IDEMIA

ID-A v1.0 on Cosmo X - Public Security Target

About IDEMIA

OT-Morpho is now IDEMIA, the global leader in trusted identities for an increasingly digital world, with the ambition to empower citizens and consumers alike to interact, pay, connect, travel and vote in ways that are now possible in a connected environment.

Securing our identity has become mission critical in the world we live in today. By standing for Augmented Identity, we reinvent the way we think, produce, use and protect this asset, whether for individuals or for objects. We ensure privacy and trust as well as guarantee secure, authenticated and verifiable transactions for international clients from Financial, Telecom, Identity, Security and IoT sectors.

With close to €3bn in revenues, IDEMIA is the result of the merger between OT (Oberthur Technologies) and Safran Identity & Security (Morpho). This new company counts 14,000 employees of more than 80 nationalities and serves clients in 180 countries.

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APPROVAL

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DOCUMENT EVOLUTION

Date	Version	Author	Revision
11/05/2021	1.0	Prem KUMAR	Sanitized version created for Public Issue
02/06/2021	2.0	Prem KUMAR	Updated Applet Guidance Ed versions
16/07/2021	3.0	Prem KUMAR	Incorporated ANSSI remarks.

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1 Security Target Introduction

1.1 Introduction

This document is the Security Target for the ID-A v1.0 application installed on the IDEMIA ID-One Cosmo X platform. The ID-A v1.0 application is an IDEMIA Java Card application designed to provide identification, authentication and advanced signature creation functionality for national ID cards, health cards and corporate cards.

The ID-A application can be used to create advanced or qualified signature in the sense of [eIDAS] in its Qualified Signature Creation Device (QSCD) configuration defined in this security target and complies to the Identification Authentication Signature for European Citizen Card IAS ECC v2 specification [IAS ECC].

ID-One Cosmo X is an IDEMIA Global Platform Java Card solution, which is Common Criteria EAL 5+ certified on top of the Infineon SLC37 security controller.

This ST has been conceived to prepare a Common Criteria evaluation following the "compositional approach" described in [COMP]. This approach consists in starting from a Platform that has been independently certified, and performing an evaluation of the composite product resulting from embedding an Application into it, using some of the results from the evaluation of the Cosmo X open platform certified by the ANSSI.

This Security Target describes:

1. The Target of Evaluation (TOE)
2. The assets to be protected, the threats (T) to be countered by the TOE itself during the usage of the TOE,
3. The organizational security policies (OSP), and the assumptions (A),
4. The security objectives (OT) for the TOE and its environment (OE),
5. The security functional requirements (SFR) for the TOE and its IT environment,
6. The TOE security assurance requirements (SAR), and
7. The TOE Summary specification (TSS).

1.2 ST Reference

Title	ID-A v1.0 on Cosmo X - Public Security Target
Reference	FQR 550 0200 Ed 3
CC Version	3.1 Revision 5
Assurance Level	EAL5 augmented with ALC_DVS.2 and AVA_VAN.5
ITSEF	CEA-LETI
Certification Body	ANSSI
Author	IDEMIA
Protection Profiles	PP SSCD-Part 2 Key Generation [PP-SSCD2], PP SSCD-Part 3 Key Import [PP-SSCD3], PP SSCD-Part 4 Key Generation and Trusted Channel with CGA [PP-SSCD4] PP SSCD-Part 5 Key Generation and Trusted Channel with SCA [PP-SSCD5] PP SSCD-Part 6 Key Import and Trusted Channel with SCA [PP-SSCD6]

1.3 TOE Reference

TOE Commercial Name	ID-A v1.0 on ID-One Cosmo X
Applet Code Versions (SAAAAR Code)	Refer **TOE Configurations** table below
Applet Internal Versions	Refer **Applet Internal Versions** table below
Platform Certificate	[PTF_CERT]
Platform Identification	093363
IC Certificate	[IC_CERT]
Guidance Documents	Refer to Table 3 - TOE Guidance under TOE Overview Section

The following table defines the TOE configurations, depending on the source code compilation and build options:

Configurations	Description	Content of the config (package/cap files)	SAAAAR + version + config code
Config 1	ID-A Applet without support for Asymmetric Role and Device Authentication and without biometric authentication	SAAAAR + version + config of ID-A Java Applet on Cosmo X {config 1}	417692FF 01010000 **0101**
		SAAAAR + version + config of Common Package {Cosmo X build}	417641FF 01000000 **0201**
Config 2	ID-A Applet with support for Asymmetric Role and Device Authentication and without support for biometric authentication	SAAAAR + version + config of ID-A Java Applet on Cosmo X{config 2}	417692FF 01010000 **0201**
		SAAAAR + version + config of Common Package {Cosmo X build}	417641FF 01000000 **0201**
Config 3	ID-A Applet without support for Asymmetric Role and Device Authentication and with support for biometric authentication	SAAAAR + version + Config of ID-A Java Applet on Cosmo X {config 3}	417692FF 01010000 **0101**
		SAAAAR + version + config of Common Package {Cosmo X build}	417641FF 01000000 **0301**
Config 4	ID-A Applet with support for Asymmetric Role and Device Authentication and with biometric authentication	SAAAAR + version + config of ID-A Java Applet on Cosmo X {config 4}	417692FF 01010000 **0201**
		SAAAAR + version + config of Common Package {Cosmo X build}	417641FF 01000000 **0301**

Table 1 TOE Configurations

Note:

In the table above a "SAAAAR code" is denoted by first 4 bytes, a "version" by the next 2 bytes and a "config" ID by the last 2 bytes.

The "SAAAAR" is product configuration item number within IDEMIA uniquely defined as:

S	IDEMIA Site code	1 byte
AAAA	Article number	4 bytes
R	Software Release number	1 byte

Applet Internal Versions of above Configurations are as follows:

Configurations	Returned value of DF67
Config 1	01 01 01 07 01 01 00 08
Config 2	01 02 01 07 01 01 00 08
Config 3	01 01 01 07 01 04 00 07
Config 4	01 02 01 07 01 04 00 07

Table 2 Applet Internal Versions

2 Technical Terms, Abbreviation and Associated References

2.1 Technical terms

Term	Definition
Application note	*Optional informative part of the ST containing sensitive supporting information that is considered relevant or useful for the construction, evaluation or use of the TOE.*
Administrator	*user who performs TOE initialization, TOE personalisation, or other TOE administrative functions*
Advanced electronic signature	*An electronic signature which meets the following requirements [DIR]:* *(i) it is uniquely linked to the signatory,* *(ii) it is capable of identifying the signatory,* *(iii) it is created using means that the signatory can maintain under his sole control,* *(iv) it is linked to the data to which it relates in such a manner that any subsequent change of the data is detectable.*
Authentication data	*information used to verify the claimed identity of a user*
Authentication	*Authentication defines a procedure that verifies the identity of the communication partner. The most elegant method is based on the use of so called digital signatures.*

Card Access Number (CAN)	*A short password that is printed or displayed on the document. The CAN is a non-blocking password. The CAN may be static (printed on the Identification Card), semi-static (e.g. printed on a label on the Identification Card) or dynamic (randomly chosen by the Card and displayed by it using e.g. ePaper, OLED or similar technologies), see [[TR03110]], sec. 3.3*
Certificate	*digital signature used as electronic attestation binding signature-verification data to a person confirming the identity of that person as legitimate signer*
Certificate info	*information associated with an SCD/SVD pair that may be stored in a secure signature creation device* *NOTE 1: Certificate info is either* - *a signer's public key certificate or,* - *one or more hash values of a signer's public key certificate together with an identifier of the hash function used to compute the hash values.* *NOTE 2: Certificate info may contain information to allow the user to distinguish between several certificates.*
Certificate-generation application (CGA)	*collection of application components that receive the SVD from the SSCD to generate a certificate obtaining data to be included in the certificate and to create a digital signature of the certificate*
Certificate revocation list	*A list of revoked certificates issued by a certificate authority*
Certification service provider (CSP)	*entity that issues certificates or provides other services related to electronic signatures*
CLFDB	*Ciphered Load File Data Block* *Defined in Global Platform load encrypted applets. Decryption occurs with a GP symmetrice CLFDB key installed in the SSD or ISD.*
Data to be signed (DTBS)	*all of the electronic data to be signed including a user message and signature attributes*
Data to be signed or its unique representation (DTBS/R)	*data received by a secure signature creation device as input in a single signature creation operation* *NOTE: Examples of DTBS/R are* - *a hash value of the data to be signed (DTBS), or* - *an intermediate hash value of a first part of the DTBS complemented with a remaining part of the DTBS, or* - *the DTBS.*
ECC	*(Elliptic Curve Cryptography) class of procedures providing an attractive alternative for the probably most popular asymmetric procedure, the RSA algorithm.*

Electronic Identification, Authentification and Trust Services (eIDAS)	*REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC*
Hash function	*A function which forms the fixed-size result (the hash value) from an arbitrary amount of data (which is the input). These functions are used to generate the electronic equivalent of a fingerprint. The significant factor is that it must be impossible to generate two entries which lead to the same hash value (so called collisions) or even to generate a matching message for a defined hash value.*
Integrity	*The test on the integrity of data is carried out by checking messages for changes during the transmission by the receiver. Common test procedures employ Hash functions, MACs (Message Authentication Codes) or – with additional functionality – digital signatures.*
Javacard	*A smart card with a Javacard operation system.*
Legitimate user	*An user of a secure signature creation device who gains possession of it from an SSCD provisioning service provider and who may be authenticated by the SSCD as its signatory.*
MAC	*Message Authentication Code. Algorithm that expands the message by means of a secret key by special redundant pieces of information, which are stored or transmitted together with the message. To prevent an attacker from targeted modification of the attached redundancy requires its protection in a suitable way.*
Notified body	*An organizational entity designated by a member state of the European Union as responsible for accreditation and supervision of the evaluation process for products conforming to [PP-SSCD2], [PP-SSCD5] and for determining admissible algorithms and algorithm parameters.*
Non repudiation	*One of the objectives in the employment of digital signatures. It describes the fact that the sender of a message is prevented from denying the preparation of the message. The problem cannot be simply solved with cryptographic routines, but the entire environment needs to be considered and respective framework conditions need to be provided by pertinent laws.*
PACE Terminal (PCT)	*A technical system verifying correspondence between the stored password and the related value presented to the terminal. PCT implements the terminal's part of the PACE protocol and authenticates itself to the Card using a shared password (CAN, PIN or PUK). The PCT is not allowed reading User Data (see sec. 4.2.2 in [[TR03110]]).* *See [[TR03110]], chap. 3.3, 4.2, table 1.2 and G.2.*
Password Authenticated Connection Establishment (PACE)	*A communication establishment protocol defined in [[TR03110]], sec. 4.2. The PACE Protocol is a password authenticated DiffieHellman key agreement protocol providing implicit password based authentication of the communication partners (e.g. smart card and the terminal connected): i.e. PACE provides a verification, whether the communication partners share the same value of a password π). Based on this authentication, PACE also provides a secure communication, whereby confidentiality and authenticity of data transferred within this communication channel are maintained.*
Private key	*Secret key only known to the receiver of a message, which is used in asymmetric ciphers for encryption or generation of digital signatures.*

Pseudo random number	*Many cryptographic mechanisms require random numbers (e.g. in key generation). The problem, however, is that it is difficult to implement true random numbers in software. Therefore, so called pseudo random number generators are used, which then should be initialized with a real random element (the so called seed).*
Public Key	*Publicly known key in an asymmetric cipher which is used for encryption and verification of digital signatures.*
Public key infrastructure (PKI)	*Combination of hardware and software components, policies, and different procedures used to manage digital certificates.*
Qualified certificate	*public key certificate that meets the requirements laid down in Annex I and that is provided by a CSP that fulfils the requirements laid down in Annex II (the directive: 2.10) [DIR]*
Qualified electronic signature	*advanced electronic signature that has been created with an SSCD with a key certified with a qualified certificate ([DIR]: 5.1).*
Random numbers	*Many cryptographic algorithms or protocols require a random element, mostly in form of a random number, which is newly generated in each case. In these cases, the security of the procedure depends in part on the suitability of these random numbers. As the generation of real random numbers within computers still imposes a problem (a source for real random events can in fact only be gained by exact observation of physical events, which is not easy to realize for software), so called pseudo random numbers are used instead.*
Reference authentication data (RAD)	*Data persistently stored by the TOE for authentication of a user as authorised for a particular role.*
Secure messaging	*Secure messaging using encryption and message authentication code according to ISO/IEC 7816-4.*
Secure signature creation device (SSCD)	*Personalised device that meets the requirements laid down in [DIR], Annex III by being evaluated according to a security target conforming to this PP ([DIR]: 2.5 and 2.6).*
Signatory	*legitimate user of an SSCD associated with it in the certificate of the signature-verification data and who is authorized by the SSCD to operate the signature-creation function*
Signature attributes	*Additional information that is signed together with a user message.*
Signature creation application (SCA)	*Application complementing an SSCD with a user interface with the purpose to create an electronic signature. Note: A signature creation application is software consisting of a collection of application components configured to:* ▪ *present the data to be signed (DTBS) for review by the signatory,* ▪ *obtain prior to the signature process a decision by the signatory,* ▪ *if the signatory indicates by specific unambiguous input or action its in-tent to sign send a DTBS/R to the TOE,* ▪ *process the electronic signature generated by the SSCD as appropriate, e.g. as attachment to the DTBS.*

Signature creation data (SCD)	*private cryptographic key stored in the SSCD under exclusive control by the signatory to create an electronic signature*
Signature creation system (SCS)	*complete system that creates an electronic signature consisting of an SCA and an SSCD*
Signature verification data (SVD)	*public cryptographic key that can be used to verify an electronic signature*
Signed data object	*The electronic data to which the electronic signature has been attached to or logically associated with as a method of authentication.*
Smart card	*A smart card is a chip card which contains an internal micro controller with CPU, volatile (RAM) and non-volatile (FLASH) memory, i.e. which can carry out its own calculations in contrast to a simple storage card. Sometimes a smart card has a numerical coprocessor (NPU) to execute public key algorithms efficiently. Smart cards have all of their functionality comprised on a single chip (in contrast to chip cards, which contain several chips wired to each other). There-fore, such a smart card is ideal for use in cryptography as it is almost impossible to manipulate its internal processes.*
SSCD provisioning service	*service to prepare and provide an SSCD to a subscriber and to support the signatory with certification of generated keys and administrative functions of the SSCD*
User	*entity (human user or external IT entity) outside the TOE that interacts with the TOE*
User Message	*data determined by the signatory as the correct input for signing*
Verification authentication data (VAD)	*data provided as input to a secure signature creation device for authentication by cognition or by data derived from a user's biometric characteristics*

2.2 Abbreviation

Acronym	Definition
ADF	*Application Dedicated File*
CA	*Certification authority*
CAD	*card acceptance device*
CAN	*Card Access Number*
CC	*Common Criteria*
CGA	*Certification generation application*
CPU	*Central Processing Unit*
CSP	*certification service provider*
DPA	*differential power analysis*
DTBS	*Data to be signed*
DTBS/R	*Data to be signed or its unique representation*
EAL	*Evaluation assurance level*
ECC	*Elliptic Curve Cryptography*
GP	*Global Platform*
HID	*human interface device*
IT	*Information technology*
MAC	*Message Authentication Code*

OSP	*Organizational security policy*
PACE	*Password Authenticated Connection Establishment*
PIN	*Personal Identification Number*
PP	*Protection profile*
PS	*Personalization System*
PUK	*PIN Unblocked Key*
RAD	*Reference authentication data*
RAM	*random access memory*
RNG	*random number generation*
SAR	*Security Assurance Requirements*
SCA	*Signature creation application*
SCD	*Signature creation data*
SCS	*Signature creation system*
SDO	*Security data object*
SF	*security function*
SFP	*Security function policy*
SFR	*Security functional requirement*
SPA	*simple power analysis*
SSCD	*Secure signature creation device*
ST	*Security target*
SVD	*Signature verification data*
TOE	*Target of evaluation*
TSF	*TOE security functionality*
VAD	*Verification authentication data*

2.3 Associated references

Reference	Description
[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, Part 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.
[COMP]	Composite product evaluation for smart cards and similar devices, Version 1.5.1, May 2018.
[PACEPP]	Protection Profile Machine Readable Travel Document using Standard Inspection Procedure with PACE – Common Criteria Protection Profile, BSI-CC-PP-0068-V2-2011-MA-01, Version 1.0.1, 22nd July 2014.
[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-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
[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

[PP-PL]	Java Card System - Open Configuration Protection Profile, Version 3.0.5, BSI-CC-PP-0099-2017
[ST-PL]	Security Target Lite ID-ONE COSMO X, FQR 110 9730 Ed 3
[PTF_CERT]	ANSSI-CC-2021/29
[ST-IC]	IFX_CCI_000Dh, IFX_CCI_0020h, IFX_CCI_0031h, IFX_CCI_0032h, IFX_CCI_0034h, IFX_CCI_0037h T31 and M31 Security Target Lite revision 4.3
[IC_CERT]	BSI_DSZ-CC-1107-2020
[AGD_PRE]	FQR 401 8717 Ed 7 - AGD_PRE
[AGD_OPE]	FQR 401 8718 Ed 6 - AGD_OPE
[QR_QSCD_Guide]	FQR 401 8925 Ed 2 - ID-A on CosmoX - Recommendations for QR and QSCD
[ICAO9303]	International Civil Aviation Organization, ICAO Doc 9303, Machine Readable Travel Documents – Machine Readable Passports, Version Seventh Edition, 2016 (this includes the latest supplemental for ICAO Doc 9303 which also should be considered).
[CICC]	ISO/IEC 14443 Identification cards -- Contactless integrated circuit cards -- Proximity cards, 2008-11.
[ICC]	ISO/IEC 7816: Identification cards — Integrated circuit cards, Version Second Edition, 2008.
[D14890-2]	Application Interface for smart cards used as Secure Signature Creation Devices - Part 2: Additional Services.
[PKCS3]	PKCS #3: Diffie-Hellman Key-Agreement Standard, An RSA Laboratories Technical Note, Version 1.4, Revised, November 1, 1993.
[AIS20]	Bundesamt fuer Sicherheit in der Informationstechnik. Anwendungshinweise und Interpretationen zum Schema, AIS 20: Funktionalitaetsklassen und Evaluationsmethodologie fuer deterministische Zufallszahlengeneratoren, Version 2.1, 2.12.2011.
[IAS ECC]	Identification Authentication Signature - European Citizen Card Technical Specifications Revision: 2.0.
[DIR]	DIRECTIVE 1999/93/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 December 1999 on a Community framework for electronic signatures.
[EU-REG-910/2014]	REGULATION (EU) No 910/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 July 2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC
[EU-IMP-2016-650]	COMMISSION IMPLEMENTING DECISION (EU) 2016/650 of 25 April 2016 laying down standards for the security assessment of qualified signature and seal creation devices pursuant to Articles 30(3) and 39(2) of Regulation (EU) No 910/2014 of the European Parliament and of the Council on electronic identification and trust services for electronic transactions in the internal market.

[JCRE]	Published by Oracle. Java Card 3 Platform, Runtime Environment Specification, Classic Edition, Version 3.0.5, May 2015.
[JCAPI]	Published by Oracle. Java Card 3 Platform, Application Programming Interface, Classic Edition, Version 3.0.5. May 2015.
[GP]	GlobalPlatform Card Specification 2.3, GlobalPlatform Inc., October 2015.
[JCVM]	Published by Oracle. Java Card 3 Platform, Virtual Machine Specification, Classic Edition, Version 3.0.5, May 2015.
[EAC2-PP]	Common Criteria Protection Profile Profile Electronic Document implementing Extended Access Control Version 2 defined in BSI [TR03110, BSI-CC-PP-0086, Version 1.01, May 20th, 2015, BSI
[Minidriver]	Windows Smart Card Minidriver Specification - Version 7.06 - July 1, 2009
[TR03110]	**[TR03110-2]** and **[TR03110-3]**
[TR03110-2]	BSI: 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, 25 December 2016
[TR03110-3]	BSI: TR-03110-3: Advanced Security Mechanisms for Machine Readable Travel Documents. Part 3 - Common Specifications, Version 2.21, 21 December 2016

3 TOE Overview

The TOE comprises of the IDEMIA ID-A v1.0 Java Card PKI application installed on top of the IDEMIA ID-One Cosmo X Global Platform Java Card operating system and the Infineon SLC37 security controller.

The ID-A v1.0 application is an IDEMIA specific Java Card implementation designed to provide functionality for identification, authentication and advanced digital signature creation for national ID cards, health cards and corporate cards.

The ID-One Cosmo X platform has been Common Criteria EAL 5+ certified on top of the Infineon SLC37 security controller [See ST-PL]. The Infineon SLC37 is a Common Critieria EAL6+ certificed security controller.

In its Qualified Signature Creation Device (QSCD) configuration defined in this security target, ID-A v1.0 application instances can create advanced (qualified) digital signatures in the sense of [eIDAS].

The ID-A v1.0 application complies to the Identification Authentication Signature for European Citizen Card IAS ECC v2 specification [IAS ECC] and therefore supports authentication protocols for symmetric secure messaging ciphers AES128, AES192, AES256 end 3DES.

In addition, the ID-A v1.0 applet supports the following secure authentication protocols defined in [[TR03110-2] and [[TR03110-3]:

- PACE with
    - support for ECDH in Generic and Integrated Mapping modes (PACE-GM, PACE-IM),
    - MRZ, CAN, PIN and PUK passwords and
    - PIN/PUK suspend and resume mechanism (over contactless interface)
- Chip Authentication v2 (CAv2)
- Terminal Authentication v2 (TAv2)

The TOE addressed by the this ST is a qualified electronic signature creation device QSCD/SSCD according to European Regulation 910/2014 [EU-REG-910/2014] and implementing act [EU-IMP-2016-650] with functionality covered in (a combination of) the following SSCD protection profiles:

1) SSCD Part 2: that performs the generation of signature keys in the device [PP-SSCD2],
2) SSCD Part 3: that performs the import of the signature keys generated in a trusted manner outside the device [PP-SSCD3],
3) SSCD Part 4: that specifies an extension for an SSCD with key generation (SSCD Part 2) that support establishing a trusted channel with a certificate generation application (CGA) [PP-SSCD4],
4) SSCD Part 5: that specifies an extension for an SSCD with key generation (SSCD Part 2) that additionally supports establishing a trusted channel with a signature creation application (SCA)) [PP-SSCD5] and
5) SSCD Part 6: that specifies an extension for an SSCD with key import (SSCD Part 3) that additionally supports establishing a trusted channel with a signature creation application (SCA) [PP-SSCD6].

For these additional authentication protocols PACE, CAv2, TAv2

i. additional security problem definitions,
ii. additional security objectives and
iii. additional SFRs have been added from [EAC2-PP].

Note
The added security objectives for the operational environment don't mitigate any threats of [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6] and don't fulfil any OSPs meant to be addressed by security objectives for the TOE in PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6]. The objectives and SFRs related to the functionality are only valid in case the additional functionalities are configured for the TOE.

