2	Conformance with the extended[3] part: ▪ FAU_SAS.1 "Audit Storage" ▪ FCS_RND.1 "Quality metric for random numbers" ▪ FMT_LIM.1 "Limited capabilities" ▪ FMT_LIM.2 "Limited availability" ▪ FPT_EMS.1 "TOE Emanation" ▪ FIA_API.1[2] "Authentication Proof of Identity"
Part 3	Conformance to EAL4, augmented with ▪ ALC_DVS.2 "Sufficiency of security measures" defined in [CC3], ▪ ADV_FSP.5 "Complete semi-formal functional specification with additional error information" defined in [CC3], ▪ ADV_INT.2 "Well-structured internals" defined in [CC3], ▪ ADV_TDS.4 "Semiformal modular design" defined in [CC3], ▪ ALC_CMS.5 "Development tools CM coverage" defined in [CC3], ▪ ALC_TAT.2 "Compliance with implementation standards" defined in [CC3], ▪ ATE_DPT.3 "Testing: modular design" defined in [CC3]. ▪ ALC_FLR.3: "Systematic Flaw Remediation"

Table 13 Common Criteria conformance claim

Remark:

For interoperability reasons, it is assumed the receiving state cares for sufficient measures against eavesdropping within the operating environment of the inspection systems. Otherwise, the TOE may protect the confidentiality of some less sensitive assets (e.g. the personal data of the TOE holder which are also printed on the physical TOE) for some specific attacks only against enhanced basic attack potential (AVA_VAN.3).

The Common Methodology for Information Technology Security Evaluation [CEM] has been taken into account.

The applet runs on the certified underlying Java Card Open Platform [PTF_CERT].

[2] FIA_API.1 has been added to this security target for the needs of the Chip Authentication Protocol.

5.2 Protection Profile Conformance Claim

This security target (ST) claims strict conformance to:

- [PP_BAC]: 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

This ST also addresses Active Authentication as an additional authentication protocol.
Since the Chip Authentication protocol is an alternative to the Active Authentication defined in [ICO_9303], the additional assumptions and security objectives for the operational environment counter the same threats as the ones for chip authentication. They however do not mitigate the threat, and instead provide an additional functionality to the ones defined in the PP.

The additional functionality of the Chip Authentication (CA) and Active Authentication protocols available in operational use phase has been added to the TOE with:

- additional threats (T.Configuration, T.Counterfeit, T.ADMIN_Configuration and T.Key_Usage)
- additional organizational security policies (P.Activ_Auth)
- additional assumptions (A.Insp_Sys_Chip_Auth, A.Signature_PKI and A.Insp_Sys_AA)
- additional objectives for the TOE (OT.Chip_Auth_Proof, OT.Configuration, OT.AA_Proof and OT.Data_Int_AA, OT.ADMIN_Configuration, OT.Key_Usage_Counter and OT.AC_SM_Level)

- additional objectives for the environment (OE.Auth_MRTD, OE.Exam_Chip_Auth, OE.Exam_MRTD_AA, OE.Prot_Logical_MRTD_AA, OE.Activ_Auth_Verif and OE.Activ_Auth_Sign)

The additions do not contradict any of the threats, assumptions, organizational policies, objectives or SFRs stated in the [PP_BAC] that covers the advanced security methods BAC in operational use phase.

The underlying Java Card Open Platform of the TOE is evaluated and certified in accordance with the Java Card™ System Protection Profile Open Configuration [PP_JAVACARD].

The underlying integrated circuit is successfully evaluated and certified in accordance with the Security IC Platform Protection Profile [PP_IC].

5.3 Package Claim

This ST is conforming to assurance package EAL4 augmented with ADV_FSP.5, ADV_INT.2, ADV_TDS.4, ALC_CMS.5, ALC_DVS.2, ALC_TAT.2, and ATE_DPT.3 and ALC_FLR.3 defined in CC part 3 [CC3].

EAL4 was chosen because it offers a good compromise between security rigor and economic feasibility. It allows for reasonably high assurance based on sound industrial development practices, without requiring overly specialized skills. This level is suitable for standard products for which a moderate to high level of independent assessment is desired, particularly when securing an existing solution without excessive costs.

5.3.1 EAL Rationale

5.3.1.1 ALC_DVS.2 "Sufficiency of security measures"

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

The component ALC_DVS.2 augmented to EAL4 has no dependencies to other security requirements.

5.3.1.2 ADV_FSP.5 "Complete semi-formal functional specification with additional error information"

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

5.3.1.3 ADV_INT.2 "Well-structured internals"

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

5.3.1.4 ADV_TDS.4 "Semiformal modular design"

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

5.3.1.5 ALC_CMS.5 “Development tools CM coverage”

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

5.3.1.6 ALC_TAT.2 “Compliance with implementation standards”

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

5.3.1.7 ATE_DPT.3 “Testing: modular design”

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

5.3.2 Main aspects

- The TOE description is based on the TOE definition and TOE usage of [PP_BAC]. It was enhanced by product specific details.

- All definitions of the security problem definition in [PP_BAC] have been taken exactly from the protection profile in the same wording.

- Except those in section 5.3.8 *Additional Security Objectives,* the security objectives have been taken exactly from [PP_BAC] in the same wording.

- The part of extended components definition has been taken originally from [PP_BAC].

- Except those in section *5.3.10 Additional Security Functional Requirements*, the SFRs for the TOE have been taken originally from the [PP_BAC] added by according iterations, selections and assignments.

- The security assurance requirements (SARs) have been taken originally from the [PP_BAC].

5.3.3 Overview of differences between the PP and the ST

The following parts list additional Subject, Threats and Objectives for this TOE, which are not in [PP_BAC].

These additions do not contradict with any other Subjects, Threats and Objectives of the TOE of the original PP nor mitigate a threat (or part of a threat), meant to be addressed by security objectives for the TOE in the PP.

5.3.4 Additional Subjects

The following additional Subject are identified:

- **Pre-personalization Agent**
- **MRTD packaging responsible**
- **Embedded software loading responsible**
- **Administrator**

5.3.5 Additional Threats

The following additional Threats are identified:

- **T.Counterfeit**
- **T.Configuration**
- **T.ADMIN_Configuration**
- **T.Key_Usage**

5.3.6 Additional Organisational Security Policies

The following additional Organisational Security Policy is identified:

- **P.Activ_Auth**

5.3.7 Additional Assumptions

The following additional Assumptions are identified:

- **A.Insp_Sys_Chip_Auth**
- **A.Signature_PKI**
- **A.Insp_Sys_AA**

5.3.8 Additional Security Objectives

The following additional Security Objectives of the TOE are identified:

- **OT.Chip_Auth_Proof**
- **OT.Configuration**
- **OT.AA_Proof**
- **OT.Data_Int_AA**
- **OT.ADMIN_Configuration**
- **OT.Key_Usage_Counter**
- **OT.AC_SM_Level**

5.3.9 Additional Security Objectives for the Operational Environment

The following additional Security Objectives of the Operational Environment are identified:

- **OE.Auth_MRTD**
- **OE.Exam_Chip_Auth**
- **OE.Exam_MRTD_AA**
- **OE.Prot_Logical_MRTD_AA**
- **OE.Activ_Auth_Verif**
- **OE.Activ_Auth_Sign**

5.3.10 Additional Security Functional Requirements

The following additional Security Functional Requirements are identified:

- **FCS_CKM.1/CA**
- **FCS_COP.1/AA**
- **FCS_COP.1/CA_SHA**
- **FCS_COP.1/CA_ENC**
- **FCS_COP.1/CA_MAC**
- **FCS_CKM.1/GP**
- **FCS_COP.1/GP_ENC**
- **FCS_COP.1/GP_AUTH**
- **FCS_COP.1/GP_MAC**
- **FCS_COP.1/GP_KEY_DEC**
- **FIA_UAU.5/MP**
- **FIA_UAU.6/MP**
- **FIA_AFL.1/MP**
- **FIA_UAU.5/CA**
- **FIA_UAU.6/CA**
- **FIA_API.1/CA**
- **FDP_ACC.1/CA**
- **FDP_ACF.1/CA**
- **FDP_UCT.1/CA**
- **FDP_UIT.1/CA**
- **FDP_DAU.1/AA**
- **FDP_ITC.1/AA**
- **FMT_MOF.1/PROT**
- **FMT_MOF.1/AA**
- **FMT_MTD.1/CAPK**
- **FMT_MTD.1/CAPK_READ**
- **FMT_MTD.1/AA_KEY_READ**
- **FMT_MTD.1/AA_KEY_WRITE**
- **FMT_MTD.1 /LCS_PERS**
- **FMT_MTD.1/ADMIN**
- **FMT_MTD.1/Key_Usage_Counter**
- **FMT_MTD.1/SM_LVL**
- **FTP_ITC.1/MP**

Note: FPT_EMSEC.1 from [PP_BAC] has been renamed to FPT_EMS.1, in order to keep the SFR formatting.

5.4 CC Conformance and usage in real life

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

- If the terminal reads MRTD data by performing only BAC, the security of the MRTD will be covered by the security evaluation of the TOE described in the ST claiming compliance to the [PP_BAC] only.

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

- If the terminal reads the content of the MRTD by performing PACE then EAC, the security of the MRTD will be covered by the security evaluation of the TOE described by the ST claiming compliance to [PP_EACwPACE], assuming PACE is supported by the terminal (as not used for the inspection procedure).

6 Security Problem Definition

6.1 Assets

6.1.1 Logical MRTD Data

The following table presents the assets of the TOE and their corresponding phase(s) according to section 1.2.3

Asset	Phase 5	Phase 6	Phase 7
Personal Data	No	Yes	Yes
Biometric Data	No	Yes	Yes
EF.COM	No	Yes	Yes
EF.SOD	No	Yes	Yes
CA_PK	No	Yes	Yes
CA_SK	No	Yes	Yes
Perso_K	No	Yes	No
BAC_K	No	Yes	Yes
Session_K	Yes	Yes	Yes
LCS	Yes	Yes	Yes
AA_PK	No	Yes	Yes
AA_SK	No	Yes	Yes
Pre-Perso_K	Yes	No	No

Active Authentication key (AA_SK)

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

Active Authentication key (AA_PK)

The public key is stored in data group DG15 and thus protected by Passive Authentication.

Personal Data

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

Biometric Data

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

EF.COM

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

EF.SOD

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

Chip Authentication Public Key (CA_PK)

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

Chip Authentication Private Key (CA_SK)

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

Personalization Agent keys (Perso_K)

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

Pre-Personalization Agent keys (Pre-Perso_K)

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

BAC keys (BAC_K)

This key set used for secure communication establishment between the Terminal and the chip.

Secure Messaging session keys (Session_K)

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

TOE Life Cycle State (LCS)

This is the Life Cycle State related to the Prepersonalization, Personalisation and use phase of the application.

6.1.2 Miscellaneous

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.

6.2 Users / Subjects

The following table presents the subjects of the TOE and their corresponding phase(s) according to §3.2 TOE description

Subject	Phase 3	Phase 4	Phase 5	Phase 6	Phase 7
IC manufacturer(Manufacturer role)	Yes	No	No	No	No
MRTD packaging responsible(Manufacturer role)	No	Yes	No	No	No
Embedded software loading responsible(Manufacturer role)	No	Yes	No	No	No
Pre-personalization Agent(Manufacturer role)	No	No	Yes	No	No
Personalization Agent	No	No	No	Yes	No
Terminal	No	No	Yes	Yes	Yes
Inspection System	No	No	No	No	Yes
MRTD Holder	No	No	No	No	Yes
Traveler	No	No	No	No	Yes
Attacker	Yes	Yes	Yes	Yes	Yes

6.2.1 Additional Subject

Pre-personalization Agent

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

MRTD packaging responsible

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

Embedded software loading responsible

This additional subject is a refinement of the role Manufacturer as described in [PP_BAC]. This subject is responsible for the embedded software loading when the applet is loaded by the OS loader in phase 4 before TOE delivery point This subject does not exist if the applet is loaded by the IC Manufacturer. This subject used the Flash loader embedded in the IC.

Administrator

The role ADMIN is an Administrator in use phase who can act on the TOE configuration. The administrative actions are dedicated to:

- Manage symmetric authentication using Administration Agent keys,
- Configure the size or value of the Chip Authentication key to be modified in USE phase,
- Change the key parameters during the key generation process,
- Invalidate one of the Chip Authentication key in USE phase and to set the secondary key as being the primary key.

6.2.2 Miscellaneous

IC Manufacturer

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

If the IC Manufacturer loads the TOE at phase 3, this subject is responsible for the embedded software downloading in the IC. This subject does not use Flash loader, even if it is embedded in the IC.

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 (iv) signing the Document Security Object defined in [ICAO_9303].

Terminal

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

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

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 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. 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.

6.3 Threats

6.3.1 Threats from Protection Profile

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 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 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 chip.

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

Asset: authenticity of logical MRTD data.

T.Abuse-Func

"Abuse of Functionality"

Adverse action: An attacker may use functions of the TOE which shall not be used in the phase "Operational Use" in order (i) to manipulate User Data, (ii) to manipulate (explore, bypass, deactivate or change) security features or functions of the TOE or (iii) to disclose or to manipulate TSF Data. This threat addresses the misuse of the functions for the initialization and the personalization in the operational state after delivery to 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 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.

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.

T.Malfunction

"Malfunction due to Environmental Stress"

Adverse action: An attacker may cause a malfunction of TSF or of the MRTD’s chip Embedded Software by applying environmental stress in order to (i) deactivate or modify security features or functions of the TOE or (ii) circumvent, deactivate or modify security functions of the MRTD’s chip Embedded Software. This may be achieved e.g. by operating the MRTD’s chip outside the normal operating conditions, exploiting errors in the MRTD’s chip Embedded Software or misusing administration function. 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.

6.3.2 Additional Threats Identified

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

T.Configuration

"Tampering attempt of the TOE during preparation"

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

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

Asset: authenticity of logical MRTD data

T.ADMIN_Configuration

Adverse action: An attacker may access to the TOE at user phase (phase 7) to try to (i) deactivate or modify security features or functions of the TOE or (ii) circumvent, deactivate or modify security functions of the travel document's embedded software.

Threat agent: having high attack potential, being in possession of one or more legitimate travel document in Operational use phase.

Asset: authenticity of logical travel document data.

T.Key_Usage

Adverse action: An attacker may use the internal secret keys of the TOE while the maximum of Key_Usage_Counter is not reached.

Threat agent: having high attack potential, being in possession of a legitimate travel document.

Asset: TOE internal secret cryptographic keys

6.4 Organisational Security Policies

6.4.1 Additional OSP

P.Activ_Auth

The terminal implements the Active Authentication protocol as described in [ICAO_9303]

6.4.2 OSP from PP

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-personalization Data which contains at least the Personalization 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:

Note that EF.DG3 and EF.DG4 are only readable after successful EAC authentication, not covered by this ST.

6.5 Assumptions

6.5.1 Additional Assumptions

A.Insp_Sys_Chip_Auth

"Inspection Systems for global interoperability on chip authenticity"

The Inspection System implements the following protocol to authenticate the MRTD's chip: Chip Authentication v1 as defined in [TR_03110-3].

The Inspection System is used by the border control officer of the receiving State (i) examining an MRTD presented by the traveler and verifying its authenticity and (ii) verifying the traveler as MRTD holder. The Basic Inspection System for global interoperability (i) includes the Country Signing 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. The General Inspection System in addition to the Basic Inspection System implements the Chip Authentication Mechanism v1. The General Inspection System reads the logical travel document under BAC and performs the Chip Authentication v1 to verify the logical travel document and establishes a new secure messaging that is different from the BAC one.

A.Signature_PKI

"PKI for Passive Authentication"

The issuing and receiving States or Organizations establish a public key infrastructure for passive authentication i.e. digital signature creation and verification for the logical MRTD. The issuing State or Organization runs a Certification Authority (CA) which securely generates stores and uses the Country Signing CA Key pair. The CA keeps the Country Signing CA Private Key secret and is recommended to distribute the Country Signing CA Public Key to ICAO, all receiving States maintaining its integrity. The Document Signer (i) generates the Document Signer Key Pair, (ii) hands over the Document Signer Public Key to the CA for certification, (iii) keeps the Document Signer Private Key secret and (iv) uses securely the Document Signer Private Key for signing the Document Security Objects of the MRTDs. The CA creates the Document Signer Certificates for the Document Signer Public Keys that are distributed to the receiving States and Organizations.