3.1 TOE Description

The TOE consists of:

- The chip's circuitry and the IC dedicated software forming the Chip Platform (Hardware Platform);
- The IC embedded ID-One Cosmo X Global Platform Java Card operating system software consisting of
    - Java Card virtual machine, ensuring language-level security;
    - Java Card runtime environment, providing additional security features for Java card technology enabled devices;
    - Java card API, providing access to card's resources for the Applet;
    - Global Platform Card Manager, responsible for management of Applets on the card.
    - Crypto Library.
- ID-A v1.0 Applet along with Common package.
- TOE Guidance documentation for the ID-A v1 application and the Cosmo X platform as specified in Table 4.
- The Global Platform Key Set (for TOE preparation by the Personalisation Agent)

The ID-A v1.0 application provides e-Services and national e-ID Applications based on Java Card. ID-A v1.0 is designed to be compliant with the IAS ECC v2 specification [IAS ECC]. It provides the following services:

1) QSCD/SSCD containing sensensitive private keys needed for generating qualified electronic signatures on behalf of the Card Holder as well as for user authentication and identification. The ID-A v1.0 application is intended to be used in the context of official and commercial services, where an electronic digital signature of the Card Holder is required and is to be certified according to [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5] and [PP-SSCD6].
2) PACE authentication as defined in [[TR03110-2] and [[TR03110-3] to ensure a trusted channel for secure communication of the TOE with a SCA and a CGA.
3) Extended Access Control Version 2 (EAC2) as defined in [TR03110-2]. It consists of two parts: Chip Authentication Protocol Version 2 and Terminal Authentication Protocol Version 2.
4) Several features required by [Minidriver]

3.1.1 Physical Scope

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 form factor (chip module or antenna inlay, etc.) into which the microchip is mounted is not part of the target of evaluation, because it does not alter nor modify any security functions of the TOE.
The TOE may be used on several physical form factors: modules within an inlay, or eCover; in a contact, contactless or dual plastic card.

The physical form factor of the TOE and its physical interfaces are 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.

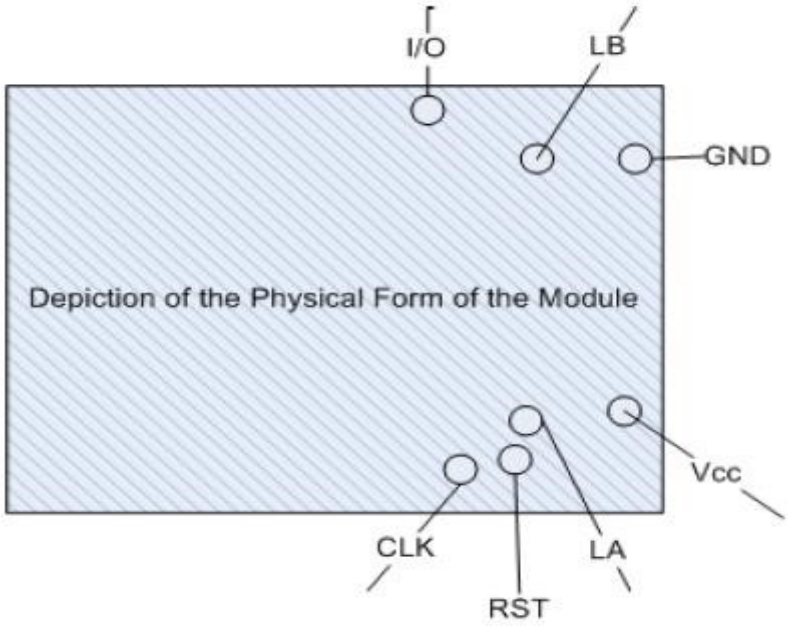


Figure 1 TOE's Physical form factor and interfaces

The contactless ports of the module require connection to an antenna. The module relies on [ISO7816] and [ISO14443] card readers and antenna connections as input/output devices.

Port	Description	Logical Interface Type
VCC, GND	ISO 7816: Supply voltage	Power (not available in contactless-only configurations)
RST	ISO 7816:Reset	Control in (not available in contactless-only configurations)
CLK	ISO 7816: Clock	Control in (not available in contactless-only configurations)
I/O	ISO 7816: Input/ Output	Control in, Data in, Data out, Status out (not available in contactless-only configurations)
LA, LB	ISO 14443: Antenna	Power, Control in, Data in, Data out, Status out (Not available in Contact-only configurations)

Table 3 Ports and Interfaces

The following guidance documents will be provided for the TOE:

Description	Audience	Form Factor of Delivery
[AGD_PRE]	Personalising Agent	Electronic Version
[AGD_OPE]	End user of the TOE	
[QR_QSCD_Guide]	Recommendations for QR and QSCD	

Table 4 TOE Guidance

This ST Lite version of this Security Target will also be provided along with above mentioned documents. All the above mentioned guidance documents will be delivered by mail in a .pgp encrypted and signed format.
Platform related guidance documents are mentioned in **[ST-PL]**.

Form factor and Delivery Preparation:

1. In accordance with the software development process of IDEMIA, upon completion of development activities, particular applet will be uploaded into PS in CAP file format.
2. During Release for Sample as project milestone, status of the applet in PS will be changed into "Pilot version" to be used further for manufacturing samples.
3. During Software Delivery Review as the final R&D project milestone, status of the applet in PS will be changed into "Industrial release" to be used further for mass production.

Refer Life Cycle chapter of this ST for more details regarding TOE delivery as per different options.

3.1.2 Logical Scope

The ID-A v1.0 application on Cosmo X platform is an integrated circuit chip embedding:

- An Operating system providing:
  - Java Card interfaces, as specified in [JCAPI]
  - Extended interfaces for targeted applications needs
  - A card manager application compliant with the Global Platform v2.3 specifications [GP] standard.
- An ID-A application, compliant to the IAS ECC v2 specification [IAS ECC] with extensions for PACE and EAC2 in accordance with [[TR03110-2] and [[TR03110-3].
- The Common package. For additional information about each of these parts, please refer TOE guidance.

The ID-A v1.0 Application comprises of 2 basic packages, that work together to provide the functionality defined in this Security Target. They are:

1. The ID-A Applet Package, and
2. The Common Package

So, ID-A v1.0 Application will always include ID-A Applet Package and Common Package.

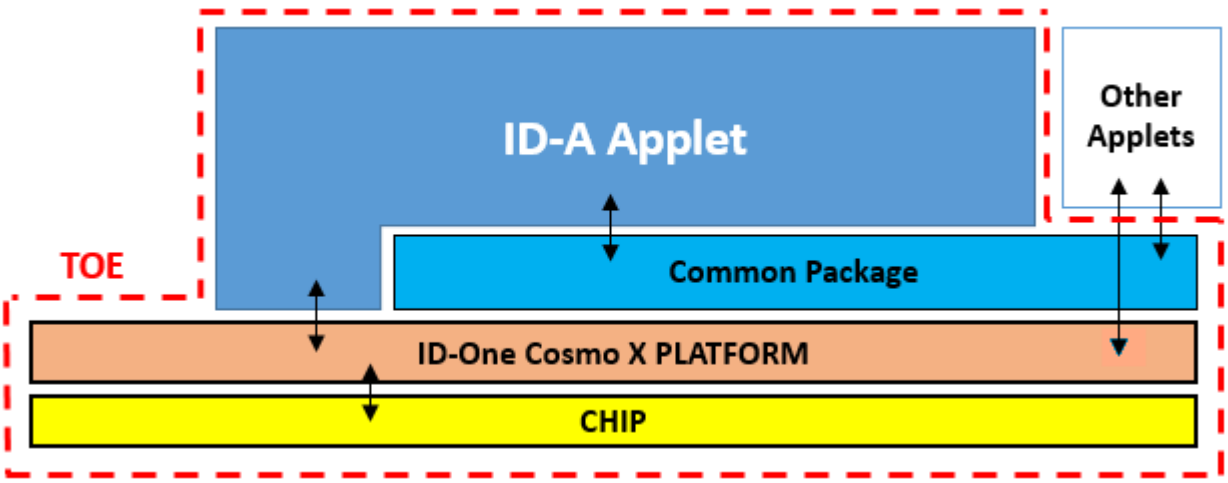


Figure 2: TOE Logical scope

3.2 Required non-TOE hardware/software/firmware

The TOE is a Qualified Signature Creation Device. It is an independent product and does not need any additional hardware/software/firmware to ensure its security.

In order to be powered up and to be able to communicate, the TOE needs a reader.

3.3 TOE Usage and Major Security Features

The TOE intended usage is to be used as a "Qualified Signature Creation Device" with key generation and/or key import, with respect to the [EU-REG-910/2014].
Within the framework described by [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], and [PP-SSCD6], the TOE allows to

- perform basic, advanced and qualified signatures;
- authenticate the cardholder based on a PIN verification;
- authenticate one (or several) administrator(s) of the TOE, that may have special rights to administrate the SCD and SVD (generation, import), using either symmetric and/or asymmetric mechanisms, or PIN verification;
- establish trusted channel, protected in integrity and confidentiality, with Trusted IT entities such as a SCA or a CSP. It may be realized by means of symmetric and/or asymmetric mechanisms;

The scope of [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], and [PP-SSCD6] is extended in several ways:

- A super Administrator (TOE_Administrator) has special rights to administrate the signature creation function and the type of cryptographic mechanisms to use.
- SCD/SVD pairs and other cryptographic objects may be generated and/or imported after issuance at any time, and in particular, they may be updated during the TOE life cycle.

- eServices features are added, enabling the cardholder to perform C/S authentication, Encryption key decipherment….
- A complete access control over objects is ensured, whatever their type is: file or cryptographic objects (PIN, keys,…), ensuring it is not possible to bypass the access rules.
- Personalisation phase including:
  - authentication protocol;
  - access control;
  - encryption mechanism involved in key loading;
  - initialization of the data structure;
  - data loading;
  - locks management;
  - phase switching.
- All authentication protocols (symmetric and asymmetric), and secure messaging type (3DES-112, AES128/192/256);
- All supported digital signature algorithm;
- Authentication of the TOE using symmetric and asymmetric cryptography;
- All PIN management operations available after delivery point;
- Certificate management;

The TOE may be used for various use cases requiring qualified signature:
- Electronic signature application;
- Electronic health card;
- Electronic services cards;

Depending on the use case and or the ability of the underlying java card open platform, the TOE may be used:
- in contact mode (T=0 and/or T=1 protocol);
- in contactless protocol (T=CL);

Since the TOE claims compliancy to protection profiles from 419 211-2 to EN 419 211-6 (Signature Protection Profiles [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5] and [PP-SSCD6]), the TOE can (depending on the desired card profile/issuer policy) be used in the following QSCD/SSCD configurations:

- **SSCD Config#1** claiming compliancy to CEN/EN 419 211-2/3/4/5/6 ([PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5] and [PP-SSCD6]).
- **SSCD Config#2** claiming compliancy to CEN/EN 419 211-2/3/4 ([PP-SSCD2], [PP-SSCD3], [PP-SSCD4]). This configuration does not support the trusted channel between the TOE and the SCA.
- **SSCD Config#3** claiming compliancy to CEN/EN 419 211-2/3 ([PP-SSCD2], [PP-SSCD3]). This configuration does not support the trusted channel between: (i) the TOE and the SCA; (ii) the TOE and the CGA.
-

The TOE provides the following TOE security features:

3.3.1 Authentication mechanisms

This feature realizes the following authentication mechanisms:
- User authentication (PIN or biometry)
- External authentication (symmetric and asymmetric role authentication, Terminal Authentication v2)
- Secure messaging (symmetric and asymmetric device authentication, Chip Authentication v2)

- PACE protocol with
    - support for ECDH in Generic and Integrated Mapping modes (PACE-GM, PACE-IM),
    - MRZ, CAN, PIN and PUK passwords and
    - PIN/PUK suspend and resume mechanism (over contactless interface)
- GP authentication in phase 6 (personaliser) and 7 (TOE admin)
- combined device/role authentication

It also ensures that only authenticated terminals can get access to the user data stored on the TOE.

3.3.2 Cryptographic operations

This feature performs high level cryptographic operations (key generation, symmetric and asymmetric encryption and decryption, signature creation, destruction of cryptographic keys and random number generation). The implementation is mainly based on the Security Functionalities provided by the platform.

3.3.3 Trusted Channel function

This feature realizes a secure communication channel to verify authenticity and integrity as well as securing confidentiality of user data between the TOE and other devices connected. The TOE provides:

- Secure messaging with external applications as CGA and SCA
- GP secure messaging in phase 6
- PACE protocol for 3DES, AES128, AES192 and AES256 [ICAO9303] and [IAS ECC] secure messaging.
- TDES for encryption/decryption and MAC generation/verification
- AES128, AES192 and AES256 for encryption/decryption and MAC generation/verification
- Chip Authentication v2 (CAv2) used to establish new session keys for secure messaging

This feature is provided by the platform and used for secure messaging.

3.3.4 Access Control function

This feature manages the access to objects (files, directories, data and secrets) stored in the ID-A file system. It ensures secure management of secrets such as cryptographic keys. Access control is enforced by the APDU methods as specified in the interface defined in the functional specification.

3.3.5 Data Storage function

This feature manages the storage of manufacturing data, pre-personalisation data and personalisation data. This covers also the secure storage of SCD/SVD and RAD.

3.3.6 Integrity function

This feature monitors the integrity of sensitive user data and the integrity of the DTBS/R.

3.3.7 Electronic Services

The TOE supports as well several electronic services:

- C/S authentication: this feature enables to authenticate the TOE to an external entity.

- Digital signature: this feature enables the cardholder to electronically signs documents. The signature may be either advanced or qualified (compliant with [PP-SSCD2] and [PP-SSCD3]).
- Encryption key decipherment: this feature enables the cardholder to store secret data on an electronic vault. The key needed to decipher the key encrypting these data is securely stored in the TOE. The cardholder's computer sends the encrypted encryption key to the TOE to get the plain encryption key.
- Symmetric encryption and decryption: this feature allows the card to be used as a safe for AES keys

3.3.8 Keys and PINs management

The TOE handles as well cryptographic data objects, such as keys (for digital signature, authentication, encryption key decipherment etc.) and PINs.
The TOE enables to create, update and use PINs as detailed in [AGD_OPE].
For keys, the TOE enables to create, import, generate and erase keys as detailed in [AGD_OPE].

3.3.9 Features from the Platform

This contains all security functionalities provided by the certified platform (IC and Java Card operation system):

- Protection against malfunctions that are caused by exposure to operating conditions that may cause a malfunction. This includes hardware resets and operation outside the specified norms.
- Protection against tampering and the stored assets can not be retrieved or altered by physical manipulation
- Protection against physical attack and perform self tests as described in [ST-PL].
- Security domains are supported by the Java Card platform.
- Cryptographic operations: Signature generation, signature creation and secure messaging, symmetric and asymmetric encryption and decryption and key generation.

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].

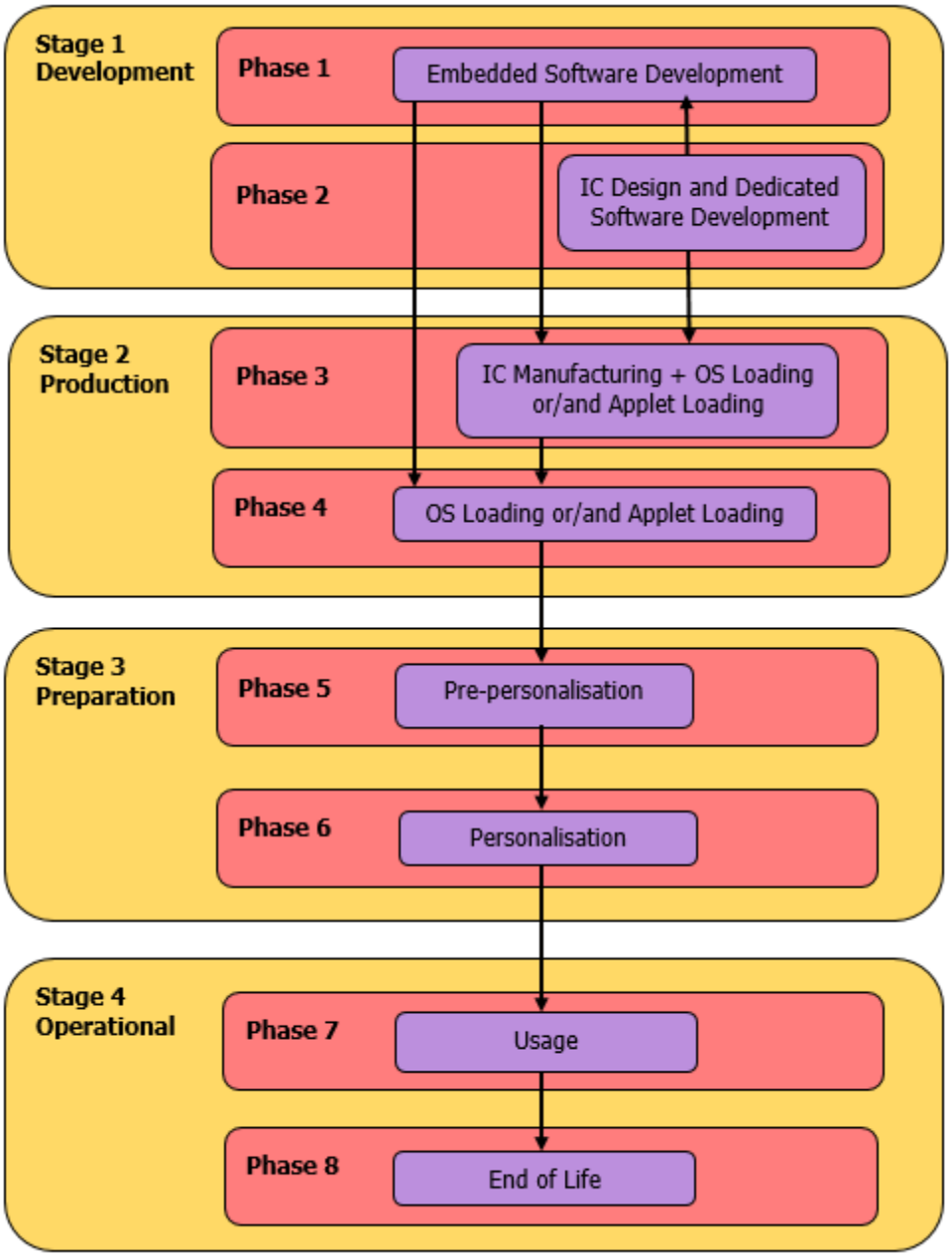


Figure 3 Life cycle Overview

4.1.1 Development Environment

In this environment, the following two phases take place:

- Phase 1: IC Embedded Software Development (Java Card Open Platform components and ID-A applet)
- 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 ID-A applet).

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
ID-A Applet Developer	IDEMIA	JAKARTA, MANILA, COURBEVOIE and PESSAC R&D sites	ALC
Embedded Software Developer (Java Card Open Platform)	IDEMIA	Platform Developer Refer to [ST-PL]	ALC
Redaction and Review of Documents	IDEMIA	NOIDA and HAARLEM R&D site	ALC
IC Developer	Infineon	IC Manufacturer Refer to [ST-PL]	ALC

4.1.2 Production Environment

In this environment, the following two phases take place:

- Phase 3: IC Manufacturing
- Phase 4: ID-One Cosmo X Operating System loading and ID-A v1.0 applet loading

The ID-A Applet run time code and the Common Package is integrated in FLASH of the chip together with the ID-One Cosmo X Operating System.

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

(Option 1) Both Cosmo X Platform along with ID-A v1.0 application with Common package is securely delivered directly from the software developer (IDEMIA R&D Audited Site) to the **IC Manufacturer** (Infineon Audited Site) to be loaded into flash. The FLASH image is always encrypted. Decryption is performed by the loader inside the IC.

TOE Delivery point:

- Here, the TOE delivery is considered after Phase 3, as soon as the loading of Java Card Platform package + Applet package (as described below) is complete.

Package	Actor	Site	Covered by
Images containing Java Card Platform OS + Applet and additional packages	IC Manufacturer	IC Manufacturer Production Plants [ST-PL]	ALC

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

(Option 2) Both Cosmo X Platform along with ID-A v1.0 application with Common package is securely delivered directly from the software developer (IDEMIA R&D Audited Site) for loading to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen or Ostrava) or **Non-Audited IDEMIA Sites** or **External Sites**.

TOE Delivery points:

- If loading of Java Card Platform package + Applet package (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered after Phase 4.

- If loading of Java Card Platform package + Applet package (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered after Phase 3.

Package	Actor	Site	Covered by
-	-	-	-
Images containing the Java Card Platform OS + Applet and additional packages	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD

Table 6 Option 2: Both Platform and Applet packages are loaded at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites

(Option 3) Only the Cosmo X Platform is delivered to the IC Manufacturer (Infineon Audited Sites) to be loaded.
Next, following options (**3a or 3b (i) or 3b (ii) or 3c**) can be opted for loading applets on top of the platform already loaded.

(Option 3a) ID-A v1.0 Application with Common package along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava) or **Non-Audited 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 IC Manufacturer (Infineon).

TOE Delivery points:

- If loading of Applet package on top of already loaded Java Card Platform package (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered after Phase 4.

- If loading of Applet package on top of already loaded Java Card Platform package (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered during Phase 4.

Package	Actor	Site	Covered by
Image containing only Java Card Platform OS	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF_CERT]	ALC
Applet and additional packages loaded through GP mechanism using CLFDB Key	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD

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

(Option 3b)

(i) ID-A v1.0 Application with Common package along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava) or **Non-Audited IDEMIA Sites** or **External Sites**.
Loading of Applet in any of these sites is done through Resident Application using LSK format on top of the platform already loaded by IC Manufacturer (Infineon).

(ii) DUMP package (including ID-A v1.0 Application with Common package data) with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava) or **Non-Audited IDEMIA Sites** or **External Sites**.
Loading of DUMP PACKAGES in any of these sites is done through Resident Application using DSK secret live key on top of the platform already loaded by IC Manufacturer (Infineon).

TOE Delivery points:

- If loading of Applet package /DUMP Package on top of already loaded Java Card Platform package (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered after Phase 4.

- If loading of Applet package /DUMP Package on top of already loaded Java Card Platform package (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered during Phase 4.

<table>
<tr><th>Package</th><th>Actor</th><th>Site</th><th>Covered by</th></tr>
<tr><td>Image containing only Java Card Platform OS</td><td>IC Manufacturer</td><td>IC Manufacturer Production Plants Refer to [PTF_CERT]</td><td>ALC</td></tr>
<tr><td>3b (i)
Applet and additional packages loaded through Resident Application using LSK format</td><td>IDEMIA Authorized Entity
or
External Authorized Agent</td><td rowspan="2">Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)
or
Non-Audited IDEMIA Sites
or
External Sites</td><td rowspan="2">ALC
or
AGD</td></tr>
<tr><td>3b (ii)
DUMP PACKAGE Ciphered format [DSK Secret Live Key]</td><td>IDEMIA Authorized Entity</td></tr>
</table>

Table 8 Platform package is loaded at IC Manufacturer Site and 3b (i) Applet package is loaded through resident application using LSK format and 3b (ii) DUMP Package is loaded through resident application using DSK Secret Live Key - at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites

(Option 3c) ID-A v1.0 Application with Common package along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava).
Here, there is a provision of loading the applet in plain format in Audited IDEMIA Sites **only,** on top of the platform already loaded by IC Manufacturer (Infineon). This applet loading in plain format is not allowed in Non-Audited IDEMIA Sites or External Sites.

TOE Delivery points:

- Here, since the loading of Applet package on top of already loaded Java Card Platform package (as described below) is done Plain format in Audited IDEMIA Production Sites, so TOE delivery is considered after Phase 4.

Package	Actor	Site	Covered by
Image containing only Java Card Platform OS	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF_CERT]	ALC
Applet and additional packages in Plain Format	IDEMIA Authorized Entity	Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)	ALC

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

(Option 4) Only Cosmo X Platform is securely delivered directly from the software developer (IDEMIA R&D Audited Site) for loading to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen or Ostrava) or **Non-Audited IDEMIA Sites** or **External Sites**.
Note: Here, when the Platform package is loaded in Non-Audited IDEMIA Sites or External Sites, then the Platform is in self-protected mode by its secure functions

Next, following options (**4a or 4b (i) or 4b (ii) or 4c**) can be opted for loading applets on top of the platform already loaded.