A.Insp_Sys_AA

The Inspection System implements the Active Authentication Mechanism. The Inspection System verifies the authenticity of the MRTD's chip during inspection using the signature returned by the TOE during Active Authentication.

6.5.2 Assumptions from PP

A.MRTD_Manufact

"MRTD manufacturing on phase 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 phase 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.
- 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, and (iv) 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.Insp_Sys

"Inspection Systems for global interoperability"

The Inspection System is used by the border control officer of the receiving State (i) examining an MRTD presented by the traveler and verifying its authenticity and (ii) verifying the traveler as MRTD holder. The Basic Inspection System for global interoperability (i) includes the Country Signing Public Key and the Document Signer Public Key of each issuing State or Organization, and (ii) implements the terminal part of the Basic Access Control [ICAO_9303]. The Basic Inspection System reads the logical MRTD under Basic Access Control and performs the Passive Authentication to verify the logical MRTD.

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_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.

7 Security Objectives

7.1 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.

7.1.1 Additional Objectives

OT.Chip_Auth_Proof

"Proof of MRTD's chip authenticity"

The TOE must support the 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 Chip Authentication as defined in [TR_03110-3] the chip is genuine and chip and data page belong to each other as defined in [ICAO_9303].The authenticity proof provided by MRTD's chip shall be protected against attacks with high attack potential.

OT.Configuration

"Protection of the TOE preparation"

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

OT.AA_Proof

The TOE must support the Inspection Systems to verify the identity and authenticity of MRTD's chip as issued by the identified issuing State or Organization by means of the Active Authentication as defined in [ICAO_9303]. The authenticity proof through AA provided by MRTD's chip shall be protected against attacks with high attack potential.

OT.Data_Int_AA

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 the integrity of the logical MRTD data during their transmission to the General Inspection System after Active Authentication.

OT.ADMIN_Configuration

Protection of the TOE administration

In user phase, the TOE must ensure the administration actions are only authorized for Administrator. The TOE must control the access to its sensitive information and its functions and must provide the means to secure exchanges using cryptographic functions.

OT.Key_Usage_Counter

Configuration of Key Usage Counter

The TOE must protect the key usage through OT.Key_Usage_Counter that support a Key Usage Counter which should be decremented by one each time the key is used. Once the counter is depleted, the key should become unusable.

OT.AC_SM_Level

Secure Messaging Level

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

7.1.2 Objectives from PP

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 Personalization 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 personalization. The Document security object can be updated by authorized Personalization Agents if data in the data groups EF.DG 3 to EF.DG16 are added.

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.

OT.Identification

"Identification and Authentication of the TOE"

The TOE must provide means to store IC Identification and Pre-Personalization Data in its non-volatile 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.

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 IC Embedded 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

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 has not been proven or tested. This is to prevent errors. The environmental conditions may include external energy (esp. electromagnetic) fields, voltage (on any contacts), clock frequency, or temperature.

7.1.3 OT origin

Security Objectives	Origin PP/Add/CC
OT.AC_Pers	[PP_BAC]
OT.Data_Int	[PP_BAC]
OT.Data_Conf	[PP_BAC]
OT.Identification	[PP_BAC]
OT.Prot_Abuse-Func	[PP_BAC]
OT.Prot_Inf_Leak	[PP_BAC]
OT.Prot_Phys-Tamper	[PP_BAC]
OT.Prot_Malfunction	[PP_BAC]
OT.Chip_Auth_Proof	[PP_EAC]
OT.Configuration	Add
OT.AA_Proof	Add
OT.Data_Int_AA	Add
OT.ADMIN_Configuration	Add
OT.Key_Usage_Counter	Add
OT.AC_SM_Level	Add

7.2 Security Objectives for the Operational Environment

7.2.1 Issuing State or Organization

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 phase 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_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.

7.2.2 Receiving State or Organization

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.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 from 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).

7.2.3 Additional Security Objectives for the Operational Environment

OE.Auth_MRTD

"MRTD Authentication Key"

The issuing State or Organization has to establish the necessary public key infrastructure in order to

(i) generate the MRTD's Authentication Key Pair(s), (ii) ensure the secrecy of the MRTD's Authentication Private Key(s), (iii) sign and store the Authentication Public Key(s) in the Authentication Public Key data (i.e in EF.DG14 for Chip Authentication Public Key and (iv) 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 Authentication Public Key by means of the Document Security Object.

OE.Exam_Chip_Auth

"Examination of the chip authenticity"

Additionally to the OE.Exam_MRTD, inspection system performs the Chip Authentication to verify the Authenticity of the presented MRTD's chip.

OE.Exam_MRTD_AA

Aditionally to the OE.Exam_MRTD, the inspection systems perform the Active Authentication protocol to verify the Authenticity of the presented MRTD's chip.

OE.Prot_Logical_MRTD_AA

Aditionally to the OE.Prot_Logical_MRTD, the inspection system prevents eavesdropping to their communication with the TOE before secure messaging is successfully established based on the Active Authentication Protocol.

OE.Activ_Auth_Verif

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

OE.Activ_Auth_Sign

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

7.2.4 OE Origin

Security Objectives	Origin PP/Add/CC
OE.MRTD_Manufact	[PP_BAC]
OE.MRTD_ Delivery	[PP_BAC]
OE.Personalization	[PP_BAC]
OE.Pass_Auth_Sign	[PP_BAC]
OE.BAC-Keys	[PP_BAC]
OE.Exam_MRTD	[PP_BAC]
OE.Passive_Auth_Verif	[PP_BAC]
OE.Prot_Logical_MRTD	[PP_BAC]
OE.Auth_MRTD_	Add
OE.Exam_Chip_Auth_	Add
OE.Exam_MRTD_AA	Add
OE.Prot_Logical_MRTD_AA	Add
OE.Activ_Auth_Verif	Add
OE.Activ_Auth_Sign	Add

7.3 Security Objectives Rationale

7.3.1 Threats

7.3.1.1 Threats from Protection Profile

T.Chip_ID The threat T.Chip_ID "Identification of MRTD's chip" 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 "Identification and Authentication of the TOE" by Basic Access Control using sufficiently strong derived keys as required by the security objective for the environment OE.BAC-Keys "Cryptographic quality of Basic Access Control Keys".

T.Skimming The threat T.Skimming "Skimming the logical MRTD" addresses the reading of the logical MRTD trough the contactless interface. 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 "Cryptographic quality of Basic Access Control Keys" and also by OT.AC_SM_Level "Secure Messaging Level".

T.Eavesdropping The threat T.Eavesdropping "Eavesdropping to the communication between TOE and inspection system" addresses listening to 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 "Cryptographic quality of Basic Access Control Keys".

T.Forgery The threat T.Forgery "Forgery of data on MRTD's chip" 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" and OE.Exam_MRTD_AA shall ensure that passport book does not contain a sensitive contactless 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 The threat T.Abuse-Func "Abuse of Functionality" 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 The threats T.Information_Leakage "Information Leakage from MRTD's chip" is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threat is addressed by the directly related security objective OT.Prot_Inf_Leak "Protection against Information Leakage".

T.Phys-Tamper The threat T.Phys-Tamper "Physical Tampering" is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the

TOE against this threat is addressed by the directly related security objective OT.Prot_Phys-Tamper "Protection against Physical Tampering".

T.Malfunction The threat T.Malfunction "Malfunction due to Environmental Stress" is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threat is addressed by the directly related security objective OT.Prot_Malfunction "Protection against Malfunctions".

7.3.1.2 Additional Threats Identified

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 an identification and authenticity proof required by OT.Chip_Auth_Proof "Proof of MRTD’s chip authenticity" using a authentication key pair to be generated by the issuing State or Organization. The Public Chip Authentication Key has to be written into EF.DG14 and signed by means of Documents Security Objects as demanded by OE.Auth_MRTD "MRTD Authentication Key". According to OE.Exam_Chip_Auth the inspection system has to perform the Chip Authentication Protocol to verify the authenticity of the MRTD’s chip. This attack is also thwarted by Active Authentication proving the authenticity of the chip as required by OT.AA_Proof and OT.Data_Int_AA using a authentication key pair to be generated by the issuing State or Organization. This threat is also covered by OE.Auth_MRTD "MRTD Authentication Key" using a authentication key pair to be generated by the issuing State or Organization. OE.Activ_Auth_Verif and OE.Activ_Auth_Sign covers also this threat enabling the possibility of performing an Active Authentication which reinforce the security associated to the communication.

T.Configuration The threat T.Configuration "Tampering attempt of the TOE during preparation" addresses attacks in Pre-personalization and Personalization phases. The attacker trying to access to unauthorized TOE functions, trying to access or to modify sensitive information exchanged between the TOE and the Personalization system. Protection of the TOE during these two phases is directly addressed by OT.Configuration "Protection of the TOE preparation".

T.ADMIN_Configuration The threat T.ADMIN_Configuration “Tampering attempt of the TOE during administration” addresses attacks in Operational use phase. The attacker trying to access to unauthorized TOE functions, trying to access or to modify sensitive information exchanged between the TOE and the Administartion system. Protection of the TOE during this phases is directly addressed by OT.ADMIN_Configuration “Protection of the TOE administration”.

T.Key_Usage The threat T.Key_Usage addresses the threat of usage of the internal secret cryptographic keys of the TOE. The TOE protects the key usage through OT.Key_Usage_Counter “Configuration of Key Usage Counter” that support a Key Usage Counter that is decremented by one each time the key is used. Once the counter is depleted, the key becomes unusable. In the case of CA key, the Key Usage Counter will be reset to the maximum usage if the CA key is re-generated in USE phase.

7.3.1.3 Threats Origin

Threats	Origin PP/Add/CC
T.Chip_ID	[PP_BAC]
T.Skimming	[PP_BAC]
T.Eavesdropping	[PP_BAC]
T.Forgery	[PP_BAC]
T.Abuse-Func	[PP_BAC]
T.Information_Leakage	[PP_BAC]
T.Phys-Tamper	[PP_BAC]
T.Malfunction	[PP_BAC]
T.Counterfeit	[PP_EAC]
T.Configuration	Add
T.ADMIN_Configuration	Add
T.Key_Usage	Add

7.3.2 Organisational Security Policies

7.3.2.1 Additional OSP

P.Activ_Auth The OSP P.Activ_Auth requires the implementation of the Active Authentication protocol as enforced by OT.AA_Proof.

7.3.2.2 OSP from PP

P.Manufact The OSP P.Manufact "Manufacturing of the MRTD's chip" 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 "Identification and Authentication of the TOE".

P.Personalization The OSP P.Personalization "Personalization of the MRTD by issuing State or Organization only" 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 "Access Control for Personalization of logical MRTD" limits the management of TSF data and management of TSF to the Personalization Agent.

P.Personal_Data The OSP P.Personal_Data "Personal data protection policy" 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" and OT.Data_Int_AA 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.

7.3.2.3 OSP Origin

OSP	Origin PP/Add/CC
P.Activ_Auth	Add
P.Manufact	[PP_BAC]
P.Personalization	[PP_BAC]
P.Personal_Data	[PP_BAC]

7.3.3 Assumptions

7.3.3.1 Additional Assumptions

A.Insp_Sys_Chip_Auth The examination of the MRTD passport book addressed by the assumption A.Insp_Sys_Chip_Auth "Inspection Systems for global interoperability on chip authenticity" is covered by the security objectives for the TOE environment OE.Exam_Chip_Auth.

A.Signature_PKI The assumption is directly covered by the security objective for the TOE environment OE.Pass_Auth_Sign "Authentication of logical MRTD by Signature" covering the necessary procedures for the Country Signing CA Key Pair and the Document Signer Key Pairs.

A.Insp_Sys_AA The examination of the MRTD passport book addressed by the assumption A.Insp_Sys_AA "Inspection Systems for global interoperability" is covered by the security objectives for the TOE environment OE.Exam_MRTD_AA "Examination of the MRTD passport book". The security objectives for the TOE environment OE.Prot_Logical_MRTD_AA "Protection of data from the logical MRTD" will require the Basic

Inspection System to implement the Active Authentication Protocol and to protect the logical MRTD data during the transmission and the internal handling.

7.3.3.2 Assumptions from PP

A.MRTD_Manufact The assumption A.MRTD_Manufact "MRTD manufacturing on phase 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 The assumption A.MRTD_Delivery "MRTD delivery during phase 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 assumption A.Pers_Agent "Personalization of the MRTD's chip" is 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 The examination of the MRTD passport book addressed by the assumption A.Insp_Sys "Inspection Systems for global interoperability" is covered by the security objectives for the TOE environment OE.Exam_MRTD "Examination of the MRTD passport book". 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 The assumption 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.

7.3.3.3 Assumptions Origin

Assumptions	Origin PP/Add/CC
A.Insp_Sys_Chip_Auth	Add
A.Insp_Sys_AA	Add
A.Signature_PKI	[PP_EAC]
A.MRTD_Manufact	[PP_BAC]
A.MRTD_Delivery	[PP_BAC]
A.Pers_Agent	[PP_BAC]

A.Insp_Sys	[PP_BAC]
A.BAC-Keys	[PP_BAC]

7.3.4 SPD and Security Objectives

Threats	Security Objectives	Rationale
T.Chip_ID	OT.Identification, OE.BAC-Keys	Section 7.3.1
T.Skimming	OT.Data_Conf, OE.BAC-Keys, OT.AC_SM_Level	Section 7.3.1
T.Eavesdropping	OT.Data_Conf, OE.BAC-Keys	Section 7.3.1
T.Forgery	OT.AC_Pers, OT.Data_Int, OT.Prot_Phys-Tamper, OE.Exam_MRTD, OE.Pass_Auth_Sign, OE.Passive_Auth_Verif, OE.Personalization, OE.Exam_MRTD_AA	Section 7.3.1
T.Abuse-Func	OT.Prot_Abuse-Func, OE.Personalization	Section 7.3.1
T.Information_Leakage	OT.Prot_Inf_Leak	Section 7.3.1
T.Phys-Tamper	OT.Prot_Phys-Tamper	Section 7.3.1
T.Malfunction	OT.Prot_Malfunction	Section 7.3.1
T.Counterfeit	OT.Chip_Auth_Proof, OE.Exam_Chip_Auth, OE.Auth_MRTD, OT.AA_Proof, OT.Data_Int_AA, OE.Activ_Auth_Verif, OE.Activ_Auth_Sign	Section 7.3.1
T.Configuration	OT.Configuration	Section 7.3.1
T.ADMIN_Configuration	OT.ADMIN_Configuration	Section 7.3.1
T.Key_Usage	OT.Key_Usage_Counter	Section 7.3.1

Table 14 Threats and Security Objectives - Coverage

Security Objectives	Threats	Rationale
OT.Chip_Auth_Proof	T.Counterfeit	
OT.Configuration	T.Configuration	
OT.AA_Proof	T.Counterfeit	
OT.Data_Int_AA	T.Counterfeit	
OT.ADMIN_Configuration	T.ADMIN_Configuration	
OT.Key_Usage_Counter	T.Key_Usage	
OT.AC_SM_Level	T.Skimming	

OT.AC_Pers	T.Forgery	
OT.Data_Int	T.Forgery	
OT.Data_Conf	T.Skimming, T.Eavesdropping	
OT.Identification	T.Chip_ID	
OT.Prot_Abuse-Func	T.Abuse-Func	
OT.Prot_Inf_Leak	T.Information_Leakage	
OT.Prot_Phys-Tamper	T.Forgery, T.Phys-Tamper	
OT.Prot_Malfunction	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, T.Eavesdropping	
OE.Exam_MRTD	T.Forgery	
OE.Passive_Auth_Verif	T.Forgery	
OE.Prot_Logical_MRTD		
OE.Auth_MRTD	T.Counterfeit	
OE.Exam_Chip_Auth	T.Counterfeit	
OE.Exam_MRTD_AA	T.Forgery	
OE.Prot_Logical_MRTD_AA		
OE.Activ_Auth_Verif	T.Counterfeit	
OE.Activ_Auth_Sign	T.Counterfeit	

Table 15 Security Objectives and Threats - Coverage

Organisational Security Policies	Security Objectives	Rationale
P.Activ_Auth	OT.AA_Proof	Section 7.3.2
P.Manufact	OT.Identification	Section 7.3.2
P.Personalization	OE.Personalization, OT.AC_Pers, OT.Identification	Section 7.3.2
P.Personal_Data	OT.Data_Int, OT.Data_Conf, OT.Data_Int_AA	Section 7.3.2

Table 16 OSPs and Security Objectives - Coverage

Security Objectives	Organisational Security Policies
OT.Chip_Auth_Proof	
OT.Configuration	
OT.AA_Proof	P.Activ_Auth
OT.Data_Int_AA	P.Personal_Data
OT.ADMIN_Configuration	
OT.Key_Usage_Counter	
OT.AC_SM_Level	
OT.AC_Pers	P.Personalization
OT.Data_Int	P.Personal_Data
OT.Data_Conf	P.Personal_Data
OT.Identification	P.Manufact, P.Personalization
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.Exam_MRTD	
OE.Passive_Auth_Verif	
OE.Prot_Logical_MRTD	
OE.Auth_MRTD	
OE.Exam_Chip_Auth	
OE.Exam_MRTD_AA	
OE.Prot_Logical_MRTD_AA	
OE.Activ_Auth_Verif	
OE.Activ_Auth_Sign	

Table 17 Security Objectives and OSPs - Coverage

Assumptions	Security Objectives for the Operational Environment	Rationale
A.Insp_Sys_Chip_Auth	OE.Exam_Chip_Auth	Section 7.3.3
A.Signature_PKI	OE.Pass_Auth_Sign	Section 7.3.3
A.Insp_Sys_AA	OE.Exam_MRTD_AA, OE.Prot_Logical_MRTD_AA	Section 7.3.3
A.MRTD_Manufact	OE.MRTD_Manufact	Section 7.3.3
A.MRTD_Delivery	OE.MRTD_Delivery	Section 7.3.3
A.Pers_Agent	OE.Personalization	Section 7.3.3
A.Insp_Sys	OE.Exam_MRTD, OE.Prot_Logical_MRTD	Section 7.3.3
A.BAC-Keys	OE.BAC-Keys	Section 7.3.3

Table 18 Assumptions and Security Objectives for the Operational Environment - Coverage

Security Objectives for the Operational Environment	Assumptions
OE.MRTD_Manufact	A.MRTD_Manufact
OE.MRTD_Delivery	A.MRTD_Delivery
OE.Personalization	A.Pers_Agent
OE.Pass_Auth_Sign	A.Signature_PKI
OE.BAC-Keys	A.BAC-Keys
OE.Exam_MRTD	A.Insp_Sys
OE.Passive_Auth_Verif	
OE.Prot_Logical_MRTD	A.Insp_Sys
OE.Auth_MRTD	
OE.Exam_Chip_Auth	A.Insp_Sys_Chip_Auth
OE.Exam_MRTD_AA	A.Insp_Sys_AA
OE.Prot_Logical_MRTD_AA	A.Insp_Sys_AA
OE.Activ_Auth_Verif	
OE.Activ_Auth_Sign	

Table 19 Security Objectives for the Operational Environment and Assumptions - Coverage

8 Extended Requirements

8.1 Extended Families

8.1.1 Extended Family FPT_EMS - TOE Emanation

8.1.1.1 Description

The additional family FPT_EMS (TOE Emanation) of the Class FPT (Protection of the TSF) is defined here to describe the IT security functional requirements of the TOE. The TOE shall prevent attacks against the TOE and other secret data where the attack is based on external observable physical phenomena of the TOE. Examples of such attacks are evaluation of TOE's electromagnetic radiation, simple power analysis (SPA), differential power analysis (DPA), timing attacks, radio emanation etc. This family describes the functional requirements for the limitation of intelligible emanations. The family FPT_EMS belongs to the Class FPT because it is the class for TSF protection. Other families within the Class FPT do not cover the TOE emanation.

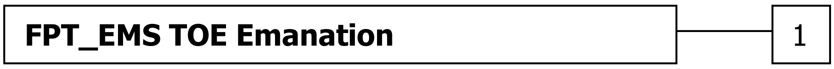
8.1.1.2 Extended Components

Extended Component FPT_EMS.1

Family behavior:

This family defines requirements to mitigate intelligible emanations.

Component levelling:



FPT_EMS.1 TOE Emanation has two constituents:

- FPT_EMS.1.1 Limit of Emissions requires to not emit intelligible emissions enabling access to TSF data or user data.
- FPT_EMS.1.2 Interface Emanation requires to not emit interface emanation enabling access to TSF data or user data.

Management: FPT_EMS.1

There are no management activities foreseen.

Audit: FPT_EMS.1

There are no actions identified that shall be auditable if **FAU_GEN** (*Security audit data generation*) isincluded in a PP or ST using FPT_EMS.1.

Definition

FPT_EMS.1 TOE Emanation

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].

Hierarchical to: No other components.

Dependencies: No dependencies.

8.1.2 Extended Family FMT_LIM - Limited capabilities

8.1.2.1 Description

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 abuse of functions by limiting the capabilities of the functions and by limiting their availability.

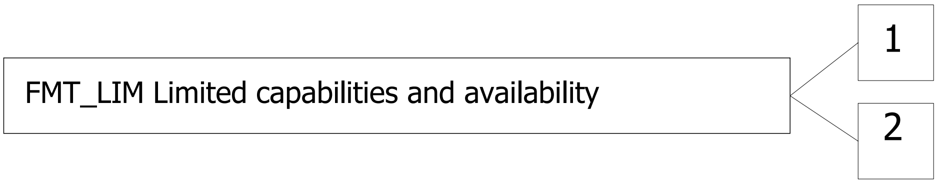
8.1.2.2 Extended Components

Extended Component FMT_LIM.1

Family behavior:

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

Component levelling:



FMT_LIM Limited capabilities and availability

1

2

FMT_LIM.1 Limited capabilities requires that the TSF is built to provide only the capabilities (perform action, gather information) necessary for its genuinepurpose.

FMT_LIM.2	Limited availability requires that the TSF restrict the use of functions (refer to Limited capabilities (FMT_LIM.1)). This can be achieved, for instance, by removing or by disabling functions in a specific phase of the TOE's life-cycle.
Management:	FMT_LIM.1, FMT_LIM.2 There are no management activities foreseen.
Audit:	FMT_LIM.1, FMT_LIM.2 There are no actions defined to be auditable.

Definition

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 [assignment: Limited capability and availability policy]

Hierarchical to: No other components

Dependencies: FMT_LIM.2 Limited availability.

Extended Component FMT_LIM.2

Definition

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 [assignment: Limited capability and availability policy]

Hierarchical to: No other components

Dependencies: FMT_LIM.1 Limited availability.

8.1.3 Extended Family FIA_API - Authentication Proof of Identity

8.1.3.1 Description

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.

Application note 10: The other families of the Class FIA describe only the authentication verification of users' identity performed by the TOE and do not describe the functionality of the user to prove their identity. The following paragraph defines the family FIA_API in the style of the Common Criteria part 2 (cf. [3], chapter 'Explicitly stated IT security requirements (APE_SRE)') from a TOE point of view.

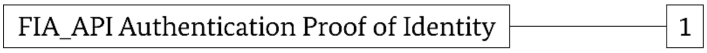
8.1.3.2 Extended Components

Extended Component FIA_API.1

Family behavior:

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

Component levelling:



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: FIA_API.1
There are no actions defined to be auditable.

Definition

FIA_API.1 Authentication Proof of Identity

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

Hierarchical to: No other components

Dependencies: No dependencies.

8.1.4 Extended Family FAU_SAS - Audit data storage

8.1.4.1 Description

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

The family 'Audit data storage (FAU_SAS)' is specified as follows:
FAU_SAS Audit data storage

Family behavior

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

Component levelling

FAU_SAS.1 Requires the TOE to provide the possibility to store audit data.

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

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

FAU_SAS.1 Audit storage

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

Hierarchical to: No other components

Dependencies: No Depenedencies

8.1.5 Extended Family FCS_RND - Generation of random numbers

8.1.5.1 Description

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

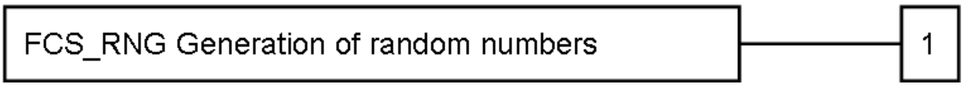
8.1.5.2 Extended Components

Extended Component FCS_RND.1

Family behavior:

This family defines requirements for the generation random number where the random numbers are intended to be used for cryptographic purposes.

Component levelling:



Management: FCS_RND.1

There are no management activities foreseen.

Audit: FCS_RND.1

There are no actions defined to be auditable.

Definition

FCS_RND.1 Quality metric for random numbers

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

Hierarchical to: No other components.

Dependencies: No dependencies.

9 Security Requirements

9.1.1 Security Functional Requirements

Security Functional requirements are as follows:

9.1.2 Class FAU Security Audit

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

FAU_SAS.1 Audit storage

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

9.1.3 Class FCS Cryptographic Support

FCS_CKM.1/BAC Cryptographic key generation

FCS_CKM.1.1/BAC 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], normative appendix 5**.

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 **zeroisation** that meets the following: **none**.

FCS_COP.1/BAC_SHA Cryptographic operation

FCS_COP.1.1/BAC_SHA The TSF shall perform **hashing** in accordance with a specified cryptographic algorithm **SHA-1** and cryptographic key sizes **none** that meet the following: **[FIPS_180_4]**.

FCS_COP.1/BAC_ENC Cryptographic operation

FCS_COP.1.1/BAC_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] and [ICAO_9303]; normative appendix 5, A5.3 [ICAO_9303]**.

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 cryptographic key sizes **112 bit** that meet the following: **[FIPS_46_3]**.

FCS_COP.1/BAC_MAC Cryptographic operation

FCS_COP.1.1/BAC_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_1] (MAC algorithm 3, block cipher DES, Sequence Message Counter, padding mode 2)**.

FCS_RND.1 Quality metric for random numbers

FCS_RND.1.1 The TSF shall provide a mechanism to generate random numbers that meet **the average Shannon entropy per internal random bit exceeds 0.994**.

9.1.4 Additional FCS SFR's Identified

FCS_CKM.1/CA Cryptographic key generation

FCS_CKM.1.1/CA The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **based on ECDH compliant to [TR_03110-3]** and specified cryptographic key sizes **192 to 512 bit** that meet the following: **[ICAO-9303] Part 11**.

FCS_COP.1/AA Cryptographic operation

FCS_COP.1.1/AA The TSF shall perform **[cryptographic operation]** in accordance with a specified cryptographic algorithm **[cryptographic algorithm]** and cryptographic key sizes **[cryptographic key sizes]** that meet the following: **[standard]**

cryptographic operation	cryptographic algorithm	cryptographic key sizes(bits)	standard
Digital Signature Creation	ECDSA with SHA1, 256, 384, 512	192 to 521 over prime field curves	[ISO_9796-2], [PKCS#3], [FIPS_180_4] and [X9.92]
Digital Signature Creation	RSA signature (CRT) with SHA1, 256, 384, 512	1024, 1536 and 2048	[ISO_9796-2]

FCS_COP.1/CA_SHA Cryptographic operation

FCS_COP.1.1/CA_SHA The TSF shall perform **hashing** in accordance with a specified cryptographic algorithm **SHA-1 and SHA-256** and cryptographic key sizes **none** that meet the following: **[FIPS_180_4]**.

FCS_COP.1/CA_ENC Cryptographic operation

FCS_COP.1.1/CA_ENC The TSF shall perform **secure messaging – encryption and decryption** in accordance with a specified cryptographic algorithm **[Algorithm]** and cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Triple-DES in CBC mode	112 bit	[FIPS_46_3]
AES in CBC mode	128, 192 and 256 bit	[FIPS_197]

FCS_COP.1/CA_MAC Cryptographic operation

FCS_COP.1.1/CA_MAC The TSF shall perform **secure messaging – message authentication code** in accordance with a specified cryptographic algorithm **[Algorithm]** and cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Retail MAC	112 bit	[ISO_9797_1]
AES CMAC	128, 192 and 256 bit	[NIST_800_38B]

FCS_CKM.1/GP Cryptographic key generation

FCS_CKM.1.1/GP The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **[Algorithm]** and specified cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Triple-DES in CBC mode	112 bit	[GPC_SPE_034]; appendix E.4.1.
AES in CBC mode	128, 192 and 256 bit	[GPC_SPE_014]

FCS_COP.1/GP_ENC Cryptographic operation

FCS_COP.1.1/GP_ENC The TSF shall perform **secure messaging (GP) – encryption and decryption** in accordance with a specified cryptographic algorithm **[Algorithm]** and cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Triple-DES in CBC mode	112 bit	[FIPS_46_3]
AES in CBC mode	128, 192 and 256 bit	[FIPS_197]

FCS_COP.1/GP_AUTH Cryptographic operation

FCS_COP.1.1/GP_AUTH The TSF shall perform **symmetric authentication – encryption and decryption** in accordance with a specified cryptographic algorithm

[Algorithm] and cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Triple-DES	112 bit	[FIPS_46_3]
AES	128, 192 and 256 bit	[FIPS_197]

FCS_COP.1/GP_MAC Cryptographic operation

FCS_COP.1.1/GP_MAC The TSF shall perform **secure messaging – message authentication code** in accordance with a specified cryptographic algorithm **[Algorithm]** and cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Retail MAC	112 bit	[ISO_9797_1]
AES CMAC	128, 192 and 256 bit	[NIST_800_38B]

FCS_COP.1/GP_KEY_DEC Cryptographic operation

FCS_COP.1.1/GP_KEY_DEC The TSF shall perform **key decryption** in accordance with a specified cryptographic algorithm **[Algorithm]** and cryptographic key sizes **[Key Size(s)]** that meet the following: **[Standard]**

Algorithm	Key Size(s)	Standard
Triple-DES in CBC mode	112 bit	[FIPS_46_3]
AES in CBC mode	128, 192 and 256 bit	[FIPS_197]

9.1.5 Class FIA Identification and Authentication

FIA_UID.1 Timing of identification

FIA_UID.1.1 The TSF shall allow

- **to read the Initialization Data in Stage 2 "Production",**
- **to read the random identifier in Stage 3 "Preparation",**

- **to read the random identifier in Stage 4 "Operational"**

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.

FIA_UAU.1 Timing of authentication

FIA_UAU.1.1 The TSF shall allow

- **to read the Initialization Data in Stage 2 "Production",**
- **to read the random identifier in Stage 3 "Preparation",**
- **to read the random identifier in Stage 4 "Operational"**

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

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

FIA_UAU.4 Single-use authentication mechanisms

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

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

Application Note:

The Authentication Mechanisms based on Triple-DES or AES is the authentication process performed in phases 5 and 6.

FIA_UAU.5/BAC Multiple authentication mechanisms

FIA_UAU.5.1/BAC The TSF shall provide

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

to support user authentication.

FIA_UAU.5.2/BAC The TSF shall authenticate any user's claimed identity according to the **following rules:**

- **The TOE accepts the authentication attempt as Personalization Agent by one of the following mechanism(s) 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**.

FIA_UAU.6/BAC Re-authenticating

FIA_UAU.6.1/BAC 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**.

FIA_AFL.1/BAC Authentication failure handling

FIA_AFL.1.1/BAC The TSF shall detect when **an administrator configurable positive integer within range of acceptable values 0 to 255 consecutive** unsuccessful authentication attempts occur related to **BAC authentication protocol**.

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

9.1.6 Additional FIA SFR's Identified

FIA_UAU.5/MP Multiple authentication mechanisms

FIA_UAU.5.1/MP The TSF shall provide **Authentication Mechanism based on Triple-DES and AES** to support user authentication.

FIA_UAU.5.2/MP The TSF shall authenticate any user's claimed identity according to the **following rules:**

- **The TOE accepts the authentication attempt as Manufacturer by the Symmetric Authentication Mechanism with Pre-Personalization Agent Key**.

FIA_UAU.6/MP Re-authenticating

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

Application Note:

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

FIA_AFL.1/MP Authentication failure handling

FIA_AFL.1.1/MP The TSF shall detect when **1** unsuccessful authentication attempts occur related to **authentication of the Manufacturer and the Personalization Agent**.

FIA_AFL.1.2/MP When the defined number of unsuccessful authentication attempts has been **met**, the TSF shall **slow down exponentially the next authentication**.

FIA_UAU.5/CA Multiple authentication mechanisms

FIA_UAU.5.1/CA The TSF shall provide

- **Secure messaging in MAC-ENC mode,**
- **Key agreement protocol Diffie-Hellman during Chip Authentication Protocol v.1 according to [TR_03110-3]**

to support user authentication.

FIA_UAU.5.2/CA The TSF shall authenticate any user's claimed identity according to the **following rules:**

- **After run of the Chip Authentication Protocol Version 1 the TOE accepts only received commands with correct message authentication code sent by means of secure messaging with key agreed with the terminal by means of the Chip Authentication Mechanism v1**.