(Option 4a) ID-A v1.0 Application with Common package along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava) or **Non-Audited 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 **Audited IDEMIA Production Sites** or **Non-Audited IDEMIA Sites** or **External Sites**.

TOE Delivery points:

- If loading of Applet package on top of already loaded Java Card Platform package (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered after Phase 4.

- If loading of Applet package on top of already loaded Java Card Platform package (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered during Phase 4.

Package	Actor	Site	Covered by
Image containing only Java Card Platform OS	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD
Applet and additional packages loaded through GP mechanism using CLFDB Key	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD

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

(Option 4b)

(i) ID-A v1.0 Application with Common package along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava) or **Non-Audited IDEMIA Sites** or **External Sites**.
Loading of Applet in any of these sites is done through Resident Application using LSK format on top of the platform already loaded by **Audited IDEMIA Production Sites** or **Non-Audited IDEMIA Sites** or **External Sites**.

(ii) DUMP package (including ID-A v1.0 Application with Common package data) with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava) or **Non-Audited IDEMIA Sites** or **External Sites**.
Loading of DUMP PACKAGES in any of these sites is done through Resident Application using DSK secret live key on top of the platform already loaded by **Audited IDEMIA Production Sites** or **Non-Audited IDEMIA Sites** or **External Sites**.

TOE Delivery points:

- If loading of Applet package /DUMP Package on top of already loaded Java Card Platform package (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered after Phase 4.

- If loading of Applet package /DUMP Package on top of already loaded Java Card Platform package (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered during Phase 4.

Package	Actor	Site	Covered by
Image containing only Java Card Platform OS	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD
4b (i) Applet and additional packages loaded through Resident Application using LSK format	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD
4b (ii) DUMP PACKAGE Ciphered format [DSK Secret Live Key]	IDEMIA Authorized Entity		

Table 11 Platform package is loaded at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites and 4b (i) Applet package is loaded through Resident application using LSK format and 4b (ii) DUMP Package is loaded through resident application using DSK Secret Live Key - at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites

(Option 4c) ID-A v1.0 Application with Common package along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Haarlem, Noida, Vitré, Shenzhen, Ostrava).
Here, there is a provision of loading the applet in plain format in Audited IDEMIA Sites **only,** on top of the platform already loaded by Audited IDEMIA Production Sites or Non-Audited IDEMIA Sites or External Sites. This applet loading in plain format is not allowed in Non-Audited IDEMIA Sites or External Sites.

TOE Delivery points:

- Here, since the loading of Applet package on top of already loaded Java Card Platform package (as described below) is done in Plain format in Audited IDEMIA Production Sites, so TOE delivery is considered after Phase 4.

Package	Actor	Site	Covered by
Image containing only Java Card Platform OS	IDEMIA Authorized Entity or External Authorized Agent	**Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)** or Non-Audited IDEMIA Sites or External Sites	**ALC** or AGD
Applet and additional packages in Plain Format	IDEMIA Authorized Entity	Audited IDEMIA Production Sites (Shenzhen, Haarlem, Vitré, Noida, Ostrava)	ALC

Table 12 Option 4(c): Platform package is loaded at IC Manufacturer Site and Applet package in plain format is loaded at Audited IDEMIA Sites only

4.1.3 Preparation Environment

All along this phase, the TOE is self-protected as it requires the authentication of the personalisation agent prior to any operation. During this phase, creation of ID-A SSCD applet instance is mandatory.

This phase consists of:

1) SSCD ID-A applet instance creation of MF for the loaded configuration according to [AGD_PRE].
2) Personalisation according to [AGD_PRE]:
    a. RAD storage on SSCD (optional)
    b. [OPTIONAL] Creation of SCD/SVD pair
        i. by the TOE through the SCD/SVD generation functionality or
        ii. by the Personalisation Agent, who loads the SCD and/or SVD into the TOE.
    c. [OPTIONAL] export of SVD to CGA.
    d. [OPTIONAL] storing back the ontained certificates
    e. [OPTIONAL] depending on SSCD Config#1 or SSCD Config2#, required trusted channel cryptographic keys and mechanisms (e.g. PACE, EAC2, IAS-ECC CV certificates) for secure messaging with SCA and CGA.
3) Post-perso steps including: (i) ISD life-cycle management; (ii) disabling access to the Global Platform ISD (Card Manager) in order to prevent post issuance applet loading.

Application note:
Personalisation steps 2b, 2c and 2d are not mandatory in preparation phase as they may be performed in operational phase of the TOE as well. Personalisation steps 2e is optional because it is not required for the SSCD Config#3.

4.1.4 Operational Environment

The TOE in this phase is under the control of the User (Signatory and/or Administrator).

Note that applications can be loaded onto the Cosmo X 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 [PTF_AGD2] and [PTF_AGD3] tasks of [ST-PL].

5 Conformance Claims

5.1 CC Conformance

This Security Target claims conformance to the following documents defining the ISO/IEC 15408:2005 standard:

- Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and general model. Version 3.1. Revision 5. April 2017. CCMB-2017-04-001.
- Common Criteria for Information Technology Security Evaluation, Part 2: Security functional requirements. Version 3.1. Revision 5. April 2017. CCMB-2017-04-002.
- Common Criteria for Information Technology Security Evaluation, Part 3: Security assurance requirements. Version 3.1. Revision 5. April 2017. CCMB-2017-04-003.
- Common Methodology for Information Technology Security Evaluation, Evaluation Methodology, CCMB-2012-09-004, Version 3.1, Revision, April 2017. CCMB-2017-04-004.

Conformance to ISO/IEC 15408:2005 is claimed as follows:

- Part 1: conformant
- Part 2: extended with
  - FPT_EMS.1 TOE Emanation [PP-SSCD2].
  - FCS_RNG Quality metric for random numbers [PACEPP].
  - FIA_API Authentication proof of identity [PP-SSCD4].
  - FMT_LIM - Limited capabilities [PACEPP].

  All the other security requirements have been drawn from the catalogue of requirements in [CC2].
- Part 3: conformant, compliant to EAL5 augmented with
  - ALC_DVS.2 (Sufficiency of security measures)
  - AVA_VAN.5 (Advanced methodical vulnerability analysis)

The TOE also includes:

- Cosmo X Platform.
- The Infineon IC.

5.2 PP Claims

This security target is compliant with the following PPs:

- "Common Criteria Protection Profile for Secure Signature Creation Device – Part 2: Device with key generation" [PP-SSCD2].
- "Common Criteria Protection Profile for Secure Signature Creation Device – Part 3: Device with key import" [PP-SSCD3].
- "Common Criteria Protection Profile for Secure Signature Creation Device – Part 4: Extension for device with key generation and trusted communication with certificate generation application" [PP-SSCD4].
- "Common Criteria Protection Profile for Secure Signature Creation Device – Part 5: Extension for device with key generation and trusted communication with signature creation application" [PP-SSCD5].
- "Common Criteria Protection Profile for Secure Signature Creation Device – Part 6: Extension for device with key import and trusted communication with signature creation application" [PP-SSCD6].

5.3 Conformance Rationale

[PP-SSCD4] and [PP-SSCD5] are strictely conforming to the core PP-SSCD2 [PP-SSCD2]. [PP-SSCD6] is strictely conforming to the core PP-SSCD3 [PP-SSCD3]. This ST is claimed to be conformant to the above mentioned PPs [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6]. A detailed justification is given in the following:

1) The SPD of this ST contains the security problem definition [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6]. The SPD for this ST is described by the same threats, organisational security policies and assumptions as for the TOE in the PPs.

2) The security objectives for the TOE in this ST include all the security objectives for the TOE of the core PPs [PP-SSCD2] and [PP-SSCD3] and add
   a. the security objectives OT.TOE_TC_VAD_Imp and OT.TOE_TC_DTBS_Imp from [PP-SSCD5] and [PP-SSCD6],
   b. the security objectives OT.TOE_SSCD_Auth and OT.TOE_TC_SVD_Exp from [PP-SSCD4],

3) The assumptions in this ST include A.CSP from [PP-SSCD3] and [PP-SSCD6]. This assumption doesn't mitigate any threat and doesn't fulfil any OSP meant to be addressed by security objectives for the TOE in the other PPs.

4) The security objectives for the operational environment in this ST include all security objectives for the operational environment of the core PPs [PP-SSCD2] and [PP-SSCD3] except OE.HI_VAD, OE.DTBS_Protect and OE.SSCD_Prov_Service.
   - This ST adapts OE.HI_VAD and OE.DTBS_Protect to the support provided by the TOE by new security functionality (cf. OT.TOE_TC_VAD_Imp, OT.TOE_TC_DTBS_Imp) provided by the TOE and changes them into OE.HID_TC_VAD_Exp and OE.SCA_TC_DTBS_Exp ([PP-SSCD5] and [PP-SSCD6] for details).
   - OE.SSCD_Prov_Service is replaced by OE.Dev_Prov_Service from [PP-SCCD4].

   This ST also includes security objectives for the operational environment OE.CGA_SSCD_Auth and OE.CGA_TC_SVD_Imp from [PP-SSCD4]

5) The SFRs specified in this ST includes all security functional requirements (SFRs) specified in the core PPs [PP-SSCD2] and [PP-SSCD3]. Additional SFRs address :
   a. trusted channel between the TOE and the SCA from [PP-SSCD5] and [PP-SSCD6]: FDP_UIT.1/DTBS, FTP_ITC.1/VAD and FTP_ITC.1/DTBS.
   b. Trusted communication with CGA from [PP-SSCD4] : FIA_API.1 and FDP_DAU.2/SVD, FTP_ITC.1/SVD

6) This ST provides refinements for the SFR FIA_UAU.1 according to [PP-SSCD4], [PP-SSCD5] and [PP-SSCD6].

7) The security assurance requirements (SARs) are originally taken from SARs of part 3 [CC3] according to the package conformance EAL 5 augmented with ALC_DVS.2 and AVA_VAN.5 (the Evaluation Assurance Level EAL5+ of the current ST exceeds the EAL4+ defined by [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6]).

8) The additional functionalities (PACE authentication, Chip Authentication Protocol Version 2 and Terminal Authentication Protocol Version 2) have been added to the TOE with: (i) additional security problem definition; (ii) additional security objectives; (iii) additional SFRs. All these additions are inspired from the [EAC2-PP]. Notice that

the added security objectives for the operational environment don’t mitigate any threats of [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6] and don’t fulfil any OSPs meant to be addressed by security objectives for the TOE in PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6]. The objectives and SFRs related to the functionality are only valid in case the additional functionalities are configured for the TOE.

This security target is compliant with the SPD of [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6] as shown in the following table:

TOE SPDs	PP SSCD2	PP SSCD3	PP SSCD4	PP SSCD5	PP SSCD6	Included
Assumptions						
A.CGA	×		x	×		×
A.SCA	×		x	×		×
A.CSP		x			x	x
Threats						
T.SCD_Divulg	x	x	x	×	x	×
T.SCD_Derive	×	x	x	×	x	×
T.Hack_Phys	×	x	x	×	x	×
T.SVD_Forgery	×	x	x	×	x	×
T.SigF_Misuse	×	x	x	×	x	×
T.DTBS_Forgery	×	x	x	×	x	×
T.Sig_Forgery	×	x	x	×	x	×
Organisational Security Policies						
P.CSP_QCert	×	x	x	×	x	×
P.QSign	×	x	x	×	x	×
P.Sigy_SSCD	×	x	x	×	x	×
P.Sig_Non-Repud	×	x	x	×	x	×

Table 13 PP SPDs vs. ST

This security target is compliant with the security objectives of [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6] as shown in the following table:

TOE Objectives	PP SSCD2	PP SSCD3	PP SSCD4	PP SSCD5	PP SSCD6	Included
Objectives for the TOE						
OT.Lifecycle_Security	x	x	x	x	x	×
OT.SCD/SVD_Auth_Gen	x		x	x		×
OT.SCD_Unique	x		x	x		×
OT.SCD_SVD_Corresp	x		x	x		×
OT.SCD_Secrecy	x	x	x	x	x	×
OT.Sig_Secure	x	x	x	x	x	×
OT.Sigy_SigF	x	x	x	x	x	×
OT.DTBS_Integrity_TOE	x	x	x	x	x	×
OT.EMSEC_Design	x	x	x	x	x	×
OT.Tamper_ID	x	x	x	x	x	×
OT.Tamper_Resistance	x	x	x	x	x	×
OT.TOE_TC_VAD_Imp				×	x	×
OT.TOE_TC_DTBS_Imp				×	x	×
OT.TOE_SSCD_Auth			x			×
OT.TOE_TC_SVD_Exp			x			×
OT.SCD_Auth_Imp		x			x	x

Objectives for the Operational Environment						
OE.SVD_Auth	×	×	×	×	×	×
OE.CGA_QCert	×	×	×	×	×	×
OE.SSCD_Prov_Service	×	×		×	×	
OE.SCD/SVD_Auth_Gen		×			×	×
OE.SCD_Unique		×			×	×
OE.SCD_SVD_Corresp		×			×	×
OE.SCD_Secrecy		x			x	×
OE.HID_VAD	×	×	×			
OE.DTBS_Intend	×	×	×	×	x	×
OE.DTBS_Protect	×	×	×			
OE.Signatory	×	×	×	×	×	×
OE.HID_TC_VAD_Exp				×	×	×
OE.SCA_TC_DTBS_Exp				×	×	×
OE.Dev_Prov_Service			x			x
OE.CGA_SSCD_Auth			x			×
OE.CGA_TC_SVD_Imp			x			×

Table 14 PP Security Objectives vs. ST

This security target is compliant with the security functional requirements of [PP-SSCD2], [PP-SSCD3], [PP-SSCD4], [PP-SSCD5], [PP-SSCD6] as shown in the following table:

TOE SFRs	PP SSCD2	PP SSCD3	PP SSCD4	PP SSCD5	PP SSCD6	Included
FCS_CKM.1	×		×	×		×
FCS_CKM.4	×	×	×	×	×	×
FCS_COP.1	×	×	×	×	×	×
FDP_ACC.1/SCD/SVD_Generation	×		×	×		×
FDP_ACF.1/SCD/SVD_Generation	×		×	×		×
FDP_ACC.1/SVD_Transfer	×		×	×		×
FDP_ACF.1/SVD_Transfer	×		×	×		×
FDP_ACC.1/Signature_Creation	×	×	×	×	×	×
FDP_ACF.1/Signature_Creation	×	×	×	×	×	×
FDP_ACC.1/SCD_Import		×			×	×
FDP_ACF.1/SCD_Import		×			×	×
FDP_RIP.1	×	×	×	×	×	×
FDP_SDI.2/Persistent	×	×	×	×	×	×
FDP_SDI.2/DTBS	×	×	×	×	×	×
FIA_UID.1	×	×	×	×	×	×
FIA_UAU.1	×	×	×	×	×	×
FIA_AFL.1	×	×	×	×	×	×
FMT_SMR.1	×	×	×	×	×	×
FMT_SMF.1	×	×	×	×	×	×
FMT_MOF.1	×	×	×	×	×	×
FMT_MSA.1/Admin	×	×	×	×	×	×
FMT_MSA.1/Signatory	×	×	×	×	×	×

TOE SFRs	PP SSCD2	PP SSCD3	PP SSCD4	PP SSCD5	PP SSCD6	Included
FMT_MSA.2	×	×	×	×	×	×
FMT_MSA.3	×	×	×	×	×	×
FMT_MSA.4	×	×	×	×	×	×
FMT_MTD.1/Admin	×	×	×	×	×	×
FMT_MTD.1/Signatory	×	×	×	×	×	×
FPT_EMS.1	×	×	×	×	×	×
FPT_FLS.1	×	×	×	×	×	×
FPT_PHP.1	×	×	×	×	×	×
FPT_PHP.3	×	×	×	×	×	×
FPT_TST.1	×	×	×	×	×	×
FIA_API.1			×			×
FTP_ITC.1/SVD			×			×
FDP_DAU.2/SVD			×			x
FDP_UIT.1/DTBS				×	×	×
FTP_ITC.1/VAD				×	×	×
FTP_ITC.1/DTBS				×	×	×
FDP_ITC.1/SCD		×				×
FDP_UCT.1/SCD		×				×
FTP_ITC.1/SCD		×				×
FCS_RNG.1						×

Table 15 PP SFRs vs. ST

6 Security Problem Definition

6.1 Assets

6.1.1 Primary Assets drawn from the protection profiles

Following primary assets are protected by the TOE as listed below:

D.SCD

Signature Creation Data

Private key used to perform an electronic signature operation. The confidentiality, integrity and signatory's sole control over the use of the SCD must be maintained.

D.SVD

Signature Verification Data

Public key linked to the SCD and used to perform electronic signature verification. The integrity of the SVD when it is exported must be maintained.

D.DTBS/R

Data to be signed or its unique Representation

Set of data, or its representation, which the signatory intends to sign. Their integrity and the unforgeability of the link to the signatory provided by the electronic signature must be maintained.

6.1.2 Primary Assets related to EAC2

Authenticity of the Electronic Documents Chip

The authenticity of the electronic document's chip, personalised by the issuing state or organization for the electronic document holder, is used by the electronic document presenter to prove his possession of a genuine electronic document. Generic Security Property: Authenticity

Tracing Data

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

Generic Security Property: Unavailability

Sensitive User Data

User data, which have been classified as sensitive data by the electronic document issuer, e. g. sensitive biometric data. Sensitive user data are a subset of all user data, and are protected by EAC2.

Generic Security Properties: Confidentiality, Integrity, Authenticity

User Data stored on the TOE

All data, with the exception of authentication data, that are stored in the context of the application(s) on the electronic document. These data are allowed to be accessed either by a PACE terminal, or, in the case of sensitive data, by an EAC2 terminal with appropriate authorization level.

Generic Security Properties: Confidentiality, Integrity, Authenticity

User Data transferred between the TOE and the Terminal

All data, with the exception of authentication data, that are transferred (both directions) during usage of the application(s) of the electronic document between the TOE and authenticated terminals.

Generic Security Properties: Confidentiality, Integrity, Authenticity

Accessibility of TOE Functions and Data only for Authorized Subjects

Property of the TOE to restrict access to TSF and TSF-Data stored in the TOE to authorized subjects only.

Generic Security Property: Availability

Genuineness of the TOE

Property of the TOE to be authentic in order to provide claimed security functionality in a proper way.

Generic Security Property: Availability

Electronic Document Communication Establishment Authorization Data

Restricted-revealable authorization information for a human user used for verification of the authorization attempts as an authorized user (PACE password). These data are stored in the TOE and not send to it.

Restricted-revealable here refers to the fact that if necessary, the electronic document holder may reveal her verification values of CAN to an authorized person, or to a device that acts according to respective regulations and is considered trustworthy.

Generic Security Properties: Confidentiality, Integrity

Secret Electronic Document Holder Authentication Data

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

Generic Security Properties: Confidentiality, Integrity

TOE internal Non-Secret Cryptographic Material

Permanently or temporarily stored non-secret cryptographic (public) keys and other non-secret material used by the TOE in order to enforce its security functionality. An example for such non-secret material is the document security object (SOD) that contains a digital signature.

Generic Security Properties: Integrity, Authenticity

TOE internal Secret Cryptographic Keys

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

Generic Security Properties: Confidentiality, Integrity

Application Note:

Data for electronic document holder authentication and for authorization of communication with the electronic document can be categorized as (i) reference information that are persistently stored within the TOE, and (ii) verification information for the TOE that are input by a human user during an authentication and/or authorization attempt.The TOE shall secure both reference information, and, together with the connected terminal, verification information that are transferred in the channel between the TOE and the terminal.

6.2 Users / Subjects

6.2.1 Subjects drawn from the protection profiles

S.User

End user of the TOE who can be identified as administrator or signatory. The subject S.User may act as S.Admin in the role R.Admin or as S.Sigy in the role R.Sigy.

S.Admin

User who is in charge to perform the TOE initialisation, TOE personalisation or other TOE administrative functions. The subject S.Admin is acting in the role R.Admin for this user after successful authentication as administrator.

S.Signatory

User who hold the TOE and use it on their own behalf or on behalf of the natural or legal person or entity they represent. The subject S.Sigy is acting in the role R.Sigy for this user after successful authentication as signatory.

6.2.2 Additional Users/Subjects

S.CSCA

Country Signing Certification Authority

An organization enforcing the policy of the electronic document issuer, i. e. confirming correctness of user and TSF data that are stored within the electronic document. The CSCA represents the country specific root of the public key infrastructure (PKI) for the electronic document, and creates Document Signer Certificates within this PKI. The CSCA also issues a self-signed CSCA certificate that has to be distributed to other countries by secure diplomatic means, see [ICAO9303].

S.CVCA

Country Verifying Certification Authority

The Country Verifying Certification Authority (CVCA) enforces the privacy policy of the issuing state or organization, i. e. enforcing protection of sensitive user data that are stored in the electronic document. The CVCA represents the country specific root of the PKI of EAC2 terminals, and creates Document Verifier Certificates within this PKI. Updates of the public key of the CVCA are distributed as CVCA Link-Certificates, see [TR03110-3].

S.DS

Document Signer

An organization enforcing the policy of the CSCA. A DS signs the Document Security Object (SOD) that is stored on the electronic document for Passive Authentication. A Document Signer is authorized by the national CSCA that issues Document Signer Certificates, see [ICAO9303]. Note that this role is usually delegated to a Personalisation Agent.

S.DV

Document Verifier

An organization issuing terminal certificates. The DV is a Certificate Authority, authorized by the corresponding CVCA to issue certificates for EAC2 terminals, see [TR03110-3].

S.EDH

Electronic Document Holder

A person who the electronic document issuer has personalised the electronic document for. Personalisation here refers to associating a person uniquely with a specific electronic document. Note that an electronic document holder can also be an attacker. The electronic document holder is equivalent to the signatory and can use and manage the PIN and the PUK.

S.EDP

Electronic Document Presenter

A person presenting the electronic document to a terminal and claiming the identity of the electronic document holder. Note that an electronic document presenter can also be an attacker, cf. below.

S.Manufacturer

Generic term comprising both the IC manufacturer that produces the integrated circuit, and the electronic document manufacturer that creates the electronic document and attaches the IC to it. The manufacturer is the default user of the TOE during the manufacturing life cycle phase. When referring to the role manufacturer, the TOE itself does not distinguish between the IC manufacturer and the electronic document manufacturer.

S.PACE Terminal

A PACE terminal implements the terminal part of the PACE protocol and/or the VERIFY PIN command, and authenticates itself to the electronic document using a shared password (CAN, PIN or PUK). A PACE terminal is not allowed to access sensitive user data.

S.Personalisation Agent

An organization acting on behalf of the electronic document issuer that personalises the electronic document for the electronic document holder. Personalisation includes some or all of the following activities: (i) establishing the identity of the electronic document holder for the biographic data in the electronic document, (ii) enrolling the biometric reference data of the electronic document holder, (iii) writing a subset of these data on the physical electronic document (optical personalisation) and storing them within the electronic document's chip (electronic personalisation), (iv) writing document meta data (i. e. document type, issuing country, expiry date, etc.) (v) writing the initial TSF data, and (vi) signing the Document Security Object, and the elementary files EF.CardSecurity and the EF.ChipSecurity (if applicable [ICAO9303], [TR03110-3]) in the role DS. Note that the role

personalisation agent may be distributed among several institutions according to the operational policy of the electronic document issuer.