FIA_UAU.6/CA Re-authenticating

FIA_UAU.6.1/CA The TSF shall re-authenticate the user under the conditions **each command sent to the TOE after successful run of the Chip Authentication Protocol shall be verified as being sent by the inspection system (GIS)**.

FIA_API.1/CA Authentication Proof of Identity

FIA_API.1.1/CA The TSF shall provide a **Chip Authentication protocol according to [TR_03110-3]** to prove the identity of the **TOE**.

9.1.7 Class FDP User Data Protection

FDP_ACC.1/BAC Subset access control

FDP_ACC.1.1/BAC 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/BAC Security attribute based access control

FDP_ACF.1.1/BAC 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/BAC 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 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**.

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

FDP_ACF.1.4/BAC 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/BAC Basic data exchange confidentiality

FDP_UCT.1.1/BAC 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/BAC Data exchange integrity

FDP_UIT.1.1/BAC 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/BAC The TSF shall be able to determine on receipt of user data, whether **modification, deletion, insertion and replay** has occurred.

9.1.8 Additional FDP SFR's Identified

FDP_ACC.1/CA Subset access control

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

FDP_ACF.1/CA Security attribute based access control

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

- **Subjects:**
  - **General 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/CA The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed:

- **the successfully authenticated General 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.**.

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

FDP_ACF.1.4/CA 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 General Inspection System is not allowed to read the data in EF.DG3 and EF.DG4**.

FDP_UCT.1/CA Basic data exchange confidentiality

FDP_UCT.1.1/CA [Editorially Refined] The TSF shall enforce the **CA Access Control SFP** to **transmit and receive** user data in a manner protected from unauthorised disclosure **after Chip Authentication**.

FDP_UIT.1/CA Data exchange integrity

FDP_UIT.1.1/CA [Editorially Refined] The TSF shall enforce the **CA Access Control SFP** to **transmit and receive** user data in a manner protected from **modification, deletion, insertion and replay** errors **after Chip Authentication protocol**.

FDP_UIT.1.2/CA [Editorially Refined] The TSF shall be able to determine on receipt of user data, whether **modification, deletion, insertion and replay** has occurred **after Chip Authentication protocol**.

FDP_DAU.1/AA Basic Data Authentication

FDP_DAU.1.1/AA The TSF shall provide a capability to generate evidence that can be used as a guarantee of the validity of **the TOE itself**.

FDP_DAU.1.2/AA The TSF shall provide **any users** with the ability to verify evidence of the validity of the indicated information.

Refinement:

Evidence generation and ability of verifying it constitute the Active Authentication protocol.

FDP_ITC.1/AA Import of user data without security attributes

FDP_ITC.1.1/AA The TSF shall enforce the **Active Authentication Access Control SFP** when importing user data, controlled under the SFP, from outside of the TOE.

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

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

9.1.9 Class FMT Security Management

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,**
- **Administration**.

FMT_SMR.1 Security roles

FMT_SMR.1.1 The TSF shall maintain the roles

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

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

Application Note:

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

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 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_MTD.1/INI_ENA Management of TSF data

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

Application Note:

Please refer to F.ACW for details of the data written by the manufacturer.

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**.

FMT_MTD.1/KEY_WRITE Management of TSF data

FMT_MTD.1.1/KEY_WRITE The TSF shall restrict the ability to **write** the **Document Basic Access 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 **read** the **Document Basic Access Keys, Personalization Agent Keys and Administrator Keys** to **none**.

9.1.10 Additional FMT SFR's Identified

FMT_MOF.1/PROT Management of security functions behaviour

FMT_MOF.1.1/PROT The TSF shall restrict the ability to **enable** the functions

- **Chip Authentication,**

to **the Manufacturer**.

FMT_MOF.1/AA Management of security functions behaviour

FMT_MOF.1.1/AA The TSF shall restrict the ability to **disable and enable** the functions **TSF Active Authentication** to **Personalization Agent**.

FMT_MTD.1/CAPK Management of TSF data

FMT_MTD.1.1/CAPK The TSF shall restrict the ability to **write** the **Chip Authentication Keys** to **the Personalization Agent or the Admin**.

FMT_MTD.1/CAPK_READ Management of TSF data

FMT_MTD.1.1/CAPK_READ The TSF shall restrict the ability to **read** the **Chip Authentication Private Key** to **none**.

FMT_MTD.1/AA_KEY_READ Management of TSF data

FMT_MTD.1.1/AA_KEY_READ The TSF shall restrict the ability to **read** the **AAK** to **none**.

FMT_MTD.1/AA_KEY_WRITE Management of TSF data

FMT_MTD.1.1/AA_KEY_WRITE The TSF shall restrict the ability to **write** the **AAK** to **Personalization Agent**.

FMT_MTD.1/LCS_PERS Management of TSF data

FMT_MTD.1.1/LCS_PERS The TSF shall restrict the ability to **switch** the **LCS from phase 6 to phase 7** to **the Personalization Agent**.

FMT_MTD.1/ADMIN Management of TSF data

FMT_MTD.1.1/ADMIN The TSF shall restrict the ability to **[Operation]** the **[TSF Data]** to **Admin**

Operation	TSF Data
Modify	The Chip Authentication key parameters to be used during key generation in USE phase
Invalidate	Invalidate one of the Chip Authentication key in USE phase or set the secondary key as being the primary key

FMT_MTD.1/Key_Usage_Counter Management of TSF data

FMT_MTD.1.1/Key_Usage_Counter The TSF shall restrict the ability to **configure** the **Key Usage Counter** to **Personalization Agent**.

FMT_MTD.1/SM_LVL Management of TSF data

FMT_MTD.1.1/SM_LVL The TSF shall restrict the ability to **set** the **allowed Secure Messaging level when performing Chip Authentication** to **the Personalization Agent**.

Application Note:

Possible secure messaging levels are: 3DES, AES 128, AES 192 or AES 256

9.1.11 Class FPT Protection of the Security Functions

FPT_EMS.1 TOE Emanation

FPT_EMS.1.1 The TOE shall not emit **power variations, timing variations during command execution** in excess of **non useful information** enabling access to **Personalization Agent Keys** and

- **Chip Authentication Private Key,**
- **Personalization Agent Keys,**
- **BAC Keys,**
- **Active Authentication: Private Key (AAK),**
- **Administrator Authentication Key(s)**.

FPT_EMS.1.2 The TSF shall ensure **unauthorized users** are unable to use the following interface **smart card circuit contacts** to gain access to **Personalization Agent Keys** and

- **Chip Authentication Private Key,**
- **BAC Keys,**
- **Active Authentication: Private Key (AAK),**
- **Administrator Authentication Key(s)**.

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 **at the conditions**

- **At reset**

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.

9.1.12 Additional FTP Trusted path/channels SFR Identified

FTP_ITC.1/MP Inter-TSF trusted channel

FTP_ITC.1.1/MP The TSF shall provide a communication channel between itself and another trusted IT product that is logically distinct from other communication channels and provides assured identification of its end points and protection of the channel data from modification or disclosure.

FTP_ITC.1.2/MP The TSF shall permit **another trusted IT product** to initiate communication via the trusted channel.

FTP_ITC.1.3/MP The TSF shall initiate communication via the trusted channel for **loading sensitive data (Perso_K, CA_SK) shall be encrypted**.

9.2 SFRs Origins

Security Functional Requirements	Origin PP/added/CC
FAU_SAS.1	[PP_BAC]
FCS_CKM.1/BAC	[PP_BAC]
FCS_CKM.4	[PP_BAC]
FCS_COP.1/BAC_SHA	[PP_BAC]
FCS_COP.1/BAC_ENC	[PP_BAC]
FCS_COP.1/AUTH	[PP_BAC]
FCS_COP.1/BAC_MAC	[PP_BAC]
FCS_RND.1	[PP_BAC]
FCS_CKM.1/CA	Add
FCS_COP.1/AA	Add
FCS_COP.1/CA_SHA	Add
FCS_COP.1/CA_ENC	[PP_EAC]
FCS_COP.1/CA_MAC	[PP_EAC]
FCS_CKM.1/GP	Add
FCS_COP.1/GP_ENC	Add
FCS_COP.1/GP_AUTH	Add
FCS_COP.1/GP_MAC	Add
FCS_COP.1/GP_KEY_DEC	Add
FIA_UID.1	[PP_BAC]
FIA_UAU.1	[PP_BAC]
FIA_UAU.4	[PP_BAC]
FIA_UAU.5/BAC	[PP_BAC]
FIA_UAU.6/BAC	[PP_BAC]

Security Functional Requirements	Origin PP/added/CC
FIA_AFL.1/BAC	[PP_BAC]
FIA_UAU.5/MP	Add
FIA_UAU.6/MP	Add
FIA_AFL.1/MP	Add
FIA_UAU.5/CA	Add
FIA_UAU.6/CA	Add
FIA_API.1/CA	[PP_EAC]
FDP_ACC.1/BAC	[PP_BAC]
FDP_ACF.1/BAC	[PP_BAC]
FDP_UCT.1/BAC	[PP_BAC]
FDP_UIT.1/BAC	[PP_BAC]
FDP_ACC.1/CA	[PP_EAC]
FDP_ACF.1/CA	[PP_BAC] with Editorial refined
FDP_UCT.1/CA	CC
FDP_UIT.1/CA	[PP_BAC] with Editorial refined
FDP_DAU.1/AA	Add
FDP_ITC.1/AA	Add
FMT_SMF.1	[PP_BAC]
FMT_SMR.1	[PP_BAC]
FMT_LIM.1	[PP_BAC]
FMT_LIM.2	[PP_BAC]
FMT_MTD.1/INI_ENA	[PP_BAC]
FMT_MTD.1/INI_DIS	[PP_BAC]
FMT_MTD.1/KEY_WRITE	[PP_BAC]
FMT_MTD.1/KEY_READ	[PP_BAC]
FMT_MOF.1/PROT	Add
FMT_MOF.1/AA	Add
FMT_MTD.1/CAPK	[PP_EAC]
FMT_MTD.1/CAPK_READ	[PP_EAC]
FMT_MTD.1/AA_KEY_READ	Add
FMT_MTD.1/AA_KEY_WRITE	Add

Security Functional Requirements	Origin PP/added/CC
FMT_MTD.1/LCS_PERS	Add
FMT_MTD.1/ADMIN	Add
FMT_MTD.1/Key_Usage_Counter	Add
FMT_MTD.1/SM_LVL	Add
FPT_EMS.1	[PP_BAC] FPT_EMSEC.1
FPT_FLS.1	[PP_BAC]
FPT_TST.1	[PP_BAC]
FPT_PHP.3	[PP_BAC]
FTP_ITC.1/MP	Add

9.3 Security Assurance Requirements

The assurance components for the evaluation of the TOE and its development and operating environment are those taken from the Evaluation Assurance Level 4 (EAL4) and augmented by taking the following component: ADV_FSP.5, ADV_INT.2, ADV_TDS.4, ALC_CMS.5, ALC_DVS.2, ALC_TAT.2, and ATE_DPT.3.

9.3.1 ADV Development

9.3.1.1 ADV_ARC Security Architecture

ADV_ARC.1 Security architecture description

ADV_ARC.1.1D The developer shall design and implement the TOE so that the security features of the TSF cannot be bypassed.

ADV_ARC.1.2D The developer shall design and implement the TSF so that it is able to protect itself from tampering by untrusted active entities.

ADV_ARC.1.3D The developer shall provide a security architecture description of the TSF.

ADV_ARC.1.1C The security architecture description shall be at a level of detail commensurate with the description of the SFR-enforcing abstractions described in the TOE design document.

ADV_ARC.1.2C The security architecture description shall describe the security domains maintained by the TSF consistently with the SFRs.

ADV_ARC.1.3C The security architecture description shall describe how the TSF initialisation process is secure.

ADV_ARC.1.4C The security architecture description shall demonstrate that the TSF protects itself from tampering.

ADV_ARC.1.5C The security architecture description shall demonstrate that the TSF prevents bypass of the SFR-enforcing functionality.

ADV_ARC.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.1.2 ADV_FSP Functional specification

ADV_FSP.5 Complete semi-formal functional specification with additional error information

ADV_FSP.5.1D The developer shall provide a functional specification.

ADV_FSP.5.2D The developer shall provide a tracing from the functional specification to the SFRs.

ADV_FSP.5.1C The functional specification shall completely represent the TSF.

ADV_FSP.5.2C The functional specification shall describe the TSFI using a semi-formal style.

ADV_FSP.5.3C The functional specification shall describe the purpose and method of use for all TSFI.

ADV_FSP.5.4C The functional specification shall identify and describe all parameters associated with each TSFI.

ADV_FSP.5.5C The functional specification shall describe all actions associated with each TSFI.

ADV_FSP.5.6C The functional specification shall describe all direct error messages that may result from an invocation of each TSFI.

ADV_FSP.5.7C The functional specification shall describe all error messages that do not result from an invocation of a TSFI.

ADV_FSP.5.8C The functional specification shall provide a rationale for each error message contained in the TSF implementation yet does not result from an invocation of a TSFI.

ADV_FSP.5.9C The tracing shall demonstrate that the SFRs trace to TSFIs in the functional specification.

ADV_FSP.5.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ADV_FSP.5.2E The evaluator shall determine that the functional specification is an accurate and complete instantiation of the SFRs.

9.3.1.3 ADV_IMP Implementation representation

ADV_IMP.1 Implementation representation of the TSF

ADV_IMP.1.1D The developer shall make available the implementation representation for the entire TSF.

ADV_IMP.1.2D The developer shall provide a mapping between the TOE design description and the sample of the implementation representation.

ADV_IMP.1.1C The implementation representation shall define the TSF to a level of detail such that the TSF can be generated without further design decisions.

ADV_IMP.1.2C The implementation representation shall be in the form used by the development personnel.

ADV_IMP.1.3C The mapping between the TOE design description and the sample of the implementation representation shall demonstrate their correspondence.

ADV_IMP.1.1E The evaluator shall confirm that, for the selected sample of the implementation representation, the information provided meets all requirements for content and presentation of evidence.

9.3.1.4 ADV_TDS TOE design

ADV_TDS.4 Semiformal modular design

ADV_TDS.4.1D The developer shall provide the design of the TOE.

ADV_TDS.4.2D The developer shall provide a mapping from the TSFI of the functional specification to the lowest level of decomposition available in the TOE design.

ADV_TDS.4.1C The design shall describe the structure of the TOE in terms of subsystems.

ADV_TDS.4.2C The design shall describe the TSF in terms of modules, designating each module as SFR-enforcing, SFR-supporting, or SFR-non-interfering.

ADV_TDS.4.3C The design shall identify all subsystems of the TSF.

ADV_TDS.4.4C The design shall provide a semiformal description of each subsystem of the TSF, supported by informal, explanatory text where appropriate.

ADV_TDS.4.5C The design shall provide a description of the interactions among all subsystems of the TSF.

ADV_TDS.4.6C The design shall provide a mapping from the subsystems of the TSF to the modules of the TSF.

ADV_TDS.4.7C The design shall describe each SFR-enforcing and SFR-supporting module in terms of its purpose and relationship with other modules.

ADV_TDS.4.8C The design shall describe each SFR-enforcing and SFR-supporting module in terms of its SFR-related interfaces, return values from those interfaces, interaction with other modules and called SFR-related interfaces to other SFR-enforcing or SFR-supporting modules.

ADV_TDS.4.9C The design shall describe each SFR-non-interfering module in terms of its purpose and interaction with other modules.

ADV_TDS.4.10C The mapping shall demonstrate that all TSFIs trace to the behaviour described in the TOE design that they invoke.

ADV_TDS.4.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ADV_TDS.4.2E The evaluator shall determine that the design is an accurate and complete instantiation of all security functional requirements.

9.3.1.5 ADV_INT TSF internals

ADV_INT.2 Well-structured internals

ADV_INT.2.1D The developer shall design and implement the entire TSF such that it has well-structured internals.

ADV_INT.2.2D The developer shall provide an internals description and justification.

ADV_INT.2.1C The justification shall describe the characteristics used to judge the meaning of ``well-structured".

ADV_INT.2.2C The TSF internals description shall demonstrate that the entire TSF is well-structured.

ADV_INT.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ADV_INT.2.2E The evaluator shall perform an internals analysis on the TSF.

9.3.2 AGD Guidance documents

9.3.2.1 AGD_OPE Operational user guidance

AGD_OPE.1 Operational user guidance

AGD_OPE.1.1D The developer shall provide operational user guidance.

AGD_OPE.1.1C The operational user guidance shall describe, for each user role, the user-accessible functions and privileges that should be controlled in a secure processing environment, including appropriate warnings.

AGD_OPE.1.2C The operational user guidance shall describe, for each user role, how to use the available interfaces provided by the TOE in a secure manner.

AGD_OPE.1.3C The operational user guidance shall describe, for each user role, the available functions and interfaces, in particular all security parameters under the control of the user, indicating secure values as appropriate.

AGD_OPE.1.4C The operational user guidance shall, for each user role, clearly present each type of security-relevant event relative to the user-accessible functions that need to be performed, including changing the security characteristics of entities under the control of the TSF.

AGD_OPE.1.5C The operational user guidance shall identify all possible modes of operation of the TOE (including operation following failure or operational error), their consequences and implications for maintaining secure operation.

AGD_OPE.1.6C The operational user guidance shall, for each user role, describe the security measures to be followed in order to fulfil the security objectives for the operational environment as described in the ST.

AGD_OPE.1.7C The operational user guidance shall be clear and reasonable.

AGD_OPE.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.2.2 AGD_PRE Preparative procedures

AGD_PRE.1 Preparative procedures

AGD_PRE.1.1D The developer shall provide the TOE including its preparative procedures.

AGD_PRE.1.1C The preparative procedures shall describe all the steps necessary for secure acceptance of the delivered TOE in accordance with the developer's delivery procedures.

AGD_PRE.1.2C The preparative procedures shall describe all the steps necessary for secure installation of the TOE and for the secure preparation of the operational environment in accordance with the security objectives for the operational environment as described in the ST.

AGD_PRE.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

AGD_PRE.1.2E The evaluator shall apply the preparative procedures to confirm that the TOE can be prepared securely for operation.

9.3.3 ALC Life-cycle support

9.3.3.1 ALC_CMC CM capabilities

ALC_CMC.4 Production support, acceptance procedures and automation

ALC_CMC.4.1D The developer shall provide the TOE and a reference for the TOE.

ALC_CMC.4.2D The developer shall provide the CM documentation.

ALC_CMC.4.3D The developer shall use a CM system.

ALC_CMC.4.1C The TOE shall be labelled with its unique reference.

ALC_CMC.4.2C The CM documentation shall describe the method used to uniquely identify the configuration items.

ALC_CMC.4.3C The CM system shall uniquely identify all configuration items.

ALC_CMC.4.4C The CM system shall provide automated measures such that only authorised changes are made to the configuration items.

ALC_CMC.4.5C The CM system shall support the production of the TOE by automated means.

ALC_CMC.4.6C The CM documentation shall include a CM plan.

ALC_CMC.4.7C The CM plan shall describe how the CM system is used for the development of the TOE.

ALC_CMC.4.8C The CM plan shall describe the procedures used to accept modified or newly created configuration items as part of the TOE.

ALC_CMC.4.9C The evidence shall demonstrate that all configuration items are being maintained under the CM system.

ALC_CMC.4.10C The evidence shall demonstrate that the CM system is being operated in accordance with the CM plan.

ALC_CMC.4.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.3.2 ALC_CMS CM scope

ALC_CMS.5 Development tools CM coverage

ALC_CMS.5.1D The developer shall provide a configuration list for the TOE.

ALC_CMS.5.1C The configuration list shall include the following: the TOE itself; the evaluation evidence required by the SARs; the parts that comprise the TOE; the implementation representation; security flaw reports and resolution status; and development tools and related information.

ALC_CMS.5.2C The configuration list shall uniquely identify the configuration items.

ALC_CMS.5.3C For each TSF relevant configuration item, the configuration list shall indicate the developer of the item.

ALC_CMS.5.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.3.3 ALC_DEL Delivery

ALC_DEL.1 Delivery procedures

ALC_DEL.1.1D The developer shall document and provide procedures for delivery of the TOE or parts of it to the consumer.

ALC_DEL.1.2D The developer shall use the delivery procedures.

ALC_DEL.1.1C The delivery documentation shall describe all procedures that are necessary to maintain security when distributing versions of the TOE to the consumer.

ALC_DEL.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.3.4 ALC_DVS Development security

ALC_DVS.2 Sufficiency of security measures

ALC_DVS.2.1D The developer shall produce and provide development security documentation.

ALC_DVS.2.1C The development security documentation shall describe all the physical, procedural, personnel, and other security measures that are necessary to protect the confidentiality and integrity of the TOE design and implementation in its development environment.

ALC_DVS.2.2C The development security documentation shall justify that the security measures provide the necessary level of protection to maintain the confidentiality and integrity of the TOE.

ALC_DVS.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ALC_DVS.2.2E The evaluator shall confirm that the security measures are being applied.

9.3.3.5 ALC_LCD Life-cycle definition

ALC_LCD.1 Developer defined life-cycle model

ALC_LCD.1.1D The developer shall establish a life-cycle model to be used in the development and maintenance of the TOE.

ALC_LCD.1.2D The developer shall provide life-cycle definition documentation.

ALC_LCD.1.1C The life-cycle definition documentation shall describe the model used to develop and maintain the TOE.

ALC_LCD.1.2C The life-cycle model shall provide for the necessary control over the development and maintenance of the TOE.

ALC_LCD.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.3.6 ALC_TAT Tools and techniques

ALC_TAT.2 Compliance with implementation standards

ALC_TAT.2.1D The developer shall provide the documentation identifying each development tool being used for the TOE.

ALC_TAT.2.2D The developer shall document and provide the selected implementation-dependent options of each development tool.

ALC_TAT.2.3D The developer shall describe and provide the implementation standards that are being applied by the developer.

ALC_TAT.2.1C Each development tool used for implementation shall be well-defined.

ALC_TAT.2.2C The documentation of each development tool shall unambiguously define the meaning of all statements as well as all conventions and directives used in the implementation.

ALC_TAT.2.3C The documentation of each development tool shall unambiguously define the meaning of all implementation-dependent options.

ALC_TAT.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ALC_TAT.2.2E The evaluator shall confirm that the implementation standards have been applied.

9.3.4 ASE Security Target evaluation

9.3.4.1 ASE_CCL Conformance claims

ASE_CCL.1 Conformance claims

ASE_CCL.1.1D The developer shall provide a conformance claim.

ASE_CCL.1.2D The developer shall provide a conformance claim rationale.

ASE_CCL.1.1C The conformance claim shall contain a CC conformance claim that identifies the version of the CC to which the ST and the TOE claim conformance.

ASE_CCL.1.2C The CC conformance claim shall describe the conformance of the ST to CC Part 2 as either CC Part 2 conformant or CC Part 2 extended.

ASE_CCL.1.3C The CC conformance claim shall describe the conformance of the ST to CC Part 3 as either CC Part 3 conformant or CC Part 3 extended.

ASE_CCL.1.4C The CC conformance claim shall be consistent with the extended components definition.

ASE_CCL.1.5C The conformance claim shall identify all PPs and security requirement packages to which the ST claims conformance.

ASE_CCL.1.6C The conformance claim shall describe any conformance of the ST to a package as either package-conformant or package-augmented.

ASE_CCL.1.7C The conformance claim rationale shall demonstrate that the TOE type is consistent with the TOE type in the PPs for which conformance is being claimed.

ASE_CCL.1.8C The conformance claim rationale shall demonstrate that the statement of the security problem definition is consistent with the statement of the security problem definition in the PPs for which conformance is being claimed.

ASE_CCL.1.9C The conformance claim rationale shall demonstrate that the statement of security objectives is consistent with the statement of security objectives in the PPs for which conformance is being claimed.

ASE_CCL.1.10C The conformance claim rationale shall demonstrate that the statement of security requirements is consistent with the statement of security requirements in the PPs for which conformance is being claimed.

ASE_CCL.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.4.2 ASE_ECD Extended components definition

ASE_ECD.1 Extended components definition

ASE_ECD.1.1D The developer shall provide a statement of security requirements.

ASE_ECD.1.2D The developer shall provide an extended components definition.

ASE_ECD.1.1C The statement of security requirements shall identify all extended security requirements.

ASE_ECD.1.2C The extended components definition shall define an extended component for each extended security requirement.

ASE_ECD.1.3C The extended components definition shall describe how each extended component is related to the existing CC components, families, and classes.

ASE_ECD.1.4C The extended components definition shall use the existing CC components, families, classes, and methodology as a model for presentation.

ASE_ECD.1.5C The extended components shall consist of measurable and objective elements such that conformance or nonconformance to these elements can be demonstrated.

ASE_ECD.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ASE_ECD.1.2E The evaluator shall confirm that no extended component can be clearly expressed using existing components.

9.3.4.3 ASE_INT ST introduction

ASE_INT.1 ST introduction

ASE_INT.1.1D The developer shall provide an ST introduction.

ASE_INT.1.1C The ST introduction shall contain an ST reference, a TOE reference, a TOE overview and a TOE description.

ASE_INT.1.2C The ST reference shall uniquely identify the ST.

ASE_INT.1.3C The TOE reference shall identify the TOE.

ASE_INT.1.4C The TOE overview shall summarise the usage and major security features of the TOE.

ASE_INT.1.5C The TOE overview shall identify the TOE type.

ASE_INT.1.6C The TOE overview shall identify any non-TOE hardware/software/firmware required by the TOE.

ASE_INT.1.7C The TOE description shall describe the physical scope of the TOE.

ASE_INT.1.8C The TOE description shall describe the logical scope of the TOE.

ASE_INT.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ASE_INT.1.2E The evaluator shall confirm that the TOE reference, the TOE overview, and the TOE description are consistent with each other.

9.3.4.4 ASE_OBJ Security objectives

ASE_OBJ.2 Security objectives

ASE_OBJ.2.1D The developer shall provide a statement of security objectives.

ASE_OBJ.2.2D The developer shall provide a security objectives rationale.

ASE_OBJ.2.1C The statement of security objectives shall describe the security objectives for the TOE and the security objectives for the operational environment.

ASE_OBJ.2.2C The security objectives rationale shall trace each security objective for the TOE back to threats countered by that security objective and OSPs enforced by that security objective.

ASE_OBJ.2.3C The security objectives rationale shall trace each security objective for the operational environment back to threats countered by that security objective, OSPs enforced by that security objective, and assumptions upheld by that security objective.

ASE_OBJ.2.4C The security objectives rationale shall demonstrate that the security objectives counter all threats.

ASE_OBJ.2.5C The security objectives rationale shall demonstrate that the security objectives enforce all OSPs.

ASE_OBJ.2.6C The security objectives rationale shall demonstrate that the security objectives for the operational environment uphold all assumptions.

ASE_OBJ.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.4.5 ASE_REQ Security requirements

ASE_REQ.2 Derived security requirements

ASE_REQ.2.1D The developer shall provide a statement of security requirements.

ASE_REQ.2.2D The developer shall provide a security requirements rationale.

ASE_REQ.2.1C The statement of security requirements shall describe the SFRs and the SARs.

ASE_REQ.2.2C All subjects, objects, operations, security attributes, external entities and other terms that are used in the SFRs and the SARs shall be defined.

ASE_REQ.2.3C The statement of security requirements shall identify all operations on the security requirements.

ASE_REQ.2.4C All operations shall be performed correctly.

ASE_REQ.2.5C Each dependency of the security requirements shall either be satisfied, or the security requirements rationale shall justify the dependency not being satisfied.

ASE_REQ.2.6C The security requirements rationale shall trace each SFR back to the security objectives for the TOE.

ASE_REQ.2.7C The security requirements rationale shall demonstrate that the SFRs meet all security objectives for the TOE.

ASE_REQ.2.8C The security requirements rationale shall explain why the SARs were chosen.

ASE_REQ.2.9C The statement of security requirements shall be internally consistent.

ASE_REQ.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.4.6 ASE_SPD Security problem definition

ASE_SPD.1 Security problem definition

ASE_APD.1.1D The developer shall provide a security problem definition.

ASE_SPD.1.1C The security problem definition shall describe the threats.

ASE_SPD.1.2C All threats shall be described in terms of a threat agent, an asset, and an adverse action.

ASE_SPD.1.3C The security problem definition shall describe the OSPs.

ASE_SPD.1.4C The security problem definition shall describe the assumptions about the operational environment of the TOE.

ASE_SPD.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.4.7 ASE_TSS TOE summary specification

ASE_TSS.1 TOE summary specification

ASE_TSS.1.1D The developer shall provide a TOE summary specification.

ASE_TSS.1.1C The TOE summary specification shall describe how the TOE meets each SFR.

ASE_TSS.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ASE_TSS.1.2E The evaluator shall confirm that the TOE summary specification is consistent with the TOE overview and the TOE description.

9.3.5 ATE Tests

9.3.5.1 ATE_COV Coverage

ATE_COV.2 Analysis of coverage

ATE_COV.2.1D The developer shall provide an analysis of the test coverage.

ATE_COV.2.1C The analysis of the test coverage shall demonstrate the correspondence between the tests in the test documentation and the TSFIs in the functional specification.

ATE_COV.2.2C The analysis of the test coverage shall demonstrate that all TSFIs in the functional specification have been tested.

ATE_COV.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.5.2 ATE_DPT Depth

ATE_DPT.3 Testing: modular design

ATE_DPT.3.1D The developer shall provide the analysis of the depth of testing.

ATE_DPT.3.1C The analysis of the depth of testing shall demonstrate the correspondence between the tests in the test documentation and the TSF subsystems and modules in the TOE design.

ATE_DPT.3.2C The analysis of the depth of testing shall demonstrate that all TSF subsystems in the TOE design have been tested.

ATE_DPT.3.3C The analysis of the depth of testing shall demonstrate that all TSF modules in the TOE design have been tested.

ATE_DPT.3.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.5.3 ATE_FUN Functional tests

ATE_FUN.1 Functional testing

ATE_FUN.1.1D The developer shall test the TSF and document the results.

ATE_FUN.1.2D The developer shall provide test documentation.

ATE_FUN.1.1C The test documentation shall consist of test plans, expected test results and actual test results.

ATE_FUN.1.2C The test plans shall identify the tests to be performed and describe the scenarios for performing each test. These scenarios shall include any ordering dependencies on the results of other tests.

ATE_FUN.1.3C The expected test results shall show the anticipated outputs from a successful execution of the tests.

ATE_FUN.1.4C The actual test results shall be consistent with the expected test results.

ATE_FUN.1.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

9.3.5.4 ATE_IND Independent testing

ATE_IND.2 Independent testing - sample

ATE_IND.2.1D The developer shall provide the TOE for testing.

ATE_IND.2.1C The TOE shall be suitable for testing.

ATE_IND.2.2C The developer shall provide an equivalent set of resources to those that were used in the developer's functional testing of the TSF.

ATE_IND.2.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

ATE_IND.2.2E The evaluator shall execute a sample of tests in the test documentation to verify the developer test results.

ATE_IND.2.3E The evaluator shall test a subset of the TSF to confirm that the TSF operates as specified.

9.3.6 AVA Vulnerability assessment

9.3.6.1 AVA_VAN Vulnerability analysis

AVA_VAN.3 Focused vulnerability analysis

AVA_VAN.3.1D The developer shall provide the TOE for testing.

AVA_VAN.3.1C The TOE shall be suitable for testing.

AVA_VAN.3.1E The evaluator shall confirm that the information provided meets all requirements for content and presentation of evidence.

AVA_VAN.3.2E The evaluator shall perform a search of public domain sources to identify potential vulnerabilities in the TOE.

AVA_VAN.3.3E The evaluator shall perform an independent, focused vulnerability analysis of the TOE using the guidance documentation, functional specification, TOE design, security architecture description and implementation representation to identify potential vulnerabilities in the TOE.

AVA_VAN.3.4E The evaluator shall conduct penetration testing, based on the identified potential vulnerabilities, to determine that the TOE is resistant to attacks performed by an attacker possessing Enhanced-Basic attack potential.

9.4 Security Requirements Rationale

9.4.1 Objectives

9.4.1.1 Security Objectives for the TOE

<u>Additional Objectives</u>

OT.Chip_Auth_Proof The security objective OT.Chip_Auth_Proof "Proof of MRTD's chip authenticity" is ensured by the Chip Authentication Protocol activated by FMT_MOF.1/PROT and provided by FIA_API.1/CA proving the genuineness of the TOE. The Chip Authentication Protocol defined by FCS_CKM.1/CA is performed using a TOE internally stored confidential private key. Confidentiality of this key is ensured by FMT_MTD.1/CAPK and FMT_MTD.1/CAPK_READ. The Chip Authentication Protocol [TR_03110-3] requires additional TSF according to FCS_COP.1/CA_SHA (for the derivation of the session keys) using FCS_RND.1, FCS_COP.1/CA_ENC and FCS_COP.1/CA_MAC (for the ENC_MAC_Mode secure messaging).