S.EAC2 Terminal

A terminal that has successfully passed Terminal Authentication 2 is an EAC2 terminal. It is authorized by the electronic document issuer through the Document Verifier of the receiving branch (by issuing terminal certificates) to access a subset or all of the data stored on the electronic document.

S.Terminal

A terminal is any technical system communicating with the TOE through the contactless or contact-based interface. The role terminal is the default role for any terminal being recognized by the TOE that is neither a PACE terminal nor anEAC2 terminal.

6.2.3 Threat agents

S.Attacker

Human or process acting on their behalf located outside the TOE. The main goal of the attacker is to access the SCD or to falsify the electronic signature. The attacker has got a high attack potential and knows no secret.

6.3 Threats

6.3.1 Threats drawn from the protection profiles

T.SCD_Divulg

Storing, copying and releasing of the signature creation data

An attacker stores or copies the SCD outside the TOE. An attacker can obtain the SCD during generation, storage and use for signature creation in the TOE.

T.SCD_Derive

Derive the signature creation data

An attacker derives the SCD from publicly known data, such as SVD corresponding to the SCD or signatures created by means of the SCD or any other data exported outside the TOE, which is a threat against the secrecy of the SCD.

T.Hack_Phys

Physical attacks through the TOE interfaces

An attacker interacts physically with the TOE to exploit vulnerabilities, resulting in arbitrary security compromises. This threat is directed against SCD, SVD and DTBS.

T.SVD_Forgery

Forgery of the signature verification data

An attacker forges the SVD presented by the CSP to the CGA. This results in loss of SVD integrity in the certificate of the signatory.

T.SigF_Misuse

Misuse of the signature creation function of the TOE

An attacker misuses the signature creation function of the TOE to create SDO for data the signatory has not decided to sign. The TOE is subject to deliberate attacks by experts possessing a high attack potential with advanced knowledge of security principles and concepts employed by the TOE.

T.DTBS_Forgery

Forgery of the DTBS/R

An attacker modifies the DTBS/R sent by the SCA. Thus the DTBS/R used by the TOE for signing does not match the DTBS the signatory intended to sign.

T.Sig_Forgery

Forgery of the electronic signature

An attacker forges a signed data object, maybe using an electronic signature which has been created by the TOE, and the violation of the integrity of the signed data object is not detectable by the signatory or by third parties. The signature created by the TOE is subject to deliberate attacks by experts possessing a high attack potential with advanced knowledge of security principles and concepts employed by the TOE.

6.3.2 Threats related to EAC2

T.Counterfeit/EAC2

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

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

T.Sensitive_Data

An attacker tries to gain access to sensitive user data through the communication interface of the electronic document’s chip.The attack T.Sensitive_Data is similar to the threat T.Skimming from [PACEPP] w.r.t. the attack path (communication interface) and the motivation (to get data stored on the electronic document’s chip) but differs from those in the asset under the attack, the opportunity (i.e. knowing the PACE Password) and therefore the possible attack methods.

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

T.Abuse-Func

An attacker may use functions of the TOE which shall not be used in TOE operational phase in order (i) to manipulate or to disclose the User Data stored in the TOE, (ii) to manipulate or to disclose the TSF-data stored in the TOE or (iii)to manipulate (bypass, deactivate or modify) soft-coded security functionality of the TOE. This threat addresses the misuse of the functions for the initialisation and personalisation in the operational phase after delivery to the electronic document holder.

T.Eavesdropping

An attacker is listening to the communication between the electronic document and the PACE authenticated BIS-PACE in order to gain the user data transferred between the TOE and the terminal connected.

T.Forgery

An attacker fraudulently alters the User Data or/and TSF-data stored on the electronic document or/and exchanged between the TOE and the terminal connected in order to outsmart the PACE authenticated BIS-PACE by means of changed electronic document holder's related reference data (like biographic or biometric data). The attacker does it in such a way that the terminal connected perceives these modified data as authentic one.

T.Information_Leakage

An attacker may exploit information leaking from the TOE during its usage in order to disclose confidential User Data or/and TSF-data stored on the electronic document or/and exchanged between the TOE and the terminal connected. The information leakage may be inherent in the normal operation or caused by the attacker.

T.Malfunction

An attacker may cause a malfunction the electronic document's hardware and Embedded Software by applying environmental stress in order to (i) deactivate or modify security features or functionality of the TOE' hardware or to (ii) circumvent, deactivate or modify security functions of the TOE's Embedded Software. This may be achieved e.g. by operating the electronic document outside the normal operating conditions, exploiting errors in the electronic document's Embedded Software or misusing administrative functions. To exploit these vulnerabilities an attacker needs information about the functional operation.

T.Phys-Tamper

An attacker may perform physical probing of the electronic document in order (i) to disclose the TSF-data, or (ii) to disclose/reconstruct the TOE's Embedded Software. An attacker may physically modify the electronic document in order to alter (I) its security functionality (hardware and software part, as well), (ii) the User Data or the TSF-data stored on the electronic document.

T.Skimming

An attacker imitates an inspection system in order to get access to the user data stored on or transferred between the TOE and the inspecting authority connected via the contactless/contact interface of the TOE.

T.Tracing

An attacker tries to gather TOE tracing data (i.e. to trace the movement of the electronic document) unambiguously identifying it remotely by establishing or listening to a communication via the contactless/contact interface of the TOE.

T.Key_Derive

An attacker derives a key (other than SCD) from public known data, such as the corresponding public key or cryptogram created by means of the key or any other data communicated outside the TOE, which is a threat against the secrecy of the key.

T.Authentication_Replay

An attacker retrieves by observation authentication data used by a third party during an authentication sequence. The attacker tries to replay this authentication sequence to grant access to the TOE.

6.4 Organisational Security Policies

6.4.1 OSPs drawn from the protection profiles

P.CSP_QCert

Qualified certificate

The CSP uses a trustworthy CGA to generate a qualified certificate or non-qualified certificate (cf. the directive, article 2, clause 9, and Annex I [DIR]) for the SVD generated by the SSCD. The certificates contain at least the name of the signatory and the SVD matching the SCD implemented in the TOE under sole control of the signatory. The CSP ensures that the use of the TOE as SSCD is evident with signatures through the certificate or other publicly available information.

P.QSign

Qualified electronic signatures

The signatory uses a signature creation system to sign data with an advanced electronic signature (cf. the directive, article 1, clause 2 [DIR]), which is a qualified electronic signature if it is based on a valid qualified certificate (according to the directive Annex I [DIR]). The DTBS are presented to the signatory and sent by the SCA as DTBS/R to the SSCD. The SSCD creates the electronic signature created with a SCD implemented in the SSCD that the signatory maintain under their sole control and is linked to the DTBS/R in such a manner that any subsequent change of the data is detectable.

Application Note:

It is a non-qualified advanced electronic signature if it is based on a non-qualified certificate for the SVD.

P.Sigy_SSCD

TOE as secure signature creation device

The TOE meets the requirements for an SSCD laid down in Annex III of the directive [DIR]. This implies the SCD is used for digital signature creation under sole control of the signatory and the SCD can practically occur only once.

P.Sig_Non-Repud

Non-repudiation of signatures

The lifecycle of the SSCD, the SCD and the SVD shall be implemented in a way that the signatory is not able to deny having signed data if the signature is successfully verified with the SVD contained in their unrevoked certificate.

6.4.2 OSP related to EAC2

P.EAC2_Terminal

Terminals that intent to be EAC2 terminals must implement the respective terminal part of the protocols required to execute EAC version 2 according to [TR03110-2], and store (static keys) or generate (temporary keys and nonces) the corresponding credentials.

P.Terminal_PKI

The electronic document issuer shall establish a public key infrastructure for the card verifiable certificates used for Terminal Authentication. For this aim, the electronic document issuer shall run a Country Verifying Certification Authority. The instances of the PKI shall fulfill the requirements and rules of the corresponding certificate policy. The electronic document issuer shall make the CVCA certificate available to the personalisation agent or the manufacturer.

P.Card_PKI

PKI for Passive Authentication (issuing branch)

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

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

P.Manufact

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

P.Pre-Operational

1.)The electronic document Issuer issues the electronic document and approves it using the terminals complying with all applicable laws and regulations.

2.)The electronic document Issuer guarantees correctness of the user data (amongst other of those, concerning the electronic document holder) and of the TSF-data permanently stored in the TOE28.

3.)The electronic document Issuer uses only such TOE's technical components (IC) which enable traceability of the electronic documents in their manufacturing and issuing life cycle phases, i.e. before they are in the operational phase, cf. sec. 1.2.3 above.

4.)If the electronic document Issuer authorises a Personalisation Agent to personalise the electronic document for electronic document holders, the electronic document Issuer has to ensure that the Personalisation Agent acts in accordance with the electronic document Issuer's policy.

P.Terminal

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

1.)The related terminals (basic inspection system, cf. above) shall be used by terminal operators and by electronic document holders.

2.)They shall implement the terminal parts of the PACE protocol, of the Passive Authentication and use them in this order. The PACE terminal shall use randomly and (almost) uniformly selected nonces, if required by the protocols (for generating ephemeral keys for Diffie-Hellmann).

3.)The related terminals need not to use any own credentials.

4.)They shall also store the Country Signing Public Key and the Document Signer Public Key (in form of CCSCA and CDS) in order to enable and to perform Passive Authentication (determination of the authenticity of data groups stored in the electronic document).

5.)The related terminals and their environment shall ensure confidentiality and integrity of respective data handled by them (e.g. confidentiality of PACE passwords, integrity of PKI certificates, etc.), where it is necessary for a secure operation of the TOE according to the current ST.

P.Trustworthy_PKI

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

P.eServices

The TOE provides the following mechanisms:

- o decrypt encryption decipherment keys using asymmetric mechanisms;
- o digital authentication: authentication of the TOE (on behalf of the TOE holder) using an asymmetric private key;

Moreover, the TOE ensures these keys remain genuine by enforcing an access control over the update of these keys, in order to ensure that only entitled entities can change them.

6.5 Assumptions

6.5.1 All SSCD parts

A.CGA

Trustworthy certificate generation application

The CGA protects the authenticity of the signatory's name or pseudonym and the SVD in the (qualified) certificate by an advanced electronic signature of the CSP.

A.SCA

Trustworthy signature creation application

The signatory uses only a trustworthy SCA. The SCA generates and sends the DTBS/R of data the signatory wishes to sign in a form appropriate for signing by the TOE.

6.5.2 Parts 3 and 6 only

A.CSP

Secure SCD/SVD management by CSP

The CSP uses only a trustworthy SCD/SVD generation device and ensures that this device can be used by authorised user only. The CSP ensures that the SCD generated practically occurs only once, that generated SCD and SVD actually correspond to each other and that SCD cannot be derived from the SVD. The CSP ensures the confidentiality of the SCD during generation and export to the TOE, does not use the SCD for creation of any signature and irreversibly deletes the SCD in the operational environment after export to the TOE.

7 Security Objectives

7.1 Security Objectives for the TOE

7.1.1 All SSCD parts

OT.Tamper_Resistance

Tamper resistance

The TOE shall prevent or resist physical tampering with specified system devices and components.

OT.Tamper_ID

Tamper detection

The TOE shall provide system features that detect physical tampering of its components, and uses those features to limit security breaches.

OT.EMSEC_Design

Provide physical emanations security

The TOE shall be designed and built in such a way as to control the production of intelligible emanations within specified limits.

OT.DTBS_Integrity_TOE

DTBS/R integrity inside the TOE

The TOE must not alter the DTBS/R. As by definition of the DTBS/R this may consist of the DTBS themselves, this objective does not conflict with a signature creation process where the TOE hashes the provided DTBS (in part or entirely) for signature creation.

OT.Sigy_SigF

Signature creation function for the legitimate signatory only

The TOE shall provide the digital signature creation function for the legitimate signatory only and protects the SCD against the use of others. The TOE shall resist attacks with high attack potential.

OT.Sig_Secure

Cryptographic security of the electronic signature

The TOE shall create digital signatures that cannot be forged without knowledge of the SCD through robust encryption techniques. The SCD shall not be reconstructable using the digital signatures or any other data exportable from the TOE. The digital signatures shall be resistant against these attacks, even when executed with a high attack potential.

OT.SCD_Secrecy

Secrecy of the signature-creation data

The secrecy of the SCD (used for signature creation) shall be reasonably assured against attacks with a high attack potential.

Application Note:

The TOE shall keep the confidentiality of the SCD at all times, in particular during SCD/SVD generation, signature creation operation, storage and secure destruction.

OT.Lifecycle_Security

Lifecycle security

The TOE shall detect flaws during the initialisation, personalisation and operational usage. The TOE shall securely destroy the SCD on demand of the signatory.

Application Note:

The TOE may contain more than one set of SCD. There is no need to destroy the SCD in case of repeated SCD generation. The signatory shall be able to destroy the SCD stored in the SSCD e.g. after the (qualified) certificate for the corresponding SVD has been expired.

7.1.2 SSCD parts 2, 4 and 5 only

OT.SCD_SVD_Corresp

Correspondence between SVD and SCD

The TOE shall ensure the correspondence between the SVD and the SCD generated by the TOE. This includes unambiguous reference of a created SVD/SCD pair for export of the SVD and in creating an electronic signature creation with the SCD.

OT.SCD_Unique

Uniqueness of the signature creation data

The TOE shall ensure the cryptographic quality of an SCD/SVD pair it creates as suitable for the advanced or qualified electronic signature. The SCD used for signature creation shall practically occur only once and shall not be reconstructable from the SVD. In that context 'practically occur once' means that the probability of equal SCDs is negligible.

OT.SCD/SVD_Gen

Authorized SCD/SVD generation

The TOE shall provide security features to ensure that authorised users only may invoke the generation of the SCD and the SVD.

7.1.3 SSCD parts 3 and 6 only

OT.SCD_Auth_Imp

Authorized SCD import

The TOE shall provide security features to ensure that authorised users only may invoke the import of the SCD.

Application Note:

Authorized SCD import

The TOE shall provide security features to ensure that authorised users only may invoke the import of the SCD.

7.1.4 SSCD part 4 only

OT.TOE_SSCD_Auth

Authentication proof as SSCD

The TOE shall hold unique identity and authentication data as SSCD and provide security mechanisms to identify and to authenticate itself as SSCD.

OT.TOE_TC_SVD_Exp

TOE trusted channel for SVD export

The TOE shall provide a trusted channel to the CGA to protect the integrity of the SVD exported to the CGA. The TOE shall enable the CGA to detect alteration of the SVD exported by the TOE.

7.1.5 SSCD parts 5 and 6 only

OT.TOE_TC_VAD_Imp

Trusted channel of TOE for VAD import

The TOE shall provide a trusted channel for the protection of the confidentiality and integrity of the VAD received from the HID as needed by the authentication method employed.

Application Note:

This security objective for the TOE is partly covering OE.HID_VAD from the core PPs (PP Part2 SSCD KG and PP Part3 SSCD KI). While OE.HID_VAD in the core PP requires only the operational environment to protect VAD, this ST requires the HID and the TOE to implement a trusted channel for the protection of the VAD: the HID exports the VAD and establishes one end of the trusted channel according to OE.HID_TC_VAD_Exp, the TOE imports VAD at the other end of the trusted channel according to OT.TOE_TC_VAD_Imp. Therefore this ST re-assigns partly the VAD protection from the operational environment as described by OE.HID_VAD to the TOE as described by OT.TOE_TC_VAD_Imp and leaves only the necessary functionality by the HID.

OT.TOE_TC_DTBS_Imp

Trusted channel of TOE for DTBS import

The TOE shall provide a trusted channel to the SCA to detect alteration of the DTBS/R received from the SCA. The TOE must not generate electronic signatures with the SCD for altered DTBS.

7.1.6 Additional Security Objectives for the TOE

OT.AC_Pers_EAC2

Personalisation of the Electronic Document

The TOE must ensure that user data and TSF-Data that are permanently stored in the TOE can be written by authorized personalisation agents only, with the following exception: An EAC2 terminal may also write or modify user data according to its effective access rights. The access rights are determined by the electronic document during Terminal Authentication 2. Justification: This security objective for the TOE modifies OT.AC_Pers from [PACEPP] as the additional features of EAC2 allow a strongly controlled, secure and fine-grained access to individual data groups of the electronic document.

OT.CA2

Proof of the Electronic Document's Chip Authenticity

The TOE must allow EAC2 terminals to verify the identity and authenticity of the electronic document's chip as being issued by the identified issuing state or organization by Chip

Authentication 2 [TR03110-2]. The authenticity of the chip and its proof mechanism provided by the electronic document's chip shall be protected against attacks with high attack potential.

OT.Sens_Data_EAC2

Confidentiality of sensitive User Data

The TOE must ensure confidentiality of sensitive user data by granting access to sensitive data only to EAC2 terminals with corresponding access rights. The authorization of an EAC2 terminal is the minimum set of the access rights drawn from the terminal certificate used for successful authentication and the corresponding DV and CVCA certificates, and the access rights sent to the electronic document as part of PACE. The TOE must ensure confidentiality of all user data during transmission to an EAC2 terminal after Chip Authentication 2. Confidentiality of sensitive user data shall be protected against attacks with high attack potential.

OT.Data_Authenticity

Authenticity of Data

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

OT.Data_Confidentiality

Confidentiality of Data

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

OT.Data_Integrity

Integrity of Data

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

OT.Identification

Identification of the TOE

The TOE must provide means to store Initialisation36 and Pre-Personalisation Data in its non-volatile memory. The Initialisation Data must provide a unique identification of the IC during the manufacturing and the card issuing life cycle phases of the electronic document. The storage of the Pre-Personalisation data includes writing of the Personalisation Agent Key(s).

OT.Prot_Abuse-Func

Protection against Abuse of Functionality

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

OT.Prot_Inf_Leak

Protection against Information Leakage

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

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

Application Note:

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

OT.Prot_Malfunction

Protection against Malfunctions

The TOE must ensure its correct operation. The TOE must prevent its operation outside the normal operating conditions where reliability and secure operation have not been proven or tested. This is to prevent functional errors in the TOE. The environmental conditions may include external energy (esp. electromagnetic) fields, voltage (on any contacts), clock frequency or temperature. The following TOE security objectives address the aspects of identified threats to be countered involving TOE's environment.

OT.Prot_Phys-Tamper

Protection against Physical Tampering

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

- measuring through galvanic contacts representing a direct physical probing on the chip's surface except on pads being bonded (using standard tools for measuring voltage and current) or
- measuring not using galvanic contacts, but other types of physical interaction between electrical charges (using tools used in solid-state physics research and IC failure analysis),
- manipulation of the hardware and its security functionality, as well as
- controlled manipulation of memory contents (User Data, TSF-data)with a prior
- reverse-engineering to understand the design and its properties and functionality.

OT.Tracing

Tracing electronic document

The TOE must prevent gathering TOE tracing data by means of unambiguous identifying the electronic document remotely through establishing or listening to a communication via

the contactless/contact interface of the TOE without knowledge of the correct values of shared passwords (PACE passwords) in advance.

Application Note:

Since the Standard Inspection Procedure does not support any unique-secret-based authentication of the electronic document's chip (no Chip Authentication), a security objective like OT.Chip_Auth_Proof (proof of electronic document authenticity)35 cannot be achieved by the current TOE.

OT.Authentication_Secure

Secure authentication mechanisms

The TOE provides strong mechanism to authenticate external users/entity and mechanisms to establish a strong trusted channel with an external IT entity. The authentication protocols rely on cryptographic schemes that are based on either symmetric or asymmetric cryptography. The TOE uses freshly generated random number in the authentication mechanism in order to avoid replay attacks. The authentication protocols ensure that the cryptogram cannot be forged without the knowledge of the authentication key, and that they cannot be reconstructed from the authentication cryptograms. The trusted channel ensures integrity, authenticity, and confidentiality of the data using strong encryption techniques. The trusted channel ensures protection against deletion, and modification of commands. Moreover, the TOE ensures the key its uses are genuine by enforcing an access control over the authentication keys update, in order to ensure that only entitled entities can change key values

OT.Lifecycle_Management

Management of the life cycle

The TOE provides a life cycle management enabling to separate its life cycle in two main phases. The first one (phase 6) is the one during the TOE is under the sole control of the Personalisation Agent. The following operation may be realized:

- The SCD, SVD and keys may be created, generated, imported or erased
- The RAD (s) may be created and loaded
- SVD and public keys may be exported Once performed, the Personalisation Agent switches the TOE in phase 7. This transition is irreversible leaving the TOE under the sole control of the R.Sigy, R.Admin and the TOE_Administrator according to the security rules set by the Personalisation Agent.

OT.eServices

Provision of eServices The TOE provides eServices Mechanisms enabling to:

- decrypt encryption keys
- authenticate the TOE
- verify CVC certificates Moreover, the TOE ensures the key its uses are genuine by enforcing an access control over the keys update, in order to ensure that only entitled entities can change key values.

OT.TOE_AuthKey_Unique

Uniqueness of the TOE authentication key(s)

The TOE shall ensure the cryptographic quality of the asymmetric authentication key pair used for the TOE authentication. The private key used for TOE authentication can practically occur only once and cannot be reconstructed from the public key. In that

context ‘practically occur once’ means that the probability of equal TOE authentication key is negligible low

7.2 Security Objectives for the Operational Environment

7.2.1 All SSCD parts

OE.Signatory

Security obligation of the signatory

The signatory shall check that the SCD stored in the SSCD received from SSCD-provisioning service is in non-operational state. The signatory shall keep their VAD confidential.

OE.DTBS_Intend

SCA sends data intended to be signed

The signatory shall use a trustworthy SCA that

- generates the DTBS/R of the data that has been presented as DTBS and which the signatory intends to sign in a form which is appropriate for signing by the TOE,
- sends the DTBS/R to the TOE and enables verification of the integrity of the DTBS/R by the TOE,
- attaches the signature produced by the TOE to the data or provides it separately.

Application Note:

The SCA should be able to support advanced electronic signatures. Currently, there exist three formats defined by ETSI recognized as meeting the requirements needed by advanced electronic signatures: CAdES, XAdES and PAdES. These three formats mandate to include the hash of the signer's public key certificate in the data to be signed. In order to support for the mobility of the signer, it is recommended to store the certificate info on the SSCD for use by SCA and identification of the corresponding SCD if more than one SCD is stored on the SSCD.

OE.SVD_Auth

Authenticity of the SVD The operational environment shall ensure the integrity of the SVD sent to the CGA of the CSP. The CGA verifies the correspondence between the SCD in the SSCD of the signatory and the SVD in the qualified certificate.

OE.CGA_QCert

Generation of qualified certificates

The CGA shall generate a qualified certificate that includes (amongst others)

- the name of the signatory controlling the TOE,
- the SVD matching the SCD stored in the TOE and being under sole control of the signatory,
- the advanced signature of the CSP.

The CGA shall confirm with the generated qualified certificate that the SCD corresponding to the SVD is stored in a SSCD.

7.2.2 SSCD parts 3 and 6 only

OE.SCD_SVD_Corresp

Correspondence between SVD and SCD

The CSP shall ensure the correspondence between the SVD and the SCD generated by the CSP. This includes the correspondence between the SVD sent to the CGA and the SCD exported to the TOE of the signatory identified in the SVD certificate.

OE.SCD_Unique

Uniqueness of the signature creation data

The CSP shall ensure the cryptographic quality of the SCD/SVD pair, which is generated in the environment, for the qualified or advanced electronic signature. The SCD used for signature creation shall practically occur only once, i.e. the probability of equal SCDs shall be negligible, and the SCD shall not be reconstructable from the SVD.