OT.Configuration The security objective OT.Configuration "Protection of the TOE preparation" addresses management of the Data Configuration, Pre-personalization Agent keys, Personalization Agent keys and the Life Cycle State of the TOE.

The authentication of the terminal as Manufacturer is performed by TSF according to SFR FIA_UAU.4 and FIA_UAU.5/MP. The Manufacturer can be authenticated by using the symmetric authentication mechanism (FCS_COP.1/GP_AUTH) with the Pre-personalization key. FIA_UAU.6/MP describes the re-authentication. In case of failed authentication attempts FIA_AFL.1/MP enforces additional waiting time prolonging the necessary amount of time for facilitating a brute force attack. The SFR FTP_ITC.1/MP allows the Manufacturer to communicate with the OS.

Once phase 4 is done, the MRTD packaging responsible is allowed to set the Pre-personalization Agent keys according to the SFR and FCS_COP.1/GP_KEY_DEC.

In phase 5, the authentication of the terminal as Manufacturer shall be performed by TSF according to SFR FIA_UAU.4 and FIA_UAU.5/MP. The Manufacturer shall be authenticated by using the symmetric authentication mechanism (FCS_COP.1/GP_AUTH).

In case of failed authentication attempts FIA_AFL.1/MP enforces additional waiting time prolonging the necessary amount of time for facilitating a brute force attack

The SFR FIA_UAU.6/MP describes the re-authentication and the protection of the transmitted data is assumed by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1/GP, FCS_RND.1 (for key generation), and FCS_COP.1/GP_ENC as well as FCS_COP.1/GP_MAC for the ENC_MAC_Mode. The SFR FCS_CKM.4 enforces the destruction of Secure Messaging session keys.

The Manufacturer can enable Chip Authentication functionalities following FMT_MOF.1/PROT.

FPT_PHP.3 deals with the physical protection of the TOE and FPT_FLS.1 ensures safety of the TOE in case of a failure. FPT_EMS.1 ensures no emissions allow access to data stored on the TOE.

FMT_SMF.1 controls the management functions along with FMT_SMR.1.

OT.AA_Proof The security objective OT.AA_Proof is ensured by the Active Authentication Protocol activated by FMT_MOF.1/AA and provided by FDP_DAU.1/AA, FDP_ITC.1/AA proving the identity and authenticity of the TOE. The Active Authentication relies on FCS_COP.1/AA and FCS_RND.1. It is performed using a TOE internally stored confidential private key as required by FMT_MTD.1/AA_KEY_WRITE and FMT_MTD.1/AA_KEY_READ.

OT.Data_Int_AA The security objective OT.AA_Proof is ensured by the Active Authentication Protocol activated by FMT_MOF.1/AA and provided by FDP_DAU.1/AA and FDP_ITC.1/AA proving the identity and authenticity of the TOE.

OT.ADMIN_Configuration The security objective OT.ADMIN_Configuration "Protection of the TOE administration" addresses management of the Data Configuration with key size management for the Chip Authentication of the TOE. The Administrator can be authenticated by using the symmetric authentication mechanism (FCS_COP.1/GP_AUTH) with the Administartor key. ADMIN keys are created during pre-personalization. FMT_MTD.1/KEY_READ restricts the ability to read the Administrator Keys to none. FPT_EMS.1 protects the confidentially of Administrator Agent keys. The SFRs FMT_SMF.1 and FMT_SMR.1 support the functions and roles related. The administration TSF data manipulation are supported by FMT_MTD.1/ADMIN. It is now allowed to modify the Chip Authentication key parameters to be used during key generation in USE phase. The minimum key size that the user can generate in USE phase is controlled by the "ADMIN" role. It is also possible to change the key parameters during the key generation process. For example changing the domain parameters of an elliptic curve key. It is also possible to invalidate one of the Chip Authentication key in USE phase and to set the secondary key as being the primary key. Note: after such process, the "freed" CA key set is available for a future CA key generation.

OT.Key_Usage_Counter The security objective OT.Key_Usage_Counter is covered by FMT_MTD.1/Key_Usage_Counter.

OT.AC_SM_Level The security objective OT.AC_SM_Level "Access control to sensitive biometric reference data according to SM level" is covered by FMT_MTD.1/SM_LVL that allows the personalization agent to set the SM level required to access to the sensitive data.

Miscellaneous

OT.AC_Pers The security objective OT.AC_Pers "Access Control for Personalization of logical MRTD" addresses the access control of the writing of the logical MRTD. The write access to the logical MRTD data are defined by the SFR FDP_ACC.1/BAC and FDP_ACF.1/BAC 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. FMT_MTD.1/LCS_PERS controls transition from lifecycle phase 6 to phase 7. The following paragraph is extracted from [PP_BAC] and has been refined according to the technical characteristics of this TOE. The refinement is right after. The authentication of the terminal as Personalization Agent shall be performed by TSF according to SFR FIA_UAU.4 and FIA_UAU.5/MP. The Personalization Agent can be authenticated by using the GP authentication mechanism by FCS_COP.1/GP_AUTH. Note: As BAC mechanism is not supported for the authentication of the terminal as Personalization Agent, the following two paragraphs have been added to demonstrate that symmetric authentication used in Personalization phase fulfills the OT.AC_Pers. The authentication of the terminal as Personalization Agent is performed by TSF according to SFR FIA_UAU.4 and FIA_UAU.5/BAC. FIA_UAU.6/MP describes the re-authentication. In case of failed authentication attempts FIA_AFL.1/MP enforces additional waiting time prolonging the necessary amount of time for facilitating a brute force attack. As the symmetric authentication is used in Personalization phase, the SFR FIA_UAU.6/MP describes the re-authentication and the protection of the transmitted data is assumed by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1/GP, FCS_RND.1 (for key generation), and FCS_COP.1/GP_ENC as well as FCS_COP.1/GP_MAC for the ENC_MAC_Mode. The SFR FCS_CKM.4 enforces the destruction of Secure Messaging session keys. 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. The following parts are added to integrate the personalization of the different keys in the OT.AC_Pers. Only the Personalization Agent is allowed to set the Document Basic Access Keys according to the SFR FMT_MTD.1/KEY_WRITE. The SFR FMT_MTD.1/KEY_READ prevents read access to the Document Basic Access 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. Only the Personalization Agent is allowed to set the Chip Authentication Private Key according to the SFR FMT_MTD.1/CAPK. The SFR FMT_MTD.1/CAPK_READ prevents read access to the Chip Authentication Private Key and ensure together with the SFR FCS_CKM.4, FPT_EMS.1, FPT_FLS.1 and FPT_PHP.3 the confidentially of these keys.

The Personalization Agent is the only subject allowed to ends Personalization of logical MRTD, setting the TOE Life Cycle State in Operational Use state according to FMT_MTD.1.1/LCS_PERS. Since then it is no more possible to return in Personalization state.

OT.Data_Int The security objective OT.Data_Int "Integrity of personal data" 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 SFRs (FDP_ACC.1/BAC, FDP_ACC.1/CA) and (FDP_ACF.1/BAC, FDP_ACF.1/CA) 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/BAC, 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/BAC). 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 SFR FIA_UAU.4, FIA_UAU.5/BAC and FIA_UAU.6/BAC using FCS_COP.1/AUTH.

The security objective OT.Data_Int "Integrity of personal data" 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/BAC, FDP_UCT.1/BAC and FDP_UIT.1/BAC requires the protection of the transmitted data by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1/BAC, FCS_COP.1/BAC_SHA, FCS_RND.1 (for key generation), and FCS_COP.1/BAC_ENC and FCS_COP.1/BAC_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.

The following part is added to integrate the Manufacturing and Personalization phases in the OT_Data_Int.

Manufacturer and Personalization Agent are also able to detect any modification of the transmitted logical MRTD data by means of the Symmetric Authentication mechanism. The SFR FIA_UAU.6/MP requires the re-authentication and the protection of the transmitted data is assumed by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1/GP, FCS_RND.1 (for key generation), and FCS_COP.1/GP_ENC and FCS_COP.1/GP_MAC for the ENC_MAC_Mode.

The following part is added to integrate the Chip Authentication mechanism in the coverage of the OT.Data_Int.

The inspection system is also able to detect any modification of the transmitted logical MRTD data by means of the Chip Authentication mechanism. The SFR FIA_UAU.6/CA, FDP_UCT.1/CA and FDP_UIT.1/CA requires the protection of the transmitted data by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1/CA FCS_COP.1/CA_SHA, FCS_RND.1 (for key generation), and FCS_COP.1/CA_ENC and FCS_COP.1/CA_MAC for the ENC_MAC_Mode. The SFR FMT_MTD.1/CAPK requires the Personalization Agent to establish the Chip Authentication Private Key in a way that it cannot be read by anyone in accordance to FMT_MTD.1/CAPK_READ. FCS_CKM.4 enforces the destruction of Secure Messaging session keys.

OT.Data_Conf The security objective OT.Data_Conf "Confidentiality of personal data" 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/BAC 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/BAC and FDP_ACF.1/BAC: 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/BAC 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/BAC 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/BAC_ENC and FCS_COP.1/BAC_MAC (cf. the SFR FDP_UCT.1/BAC and FDP_UIT.1/BAC). (for key generation), and FCS_COP.1/BAC_ENC and FCS_COP.1/BAC_MAC for the ENC_MAC_Mode. The SFR FCS_CKM.1/BAC, FCS_CKM.4, FCS_COP.1/BAC_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.

The following part is added to integrate the Manufacturing and Personalization phases in the OT_Data_Conf.

Manufacturer and Personalization Agent are also able to detect any modification of the transmitted logical MRTD data by means of the Symmetric Authentication mechanism. The SFR FIA_UAU.6/MP requires the protection of the transmitted data by means of secure messaging implemented by the cryptographic functions according to FCS_CKM.1/GP, FCS_RND.1 (for key generation), and FCS_COP.1/GP_ENC and FCS_COP.1/GP_MAC for the ENC_MAC_Mode.

The following parts are added to integrate the Chip Authentication mechanism and the Symmetric Authentication mechanism used in Personalization phase in the coverage of the OT.Data_Conf.

The SFR FIA_UAU.5/CA enforces the TOE to accept only received commands with correct message authentication code sent by means of secure messaging with key agreed with the terminal by means of the Chip Authentication Mechanism. Moreover, the SFR FIA_UAU.6/CA requests secure messaging after successful authentication of the chip which includes the protection of the transmitted data in ENC_MAC_Mode by means of the cryptographic functions according to FCS_COP.1/CA_ENC and FCS_COP.1/CA_MAC (cf. the SFR FDP_UCT.1/CA and FDP_UIT.1/CA). (for key generation), and FCS_COP.1/CA_ENC and FCS_COP.1/CA_MAC for the ENC_MAC_Mode. The SFR FCS_CKM.1/CA, FCS_CKM.4, FCS_COP.1/CA_SHA and FCS_RND.1 establish the key management for the secure messaging keys. The SFR FMT_MTD.1/CAPK addresses the key management and FMT_MTD.1/CAPK_READ prevents reading of the Chip Authentication Private Key. During Personalization of logical MRTD, the Chip Authentication Private Key is transmitted ciphered and the TSF deciphers these keys according to SFR FCS_COP.1/GP_KEY_DEC (FCS_CKM.1/GP and FCS_RND.1 for decryption session key generation; FCS_CKM.4 for decryption session key destruction).

OT.Identification The security objective OT.Identification "Identification and Authentication of the TOE" address 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/BAC enforces additional waiting time prolonging the necessary amount of time for facilitating a brute force attack.

OT.Prot_Abuse-Func The security objective OT.Prot_Abuse-Func "Protection against Abuse of Functionality" is ensured by the SFR FMT_LIM.1 and FMT_LIM.2 which prevent misuse of test functionality of the TOE or other features which may not be used after TOE Delivery.

OT.Prot_Inf_Leak The security objective OT.Prot_Inf_Leak "Protection against Information Leakage" requires the TOE to protect confidential TSF data stored and/or processed in the 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

- o by a physical manipulation of the TOE, which is addressed by the SFR FPT_PHP.3.

OT.Prot_Phys-Tamper The security objective OT.Prot_Phys-Tamper "Protection against Physical Tampering" is covered by the SFR FPT_PHP.3.

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

9.4.2 Rationale tables of Security Objectives and SFRs

Security Objectives	Security Functional Requirements	Rationale
OT.Chip_Auth_Proof	FCS_CKM.1/CA, FCS_COP.1/CA_SHA, FCS_COP.1/CA_ENC, FCS_COP.1/CA_MAC, FCS_RND.1, FIA_API.1/CA, FMT_MOF.1/PROT, FMT_MTD.1/CAPK, FMT_MTD.1/CAPK_READ	Section 9.3.1
OT.Configuration	FCS_CKM.1/GP, FCS_CKM.4, FCS_COP.1/GP_ENC, FCS_COP.1/GP_AUTH, FCS_COP.1/GP_MAC, FCS_COP.1/GP_KEY_DEC, FCS_RND.1, FIA_UAU.4, FIA_UAU.5/MP, FIA_UAU.6/MP, FIA_AFL.1/MP, FMT_MOF.1/PROT, FMT_SMF.1, FMT_SMR.1, FPT_EMS.1, FPT_FLS.1, FPT_PHP.3, FTP_ITC.1/MP	Section 9.3.1
OT.AA_Proof	FCS_COP.1/AA, FDP_DAU.1/AA, FDP_ITC.1/AA, FMT_MTD.1/AA_KEY_READ, FMT_MTD.1/AA_KEY_WRITE, FMT_MOF.1/AA, FCS_RND.1	Section 9.3.1
OT.Data_Int_AA	FDP_DAU.1/AA, FDP_ITC.1/AA, FMT_MOF.1/AA	Section 9.3.1
OT.ADMIN_Configuration	FCS_COP.1/GP_AUTH, FMT_MTD.1/KEY_READ, FPT_EMS.1, FMT_SMF.1, FMT_SMR.1, FMT_MTD.1/ADMIN	Section 9.3.1
OT.Key_Usage_Counter	FMT_MTD.1/Key_Usage_Counter	Section 9.3.1
OT.AC_SM_Level	FMT_MTD.1/SM_LVL	Section 9.3.1
OT.AC_Pers	FCS_CKM.1/GP, FCS_CKM.4, FCS_COP.1/GP_ENC, FCS_COP.1/GP_MAC, FCS_RND.1, FIA_UAU.4, FIA_UAU.5/BAC, FIA_UAU.6/MP, FIA_AFL.1/MP, FDP_ACC.1/BAC, FDP_ACF.1/BAC, FMT_SMF.1, FMT_SMR.1, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/KEY_READ, FMT_MTD.1/CAPK, FMT_MTD.1/CAPK_READ,	Section 9.3.1