OE.SCD_Secrecy

SCD Secrecy

The CSP shall protect the confidentiality of the SCD during generation and export to the TOE. The CSP shall not use the SCD for creation of any signature and shall irreversibly delete the SCD in the operational environment after export to the TOE.

OE.SCD/SVD_Auth_Gen

Authorized SCD/SVD generation

The CSP shall provide security features to ensure that authorised users only may invoke the generation of the SCD and the SVD.

7.2.3 SSCD part 4 only

OE.Dev_Prov_Service

Authentic SSCD provided by SSCD Provisioning Service

The SSCD Provisioning Service handles authentic devices that implement the TOE, prepares the TOE for proof as SSCD to external entities, personalises the TOE for the legitimate user as signatory, links the identity of the TOE as SSCD with the identity of the legitimate user, and delivers the TOE to the signatory.

Application Note:

This objective replaces OE.SSCD_Prov_Service from the core PP, which is possible as it does not imply any additional requirements for the operational environment when compared to OE.SSCD_Prov_Service (OE.Dev_Prov_Service is a subset of OE.SSCD_Prov_Service).

OE.CGA_TC_SVD_Imp

CGA trusted channel for SVD import

The CGA shall detect alteration of the SVD imported from the TOE with the claimed identity of the SSCD.

OE.CGA_SSCD_Auth

Pre-initialisation of the TOE for SSCD authentication

The CSP shall check by means of the CGA whether the device presented for application of a (qualified) certificate holds unique identification as SSCD, successfully proved this identity as SSCD to the CGA, and whether this identity is linked to the legitimate holder of the device as applicant for the certificate.

7.2.4 SSCD parts 5 and 6 only

OE.HID_TC_VAD_Exp

Trusted channel of HID for VAD export

The HID provides the human interface for user authentication. The HID will ensure confidentiality and integrity of the VAD as needed by the authentication method employed including export to the TOE by means of a trusted channel.

Application Note:

This security objective for the TOE is partly covering OE.HID_VAD from the core PPs (PP Part2 SSCD KG and PP Part3 SSCD KI). While OE.HID_VAD in the core PPs (PP Part2 SSCD KG and PP Part3 SSCD KI) requires only the operational environment to protect VAD, this ST requires the HID and the TOE to implement a trusted channel for the protection of the VAD: the HID exports the VAD and establishes one end of the trusted channel according to OE.HID_TC_VAD_Exp, the TOE imports VAD at the other end of the trusted channel according to OT.TOE_TC_VAD_Imp. Therefore this ST re-assigns partly the VAD protection from the operational environment as described by OE.HID_VAD to the TOE as described by OT.TOE_TC_VAD_Imp and leaves only the necessary functionality by the HID.

OE.SCA_TC_DTBS_Exp

Trusted channel of SCA for DTBS export

The SCA provides a trusted channel to the TOE for the protection of the integrity of the DTBS to ensure that the DTBS/R cannot be altered undetected in transit between the SCA and the TOE.

Application Note:

This security objective for the TOE is partly covering OE.DTBS_Protect from the core PPs (PP Part2 SSCD KG and PP Part3 SSCD KI). While OE.DTBS_Protect in the core PPs (PP Part2 SSCD KG and PP Part3 SSCD KI) requires only the operational environment to protect DTBS, this ST requires the SCA and the TOE to implement a trusted channel for the protection of the DTBS: the SCA exports the DTBS and establishes one end of the trusted channel according to OE.SCA_TC_DTBS_Exp, the TOE imports DTBS at the other end of the trusted channel according to OT.TOE_TC_DTBS_Imp. Therefore this ST re-assigns partly the DTBS protection from the operational environment as described by OE.DTBS_Protect to the TOE as described by OT.TOE_TC_DTBS_Imp and leaves only the necessary functionality by the SCA.

7.2.5 Additional Security Objectives for the Operational Environment

OE.Chip_Auth_Key

Key Pairs needed for Chip Authentication

The electronic document issuer has to ensure that the electronic document's chip authentication key pair is generated securely, that the private key of this key pair is stored correctly in the electronic document's chip, and that the corresponding public keys are distributed to the EAC2 terminals that are used according to [TR03110-2] to check the authenticity of the electronic document's chip. Justification: The TSF of [PACEPP] does not

include any mechanism to verify the authenticity of an electronic document (i.e. protection against cloning). Therefore, this additional security objective for the operational environment does not mitigate any threat of, and does not fulfill any OSP of [PACEPP].

OE.Terminal_Authentication

AuthenticationKey pairs needed for Terminal Authentication

The electronic document issuer shall establish a public key infrastructure for the card verifiable certificates used for Terminal Authentication. For this aim, the electronic document issuer shall run a Country Verifying Certification Authority. The instances of the PKI shall fulfill the requirements and rules of the corresponding certificate policy. The electronic document issuer shall make the CVCA certificate available to the personalisation agent or the manufacturer. Justification: The TSF of [PACEPP] does not include any mechanism to verify the authenticity of the terminal that reads out the data stored on the electronic document (by successfully executing PACE, a terminal only proves knowledge of the PACE password). Therefore, this additional security objective for the operational environment does not mitigate any threat of, and does not fulfill any OSP of [PACEPP].

OE.Legislative_Compliance

Issuing of the electronic document

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

OE.Passive_Auth_Sign

Authentication of electronic document by Signature

The electronic document Issuer has to establish the necessary public key infrastructure as follows: the CSCA acting on behalf and according to the policy of the electronic document Issuer must (i) generate a cryptographically secure CSCA Key Pair, (ii) ensure the secrecy of the CSCA Private Key and sign Document Signer Certificates in a secure operational environment, and (iii) publish the Certificate of the CSCA Public Key (CCSCA). Hereby authenticity and integrity of these certificates are being maintained.A Document Signer acting in accordance with the CSCA policy must (i) generate a cryptographically secure Document Signing Key Pair, (ii) ensure the secrecy of the Document Signer Private Key, (iii) hand over the Document Signer Public Key to the CSCA for certification, (iv) sign Document Security Objects of genuine electronic documents in a secure operational environment only. The digital signature in the Document Security Object relates to all hash values for each data group in use. The Personalisation Agent has to ensure that the Document Security Object contains only the hash values of genuine user data according to [6]. The CSCA must issue its certificates exclusively to the rightful organisations (DS) and DSs must sign exclusively correct Document Security Objects to be stored on electronic document.

OE.Personalisation

Personalisation of ID document

The electronic document Issuer must ensure that the Personalisation Agents acting on his behalf (i) establish the correct identity of the electronic document holder and create the biographical data for the electronic document, (ii) enrol the biometric reference data of the electronic document holder, (iii) write a subset of these data on the physical Passport (optical personalisation) and store them in the electronic document (electronic personalisation) for the electronic document holder as defined in [6]37, (iv) write the document details data, (v) write the initial TSF data, (vi) sign the Document Security Object defined in [6] (in the role of a DS).

OE.Terminal

Terminal operating

The terminal operators must operate their terminals as follows: 1)The related terminals (basic inspection systems, cf. above) are used by terminal operators and by electronic document holders.

2)The related terminals implement the terminal parts of the PACE protocol, of the Passive Authentication(by verification of the signature of the Document Security Object) and use them in this order. The PACE terminal uses randomly and (almost)uniformly selected nonces, if required by the protocols (for generating ephemeral keys for Diffie-Hellmann).

3)The related terminals need not to use any own credentials.

4)The related terminals securely store the Country Signing Public Key and the Document Signer Public Key (in form of CCSCA and CDS) in order to enable and to perform Passive Authentication of the electronic document (determination of the authenticity of data groups stored in the electronic document).

5)The related terminals and their environment must ensure confidentiality and integrity of respective data handled by them (e.g. confidentiality of the PACE passwords, integrity of PKI certificates, etc.), where it is necessary for a secure operation of the TOE according to the current ST.

OE.Electronic_Document_Holder

Electronic document holder Obligations

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

OE.AuthKey_Unique

Uniqueness of the authentication key(s)

The entity in charge of generating the authentication keys to be loaded in the TOE shall ensure the cryptographic quality of the authentication key(s). The authentication key used for authentication can practically occur only once and, in case of a TOE authentication key cannot be reconstructed from its public portion. In that context 'practically occur once' means that the probability of equal keys is negligible low.

7.3 Security Objectives Rationale

7.3.1 Threats

7.3.1.1 Threats drawn from the protection profiles

T.SCD_Divulg addresses the threat against the legal validity of electronic signature due to storage and copying of SCD outside the TOE, as expressed in the directive [DIR], recital (18). This threat is countered by

- OE.SCD_Secrecy, which assures the secrecy of the SCD in the CSP environment, and
- OT.SCD_Secrecy, which assures the secrecy of the SCD during use by the TOE for signature creation.

Furthermore, generation and/or import of SCD known by an attacker is countered by OE.SCD/SVD_Auth_Gen, which ensures that only authorized SCD generation in the

environment is possible, and OT.SCD_Auth_Imp, which ensures that only authorised SCD import is possible.

T.SCD_Derive deals with attacks on the SCD via public known data produced by the TOE, which are the SVD and the signatures created with the SCD. OT.SCD/SVD_Gen counters this threat by implementing cryptographically secure generation of the SCD/SVD pair. OT.Sig_Secure ensures cryptographically secure electronic signatures. OE.SCD_Unique counters this threat by implementing cryptographically secure generation of the SCD/SVD pair.

T.Hack_Phys deals with physical attacks exploiting physical vulnerabilities of the TOE. OT.SCD_Secrecy preserves the secrecy of the SCD. OT.EMSEC_Design counters physical attacks through the TOE interfaces and observation of TOE emanations. OT.Tamper_ID and OT.Tamper_Resistance counter the threat T.Hack_Phys by detecting and by resisting tampering attacks.

T.SVD_Forgery deals with the forgery of the SVD exported by the TOE to the CGA for certificate generation. T.SVD_Forgery is addressed by OT.SCD_SVD_Corresp, which ensures correspondence between SVD and SCD and unambiguous reference of the SVD/SCD pair for the SVD export and signature creation with the SCD, and OE.SVD_Auth that ensures the integrity of the SVD exported by the TOE to the CGA.

OE.SCD_SVD_Corresp, which ensures correspondence between SVD and SCD.

Additionally T.SVD_Forgery is addressed by OT.TOE_TC_SVD_Exp, which ensures that the TOE sends the SVD in a verifiable form through a trusted channel to the CGA, as well as by OE.CGA_TC_SVD_Imp, which provides verification of SVD authenticity by the CGA.

T.SigF_Misuse addresses the threat of misuse of the TOE signature creation function to create SDO by others than the signatory to create an electronic signature on data for which the signatory has not expressed the intent to sign, as required by paragraph 1(c) of Annex III [DIR]. OT.Lifecycle_Security (Lifecycle security) requires the TOE to detect flaws during the initialisation, personalisation and operational usage including secure destruction of the SCD, which may be initiated by the signatory. OT.Sigy_SigF (Signature creation function for the legitimate signatory only) ensures that the TOE provides the signature creation function for the legitimate signatory only. OE.DTBS_Intend (Data intended to be signed) ensures that the SCA sends the DTBS/R only for data the signatory intends to sign. OT.DTBS_Integrity_TOE (DTBS/R integrity inside the TOE) prevents the DTBS/R from alteration inside the TOE. OE.Signatory ensures that the signatory checks that an SCD stored in the SSCD when received from an SSCD-provisioning service provider is in non-operational state, i.e. the SCD cannot be used before the signatory becomes control over the SSCD. OE.Signatory ensures also that the signatory keeps their VAD confidential.

The combination of OT.TOE_TC_DTBS_Imp (Trusted channel of TOE for DTBS) and OE.SCA_TC_DTBS_Exp (Trusted channel of SCA for DTBS) counters the undetected manipulation of the DTBS during the transmission from the SCA to the TOE.

If the SCA provides a human interface for user authentication, OE.HID_TC_VAD_Exp (Trusted channel of HID for VAD) requires the HID to protect the confidentiality and the integrity of the VAD as needed by the authentication method employed. The HID and the TOE will protect the VAD by a trusted channel between HID and TOE according to OE.HID_TC_VAD_Exp (Trusted channel of HID for VAD) and OT.TOE_TC_VAD_Imp (Trusted channel of TOE for VAD).

OT.Lifecycle_Management ensures that when the TOE is under the Personalisation Agent control, it can not be misused to sign on behalf of the legitimate Signatory.

T.DTBS_Forgery addresses the threat arising from modifications of the data sent as input to the TOE's signature creation function that does not represent the DTBS as presented to the signatory and for which the signature has expressed its intent to sign. The TOE IT environment addresses T.DTBS_Forgery by the means of OE.DTBS_Intend, which ensures that the trustworthy SCA generates the DTBS/R of the data that has been presented as DTBS and which the signatory intends to sign in a form appropriate for signing by the TOE. The TOE counters this threat by the means of OT.DTBS_Integrity_TOE by ensuring the integrity of the DTBS/R inside the TOE.

The threat T.DTBS_Forgery is addressed by the security objectives OT.TOE_TC_DTBS_Imp (Trusted channel of TOE for DTBS) and OE.SCA_TC_DTBS_Exp (Trusted channel of SCA for DTBS), which ensure that the DTBS/R is sent through a trusted channel and cannot be altered undetected in transit between the SCA and the TOE.

T.Sig_Forgery deals with non-detectable forgery of the electronic signature. OT.Sig_Secure, OT.SCD_Unique and OE.CGA_QCert address this threat in general. OT.Sig_Secure (Cryptographic security of the electronic signature) ensures by means of robust cryptographic techniques that the signed data and the electronic signature are securely linked together. OT.SCD_Unique ensures that the same SCD cannot be generated more than once and the corresponding SVD cannot be included in another certificate by chance. OE.CGA_QCert prevents forgery of the certificate for the corresponding SVD, which would result in false verification decision concerning a forged signature.

OE.SCD_Unique ensures that the same SCD cannot be generated more than once and the corresponding SVD cannot be included in another certificate by chance.

7.3.1.2 Threats related to EAC2

T.Counterfeit/EAC2 The threat T.Counterfeit/EAC2 addresses the attack of an unauthorized copy or reproduction of the genuine electronic document. This attack is countered by the proof of the chip's authenticity, as aimed by OT.CA2 using a Chip Authentication key pair that is generated within the issuing PKI branch, as aimed by OE.Chip_Auth_Key. According to OE.Chip_Auth_Key, the terminal has to perform the Chip Authentication 2 protocol to verify the authenticity of the electronic document's chip.

T.Sensitive_Data The threat T.Sensitive_Data is countered by the TOE-Objective OT.Sens_Data_EAC2, that requires that read access to sensitive user data is only granted to EAC2 terminals with corresponding access rights. Furthermore, it is required that the confidentiality of the data is ensured during transmission. The objective OE.Terminal_Authentication requires the electronic document issuer to provide the public key infrastructure (PKI) to generate and distribute the card verifiable certificates needed by the electronic document to securely authenticate the EAC2 terminal.

T.Abuse-Func The threat T.Abuse-Func addresses attacks of misusing TOE's functionality to manipulate or to disclosure the stored User- or TSF-data as well as to disable or to bypass the soft-coded security functionality. The security objective OT.Prot_Abuse-Func ensures that the usage of functions having not to be used in the operational phase is effectively prevented.

T.Eavesdropping The threat T.Eavesdropping addresses listening to the communication between the TOE and a PACE terminal or an EAC2 terminal in order to gain access to transferred user data. This threat is countered by the security objective OT.Data_Confidentiality through a trusted channel based on PACE Authentication, and by OT.Sens_Data_EAC2 demanding a trusted channel that is based on Chip Authentication 2.

T.Forgery The threat T.Forgery addresses the fraudulent, complete or partial alteration of user data and/or TSF-Data stored on the TOE, and/or exchanged between the TOE and the terminal. The threat T.Forgery addresses the fraudulent, complete or partial alteration of the User Data or/and TSF-data stored on the TOE or/and exchanged between the TOE and the terminal. The security objective OT.AC_Pers requires the TOE to limit the write access for the electronic document to the trustworthy Personalisation Agent (cf. OE.Personalisation). The TOE will protect the integrity and authenticity of the stored and exchanged User Data or/and TSF-data as aimed by the security objectives OT.Data_Integrity and OT.Data_Authenticity, respectively. The objectives OT.Prot_Phys-Tamper and OT.Prot_Abuse-Func contribute to protecting integrity of the User Data or/and TSF-data stored on the TOE. A terminal operator operating his terminals according to OE.Terminal and performing the Passive Authentication using the Document Security Object as aimed by OE.Passive_Auth_Sign will be able to effectively verify integrity and authenticity of the data received from the TOE. The threat is also addressed by the refinement of OT.AC_Pers, here renamed OT.AC_Pers_EAC2.

T.Information_Leakage The threats T.Information_Leakage is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threat is addressed by the directly related security objectives OT.Prot_Inf_Leak.

T.Malfunction The threats T.Malfunction 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 objectives OT.Prot_Malfunction.

T.Phys-Tamper The threats T.Phys-Tamper is typical for integrated circuits like smart cards under direct attack with high attack potential. The protection of the TOE against this threat is addressed by the directly related security objectives OT.Prot_Phys-Tamper.

T.Skimming The threat T.Skimming addresses accessing the user data (stored on the TOE or transferred between the TOE and the terminal) using the TOE's contactless/contact-based interface. This threat is countered by the security objectives OT.Data_Integrity, OT.Data_Authenticity and OT.Data_Confidentiality through the PACE authentication. The objective OE.Electronic_Document_Holder ensures that a PACE session can only be established either by the ID document holder itself or by an authorised person or device, and, hence, cannot be captured by an attacker. Additionally, the threat is also addressed by OT.Sens_Data_EAC2 that demands a trusted channel based on Chip Authentication 2, and requires that read access to sensitive user data is only granted to EAC2 terminals with corresponding access rights. Moreover, OE.Terminal_Authentication requires the electronic document issuer to provide the corresponding PKI.

T.Tracing The threat T.Tracing addresses gathering TOE tracing data identifying it remotely by establishing or listening to a communication via the contactless/contact interface of the TOE, whereby the attacker does not a priori know the correct values of the PACE password. This threat is directly countered by security objectives OT.Tracing (no gathering TOE tracing data) and OE.Electronic_Document_Holder (the attacker does not a priori know the correct values of the shared passwords).

T.Key_Derive deals with attacks on authentication and eServices keys via public known data produced or received by the TOE (public key, authentication cryptogram,…). This threat is countered by OE.AuthKey_Unique (in case of import) and OT.TOE_AuthKey_Unique (in case of TOE's authentication key generation) that provides cryptographic secure generation of the keys. OT.Authentication_Secure ensures secure authentication cryptograms.

T.Authentication_Replay deals with the threats when an attacker retrieves an authentication cryptogram presented to the TOE by an entity and presents it again to the TOE in order to grant some rights and gain access to some data on the TOE. This threat is addressed by OT.Authentication_Secure that ensures the authentication cryptogram cannot be replayed as they rely on random data internally generated by the TOE.

7.3.2 Organisational Security Policies

7.3.2.1 OSPs drawn from the protection profiles

P.CSP_QCert establishes the CSP generating qualified certificate or non-qualified certificate linking the signatory and the SVD implemented in the SSCD under sole control of this signatory. P.CSP_QCert is addressed by

- OT.Lifecycle_Security, which requires the TOE to detect flaws during the initialisation, personalisation and operational usage,
- OT.SCD_SVD_Corresp, which requires to ensure the correspondence between the SVD and the SCD during their generation,

- OE.SCD/SVD_Auth_Gen, which ensures that the SCD/SVD generation can be invoked by authorized users only,
- OT.SCD_Auth_Imp which ensures that authorised users only may invoke the import of the SCD,
- OE.SCD_SVD_Corresp, which requires the CSP to ensure the correspondence between the SVD and the SCD during their generation, and
- OE.CGA_QCert for generation of qualified certificates or non-qualified certificates, which requires the CGA to certify the SVD matching the SCD implemented in the TOE under sole control of the signatory.

According to OT.TOE_SSCD_Auth the copies of the TOE will hold unique identity and authentication data as SSCD and provide security mechanisms enabling the CGA to identify and to authenticate the TOE as SSCD to prove this identity as SSCD to the CGA. The OE.CGA_SSCD_Auth ensures that the SP checks the proof of the device presented of the applicant that it is a SSCD.

P.QSign provides that the TOE and the SCA may be employed to sign data with an advanced electronic signature, which is a qualified electronic signature if based on a valid qualified certificate. OT.Sigy_SigF ensures signatory's sole control of the SCD by requiring the TOE to provide the signature creation function for the legitimate signatory only and to protect the SCD against the use of others. OT.Sig_Secure ensures that the TOE creates electronic signatures, which cannot be forged without knowledge of the SCD through robust encryption techniques. OE.CGA_QCert addresses the requirement of qualified or non-qualified electronic certificates building a base for the electronic signature. OE.DTBS_Intend ensures that the SCA provides only those DTBS to the TOE, which the signatory intends to sign.

P.Sigy_SSCD requires the TOE to meet Annex III [DIR]. This is ensured as follows:

- OE.SCD_Unique meets the paragraph 1(a) of the directive [DIR], Annex III, by the requirements that the SCD used for signature creation can practically occur only once;
- OT.SCD_Unique meets the paragraph 1(a) of Annex III [DIR], by the requirements that the SCD used for signature creation can practically occur only once;
- OT.SCD_Unique, OT.SCD_Secrecy and OT.Sig_Secure meet the requirement in paragraph 1(a) of Annex III [DIR] by the requirements to ensure secrecy of the SCD.
- OT.EMSEC_Design and OT.Tamper_Resistance address specific objectives to ensure secrecy of the SCD against specific attacks;
- OT.SCD_Auth_Imp, which limits SCD import to authorised users only;
- OE.SCD_Secrecy, which ensures the confidentiality of the SCD during generation and export to the TOE, and deletes the SCD after export to the TOE. The CSP does not use the SCD for signature creation;
- OT.SCD_Secrecy and OT.Sig_Secure meet the requirement in paragraph 1(b) of Annex III [DIR] by the requiements to ensure that the SCD cannot be derived from SVD, the electronic signatures or any other data exported outside the TOE;
- OT.Sigy_SigF meets the requirement in paragraph 1(c) of Annex III [DIR] by the requirements to ensure that the TOE provides the signature creation function for the legitimate signatory only and protects the SCD against the use of others;
- OT.DTBS_Integrity_TOE meets the requirements in paragraph 2 of Annex III [DIR] as the TOE must not alter the DTBS/R.

Paragraph 2 of Annex III [DIR], requires that an SSCD does not prevent the data to be signed from being presented to the signatory prior to the signature process is obviously fulfilled by the method of TOE usage: the SCA will present the DTBS to the signatory and send it to the SSCD for signing.

The usage of SCD under sole control of the signatory is ensured by

- OT.Lifecycle_Security requiring the TOE to detect flaws during the initialisation, personalisation and operational usage,
- OE.SCD/SVD_Auth_Gen, which limits invocation of the generation of the SCD and the SVD to authorised users only,
- OT.SCD/SVD_Gen, which limits invocation of the generation of the SCD and the SVD to authorised users only, and
- OT.Sigy_SigF, which requires the TOE to provide the signature creation function for the legitimate signatory only and to protect the SCD against the use of others.

OE.Dev_Prov_Service ensures that the legitimate user obtains a TOE sample as an authentic, initialised and personalised TOE from an SSCD Provisioning Service through the TOE delivery procedure. If the TOE implements SCD generated under control of the SSCD Provisioning Service the legitimate user receives the TOE as SSCD. If the TOE is delivered to the legitimate user without SCD In the operational phase he or she applies for the (qualified) certificate as the Device holder and legitimate user of the TOE. The CSP will use the TOE security feature (addressed by the security objectives OT.TOE_SSCD_Auth and OT.TOE_TC_SVD_Exp) to check whether the device presented is a SSCD linked to the applicant as required by OE.CGA_SSCD_Auth and the received SVD is sent by this SSCD as required by OE.CGA_TC_SVD_Imp. Thus the obligation of the SSCD provision service for the first SCD/SVD pair is complemented in an appropriate way by the CSP for the SCD/SVD pair generated outside the secure preparation environment.

P.Sig_Non-Repud deals with the repudiation of signed data by the signatory, although the electronic signature is successfully verified with the SVD contained in their certificate valid at the time of signature creation. This policy is implemented by the combination of the security objectives for the TOE and its operational environment, which ensures the aspects of signatory's sole control over and responsibility for the electronic signatures created with the TOE.

OE.SCD/SVD_Auth_Gen, OE.SCD_Secrecy and OE.SCD_Unique ensure the security of the SCD in the CSP environment. OE.SCD_Secrecy ensures the confidentiality of the SCD during generation, during and after export to the TOE. The CSP does not use the SCD for creation of any signature and deletes the SCD irreversibly after export to the TOE. OE.SCD_Unique provides that the signatory's SCD can practically occur just once. OE.SCD_SVD_Corresp ensures that the SVD in the certificate of the signatory corresponds to the SCD that is implemented in the copy of the TOE of the signatory.

OE.CGA_QCert ensures that the certificate allows to identify the signatory and thus to link the SVD to the signatory. OE.SVD_Auth and OE.CGA_QCert require the environment to ensure authenticity of the SVD as being exported by the TOE and used under sole control of the signatory. OT.SCD_SVD_Corresp ensures that the SVD exported by the TOE corresponds to the SCD that is implemented in the TOE. OT.SCD_Unique provides that the signatory's SCD can practically occur just once. OE.Signatory ensures that the signatory checks that the SCD, stored in the SSCD received from an SSCD provisioning service is in non-operational state (i.e. the SCD cannot be used before the signatory becomes into sole control over the SSCD). OT.Sigy_SigF provides that only the signatory may use the TOE for signature creation. As prerequisite OE.Signatory ensures that the signatory keeps their VAD confidential. OE.DTBS_Intend and OT.DTBS_Integrity_TOE ensure that the TOE creates electronic signatures only for those DTBS/R, which the signatory has decided to sign as DTBS. The robust cryptographic techniques required by OT.Sig_Secure ensure

that only this SCD may create a valid electronic signature that can be successfully verified with the corresponding SVD used for signature verification. The security objective for the TOE OT.Lifecycle_Security (Lifecycle security), OT.SCD_Secrecy (Secrecy of the signature creation data), OT.EMSEC_Design (Provide physical emanations security), OT.Tamper_ID (Tamper detection) and OT.Tamper_Resistance (Tamper resistance) protect the SCD against any compromise.

The TOE security feature addressed by the security objectives OT.TOE_SSCD_Auth and OT.TOE_TC_SVD_Exp supported by OE.Dev_Prov_Service enables the verification whether the device presented by the applicant is a SSCD as required by OE.CGA_SSCD_Auth and the received SVD is sent by the device holding the corresponding SCD as required by OE.CGA_TC_SVD_Imp.

The confidentiality of VAD is protected during the transmission between the HI device and TOE according to OE.HID_TC_VAD_Exp (Trusted channel of HID for VAD) and OT.TOE_TC_VAD_Imp (Trusted channel of TOE for VAD).

OE.DTBS_Intend (SCA sends data intended to be signed), OT.DTBS_Integrity_TOE (DTBS/R integrity inside the TOE), OE.SCA_TC_DTBS_Exp (Trusted channel of SCA for DTBS) and OT.TOE_TC_DTBS_Imp (Trusted channel of TOE for DTBS) ensure that the TOE generates electronic signatures only for a DTBS/R that the signatory has decided to sign as DTBS.

OT.Lifecycle_Management ensures that when the TOE is under the Personalisation Agent control, it cannot be misused to sign on behalf of the legitimate Signatory.

7.3.2.2 OSP related to EAC2

P.EAC2_Terminal The OSP P.EAC2_Terminal addresses the requirement for EAC2 terminals to implement the terminal parts of the protocols needed to executed EAC2 according to its specification in [TR03110-2], and to store (static keys) or generate (temporary keys and nonces) the needed related credentials. This is enforced by OE.Chip_Auth_Key which requires Chip Authentication key to be correctly generated and stored, by OE.Terminal_Authentication for the PKI needed for Terminal Authentication, and by OE.Terminal which covers the PACE protocol and the Passive Authentication protocol.

P.Terminal_PKI The OSP P.Terminal_PKI is enforced by establishing the receiving PKI branch as aimed by the objective OE.Terminal_Authentication.

P.Card_PKI The OSP P.Card_PKI is enforced by establishing the issuing PKI branch as aimed by the objectives OE.Passive_Auth_Sign (for the Document Security Object).

P.Manufact The OSP P.Manufact "Manufacturing of the electronic document's chip" requires a unique identification of the IC by means of the Initialization Data and the writing of the Pre-personalisation Data as being fulfilled by OT.Identification.

P.Pre-Operational The OSP P.Pre-Operational is enforced by the following security objectives:OT.Identification is affine to the OSP's property 'traceability before the operational phase';OT.AC_Pers and OE.Personalisation together enforce the OSP's properties 'correctness of the User- and the TSF-data stored' and 'authorisation of Personalisation Agents';OE.Legislative_Compliance is affine to the OSP's property 'compliance with laws and regulations'. In addition, the threat is also addressed by the refinement of OT.AC_Pers named OT.AC_Pers_EAC2.

P.Terminal The OSP P.Terminal is obviously enforced by the objective OE.Terminal, whereby the one-to-one mapping between the related properties is applicable.

P.Trustworthy_PKI The OSP P.Trustworthy_PKI is enforced by OE.Passive_Auth_Sign (for CSCA, issuing PKI branch).

P.eServices The OSP ensures that the TOE provides secure eServices functionalities. It is addressed by OT.eServices.

7.3.3 Assumptions

7.3.3.1 All SSCD parts

A.CGA establishes the protection of the authenticity of the signatory's name and the SVD in the qualified certificate by the advanced signature of the CSP by means of the CGA. This is addressed by OE.CGA_QCert (Generation of qualified certificates), which ensures the generation of qualified certificates, and by OE.SVD_Auth (Authenticity of the SVD), which ensures the protection of the integrity of the received SVD and the verification of the correspondence between the SVD and the SCD that is implemented by the SSCD of the signatory.

A.SCA establishes the trustworthiness of the SCA with respect to generation of DTBS/R. This is addressed by OE.DTBS_Intend (Data intended to be signed) which ensures that the SCA generates the DTBS/R of the data that have been presented to the signatory as DTBS and which the signatory intends to sign in a form which is appropriate for being signed by the TOE.

7.3.3.2 Parts 3 and 6 only

A.CSP establishes several security aspects concerning handling of SCD and SVD by the CSP. That the SCD/SVD generation device can only be used by authorized users is addressed by OE.SCD/SVD_Auth_Gen (Authorized SCD/SVD Generation), that the generated SCD is unique and cannot be derived by the SVD is addressed by OE.SCD_Unique (Uniqueness of the signature creation data), that SCD and SVD correspond to each other is addressed by OE.SCD_SVD_Corresp (Correspondence between SVD and SCD), and that the SCD are kept confidential, are not used for signature generation in the environment and are deleted in the environment once exported to the TOE is addressed by OE.SCD_Secrecy (SCD Secrecy).

7.3.4 SPD and Security Objectives

Threats	Security Objectives	Rationale
T.SCD_Divulg	OT.SCD_Secrecy, OT.SCD_Auth_Imp, OE.SCD/SVD_Auth_Gen, OE.SCD_Secrecy	Section 7.3.1
T.SCD_Derive	OT.SCD/SVD_Gen, OT.Sig_Secure, OE.SCD_Unique	Section 7.3.1
T.Hack_Phys	OT.SCD_Secrecy, OT.EMSEC_Design, OT.Tamper_ID, OT.Tamper_Resistance	Section 7.3.1
T.SVD_Forgery	OT.SCD_SVD_Corresp, OE.SVD_Auth, OE.SCD_SVD_Corresp, OT.TOE_TC_SVD_Exp, OE.CGA_TC_SVD_Imp	Section 7.3.1
T.SigF_Misuse	OT.Lifecycle_Security, OT.Sigy_SigF, OT.DTBS_Integrity_TOE, OE.Signatory, OE.DTBS_Intend, OT.TOE_TC_VAD_Imp, OT.TOE_TC_DTBS_Imp, OE.HID_TC_VAD_Exp, OE.SCA_TC_DTBS_Exp, OT.Lifecycle_Management	Section 7.3.1
T.DTBS_Forgery	OT.DTBS_Integrity_TOE, OE.DTBS_Intend, OT.TOE_TC_DTBS_Imp, OE.SCA_TC_DTBS_Exp	Section 7.3.1
T.Sig_Forgery	OT.SCD_Unique, OT.Sig_Secure, OE.CGA_QCert, OE.SCD_Unique	Section 7.3.1
T.Counterfeit/EAC2	OT.CA2, OE.Chip_Auth_Key	Section 7.3.1
T.Sensitive_Data	OT.Sens_Data_EAC2, OE.Terminal_Authentication	Section 7.3.1
T.Abuse-Func	OT.Prot_Abuse-Func	Section 7.3.1
T.Eavesdropping	OT.Data_Confidentiality, OT.Sens_Data_EAC2	Section 7.3.1
T.Forgery	OT.AC_Pers_EAC2, OT.Data_Authenticity, OT.Data_Integrity, OT.Prot_Abuse-Func, OT.Prot_Phys-Tamper, OE.Personalisation,	Section 7.3.1

	OE.Passive_Auth_Sign, OE.Terminal	
T.Information_Leakage	OT.Prot_Inf_Leak	Section 7.3.1
T.Malfunction	OT.Prot_Malfunction	Section 7.3.1
T.Phys-Tamper	OT.Prot_Phys-Tamper	Section 7.3.1
T.Skimming	OT.Data_Integrity, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Sens_Data_EAC2, OE.Terminal_Authentication, OE.Electronic_Document_Holder	Section 7.3.1
T.Tracing	OT.Tracing, OE.Electronic_Document_Holder	Section 7.3.1
T.Key_Derive	OE.AuthKey_Unique, OT.TOE_AuthKey_Unique, OT.Authentication_Secure	Section 7.3.1
T.Authentication_Replay	OT.Authentication_Secure	Section 7.3.1

Table 16 Threats and Security Objectives - Coverage

Security Objectives	Threats	Rationale
OT.Tamper_Resistance	T.Hack_Phys	
OT.Tamper_ID	T.Hack_Phys	
OT.EMSEC_Design	T.Hack_Phys	
OT.DTBS_Integrity_TOE	T.SigF_Misuse, T.DTBS_Forgery	
OT.Sigy_SigF	T.SigF_Misuse	
OT.Sig_Secure	T.SCD_Derive, T.Sig_Forgery	
OT.SCD_Secrecy	T.SCD_Divulg, T.Hack_Phys	
OT.Lifecycle_Security	T.SigF_Misuse	
OT.SCD_SVD_Corresp	T.SVD_Forgery	
OT.SCD_Unique	T.Sig_Forgery	
OT.SCD/SVD_Gen	T.SCD_Derive	
OT.SCD_Auth_Imp	T.SCD_Divulg	
OT.TOE_SSCD_Auth		
OT.TOE_TC_SVD_Exp	T.SVD_Forgery	
OT.TOE_TC_VAD_Imp	T.SigF_Misuse	
OT.TOE_TC_DTBS_Imp	T.SigF_Misuse, T.DTBS_Forgery	
OT.AC_Pers_EAC2	T.Forgery	
OT.CA2	T.Counterfeit/EAC2	
OT.Sens_Data_EAC2	T.Sensitive_Data, T.Eavesdropping, T.Skimming	
OT.Data_Authenticity	T.Forgery, T.Skimming	
OT.Data_Confidentiality	T.Eavesdropping, T.Skimming	
OT.Data_Integrity	T.Forgery, T.Skimming	

OT.Identification		
OT.Prot_Abuse-Func	T.Abuse-Func, T.Forgery	
OT.Prot_Inf_Leak	T.Information_Leakage	
OT.Prot_Malfunction	T.Malfunction	
OT.Prot_Phys-Tamper	T.Forgery, T.Phys-Tamper	
OT.Tracing	T.Tracing	
OT.Authentication_Secure	T.Key_Derive, T.Authentication_Replay	
OT.Lifecycle_Management	T.SigF_Misuse	
OT.eServices		
OT.TOE_AuthKey_Unique	T.Key_Derive	
OE.Signatory	T.SigF_Misuse	
OE.DTBS_Intend	T.SigF_Misuse, T.DTBS_Forgery	
OE.SVD_Auth	T.SVD_Forgery	
OE.CGA_QCert	T.Sig_Forgery	
OE.SCD_SVD_Corresp	T.SVD_Forgery	
OE.SCD_Unique	T.SCD_Derive, T.Sig_Forgery	
OE.SCD_Secrecy	T.SCD_Divulg	
OE.SCD/SVD_Auth_Gen	T.SCD_Divulg	
OE.Dev_Prov_Service		
OE.CGA_TC_SVD_Imp	T.SVD_Forgery	
OE.CGA_SSCD_Auth		
OE.HID_TC_VAD_Exp	T.SigF_Misuse	
OE.SCA_TC_DTBS_Exp	T.SigF_Misuse, T.DTBS_Forgery	
OE.Chip_Auth_Key	T.Counterfeit/EAC2	
OE.Terminal_Authentication	T.Sensitive_Data, T.Skimming	
OE.Legislative_Compliance		
OE.Passive_Auth_Sign	T.Forgery	
OE.Personalisation	T.Forgery	
OE.Terminal	T.Forgery	
OE.Electronic_Document_Holder	T.Skimming, T.Tracing	
OE.AuthKey_Unique	T.Key_Derive	

Table 17 Security Objectives and Threats - Coverage

Organisational Security Policies	Security Objectives	Rationale
P.CSP_QCert	OT.Lifecycle_Security, OT.SCD_SVD_Corresp, OE.CGA_QCert, OT.SCD_Auth_Imp, OE.SCD/SVD_Auth_Gen, OE.SCD_SVD_Corresp, OT.TOE_SSCD_Auth, OE.CGA_SSCD_Auth	Section 7.3.2
P.QSign	OT.Sig_Secure, OT.Sigy_SigF, OE.CGA_QCert, OE.DTBS_Intend	Section 7.3.2
P.Sigy_SSCD	OT.Lifecycle_Security, OT.SCD/SVD_Gen, OT.SCD_Unique, OT.SCD_Secrecy, OT.Sig_Secure, OT.Sigy_SigF, OT.DTBS_Integrity_TOE, OT.EMSEC_Design, OT.Tamper_Resistance, OT.SCD_Auth_Imp, OE.SCD/SVD_Auth_Gen, OE.SCD_Secrecy, OE.SCD_Unique, OT.TOE_SSCD_Auth, OT.TOE_TC_SVD_Exp, OE.Dev_Prov_Service, OE.CGA_TC_SVD_Imp, OE.CGA_SSCD_Auth	Section 7.3.2
P.Sig_Non-Repud	OT.Lifecycle_Security, OT.SCD_Unique, OT.SCD_SVD_Corresp, OT.SCD_Secrecy, OT.Sig_Secure, OT.Sigy_SigF, OT.DTBS_Integrity_TOE, OT.EMSEC_Design, OT.Tamper_ID, OT.Tamper_Resistance, OE.CGA_QCert, OE.SVD_Auth, OE.DTBS_Intend, OE.Signatory, OE.SCD/SVD_Auth_Gen, OE.SCD_Secrecy, OE.SCD_Unique, OE.SCD_SVD_Corresp, OT.TOE_SSCD_Auth, OT.TOE_TC_SVD_Exp, OE.Dev_Prov_Service, OE.CGA_TC_SVD_Imp, OE.CGA_SSCD_Auth, OT.TOE_TC_VAD_Imp, OT.TOE_TC_DTBS_Imp, OE.HID_TC_VAD_Exp, OE.SCA_TC_DTBS_Exp, OT.Lifecycle_Management	Section 7.3.2
P.EAC2_Terminal	OE.Terminal, OE.Chip_Auth_Key, OE.Terminal_Authentication	Section 7.3.2
P.Terminal_PKI	OE.Terminal_Authentication	Section 7.3.2
P.Card_PKI	OE.Passive_Auth_Sign	Section 7.3.2
P.Manufact	OT.Identification	Section 7.3.2
P.Pre-Operational	OT.Identification, OT.AC_Pers_EAC2, OE.Personalisation, OE.Legislative_Compliance	Section 7.3.2
P.Terminal	OE.Terminal	Section 7.3.2
P.Trustworthy_PKI	OE.Passive_Auth_Sign	Section 7.3.2
P.eServices	OT.eServices	Section 7.3.2

Table 18 OSPs and Security Objectives - Coverage

Security Objectives	Organisational Security Policies	Rationale
OT.Tamper_Resistance	P.Sigy_SSCD, P.Sig_Non-Repud	
OT.Tamper_ID	P.Sig_Non-Repud	
OT.EMSEC_Design	P.Sigy_SSCD, P.Sig_Non-Repud	
OT.DTBS_Integrity_TOE	P.Sigy_SSCD, P.Sig_Non-Repud	
OT.Sigy_SigF	P.QSign, P.Sigy_SSCD, P.Sig_Non-Repud	
OT.Sig_Secure	P.QSign, P.Sigy_SSCD, P.Sig_Non-Repud	
OT.SCD_Secrecy	P.Sigy_SSCD, P.Sig_Non-Repud	
OT.Lifecycle_Security	P.CSP_QCert, P.Sigy_SSCD, P.Sig_Non-Repud	
OT.SCD_SVD_Corresp	P.CSP_QCert, P.Sig_Non-Repud	
OT.SCD_Unique	P.Sigy_SSCD, P.Sig_Non-Repud	
OT.SCD/SVD_Gen	P.Sigy_SSCD	
OT.SCD_Auth_Imp	P.CSP_QCert, P.Sigy_SSCD	
OT.TOE_SSCD_Auth	P.CSP_QCert, P.Sigy_SSCD, P.Sig_Non-Repud	
OT.TOE_TC_SVD_Exp	P.Sigy_SSCD, P.Sig_Non-Repud	
OT.TOE_TC_VAD_Imp	P.Sig_Non-Repud	
OT.TOE_TC_DTBS_Imp	P.Sig_Non-Repud	
OT.AC_Pers_EAC2	P.Pre-Operational	
OT.CA2		
OT.Sens_Data_EAC2		
OT.Data_Authenticity		
OT.Data_Confidentiality		
OT.Data_Integrity		
OT.Identification	P.Manufact, P.Pre-Operational	
OT.Prot_Abuse-Func		
OT.Prot_Inf_Leak		
OT.Prot_Malfunction		
OT.Prot_Phys-Tamper		
OT.Tracing		
OT.Authentication_Secure		
OT.Lifecycle_Management	P.Sig_Non-Repud	
OT.eServices	P.eServices	
OT.TOE_AuthKey_Unique		

OE.Signatory	P.Sig_Non-Repud	
OE.DTBS_Intend	P.QSign, P.Sig_Non-Repud	
OE.SVD_Auth	P.Sig_Non-Repud	
OE.CGA_QCert	P.CSP_QCert, P.QSign, P.Sig_Non-Repud	
OE.SCD_SVD_Corresp	P.CSP_QCert, P.Sig_Non-Repud	
OE.SCD_Unique	P.Sigy_SSCD, P.Sig_Non-Repud	
OE.SCD_Secrecy	P.Sigy_SSCD, P.Sig_Non-Repud	
OE.SCD/SVD_Auth_Gen	P.CSP_QCert, P.Sigy_SSCD, P.Sig_Non-Repud	
OE.Dev_Prov_Service	P.Sigy_SSCD, P.Sig_Non-Repud	
OE.CGA_TC_SVD_Imp	P.Sigy_SSCD, P.Sig_Non-Repud	
OE.CGA_SSCD_Auth	P.CSP_QCert, P.Sigy_SSCD, P.Sig_Non-Repud	
OE.HID_TC_VAD_Exp	P.Sig_Non-Repud	
OE.SCA_TC_DTBS_Exp	P.Sig_Non-Repud	
OE.Chip_Auth_Key	P.EAC2_Terminal	
OE.Terminal_Authentication	P.EAC2_Terminal, P.Terminal_PKI	
OE.Legislative_Compliance	P.Pre-Operational	
OE.Passive_Auth_Sign	P.Card_PKI, P.Trustworthy_PKI	
OE.Personalisation	P.Pre-Operational	
OE.Terminal	P.EAC2_Terminal, P.Terminal	
OE.Electronic_Document_Holder		
OE.AuthKey_Unique		

Table 19 Security Objectives and OSPs - Coverage

Assumptions	Security Objectives for the Operational Environment	Rationale
A.CGA	OE.CGA_QCert, OE.SVD_Auth	Section 7.3.3
A.SCA	OE.DTBS_Intend	Section 7.3.3
A.CSP	OE.SCD/SVD_Auth_Gen, OE.SCD_Secrecy, OE.SCD_Unique, OE.SCD_SVD_Corresp	Section 7.3.3

Table 20 Assumptions and Security Objectives for the Operational Environment - Coverage

Security Objectives for the Operational Environment	Assumptions	Rationale
OE.Signatory		
OE.DTBS_Intend	A.SCA	
OE.SVD_Auth	A.CGA	

OE.CGA_QCert	A.CGA	
OE.SCD_SVD_Corresp	A.CSP	
OE.SCD_Unique	A.CSP	
OE.SCD_Secrecy	A.CSP	
OE.SCD/SVD_Auth_Gen	A.CSP	
OE.Dev_Prov_Service		
OE.CGA_TC_SVD_Imp		
OE.CGA_SSCD_Auth		
OE.HID_TC_VAD_Exp		
OE.SCA_TC_DTBS_Exp		
OE.Chip_Auth_Key		
OE.Terminal_Authentication		
OE.Legislative_Compliance		
OE.Passive_Auth_Sign		
OE.Personalisation		
OE.Terminal		
OE.Electronic_Document_Holder		
OE.AuthKey_Unique		

Table 21 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 SCD 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 a combined 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.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:

FIA_API Authentication Proof of Identity	1

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 FCS_RNG - Generation of random numbers

8.1.4.1 Description

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

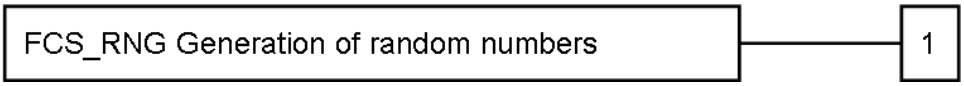
8.1.4.2 Extended Components

Extended Component FCS_RNG.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_RNG.1

There are no management activities foreseen.

Audit: FCS_RNG.1

There are no actions defined to be auditable.

Definition

FCS_RNG.1 Quality metric for random numbers

FCS_RNG.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 Security Functional Requirements

This section describes the requirements imposed on the TOE in order to achieve the security objectives laid down in the previous chapter.

9.1.1 All SSCD parts

9.1.1.1 Protection of the TSF (FPT)

FPT_EMS.1 TOE Emanation

FPT_EMS.1.1 The TOE shall not emit **side channel** in excess of **state of the art** enabling access to

- **the session keys,**
- **the ephemeral private key ephem,**
- **the Chip Authentication private keys (SKPICC),**
- **SCD**

and

- **RAD**.