	FMT_MTD.1/LCS_PERS, FPT_EMS.1, FPT_FLS.1, FPT_PHP.3, FIA_UAU.5/MP, FCS_COP.1/GP_AUTH	
OT.Data_Int	FCS_CKM.1/BAC, FCS_CKM.1/GP, FCS_CKM.1/CA, FCS_CKM.4, FCS_COP.1/BAC_SHA, FCS_COP.1/BAC_ENC, FCS_COP.1/AUTH, FCS_COP.1/BAC_MAC, FCS_COP.1/GP_ENC, FCS_COP.1/GP_MAC, FCS_COP.1/CA_SHA, FCS_COP.1/CA_ENC, FCS_COP.1/CA_MAC, FIA_UAU.4, FIA_UAU.5/BAC, FIA_UAU.6/BAC, FIA_UAU.6/MP, FIA_UAU.6/CA, FDP_ACC.1/BAC, FDP_ACF.1/BAC, FDP_UCT.1/BAC, FDP_UCT.1/CA, FDP_UIT.1/BAC, FDP_UIT.1/CA, FMT_SMF.1, FMT_SMR.1, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/KEY_READ, FMT_MTD.1/CAPK, FMT_MTD.1/CAPK_READ, FDP_ACC.1/CA, FDP_ACF.1/CA, FCS_RND.1	Section 9.3.1
OT.Data_Conf	FCS_CKM.1/BAC, FCS_CKM.1/GP, FCS_CKM.1/CA, FCS_CKM.4, FCS_COP.1/BAC_SHA, FCS_COP.1/BAC_ENC, FCS_COP.1/BAC_MAC, FCS_COP.1/GP_ENC, FCS_COP.1/GP_MAC, FCS_COP.1/GP_KEY_DEC, FCS_COP.1/CA_SHA, FCS_COP.1/CA_ENC, FCS_COP.1/CA_MAC, FCS_RND.1, FIA_UID.1, FIA_UAU.1, FIA_UAU.4, FIA_UAU.5/BAC, FIA_UAU.5/CA, FIA_UAU.6/BAC, FIA_UAU.6/MP, FIA_UAU.6/CA, FIA_AFL.1/BAC, FDP_ACC.1/BAC, FDP_ACF.1/BAC, FDP_UCT.1/BAC, FDP_UCT.1/CA, FDP_UIT.1/BAC, FDP_UIT.1/CA, FMT_SMF.1, FMT_SMR.1, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/KEY_READ, FMT_MTD.1/CAPK, FMT_MTD.1/CAPK_READ	Section 9.3.1
OT.Identification	FAU_SAS.1, FIA_UID.1, FIA_UAU.1, FIA_AFL.1/BAC, FMT_MTD.1/INI_ENA, FMT_MTD.1/INI_DIS	Section 9.3.1
OT.Prot_Abuse-Func	FMT_LIM.1, FMT_LIM.2	Section 9.3.1
OT.Prot_Inf_Leak	FPT_EMS.1, FPT_FLS.1, FPT_TST.1, FPT_PHP.3	Section 9.3.1
OT.Prot_Phys-Tamper	FPT_PHP.3	Section 9.3.1
OT.Prot_Malfunction	FPT_FLS.1, FPT_TST.1	Section 9.3.1

Table 20 Security Objectives and SFRs - Coverage

Security Functional Requirements	Security Objectives	Rational
FAU_SAS.1	OT.Identification	
FCS_CKM.1/BAC	OT.Data_Int, OT.Data_Conf	
FCS_CKM.4	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration	
FCS_COP.1/BAC_SHA	OT.Data_Int, OT.Data_Conf	
FCS_COP.1/BAC_ENC	OT.Data_Int, OT.Data_Conf	
FCS_COP.1/AUTH	OT.Data_Int	
FCS_COP.1/BAC_MAC	OT.Data_Int, OT.Data_Conf	
FCS_RND.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof, OT.Configuration, OT.AA_Proof	
FCS_CKM.1/CA	OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FCS_COP.1/AA	OT.AA_Proof	
FCS_COP.1/CA_SHA	OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FCS_COP.1/CA_ENC	OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FCS_COP.1/CA_MAC	OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FCS_CKM.1/GP	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration	
FCS_COP.1/GP_ENC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration	
FCS_COP.1/GP_AUTH	OT.AC_Pers, OT.Configuration, OT.ADMIN_Configuration	
FCS_COP.1/GP_MAC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration	
FCS_COP.1/GP_KEY_DEC	OT.Data_Conf, OT.Configuration	
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, OT.Configuration	
FIA_UAU.5/BAC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FIA_UAU.6/BAC	OT.Data_Int, OT.Data_Conf	

FIA_AFL.1/BAC	OT.Data_Conf, OT.Identification	
FIA_UAU.5/MP	OT.AC_Pers, OT.Configuration	
FIA_UAU.6/MP	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration	
FIA_AFL.1/MP	OT.AC_Pers, OT.Configuration	
FIA_UAU.5/CA	OT.Data_Conf	
FIA_UAU.6/CA	OT.Data_Int, OT.Data_Conf	
FIA_API.1/CA	OT.Chip_Auth_Proof	
FDP_ACC.1/BAC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FDP_ACF.1/BAC	OT.AC_Pers, OT.Data_Int, OT.Data_Conf	
FDP_UCT.1/BAC	OT.Data_Int, OT.Data_Conf	
FDP_UIT.1/BAC	OT.Data_Int, OT.Data_Conf	
FDP_ACC.1/CA	OT.Data_Int	
FDP_ACF.1/CA	OT.Data_Int	
FDP_UCT.1/CA	OT.Data_Int, OT.Data_Conf	
FDP_UIT.1/CA	OT.Data_Int, OT.Data_Conf	
FDP_DAU.1/AA	OT.AA_Proof, OT.Data_Int_AA	
FDP_ITC.1/AA	OT.AA_Proof, OT.Data_Int_AA	
FMT_SMF.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration, OT.ADMIN_Configuration	
FMT_SMR.1	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Configuration, OT.ADMIN_Configuration	
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	
FMT_MTD.1/KEY_READ	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.ADMIN_Configuration	
FMT_MOF.1/PROT	OT.Chip_Auth_Proof, OT.Configuration	
FMT_MOF.1/AA	OT.AA_Proof, OT.Data_Int_AA	
FMT_MTD.1/CAPK	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	

FMT_MTD.1/CAPK_READ	OT.AC_Pers, OT.Data_Int, OT.Data_Conf, OT.Chip_Auth_Proof	
FMT_MTD.1/AA_KEY_READ	OT.AA_Proof	
FMT_MTD.1/AA_KEY_WRITE	OT.AA_Proof	
FMT_MTD.1/LCS_PERS	OT.AC_Pers	
FMT_MTD.1/ADMIN	OT.ADMIN_Configuration	
FMT_MTD.1/Key_Usage_Counter	OT.Key_Usage_Counter	
FMT_MTD.1/SM_LVL	OT.AC_SM_Level	
FPT_EMS.1	OT.AC_Pers, OT.Prot_Inf_Leak, OT.Configuration, OT.ADMIN_Configuration	
FPT_FLS.1	OT.AC_Pers, OT.Prot_Inf_Leak, OT.Prot_Malfunction, OT.Configuration	
FPT_TST.1	OT.Prot_Inf_Leak, OT.Prot_Malfunction	
FPT_PHP.3	OT.AC_Pers, OT.Prot_Inf_Leak, OT.Prot_Phys-Tamper, OT.Configuration	
FTP_ITC.1/MP	OT.Configuration	

Table 21 SFRs and Security Objectives

9.4.3 Dependencies

9.4.3.1 SFRs Dependencies

Requirements	CC Dependencies	Satisfied Dependencies
FAU_SAS.1	No Dependencies	
FCS_CKM.1/BAC	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_CKM.4, FCS_COP.1/BAC_ENC, FCS_COP.1/BAC_MAC
FCS_CKM.4	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2)	FCS_CKM.1/BAC, FCS_CKM.1/CA, FCS_CKM.1/GP
FCS_COP.1/BAC_SHA	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4
FCS_COP.1/BAC_ENC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.1/BAC, FCS_CKM.4

FCS_COP.1/AUTH	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.1/BAC, FCS_CKM.4
FCS_COP.1/BAC_MAC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.1/BAC, FCS_CKM.4
FCS_RND.1	No Dependencies	
FCS_CKM.1/CA	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_CKM.4, FCS_COP.1/CA_ENC, FCS_COP.1/CA_MAC
FCS_COP.1/AA	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FDP_ITC.1/AA
FCS_COP.1/CA_SHA	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4
FCS_COP.1/CA_ENC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1/CA
FCS_COP.1/CA_MAC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1/CA
FCS_CKM.1/GP	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_CKM.4, FCS_COP.1/GP_ENC, FCS_COP.1/GP_MAC
FCS_COP.1/GP_ENC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1/GP
FCS_COP.1/GP_AUTH	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1/GP
FCS_COP.1/GP_MAC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1/GP

FCS_COP.1/GP_KEY_DEC	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1/GP
FIA_UID.1	No Dependencies	
FIA_UAU.1	(FIA_UID.1)	FIA_UID.1
FIA_UAU.4	No Dependencies	
FIA_UAU.5/BAC	No Dependencies	
FIA_UAU.6/BAC	No Dependencies	
FIA_AFL.1/BAC	(FIA_UAU.1)	FIA_UAU.1
FIA_UAU.5/MP	No Dependencies	
FIA_UAU.6/MP	No Dependencies	
FIA_AFL.1/MP	(FIA_UAU.1)	FIA_UAU.1
FIA_UAU.5/CA	No Dependencies	
FIA_UAU.6/CA	No Dependencies	
FIA_API.1/CA	No Dependencies	
FDP_ACC.1/BAC	(FDP_ACF.1)	FDP_ACF.1/BAC
FDP_ACF.1/BAC	(FDP_ACC.1) and (FMT_MSA.3)	FDP_ACC.1/BAC
FDP_UCT.1/BAC	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/BAC
FDP_UIT.1/BAC	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/BAC
FDP_ACC.1/CA	(FDP_ACF.1)	FDP_ACF.1/CA
FDP_ACF.1/CA	(FDP_ACC.1) and (FMT_MSA.3)	FDP_ACC.1/CA
FDP_UCT.1/CA	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/CA
FDP_UIT.1/CA	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/CA

FDP_DAU.1/AA	No Dependencies	
FDP_ITC.1/AA	(FDP_ACC.1 or FDP_IFC.1) and (FMT_MSA.3)	FDP_ACC.1/BAC
FMT_SMF.1	No Dependencies	
FMT_SMR.1	(FIA_UID.1)	FIA_UID.1
FMT_LIM.1	(FMT_LIM.2)	FMT_LIM.2
FMT_LIM.2	(FMT_LIM.1)	FMT_LIM.1
FMT_MTD.1/INI_ENA	(FMT_SMF.1) 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
FMT_MOF.1/PROT	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MOF.1/AA	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/CAPK	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/CAPK_READ	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/AA_KEY_READ	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/AA_KEY_WRITE	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/LCS_PERS	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/ADMIN	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/Key_Usage_Counter	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMF.1, FMT_SMR.1
FMT_MTD.1/SM_LVL	(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	
FTP_ITC.1/MP	No Dependencies	

Table 22 SFRs Dependencies

Rationale for the exclusion of Dependencies

The dependency FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2 of FCS_COP.1/BAC_SHA is discarded. The hash algorithm required by FCS_COP.1/BAC_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/CA_SHA is discarded. The hash algorithm required by FCS_COP.1/CA_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 FMT_MSA.3 of FDP_ACF.1/BAC is discarded. The access control TSF according to FDP_ACF.1/BAC 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/BAC is discarded. The SFR FDP_UCT.1/BAC requires the use of 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/BAC is discarded. The SFR FDP_UIT.1/BAC requires the use of 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 FMT_MSA.3 of FDP_ACF.1/CA is discarded. The access control TSF according to FDP_ACF.1/CA 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/CA is discarded. The SFR FDP_UCT.1/CA requires the use of 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/CA is discarded. The SFR FDP_UIT.1/CA requires the use of 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 FMT_MSA.3 of FDP_ITC.1/AA is discarded. The access control TSF according to FDP_ACF.1/BAC 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.

9.4.3.2 SARs Dependencies

Requirements	CC Dependencies	Satisfied Dependencies
ADV_ARC.1	(ADV_FSP.1) and (ADV_TDS.1)	ADV_FSP.5, ADV_TDS.4
ADV_FSP.5	(ADV_IMP.1) and (ADV_TDS.1)	ADV_IMP.1, ADV_TDS.4
ADV_IMP.1	(ADV_TDS.3) and (ALC_TAT.1)	ADV_TDS.4, ALC_TAT.2
ADV_TDS.4	(ADV_FSP.5)	ADV_FSP.5
ADV_INT.2	(ADV_IMP.1) and (ADV_TDS.3) and (ALC_TAT.1)	ADV_IMP.1, ADV_TDS.4, ALC_TAT.2
AGD_OPE.1	(ADV_FSP.1)	ADV_FSP.5
AGD_PRE.1	No Dependencies	
ALC_CMC.4	(ALC_CMS.1) and (ALC_DVS.1) and (ALC_LCD.1)	ALC_CMS.5, ALC_DVS.2, ALC_LCD.1
ALC_CMS.5	No Dependencies	
ALC_DEL.1	No Dependencies	
ALC_DVS.2	No Dependencies	
ALC_LCD.1	No Dependencies	
ALC_TAT.2	(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.5, ASE_INT.1, ASE_REQ.2
ATE_COV.2	(ADV_FSP.2) and (ATE_FUN.1)	ADV_FSP.5, ATE_FUN.1
ATE_DPT.3	(ADV_ARC.1) and (ADV_TDS.4) and (ATE_FUN.1)	ADV_ARC.1, ADV_TDS.4, ATE_FUN.1
ATE_FUN.1	(ATE_COV.1)	ATE_COV.2
ATE_IND.2	(ADV_FSP.2) and (AGD_OPE.1) and (AGD_PRE.1) and (ATE_COV.1) and (ATE_FUN.1)	ADV_FSP.5, 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.5, ADV_IMP.1, ADV_TDS.4, AGD_OPE.1, AGD_PRE.1, ATE_DPT.3

Table 23 SARs Dependencies

9.4.4 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.

9.4.5 ADV_FSP.5 Complete semi-formal functional specification with additional error information

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

9.4.6 ADV_INT.2 Well-structured internals

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

9.4.7 ADV_TDS.4 Semiformal modular design

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

9.4.8 ALC_CMS.5 Development tools CM coverage

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

9.4.9 ALC_DVS.2 Sufficiency of security measures

The selection of the component ALC_DVS.2 provides a higher assurance of the security of the MRTD’s development and manufacturing especially for the secure handling of the MRTD’s material.

The component ALC_DVS.2 augmented to EAL4 has no dependencies to other security requirements

9.4.10 ALC_TAT.2 Compliance with implementation standards

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

9.4.11 ATE_DPT.3 Testing: modular design

The TOE actually target an EAL5 + ALC_DVS.2 and AVA_VAN.5 and is only limited to EAL4+ due to the restriction of [PP_BAC] on AVA_VAN level.

Other MRTDs TOE are targeting the same physical scope are not affected by this limitation and provide the full EAL5+ set of SARs. This EAL5+ is required to reach a higher level of assurance due to sensitivity of ID documents.

10 TOE Summary Specification

10.1 TOE Summary Specification

This section provides a summary of the security functions implemented by the TOE in order to fulfil the security functional requirements. The summary is structured in security functions.

Access Control in Reading

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

- Pre-personalization Agent keys and Personalization Agent keys,
- BAC keys,
- CA private key
- AAK (Active Authentication Keys)

It ensures the access control to specific data as defined in FAU_SAS.1.

Regarding the file structure: In:

The terminal can read user data, the Document Security Object, (EF.COM, EF.SOD, EF.DG1 to EF.DG16) only after BAC or CA respectively authentication and through a valid secure channel.

In the Production and preparation stage: The Manufacturer can read the Initialization Data in Stage 2 "Production". The pre-personalization agent and the Personalization Agent can read only the random identifier in Stage 3 "Preparation" stored in the TOE. Other data-elements can only be read after they are authenticated by the TOE (using their authentication keys).

It ensures as well that no other part of the memory can be accessed at any time.

The implementation contributes to:

- FIA_UID.1, FIA_UAU.1
- FMT_MTD.1/LCS_PERS, FMT_MTD.1/INI_DIS, FMT_MTD.1/KEY_READ, FMT_MTD.1/CAPK_READ, FMT_MTD.1/AA_KEY_READ
- FDP_ACF.1/BAC, FDP_ACC.1/BAC

Access Control in Writing

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

Regarding the file structure:

In the Production and preparation stage: The Manufacturer can write all the Initialization and data for the Pre-personalization. The Personalization Agent can write through a valid secure channel all the data Document Basic Access Keys and Active Authentication Keys after it is authenticated by the TOE (using its authentication keys). The Pre-Personalization Agent can write through a valid secure channel data to be used by the personalization agent (after it is authenticated by the TOE using its authentication keys). The Pre-personalization agent is only active after delivery. The key that is written in the TOE for authentication purposes during manufacturing in meant for the pre-personalization agent. The Pre-personalization agent (which is seen as a sub-role of the Personalization agent) will refresh this key.

In the Operational Use phase: It is not possible to create any files (system or data files). Furthermore, it is not possible to update any files (system or data files),except for CA keys, DG14 and SOD which can be updated if access condition are fulfilled

The implementation contributes to:

- FDP_ACC.1/BAC and FDP_ACF.1/BAC
- FDP_ACC.1/CA and FDP_ACF.1/CA
- FMT_MTD.1/LCS_PERS
- FMT_MTD.1/INI_DIS
- FMT_MTD.1/KEY_WRITE
- FMT_MTD.1/INI_ENA
- FMT_MTD.1/AA_KEY_WRITE
- FDP_ITC.1/AA

Active Authentication

This security functionality ensures the Active Authentication is performed as described in [ICAO_9303] (if it is activated by the personalizer).