FPT_EMS.1.2 The TSF shall ensure **that unauthorized users** are unable to use the following interface **external circuit contacts** to gain access to

- **the session keys,**
- **the ephemeral private key ephem,**
- **the Chip Authentication private keys (SKPICC),**
- **SCD**

and

- **RAD**.

Application Note:

This SFR covers the definition in SSCD PPs and extends them by session keys, keys and PIN/PUK as part of the EAC V2 protocol aspects. This extension does not conflict with the strict conformance to SSCD PPs.

The TOE shall prevent attacks against the SCD and other secret data where the attack is based on external observable physical phenomena of the TOE. Such attacks may be observable at the interfaces of the TOE or may origin from internal operation of the TOE or may origin by an attacker that varies the physical environment under which the TOE operates. The set of measurable physical phenomena is influenced by the technology employed to implement the TOE. Examples of measurable phenomena are variations in the power consumption, the timing of transitions of internal states, electromagnetic radiation due to internal operation, radio emission.

Due to the heterogeneous nature of the technologies that may cause such emanations, evaluation against state-of-the-art attacks applicable to the technologies employed by the TOE is assumed. Examples of such attacks are, but are not limited to, evaluation of TOE's electromagnetic radiation, simple power analysis (SPA), differential power analysis (DPA), timing attacks, etc.

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:

- **(1) self-test according to FPT_TST fails**
- **(2) power shortage**
- **(3) over and under voltage**
- **(4) over and under clock frequency**
- **(5) over and under temperature**
- **(6) integrity problems**
- **(7) unexpected abortion of the execution of the TSF due to external events**
- **No other failure**.

FPT_PHP.1 Passive detection of physical attack

FPT_PHP.1.1 The TSF shall provide unambiguous detection of physical tampering that might compromise the TSF.

FPT_PHP.1.2 The TSF shall provide the capability to determine whether physical tampering with the TSF's devices or TSF's elements has occurred.

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.

FPT_TST.1 TSF testing

FPT_TST.1.1 The TSF shall run a suite of self tests **during initial start-up and periodically during normal operation** 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 **TSF**.

9.1.1.2 Security management (FMT)

FMT_SMR.1 Security roles

FMT_SMR.1.1 The TSF shall maintain the roles

- **R.Admin**
- **R.Sigy**
- **R.TOE Administrator**.

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

FMT_SMF.1 Specification of Management Functions

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

- **Creation and modification of RAD,**
- **Enabling the signature creation function,**
- **Modification of the security attribute SCD/SVD management, SCD operational,**
- **Change the default value of the security attribute SCD Identifier,**
- **Initialization,**
- **Pre-Personalisation,**
- **Personalisation,**
- **Configuration,**
- **Resume and unblock the PIN and PUK (if any),**.

Application Note:

There is no default value for SCD Identifier.

This SFR covers the definition in SSCD PPs and extends them by EAC V2 protocol aspects.

This extension does not conflict with the strict conformance to SSCD PPs.

FMT_MOF.1 Management of security functions behaviour

FMT_MOF.1.1 The TSF shall restrict the ability to **enable** the functions **signature creation function** to **R.Sigy**.

FMT_MSA.1/Admin Management of security attributes

FMT_MSA.1.1/Admin The TSF shall enforce the **SCD/SVD Generation SFP and SCD Import SFP** to restrict the ability to **modify** the security attributes **SCD/SVD management** to **R.Admin**.

FMT_MSA.1/Signatory Management of security attributes

FMT_MSA.1.1/Signatory The TSF shall enforce the **Signature Creation SFP** to restrict the ability to **modify** the security attributes **SCD operational** to **R.Sigy**.

FMT_MSA.2 Secure security attributes

FMT_MSA.2.1 The TSF shall ensure that only secure values are accepted for **SCD/SVD Management and SCD operational**.

FMT_MSA.3 Static attribute initialisation

FMT_MSA.3.1 The TSF shall enforce the **SCD/SVD Generation SFP, SVD Transfer SFP, SCD Import SFP and Signature Creation SFP** to provide **restrictive** default values for security attributes that are used to enforce the SFP.

FMT_MSA.3.2 The TSF shall allow the **R.Admin** to specify alternative initial values to override the default values when an object or information is created.

FMT_MSA.4 Security attribute value inheritance

FMT_MSA.4.1 The TSF shall use the following rules to set the value of security attributes:

- **(1) If S.Admin successfully generates an SCD/SVD pair without S.Sigy being authenticated the security attribute "SCD operational of the SCD" shall be set to "no" as a single operation**
- **(2) If S.Sigy successfully generates an SCD/SVD pair the security attribute "SCD operational of the SCD" shall be set to "yes" as a single operation**
- **(3) If S.Admin imports SCD while S.Sigy is not currently authenticated, the security attribute "SCD operational" of the SCD shall be set to "no" after import of the SCD as a single operation.**

- **(4) If S.Admin imports SCD while S.Sigy is currently authenticated, the security attribute "SCD operational" of the SCD shall be set to "yes" after import of the SCD as a single operation**

FMT_MTD.1/Admin Management of TSF data

FMT_MTD.1.1/Admin [Editorially Refined] The TSF shall restrict the ability to **create** the **RAD** to **R.Admin**.

FMT_MTD.1/Signatory Management of TSF data

FMT_MTD.1.1/Signatory The TSF shall restrict the ability to **modify** the **RAD and none** to **R.Sigy**.

9.1.1.3 Identification and authentication (FIA)

FIA_UID.1 Timing of identification

FIA_UID.1.1 The TSF shall allow

- **Self-test according to FPT_TST.1,**
- **Establishing a trusted channel between a trusted IT product generating the SCD/SVD pair for import of the SCD as described by FDP_UCT.1/SCD and FDP_ITC.1/SCD and the TOE by means of TSF required by FTP_ITC.1/SCD (not applicable for SSCD KG).**
- **Establishing a trusted channel between the CGA and the TOE by means of TSF required by FTP_ITC.1/SVD to export the SVD to the CGA ([PP-SSCD4]).**
- **Establishing a trusted channel between the HID and the TOE by means of TSF required by FTP_ITC.1/VAD to send the VAD ([PP-SSCD5], [PP-SSCD6]).**
- **Establishing a trusted channel between the SCA and the TOE by means of TSF required by FTP_ITC.1/DTBS to send the DTBS ([PP-SSCD5], [PP-SSCD6])**

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_AFL.1 Authentication failure handling

FIA_AFL.1.1 The TSF shall detect when **an administrator configurable positive integer within [1 and 15]** unsuccessful authentication attempts occur related to **consecutive failed authentication attempts**.

FIA_AFL.1.2 When the defined number of unsuccessful authentication attempts has been **met**, the TSF shall

- **Block RAD**.

FIA_UAU.1 Timing of authentication

FIA_UAU.1.1 The TSF shall allow

- **Self-test according to FPT_TST.1,**
- **Identification of the user by means of TSF required by FIA_UID.1**
- **Establishing a trusted channel between a trusted IT product generating the SCD/SVD pair for import the SCD as described by FDP_UCT.1/SCD and FDP_ITC.1/SCD and the TOE by means of TSF required by FTP_ITC.1/SCD (not applicable for SSCD KG).**
- **Establishing a trusted channel between the CGA and the TOE by means of TSF required by FTP_ITC.1/SVD to export the SVD to the CGA ([PP-SSCD4]).**
- **Establishing a trusted channel between the HID and the TOE by means of TSF required by FTP_ITC.1/VAD to send the VAD ([PP-SSCD5], [PP-SSCD6]).**
- **Establishing a trusted channel between the SCA and the TOE by means of TSF required by FTP_ITC.1/DTBS to send the DTBS ([PP-SSCD5], [PP-SSCD6])**

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.

9.1.1.4 User data protection (FDP)

The security attributes and related status for the subjects and objects are:

Subject or object the security attribute is associated with	Security attribute type	Value of the security attribute
S.User	Role	R.Admin, R.Sigy
S.User	SCD/SVD Management	authorised, not authorised
SCD	SCD Operational	no, yes
SCD	SCD identifier	arbitrary value

FDP_SDI.2/DTBS Stored data integrity monitoring and action

FDP_SDI.2.1/DTBS The TSF shall monitor user data stored in containers controlled by the TSF for **integrity error** on all objects, based on the following attributes: **integrity checked stored DTBS**.

FDP_SDI.2.2/DTBS Upon detection of a data integrity error, the TSF shall

- **prohibit the use of the altered data**
- **inform the S.Sigy about integrity error**.

FDP_SDI.2/Persistent Stored data integrity monitoring and action

FDP_SDI.2.1/Persistent The TSF shall monitor user data stored in containers controlled by the TSF for **integrity error** on all objects, based on the following attributes: **integrity checked stored data**.

FDP_SDI.2.2/Persistent Upon detection of a data integrity error, the TSF shall

- **prohibit the use of the altered data**
- **inform the S.Sigy about integrity error**.

FDP_RIP.1 Subset residual information protection

FDP_RIP.1.1 The TSF shall ensure that any previous information content of a resource is made unavailable upon the **deallocation of the resource from** the following objects:

o Session keys (immediately after closing related communication session),

o the ephemeral private key ephem - SKPICC- PACE (by having generated a DH shared secret K),

o secret electronic document holder authentication data, e.g. PIN and/or PUK (when their temporarily stored values are not used any more),

o The following data persistently stored by the TOE shall have the user data attribute "integrity checked persistent stored data":

- **SCD**
- **SVD (if persistently stored by the TOE)**

o The following data temporarily stored by the TOE shall have the user data attribute "integrity checked stored data":

- **DTBS/R**.

FDP_ACC.1/Signature_Creation Subset access control

FDP_ACC.1.1/Signature_Creation The TSF shall enforce the **Signature Creation SFP** on **Sending of DTBS/R by SCA and Signing of DTBS/R by Signatory:**

- **subjects: S.User,**
- **objects: DTBS/R, SCD,**

- **operations: signature creation**.

FDP_ACF.1/Signature_Creation Security attribute based access control

FDP_ACF.1.1/Signature_Creation The TSF shall enforce the **Signature Creation SFP** to objects based on the following:

- **the user S.User is associated with the security attribute "Role" and**
- **the SCD with the security attribute "SCD Operational"**.

FDP_ACF.1.2/Signature_Creation The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: **R.Sigy is allowed to create electronic signatures for DTBS/R with SCD which security attribute "SCD operational" is set to "yes"**.

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

FDP_ACF.1.4/Signature_Creation The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **S.User is not allowed to create electronic signatures for DTBS/R with SCD which security attribute "SCD operational" is set to "no"**.

9.1.1.5 Cryptographic support (FCS)

FCS_COP.1 Cryptographic operation

FCS_COP.1.1 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: **[Standards]**

Cryptographic Operation	Cryptographic Algorithms	Cryptographic Key Sizes	Standards
Digital signature	RSA PKCS#1v1.5, RSA-PSS PKCS#1 v2.1, with SHA-1 SHA-224 SHA-256 SHA-384 or SHA-512	1024, 1536, 2048, 3072 and 4096 bits	RSA PKCS1 v2.1
Digital signature	ECDSA with SHA-1 SHA-224 SHA-256 SHA-384 or SHA-512	192, 224, 256, 320, 384, 512, and 521 bits	ANSI_X9.62-
Key agreement	Anonymous DH	DH: 1024, 1536, 2048 bits	[TR03111]
PACE Authentication	PACE IM and GM with ECDH, DH,	ECDH: 192,224,256,	[ICAO9303]

	DES, AES	**320,384, 512, 521 bits DH: 1024, 1536, 2048 bits AES: 128 192 256, DES:128**	
Secure messaging - Encryption/decryption	**3DES in CBC mode or AES in CBC mode**	**3DES: 128 bits, AES:128, 192, 256 bits**	**IAS-ECC**
Secure messaging - MAC generation and verification	**ISO/IEC 9797-1 algorithm 3 padding 2 (3DES) or CMAC (AES)**	**3DES: 128 bits, AES: 128, 192, 256 bits**	**DES: ISO9797 - AES: NIST SP 800-38B**
Ciphering key decryption	**RSA-OAEP SHA-1 and SHA-256, RSA PKCS#1v1.5**	**1024, 1536, 2048, 3072, and 4096 bits**	**RSA PKCS#1 v2.1**
Ciphering key decryption	**ECDH**	**192, 224, 256, 320, 384, 512, and 521 bits**	**[IASECC]**
Symmetric encryption/decryption	**AES-CBC mode**	**128, 192, 256 bits**	
GP secret data encryption	**SCP02**	**128 bits**	**[GP2.3]**
GP secret data encryption	**SCP03 using AES**	**128, 192, and 256 bits**	**[SCP03]**
Client/Server Authentication	**RSA PKCS#1v1.5, RSA-PSS PKCS#1 v2.1**	**1024, 1536, 2048, 3072 and 4096 bits**	**RSA PKCS1 v2.1**
Symmetric role Authentication	**TDES encryption in CBC mode, Signature using Retail MAC, AES encryption in CBC mode, Signature using CMAC, Minidriver: 3DES CBC**	**3DES: 128 bits AES: 128, 192 and 256 bits Minidriver 3DES: 128 and 192 bits**	**[IASECC], [Minidriver]**
Asymmetric Role Authentication	**RSA with ISO/IEC 9796-2 with SHA-1 SHA-224 SHA-256 SHA-384 or SHA-512**	**1024, 1536 or 2048 bits**	**[IASECC]**
Symmetric Device Authentication	**TDES encryption in CBC mode, Signature using Retail MAC with SHA-1 SHA-256, AES encryption in CBC mode,**	**3DES:128 bits AES: 128, 192 and 256 bits**	**[IASECC], [14890]**

	Signature using CMAC with SHA-1 SHA-256		
Certificate verification for IAS PKI	**RSA with ISO/IEC 9796-2 padding with partial recovery and with SHA-1 SHA-256**	**1024, 1536, 2048**	**[IASECC]**
Certificate verification for EAC PKI	**ECDSA with SHA-1, SHA-224, SHA-256, SHA-384, SHA-512**	**192, 224, 256, 320, 384, 512 and 521 bits**	**[ICAO9303]**
Asymmetric Internal Device Authentication	**RSA with ISO/IEC 9796-2 padding with partial recovery and with SHA-1 or SHA-256**	**1024, 1536 and 2048 bits**	**[IASECC]**
Asymmetric External Device Authentication	**RSA with ISO/IEC 9796-2 padding with partial recovery and with SHA-1 or SHA-256**	**1024, 1536 and 2048 bits**	**[IASECC]**
EACv2 Terminal Authentication	**ECDSA with SHA-1, SHA-224, SHA-256, SHA-384, SHA-512**	**192, 224, 256, 320, 384, 512 and 521 bits**	**[TR03110]**
EACv2 Chip Authentication	**ECDH**	**192, 224, 256, 320, 384, 512 and 521 bits**	**[TR03110]**
Hashing	**SHA-1, SHA-224, SHA-256, SHA-384 and SHA-512**	**none**	**[FIPS180-4]**

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FCS_CKM.4 Cryptographic key destruction

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

9.1.2 SSCD parts 2, 4 and 5 only

9.1.2.1 Cryptographic support (FCS)

FCS_CKM.1 Cryptographic key generation

FCS_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **[Cryptographic Key Generation Algorithm]** and specified cryptographic key sizes **[Cryptographic Key Sizes]** that meet the following: **[Standards]**

Cryptographic Key Generation Algorithm	**Cryptographic Key Sizes**	**Standards**
EC key pair generation	**192,224,256, 320,384, 512 and 521 bits**	**ANS X9.62**
RSA CRT Key pair generation	**1024, 1536, 2048, 3072 and 4096 bits**	**RSA PKCS#1 v2.1**

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9.1.2.2 User data protection (FDP)

The security attributes and related status for the subjects and objects are:

Subject or object the security attribute is associated with	Security attribute type	Value of the security attribute
S.User	Role	R.Admin, R.Sigy
S.User	SCD/SVD Management	authorised, not authorised
SCD	SCD Operational	no, yes
SCD	SCD identifier	arbitrary value

FDP_ACC.1/SVD_Transfer Subset access control

FDP_ACC.1.1/SVD_Transfer The TSF shall enforce the **SVD Transfer SFP** on

- **subjects: S.User,**
- **objects: SVD,**
- **operations: export**.

FDP_ACF.1/SVD_Transfer Security attribute based access control

FDP_ACF.1.1/SVD_Transfer The TSF shall enforce the **SVD Transfer SFP** to objects based on the following:

- **the S.User is associated with the security attribute Role,**
- **the SVD**.

FDP_ACF.1.2/SVD_Transfer The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: **R.Admin and R.Sigy is allowed to export SVD**.

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

FDP_ACF.1.4/SVD_Transfer The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **none**.

FDP_ACC.1/SCD/SVD_Generation Subset access control

FDP_ACC.1.1/SCD/SVD_Generation The TSF shall enforce the **SCD/SVD Generation SFP** on

- **subjects: S.User,**
- **objects: SCD, SVD,**
- **operations: generation of SCD/SVD pair**.

FDP_ACF.1/SCD/SVD_Generation Security attribute based access control

FDP_ACF.1.1/SCD/SVD_Generation The TSF shall enforce the **SCD/SVD Generation SFP** to objects based on the following: **the user S.User is associated with the security attribute "SCD/SVD Management"**.

FDP_ACF.1.2/SCD/SVD_Generation The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: **S.User with the security attribute "SCD/SVD Management" set to "authorised" is allowed to generate SCD/SVD pair**.

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

FDP_ACF.1.4/SCD/SVD_Generation The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **S.User with the security attribute "SCD/SVD management" set to "not authorised" is not allowed to generate SCD/SVD pair**.

9.1.3 SSCD parts 3 and 6 only

9.1.3.1 Trusted path/channels (FTP)

FTP_ITC.1/SCD Inter-TSF trusted channel

FTP_ITC.1.1/SCD 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/SCD The TSF shall permit **another trusted IT product** to initiate communication via the trusted channel.

FTP_ITC.1.3/SCD The TSF shall initiate communication via the trusted channel for

- **Data exchange integrity according to FDP_UCT.1/SCD**.

9.1.3.2 User data protection (FDP)

The security attributes and related status for the subjects and objects are:

Subject or object the security attribute is associated with	Security attribute type	Value of the security attribute
S.User	Role	R.Admin, R.Sigy
S.User	SCD/SVD Management	authorised, not authorised
SCD	SCD Operational	no, yes
SCD	SCD identifier	arbitrary value

FDP_UCT.1/SCD Basic data exchange confidentiality

FDP_UCT.1.1/SCD [Editorially Refined] The TSF shall enforce the **SCD Import SFP** to **receive SCD** in a manner protected from unauthorised disclosure.

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

FDP_ITC.1.1/SCD The TSF shall enforce the **SCD Import SFP** when importing user data, controlled under the SFP, from outside of the TOE.

FDP_ITC.1.2/SCD [Editorially Refined] The TSF shall ignore any security attributes associated with the **SCD** when imported from outside the TOE.

FDP_ITC.1.3/SCD The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE: **The SCD shall be sent by an authorized trusted IT environment**.

FDP_ACC.1/SCD_Import Subset access control

FDP_ACC.1.1/SCD_Import The TSF shall enforce the **SCD Import SFP** on

- **subjects: S.User,**
- **objects: SCD,**

- **operations: import of SCD**.

FDP_ACF.1/SCD_Import Security attribute based access control

FDP_ACF.1.1/SCD_Import The TSF shall enforce the **SCD Import SFP** to objects based on the following: **the user S.User is associated with the security attribute "SCD/SVD Management"**.

FDP_ACF.1.2/SCD_Import The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: **S.User with the security attribute "SCD/SVD Management" set to "authorised" is allowed to import SCD**.

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

FDP_ACF.1.4/SCD_Import The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **S.User with the security attribute "SCD/SVD management" set to "not authorised" is not allowed to import SCD**.

9.1.4 SSCD part 4 only

9.1.4.1 Trusted path/channels (FTP)

FTP_ITC.1/SVD Inter-TSF trusted channel

FTP_ITC.1.1/SVD [Editorially Refined] The TSF shall provide a communication channel between itself and another trusted IT product **CGA** 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/SVD [Editorially Refined] The TSF shall permit **the CGA** to initiate communication via the trusted channel.

FTP_ITC.1.3/SVD [Editorially Refined] The TSF **or the CGA shall** initiate communication via the trusted channel for

- **data Authentication with Identity of Guarantor according to FIA_API.1 and FDP_DAU.2/SVD**.

9.1.4.2 User data protection (FDP)

FDP_DAU.2/SVD Data Authentication with Identity of Guarantor

FDP_DAU.2.1/SVD The TSF shall provide a capability to generate evidence that can be used as a guarantee of the validity of **SVD**.

FDP_DAU.2.2/SVD The TSF shall provide **CGA** with the ability to verify evidence of the validity of the indicated information and the identity of the user that generated the evidence.

9.1.4.3 Identification and authentication (FIA)

FIA_API.1 Authentication Proof of Identity

FIA_API.1.1 The TSF shall provide a

- **Mutual Authentication according to [IAS ECC]**
- **PACE Authentication according to [TR03110] and [ICAO9303]**

to prove the identity of the **SSCD**.

9.1.5 SSCD parts 5 and 6 only

9.1.5.1 User data protection (FDP)

FDP_UIT.1/DTBS Data exchange integrity

FDP_UIT.1.1/DTBS The TSF shall enforce the **Signature Creation SFP** to **receive** user data in a manner protected from **modification and insertion** errors.

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

9.1.5.2 Trusted path/channels (FTP)

FTP_ITC.1/VAD Inter-TSF trusted channel

FTP_ITC.1.1/VAD [Editorially Refined] The TSF shall provide a communication channel between itself and another trusted IT product **HID** 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/VAD [Editorially Refined] The TSF shall permit **the HID** to initiate communication via the trusted channel.

FTP_ITC.1.3/VAD [Editorially Refined] The TSF **or the HID** shall initiate communication via the trusted channel for:

- **User authentication according to FIA_UAU.1**

FTP_ITC.1/DTBS Inter-TSF trusted channel

FTP_ITC.1.1/DTBS [Editorially Refined] The TSF shall provide a communication channel between itself and another trusted IT product **SCA** 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/DTBS [Editorially Refined] The TSF shall permit **the SCA** to initiate communication via the trusted channel.

FTP_ITC.1.3/DTBS [Editorially Refined] The TSF **or the SCA** shall initiate communication via the trusted channel for **signature creation**.

9.1.6 Additional SFRs

FCS_RNG.1 Quality metric for random numbers

FCS_RNG.1.1 The TSF shall provide a mechanism to generate random numbers that meet **FCS_RNG.1 Quality metric for random numbers of [ST-PL]**.