The implementation contributes to:

- FCS_COP.1/AA
- FDP_DAU.1/AA
- FDP_ITC.1/AA

Basic Access Control

This TSF provides the Basic Access Control, authentication and session keys generation to be used by SECURE MESSAGING , as described in [ICAO_9303].

The BAC Session Keys are derived from the MRZ of the MRTD’s chip: this is done using SHA-1 (FCS_COP.1/BAC_SHA). The authentication initialization requires that the MRTD’s chip generate 8 bytes challenge (nonce rPICC) that is read by the Basic Inspection System (FIA_UAU.1), and 16 bytes Key (KPICC) (FCS_RND.1). The MRTD BAC authentication stages also require TDES encryption of 32 bytes of concatenated data and a Retail MAC computation over the 32 bytes of encryption output (FCS_COP.1/AUTH). The Basic Inspection System also generated a pair (KPCD, rPCD). The use of challenges enforces a protection against replay (FIA_UAU.4). Completion of the BAC Authentication protocol means that a Secure Messaging session, in ENC_MAC_Mode (FCS_COP.1/BAC_ENC and FCS_COP.1/BAC_MAC), is started with the session keys (KENC and KMAC) derived according to [ICAO_9303] from the common master secret KMaster = KPICC?KPCD and a Send Sequence Counter SSC derived from rPICC and rPCD (FCS_CKM.1/BAC). All further communication with the TOE is handled by SECURE MESSAGING , enforcing confidentiality and integrity over transferred data (FIA_UAU.5/BAC). In case the BAC authentication protocol fails (the TOE being unable to identify the Terminal as being a legitimate Basic

Inspection System) the TOE records one authentication failure. If the Terminal reaches a pre-defined amount of successive authentication failures, the BAC Authentication Key is blocked (FIA_AFL.1/BAC). The implementation contributes also to FDP_ACC.1/BAC and by FDP_ACF.1/BAC for read and write access control management and FMT_SMR.1 for security roles.

Chip Authentication

This TSF provides the Chip Authentication, authentication and session keys generation to be used by SECURE MESSAGING , as described in [TR_03110-3]. The session keys are obtained using SHA-1 or SHA-256 (FCS_COP.1/CA_SHA).

It also handles key generation based on ECDH (FCS_CKM.1/CA).

It also provides management of this function in phase 5. The implementation contributes to:

- FIA_UAU.5.2/CA
- FIA_UAU.6.1/CA
- FIA_API.1.1/CA
- FDP_UCT.1.1/CA
- FDP_UIT.1.1/CA
- FDP_UIT.1.2/CA
- FMT_MOF.1.1/PROT
- FDP_ACC.1.1/CA
- FDP_ACF.1.1/CA

MRTD Personalization

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

- Manage symmetric authentication using Personalization Agent keys,
- Compute session keys to be used by SECURE MESSAGING to establish secure channel according to [GPC_SPE_034] and SCP02/SCP03,
- Enable and disable Active Authentication,
- Write Active Authentication Keys,
- Load user data,
- Load Chip Authentication keys in encrypted mode,
- Set TOE life cycle to Operational Use phase.

The implementation contributes to:

- FCS_CKM.1/GP, FCS_RND.1, FCS_COP.1/GP_AUTH, FCS_COP.1/GP_MAC, FCS_COP.1/GP_KEY_DEC,
- FIA_UAU.5/BAC, FIA_AFL.1/MP,
- FDP_ACC.1/BAC, FDP_ACF.1/BAC
- FMT_SMF.1, FMT_SMR.1, FMT_MTD.1/INI_DIS, FMT_MTD.1/KEY_WRITE, FMT_MTD.1/CAPK, FMT_MTD.1/LCS_PERS

- FTP_ITC.1/MP
- FIA_UAU.4
- FMT_MOF.1/AA
- FMT_MTD.1/AA_KEY_WRITE

Physical Protection

This Security Function protects the TOE against physical attacks, so that the integrity and confidentiality of the TOE is ensured, including keys, user data and TOE life cycle. It detects physical tampering, responds automatically, and also controls the emanations sent out by the TOE. It furthermore prevents deploying test features after TOE delivery. This SF also preserve a secure state when any failure is detected or a malfunction occurs.

The implementation contributes to: FPT_EMS.1, FPT_FLS.1, FPT_PHP.3, FMT_LIM.1 and FMT_LIM.2.

MRTD Pre-personalization

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

- Manage symmetric authentication using Pre-personalization Agent keys,
- Compute session keys to be used by SECURE MESSAGING to establish secure channel according to [GPC_SPE_034] and SCP02/SCP03
- Load Personalization Agent keys in encrypted mode.

The implementation contributes to:

- FCS_CKM.1/GP, FCS_COP.1/GP_AUTH, FCS_COP.1/GP_KEY_DEC, FCS_RND.1
- FIA_UAU.5/MP, FIA_AFL.1/MP,
- FMT_SMF.1, FMT_SMR.1, FMT_MTD.1/INI_ENA, - FTP_ITC.1/MP

Secure Messaging

This security functionality ensures the confidentiality, authenticity and integrity of the communication between the TOE and the interface device. In the operational phase, after a successful Authentication Procedure (i.e. BAC or CA), a secure channel is established, based on Triple DES algorithm in case of BAC and based on Triple DES/AES algorithms in case of CA (according to FCS_COP.1/CA_ENC and FCS_COP.1/CA_MAC), such that the TOE is able to verify the integrity and authenticity of exchanged data. This security functionality also provides a Secure Messaging (SCP02 or SCP03) for the Pre-personalization and Personalization phases. The protocols can be configured to protect the exchanges integrity and/or confidentiality. If an error occurs in the secure messaging layer, the session keys are destroyed.

The implementation contributes to:

- FIA_UAU.1, FIA_UAU.6/BAC, FIA_UAU.6/MP, FIA_UAU.6/CA, FIA_UAU.5/CA
- FCS_CKM.4, FCS_COP.1/BAC_ENC, FCS_COP.1/BAC_MAC, FCS_COP.1/GP_ENC, FCS_COP.1/GP_MAC,FCS_COP.1/CA_ENC, FCS_COP.1/CA_MAC, and FCS_RND.1
- FDP_UCT.1/BAC, FDP_UCT.1/CA,

- FTP_ITC.1/MP
- FDP_UIT.1/BAC, FDP_UIT.1/CA
- FIA_UAU.4

Self Tests

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

- At Reset. The implementation contributes to FPT_TST.1

ADMIN - MRTD Administration

This security functionality ensures that the TOE, when delivered to the Administration Agent, provides and requires authentication for data exchange. This function allows during Use phase to:

- Manage symmetric authentication using Administration Agent keys,
- Configure the size of the Chip Authentication key to be modified in USE phase,
- Change the CA key domain parameters used for the CA key generation process in user phase,
- Invalidate the primary Chip Authentication key in USE phase and to set the secondary key as being the primary key.

10.2 SFRs and TSS

10.2.1 SFRs and TSS - Rationale

Class FAU Security Audit

FAU_SAS.1 is met by Access Control in Reading

Class FCS Cryptographic Support

FCS_CKM.1/BAC is met by Basic Access Control.

FCS_CKM.4 is met by Secure Messaging

FCS_COP.1/BAC_SHA is met by Basic Access Control

FCS_COP.1/BAC_ENC is met by Basic Access Control and Secure Messaging

FCS_COP.1/AUTH is met by MRTD Personalization

FCS_COP.1/BAC_MAC is met by Basic Access Control and Secure Messaging

FCS_RND.1 is met by Basic Access Control, MRTD Personalization, MRTD Pre-personalization and Secure Messaging

Additional FCS SFR's Identified

FCS_CKM.1/CA is met by Chip Authentication

FCS_COP.1/AA is met by Active Authentication

FCS_COP.1/CA_SHA is met by Chip Authentication

FCS_COP.1/CA_ENC is met by Secure Messaging

FCS_COP.1/CA_MAC is met by Secure Messaging

FCS_CKM.1/GP is met by MRTD Personalization and MRTD Pre-personalization

FCS_COP.1/GP_ENC is met by Secure Messaging

FCS_COP.1/GP_AUTH is met by MRTD Pre-personalization

FCS_COP.1/GP_MAC is met by Secure Messaging

FCS_COP.1/GP_KEY_DEC is met by MRTD Personalization and MRTD Pre-personalization

Class FIA Identification and Authentication

FIA_UID.1 is met by Access Control in Reading

FIA_UAU.1 is met by Access Control in Reading

FIA_UAU.4 is met by Basic Access Control, MRTD Personalization and Secure Messaging

FIA_UAU.5/BAC is met by Basic Access Control and MRTD Personalization

FIA_UAU.6/BAC is met by Secure Messaging

FIA_AFL.1/BAC is met by Basic Access Control

Additional FIA SFR's Identified

FIA_UAU.5/MP is met by MRTD Pre-personalization

FIA_UAU.6/MP is met by Secure Messaging

FIA_AFL.1/MP is met by MRTD Personalization and MRTD Pre-personalization

FIA_UAU.5/CA is met by Secure Messaging

FIA_UAU.6/CA is met by Secure Messaging

FIA_API.1/CA is met by Chip Authentication

Class FDP User Data Protection

FDP_ACC.1/BAC is met by Access Control in Reading, Access Control in Writing, Basic Access Control and MRTD Personalization

FDP_ACF.1/BAC is met by Access Control in Reading, Access Control in Writing, Basic Access Control and MRTD Personalization

FDP_UCT.1/BAC is met by Secure Messaging

FDP_UIT.1/BAC is met by Secure Messaging

Additional FDP SFR's Identified

FDP_ACC.1/CA is met by Access Control in Writing, Chip Authentication and Secure Messaging

FDP_ACF.1/CA is met by Access Control in Writing, Chip Authentication and Secure Messaging

FDP_UCT.1/CA is met by Secure Messaging

FDP_UIT.1/CA is met by Secure Messaging

FDP_DAU.1/AA is met by Active Authentication

FDP_ITC.1/AA is met by Access Control in Writing and Active Authentication

Class FMT Security Management

FMT_SMF.1 is met by Chip Authentication, MRTD Personalization and MRTD Pre-personalization

FMT_SMR.1 is met by Basic Access Control, MRTD Personalization and MRTD Pre-personalization

FMT_LIM.1 is met by Physical Protection

FMT_LIM.2 is met by Physical Protection

FMT_MTD.1/INI_ENA is met by Access Control in Writing and MRTD Pre-personalization

FMT_MTD.1/INI_DIS is met by Access Control in Reading, Access Control in Writing and MRTD Personalization

FMT_MTD.1/KEY_WRITE is met by Access Control in Writing and MRTD Personalization

FMT_MTD.1/KEY_READ is met by Access Control in Reading

Additional FMT SFR's Identified

FMT_MOF.1/PROT is met by Chip Authentication

FMT_MOF.1/AA is met by MRTD Personalization

FMT_MTD.1/CAPK is met by Access Control in Writing and MRTD Personalization

FMT_MTD.1/CAPK_READ is met by Access Control in Reading

FMT_MTD.1/AA_KEY_READ is met by Access Control in Reading

FMT_MTD.1/AA_KEY_WRITE is met by Access Control in Writing and MRTD Personalization

FMT_MTD.1/LCS_PERS is met by Access Control in Writing and MRTD Personalization

FMT_MTD.1/ADMIN is met by ADMIN - MRTD Administration

FMT_MTD.1/Key_Usage_Counter is met by MRTD Personalisation

FMT_MTD.1/SM_LVL is met by MRTD Personalization in which the level of security of the allowed secure messaging can now be restricted during perso for the USE phase.

Class FPT Protection of the Security Functions

FPT_EMS.1 is met by Physical Protection

FPT_FLS.1 is met by Physical Protection

FPT_TST.1 is met by Self Tests

FPT_PHP.3 is met by Physical Protection

Additional FTP Trusted path/channels SFR Identified

FTP_ITC.1/MP is met by MRTD Personalization, MRTD Pre-personalization and Secure Messaging

10.2.2 Association tables of SFRs and TSS

Security Functional Requirements	TOE Summary Specification
FAU_SAS.1	Access Control in Reading
FCS_CKM.1/BAC	Basic Access Control
FCS_CKM.4	Secure Messaging

Security Functional Requirements	TOE Summary Specification
FCS_COP.1/BAC_SHA	Basic Access Control
FCS_COP.1/BAC_ENC	Basic Access Control, Secure Messaging
FCS_COP.1/AUTH	MRTD Personalization, Basic Access Control
FCS_COP.1/BAC_MAC	Basic Access Control, Secure Messaging
FCS_RND.1	Basic Access Control, MRTD Personalization, MRTD Pre-personalization, Secure Messaging
FCS_CKM.1/CA	Chip Authentication
FCS_COP.1/AA	Active Authentication
FCS_COP.1/CA_SHA	Chip Authentication
FCS_COP.1/CA_ENC	Secure Messaging
FCS_COP.1/CA_MAC	Secure Messaging
FCS_CKM.1/GP	MRTD Personalization, MRTD Pre-personalization
FCS_COP.1/GP_ENC	Secure Messaging
FCS_COP.1/GP_AUTH	MRTD Pre-personalization
FCS_COP.1/GP_MAC	Secure Messaging, MRTD Pre-personalization
FCS_COP.1/GP_KEY_DEC	MRTD Personalization, MRTD Pre-personalization
FIA_UID.1	Access Control in Reading
FIA_UAU.1	Access Control in Reading
FIA_UAU.4	Basic Access Control, MRTD Personalization, Secure Messaging
FIA_UAU.5/BAC	Basic Access Control, MRTD Personalization
FIA_UAU.6/BAC	Secure Messaging
FIA_AFL.1/BAC	Basic Access Control
FIA_UAU.5/MP	MRTD Pre-personalization
FIA_UAU.6/MP	Secure Messaging
FIA_AFL.1/MP	MRTD Personalization, MRTD Pre-personalization
FIA_UAU.5/CA	Secure Messaging
FIA_UAU.6/CA	Secure Messaging
FIA_API.1/CA	Chip Authentication
FDP_ACC.1/BAC	Access Control in Reading, Access Control in Writing, Basic Access Control, MRTD Personalization

Security Functional Requirements	TOE Summary Specification
FDP_ACF.1/BAC	Access Control in Reading, Access Control in Writing, Basic Access Control, MRTD Personalization
FDP_UCT.1/BAC	Secure Messaging
FDP_UIT.1/BAC	Secure Messaging
FDP_ACC.1/CA	Access Control in Writing, Chip Authentication, Secure Messaging
FDP_ACF.1/CA	Access Control in Writing, Chip Authentication, Secure Messaging
FDP_UCT.1/CA	Secure Messaging
FDP_UIT.1/CA	Secure Messaging
FDP_DAU.1/AA	Active Authentication
FDP_ITC.1/AA	Access Control in Writing, Active Authentication
FMT_SMF.1	Chip Authentication, MRTD Personalization, MRTD Pre-personalization
FMT_SMR.1	Basic Access Control, MRTD Personalization, MRTD Pre-personalization
FMT_LIM.1	Physical Protection
FMT_LIM.2	Physical Protection
FMT_MTD.1/INI_ENA	Access Control in Writing, MRTD Pre-personalization
FMT_MTD.1/INI_DIS	Access Control in Reading, Access Control in Writing, MRTD Personalization
FMT_MTD.1/KEY_WRITE	Access Control in Writing, MRTD Personalization
FMT_MTD.1/KEY_READ	Access Control in Reading
FMT_MOF.1/PROT	Chip Authentication
FMT_MOF.1/AA	MRTD Personalization
FMT_MTD.1/CAPK	Access Control in Writing, MRTD Personalization
FMT_MTD.1/CAPK_READ	Access Control in Reading
FMT_MTD.1/AA_KEY_READ	Access Control in Reading
FMT_MTD.1/AA_KEY_WRITE	Access Control in Writing, MRTD Personalization
FMT_MTD.1/LCS_PERS	Access Control in Writing, MRTD Personalization
FMT_MTD.1/ADMIN	ADMIN - MRTD Administration
FMT_MTD.1/Key_Usage_Counter	MRTD Personalization

Security Functional Requirements	TOE Summary Specification
FMT_MTD.1/SM_LVL	MRTD Personalization
FPT_EMS.1	Physical Protection
FPT_FLS.1	Physical Protection
FPT_TST.1	Self Tests
FPT_PHP.3	Physical Protection
FTP_ITC.1/MP	MRTD Personalization, MRTD Pre-personalization, Secure Messaging

Table 24 SFRs and TSS - Coverage