FCS_CKM.1/DH_PACE Cryptographic key generation

FCS_CKM.1.1/DH_PACE The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **[Cryptographic Key Generation Algorithm]** and specified cryptographic key sizes **[Cryptographic Key Sizes]** that meet the following: **[Standards]**

Cryptographic Key Generation Algorithm	**Cryptographic Key Sizes**	**Standards**
ECDH compliant to [ISO_15946]	**192 bits to 521 bits**	**Based on ECDH protocol compliant to [TR03111]**

DH	**1024, 1536, 2048 bits**	**Based on Diffie Hellman key derivation protocol compliant to [PKCS3]**

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FIA_UID.1/PACE Timing of identification

FIA_UID.1.1/PACE [Editorially Refined] The TSF shall allow

- **To establish a communication channel,**
- **Carrying out the PACE (PIN, PUK, MRZ or CAN) protocol according to [TR03110-2],**
- **To read the Initialization Data if it is not disabled by TSF according to FMT_MTD.1/INI_DIS,**
- **Carrying out the Terminal Authentication protocol 2 according to [TR03110-2],**
- **Carrying out the Chip Authentication protocol 2 according to [TR03110-2],**

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

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

FIA_UAU.1/PACE Timing of authentication

FIA_UAU.1.1/PACE [Editorially Refined] The TSF shall allow

- **To establish a communication channel,**
- **Carrying out the PACE (PIN, PUK, MRZ, CAN) protocol according to [TR03110-2],**
- **To read the Initialization Data if it is not disabled by TSF according to FMT_MTD.1/INI_DIS,**
- **Carrying out the Terminal Authentication protocol 2 according to [TR03110-2],**
- **Carrying out the Chip Authentication protocol 2 according to [TR03110-2],**

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

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

FIA_UAU.4/PACE Single-use authentication mechanisms

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

- **PACE (PIN, PUK, MRZ or CAN) protocol according to [TR03110-2],**

- **Terminal Authentication 2 protocol according to [TR03110-2],**.

FIA_UAU.5/PACE Multiple authentication mechanisms

FIA_UAU.5.1/PACE The TSF shall provide

- **PACE (PIN, PUK, MRZ or CAN) protocol according to [TR03110-2],**
- **Secure Messaging according to [TR03110-3],**
- **Terminal Authentication 2 protocol according to [TR03110-2],**
- **Chip Authentication 2 according to [TR03110-2]**

to support user authentication.

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

- **Having successfully run the PACE (PIN, PUK, MRZ or CAN) protocol. TOE accepts only received commands with correct message authentication codes sent by secure messaging with the key agreed with the terminal by the PACE protocol.**
- **The TOE accepts the authentication attempt by means of the Terminal Authentication 2 protocol, only if (i) the terminal presents its static public key PKPCD and the key is successfully verifiable up to the CVCA and (ii) the terminal uses the PICC identifier IDPICC = Comp (ephem-PKPICC-PACE) calculated during, and the secure messaging established by the current PACE (PIN, PUK, MRZ or CAN) authentication.**
- **Having successfully run Chip Authentication 2, the TOE accepts only received commands with correct message authentication codes sent by secure messaging with the key agreed with the terminal by Chip Authentication 2**.

FIA_UAU.6/PACE Re-authenticating

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

FIA_UAU.6/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 a successful run of Chip Authentication 2 shall be verified as being sent by the EAC2 terminal**.

FIA_AFL.1/PACE Authentication failure handling

FIA_AFL.1.1/PACE The TSF shall detect when **[selection]** unsuccessful authentication attempts occur related to **[list of authentication events]**.

FIA_AFL.1.2/PACE When the defined number of unsuccessful authentication attempts has been **met**, the TSF shall **[list of actions].**

Selection	List of Authentication Attempts	List of Actions
An administrator configurable positive integer within range of acceptable values 0 to 255 consecutive	**authentication attempts using the MRZ or CAN password as the shared password for PACE**	**wait a linear increasing time, starting at a minimum of configurable amout of time, before the next authentication attempt can be performed**
An administrator configurable positive integer within range of acceptable values 0 to 14 consecutive	**Consecutive failed authentication attempts using the PIN or PUK as the shared password for PACE leaving a single authentication attempt in contactless mode**	**suspend the reference value of the PIN or PUK according to [TR03110-2]**
'1'	**Consecutive failed authentication attempts using the suspended PIN or PUK as the shared password for PACE in contact mode**	**block the reference value of PIN or PUK according to [TR03110-2]**
An administrator configurable positive integer within range of acceptable values 0 to 15 consecutive	**Consecutive failed authentication attempts using the PIN or PUK with VERIFY PIN command**	**Block the PIN or the PUK**
'1'	**Personalisation agent or TOE_Administrator authentication attempt**	**slow down exponentially the next authentication**

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FIA_API.1/CA Authentication Proof of Identity

FIA_API.1.1/CA The TSF shall provide a **protocol Chip Authentication 2 according to [TR03110-2]** to prove the identity of the **TOE**.

FDP_ACC.1/TRM Subset access control

FDP_ACC.1.1/TRM The TSF shall enforce the **Access Control SFP** on **terminals gaining access User data stored in the TOE (including sensitive user data) and**

selected by the personalisation agent, and all TOE intrinsic secret (i.e. cryptographic) data.

FDP_ACF.1/TRM Security attribute based access control

FDP_ACF.1.1/TRM The TSF shall enforce the **Access Control SFP** to objects based on the following: **1. Subjects:**

a.Terminal,

b.PACE terminal,

c.EAC2 terminal.

2. Objects:

a. User data stored in the TOE (including sensitive user data) and selected by the personalisation agent,

b. all TOE intrinsic secret (i.e. cryptographic) data.

3. Security attributes: Terminal Authorization Level (access rights).

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

- **A PACE terminal is allowed to read data objects data (object 2.a) specified in FDP_ACF.1.1/TRM after successful PACE authentication according to [TR03110-2], as required by FIA_UAU.1/PACE.**
- **Reading, modifying, writing, or using sensitive user data protected by TAv2 and CAv2 (object 2.a specified in FDP_ACF.1.1/TRM) is only allowed to EAC2 terminals using the following mechanism: The TOE applies the EAC2 protocol (cf. FIA_UAU.5) to determine access rights of the terminal according to [TR03110-2].**.

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

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

- **Any terminal not being a PACE terminal or an EAC2 terminal is not allowed to read, to write, to modify, or to use any user data (object 2.a) specified in FDP_ACF.1.1/TRM.**
- **Terminals not using secure messaging are not allowed to read, write, modify, or use any user data (object 2.a) specified in FDP_ACF.1.1/TRM.**
- **No subject is allowed to read, write, modify, or use the data objects TOE intrinsic secrets (object 2.b) specified in FDP_ACF.1.1/TRM**.

FDP_UCT.1/TRM Basic data exchange confidentiality

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

FDP_UIT.1/TRM Data exchange integrity

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

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

FTP_ITC.1/PACE Inter-TSF trusted channel

FTP_ITC.1.1/PACE [Editorially Refined] The TSF shall provide a communication channel between itself and a **PACE terminal** 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. **The trusted channel shall be established by performing the PACE protocol according to [TR03110-2].**

FTP_ITC.1.2/PACE [Editorially Refined] The TSF shall permit **a PACE terminal** to initiate communication via the trusted channel.

FTP_ITC.1.3/PACE [Editorially Refined] The TSF shall initiate communication via the trusted channel for **any data exchange between the TOE and a PACE terminal after PACE**.

FMT_SMR.1/PACE Security roles

FMT_SMR.1.1/PACE The TSF shall maintain the roles

- **Manufacturer,**
- **Personalisation Agent,**
- **Terminal,**
- **PACE terminal,**
- **Country Verifying Certification Authority,**
- **Document Verifier,**
- **EAC2 terminal,**
- **Electronic document holder**.

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

FMT_MTD.1/CVCA_INI Management of TSF data

FMT_MTD.1.1/CVCA_INI The TSF shall restrict the ability to **write** the

- **Initial CVCA Public Key,**

- **meta-data of the initial CVCA Certificate as required in [TR03110-2], resp [TR03110-3]**
- **initial Current Date**

to **the personalisation agent**.

FMT_MTD.1/CVCA_UPD Management of TSF data

FMT_MTD.1.1/CVCA_UPD The TSF shall restrict the ability to **update** the

- **CVCA Public Key (PKCVCA),**
- **meta-data of the CVCA Certificate as required by [TR03110-2], resp [TR03110-3]**

to **the Country Verifying Certification Authority**.

FMT_MTD.1/DATE Management of TSF data

FMT_MTD.1.1/DATE The TSF shall restrict the ability to **modify** the **the current date** to

- **CVCA,**
- **Document Verifier,**
- **EAC2 terminal possessing an Accurate Terminal Certificate according to [TR03110-3]**.

FMT_MTD.1/PA Management of TSF data

FMT_MTD.1.1/PA The TSF shall restrict the ability to **write** the **card/chip security object(s) (SOC) selected in Access Control SFP and the document Security Object (SOD) selected in Access Control SFP** to **the Personalisation Agent**.

FMT_MTD.1/SK_PICC Management of TSF data

FMT_MTD.1.1/SK_PICC The TSF shall restrict the ability to **load** the **Chip Authentication private key(s) (SKPICC) selected in Access Control SFP** to **the personalisation 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

- **PACE passwords,**
- **The Chip Authentication private key(s) (SKPICC)**

to **none**.

FMT_MTD.1/Initialize_PIN Management of TSF data

FMT_MTD.1.1/Initialize_PIN The TSF shall restrict the ability to **write** the **PIN and PUK selected in Access Control SFP** to **the personalisation agent**.

FMT_MTD.1/Resume_PIN Management of TSF data

FMT_MTD.1.1/Resume_PIN The TSF shall restrict the ability to **resume** the **suspended PIN** to **PACE terminal (PACE CAN followed by PACE PIN and/or VERIFY PIN command)**.

FMT_MTD.1/Change_PIN Management of TSF data

FMT_MTD.1.1/Change_PIN The TSF shall restrict the ability to **change** the **blocked PIN** to

- **The electronic document holder (using the Current PUK for changing),**
- **An authorized terminal that has access to change the current PIN**.

FMT_MTD.1/Unblock_PIN Management of TSF data

FMT_MTD.1.1/Unblock_PIN The TSF shall restrict the ability to **unblock** the **blocked PIN (including a blocked RAD)** to

- **the electronic document holder (using the PUK for unblocking),**
- **An authorized terminal that has access to unblock the current PIN**.

FMT_MTD.1/TOE State Management of TSF data

FMT_MTD.1.1/TOE State The TSF shall restrict the ability to **switch** the **TOE from Phase 6 to Phase 7** to **Personalisation Agent**.

FMT_MTD.3 Secure TSF data

FMT_MTD.3.1 The TSF shall ensure that only secure values are accepted for **TSF data of the Terminal Authentication protocol 2 and the Access Control SFP**.

FMT_MTD.1/INI_ENA Management of TSF data

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

FMT_MTD.1/INI_DIS Management of TSF data

FMT_MTD.1.1/INI_DIS The TSF shall restrict the ability to **read out** the **Initialisation Data and the Pre-personalisation Data** to **the Personalisation Agent**.

FTP_ITC.1/CA2 Inter-TSF trusted channel

FTP_ITC.1.1/CA2 [Editorially Refined] The TSF shall provide a communication channel between itself and **an EAC2 terminal** 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. **The trusted channel shall be established by performing the CA2 protocol according to [TR03110-2].**

FTP_ITC.1.2/CA2 [Editorially Refined] The TSF shall permit **an EAC2 terminal** to initiate communication via the trusted channel.

FTP_ITC.1.3/CA2 The TSF shall initiate communication via the trusted channel for **any data exchange between the TOE and an EAC2 terminal after Chip Authentication 2**.

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 do not allow

- **User Data to be manipulated and disclosed,**
- **TSF data to be manipulated or disclosed,**
- **software to be reconstructed,**
- **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 do not allow

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

9.2 Security Assurance Requirements

The Evaluation Assurance Level is EAL5 augmented with AVA_VAN.5 and ALC_DVS.2.

9.2.1 ADV Development

9.2.1.1 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.

9.2.1.2 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.

9.2.1.3 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.

9.2.1.4 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.

9.2.1.5 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.

9.2.2 AGD Guidance documents

9.2.2.1 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.

9.2.2.2 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.

9.2.3 ALC Life-cycle support

9.2.3.1 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.

9.2.3.2 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.

9.2.3.3 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.

9.2.3.4 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.

9.2.3.5 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.

9.2.3.6 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.

9.2.4 ASE Security Target evaluation

9.2.4.1 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.

9.2.4.2 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.

9.2.4.3 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.

9.2.4.4 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.

9.2.4.5 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.

9.2.4.6 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.

9.2.4.7 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.

9.2.5 ATE Tests

9.2.5.1 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.

9.2.5.2 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.

9.2.5.3 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.

9.2.5.4 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.

9.2.6 AVA Vulnerability assessment

9.2.6.1 AVA_VAN Vulnerability analysis

AVA_VAN.5 Advanced methodical vulnerability analysis

AVA_VAN.5.1D The developer shall provide the TOE for testing.

AVA_VAN.5.1C The TOE shall be suitable for testing.

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

AVA_VAN.5.2E The evaluator shall perform a search of public domain sources to identify potential vulnerabilities in the TOE.

AVA_VAN.5.3E The evaluator shall perform an independent, methodical 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.5.4E 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 High attack potential.

9.3 Security Requirements Rationale

9.3.1 Objectives

9.3.1.1 Security Objectives for the TOE

All SSCD parts

OT.Tamper_Resistance is provided by FPT_PHP.3 to resist physical attacks.

OT.Tamper_ID is provided by FPT_PHP.1 by the means of passive detection of physical attacks.

OT.EMSEC_Design covers that no intelligible information is emanated. This is provided by FPT_EMS.1.1.

OT.DTBS_Integrity_TOE ensures that the DTBS/R is not altered by the TOE. The integrity functions specified by FDP_SDI.2/DTBS require that the DTBS/R has not been altered by the TOE.

OT.Sigy_SigF is provided by an SFR for identification authentication and access control.

FIA_UAU.1 and FIA_UID.1 ensure that no signature creation function can be invoked before the signatory is identified and authenticated. The security functions specified by FMT_MTD.1/Admin and FMT_MTD.1/Signatory manage the authentication function. SFR FIA_AFL.1 provides protection against a number of attacks, such as cryptographic extraction of residual information, or brute force attacks against authentication. The security function specified by FDP_SDI.2/DTBS ensures the integrity of stored DTBS and

FDP_RIP.1 prevents misuse of any resources containing the SCD after de-allocation (e.g. after the signature creation process).

The security functions specified by FDP_ACC.1/Signature_Creation and FDP_ACF.1/Signature_Creation provide access control based on the security attributes managed according to the SFR FMT_MTD.1/Signatory, FMT_MSA.2, FMT_MSA.3 and FMT_MSA.4. The SFR FMT_SMF.1 and FMT_SMR.1 list these management functions and the roles. These ensure that the signature process is restricted to the signatory. FMT_MOF.1 restricts the ability to enable the signature creation function to the signatory. FMT_MSA.1/Signatory restricts the ability to modify the security attributes SCD operational to the signatory.

FMT_MTD.1/Unblock_PIN ensures the unblocking of the RAD is made under the sole control of the administrator. In phase 6, the RAD may be loaded on the TOE by the Personalisation Agent as defined in FMT_SMF.1. The Personalisation Agent is authenticated with a mutual authentication performed with FCS_RNG.1 and FCS_COP.1, and is authenticated with FMT_SMR.1. Effort to bypass the access control by a frontal exhaustive attack is blocked by FIA_AFL.1/PACE. During the mutual authentication, a session encryption key is agreed between the TOE and the Personalisation Agent and used by the TOE to decrypt the RAD using FCS_COP.1, ensuring the confidentiality of the RAD during its transfer in phase 6. In phase 6, FMT_MSA.1/Signatory guarantees that the Personalisation Agent cannot sign on behalf of the signatory, ensuring the signature creation features remains under the sole control of the signatory.

OT.Sig_Secure is provided by the cryptographic algorithms specified by FCS_COP.1, which ensures the cryptographic robustness of the signature algorithms. FDP_SDI.2/Persistent corresponds to the integrity of the SCD implemented by the TOE and FPT_TST.1 ensures self-tests ensuring correct signature creation.

OT.SCD_Secrecy is provided by the security functions specified by the following SFR. FCS_CKM.1 ensures the use of secure cryptographic algorithms for SCD/SVD generation. Cryptographic quality of SCD/SVD pair shall prevent disclosure of SCD by cryptographic attacks using the publicly known SVD. The security functions specified by FDP_RIP.1 and FCS_CKM.4 ensure that residual information on SCD is destroyed after the SCD has been use for signature creation and that destruction of SCD leaves no residual information.

The security functions specified by FDP_SDI.2/Persistent ensure that no critical data is modified which could alter the efficiency of the security functions or leak information of the SCD. FPT_TST.1 tests the working conditions of the TOE and FPT_FLS.1 guarantees a secure state when integrity is violated and thus assures that the specified security functions are operational. An example where compromising error conditions are countered by FPT_FLS.1 is fault injection for differential fault analysis (DFA). FDP_UCT.1/SCD and FTP_ITC.1/SCD ensures the confidentiality for SCD import.SFR FPT_EMS.1 and FPT_PHP.3 require additional security features of the TOE to ensure the confidentiality of the SCD.

OT.Lifecycle_Security is provided by the SFR for SCD/SVD generation FCS_CKM.1, SCD usage FCS_COP.1 and SCD destruction FCS_CKM.4 which ensure cryptographically secure lifecycle of the SCD. The SCD/SVD generation is controlled by TSF according to FDP_ACC.1/SCD/SVD_Generation and FDP_ACF.1/SCD/SVD_Generation. The SVD transfer for certificate generation is controlled by TSF according to FDP_ACC.1/SVD_Transfer and FDP_ACF.1/SVD_Transfer. The SCD usage is ensured by access control FDP_ACC.1/Signature_Creation, FDP_ACF.1/Signature_Creation which is based on the security attribute secure TSF management according to FMT_MOF.1, FMT_MSA.1/Admin, FMT_MSA.1/Signatory, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4, FMT_MTD.1/Admin, FMT_MTD.1/Signatory, FMT_MTD.1/Unblock_PIN, FMT_SMF.1 and FMT_SMR.1. The test

functions FPT_TST.1 provides failure detection throughout the lifecycle. The SCD import is controlled by TSF according to FDP_ACC.1/SCD_Import, FDP_ACF.1/SCD_Import and FDP_ITC.1/SCD. The confidentiality of the SCD is protected during import according to FDP_UCT.1/SCD in the trusted channel FTP_ITC.1/SCD.

SSCD parts 2, 4 and 5 only

OT.SCD_SVD_Corresp addresses that the SVD corresponds to the SCD implemented by the TOE. This is provided by the algorithms specified by FCS_CKM.1 to generate corresponding SVD/SCD pairs. The security functions specified by FDP_SDI.2/Persistent ensure that the keys are not modified, so to retain the correspondence. Moreover, the SCD Identifier allows the environment to identify the SCD and to link it with the appropriate SVD. The management functions identified by FMT_SMF.1 and by FMT_MSA.4 allow R.Admin to modify the default value of the security attribute SCD Identifier.

OT.SCD_Unique implements the requirement of practically unique SCD as laid down in Annex III [DIR], paragraph 1(a), which is provided by the cryptographic algorithms specified by FCS_CKM.1.

OT.SCD/SVD_Gen addresses that generation of a SCD/SVD pair requires proper user authentication. The TSF specified by FIA_UID.1 and FIA_UAU.1 provide user identification and user authentication prior to enabling access to authorised functions. The SFR FDP_ACC.1/SCD/SVD_Generation and FDP_ACF.1/SCD/SVD_Generation provide access control for the SCD/SVD generation. The security attributes of the authenticated user are provided by FMT_MSA.1/Admin, FMT_MSA.2, and FMT_MSA.3 for static attribute initialisation. The SFR FMT_MSA.4 defines rules for inheritance of the security attribute 'SCD operational' of the SCD.

SSCD parts 3 and 6 only

OT.SCD_Auth_Imp is provided by the security functions specified by the following SFR. FIA_UID.1 and FIA_UAU.1 ensure that the user is identified and authenticated before SCD can be imported. FDP_ACC.1/SCD_Import and FDP_ACF.1/SCD_Import ensure that only authorised users can import SCD.

SSCD part 4 only

OT.TOE_SSCD_Auth requires the TOE to provide security mechanisms to identify and to authenticate themselves as SSCD, which is directly provided by FIA_API.1 (Authentication Proof of Identity). The SFR FIA_UAU.1 allows (additionally to the core PP Part2 SSCD KG) establishment of the trusted channel before (human) user is authenticated.

OT.TOE_TC_SVD_Exp requires the TOE to provide a trusted channel to the CGA to protect the integrity of the SVD exported to the CGA, which is directly provided by

- The SVD transfer for certificate generation is controlled by TSF according to FDP_ACC.1/SVD_Transfer and FDP_ACF.1/SVD_Transfer.
- FDP_DAU.2/SVD (Data Authentication with Identity of Guarantor), which requires the TOE to provide CGA with the ability to verify evidence of the validity of the SVD and the identity of the user that generated the evidence.
- FTP_ITC.1/SVD Inter-TSF trusted channel), which requires the TOE to provide a trusted channel to the CGA.

SSCD parts 5 and 6 only

OT.TOE_TC_VAD_Imp is provided by FTP_ITC.1/VAD to provide a trusted channel to protect the VAD provided by the HID to the TOE.

OT.TOE_TC_DTBS_Imp is provided by FTP_ITC.1/DTBS to provide a trusted channel to protect the DTBS provided by the SCA to the TOE and by FDP_UIT.1/DTBS, which requires the TSF to verify the integrity of the received DTBS.

Additional Security Objectives for the TOE

OT.AC_Pers_EAC2 The security objective OT.AC_Pers_EAC2 ensures that only the personalisation agent can write user- and TSF-Data into the TOE, and that some of this data cannot be altered after personalisation. This property is covered by FDP_ACC.1/TRM and FDP_ACF.1/TRM requiring, amongst other, an appropriate authorization level of an EAC2 terminal. This authorization level can be achieved by terminal identification/authentication as required by the SFRs FIA_UID.1/PACE and FIA_UAU.1/PACE. The SFRs FMT_SMF.1 and FMT_SMR.1/PACE support the related functions and roles. Since only an EAC2 terminal can reach the necessary authorization level, using and managing the PIN (the related SFRs are FIA_AFL.1/PACE, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, and FMT_MTD.1/Initialize_PIN) also support the achievement of this objective. FDP_RIP.1 requires erasing the temporal values PIN and PUK. The justification for the SFRs FMT_MTD.1/INI_ENA and FMT_MTD.1/INI_DIS arises from the justification for OT.Identification above with respect to the pre-personalisation data. FMT_MTD.1/PA covers the related property of OT.AC_Pers_EAC2 (writing/updating SOC and SOD and, in generally, personalisation data). Updating such data can only be done by the personalisation agent prior to the operational phase. Thus such data cannot be changed after the personalisation of the document, as required by OT.AC_Pers_EAC2. Finally, FMT_MTD.1/KEY_READ ensures that cryptographic keys for EAC2 can not be read by users.

OT.CA2 The security objective OT.CA2 aims at enabling verification of the authenticity of the TOE as a whole device.This objective is mainly achieved by FIA_API.1/CA using FCS_CKM.1/DH_PACE. CA2 provides an evidence of possessing the Chip Authentication Private Key (SKPICC). FMT_MTD.1/SK_PICC governs creating/loading SKPICC, whereas FMT_MTD.1/KEY_READ requires making this key unreadable by users. Hence, its value remains confidential. FDP_RIP.1 requires erasing the values of SKPICC and the session keys, here for CMAC.The authentication token TPICC is calculated using FCS_COP.1. The SFRs FCS_COP.1 and FCS_RNG.1 represent the general required support for cryptographic operations.FMT_MTD.1/PA requires that the SOC (containing amongst other, the signature of PKPICC) used for Passive Authentication is allowed to be modified only by the personalisation agent only. Hence is to consider as trustworthy.

OT.Sens_Data_EAC2 The security objective of OT.Sens_Data_EAC2 aims to explicitly protect sensitive (as opposed to common) user and TSF-Data. This is mainly achieved by enforcing (FDP_UCT.1/TRM and FDP_UIT.1/TRM) the access control SFPs FDP_ACC.1/TRM and FDP_ACF.1/TRM. A specific authorization level is achieved by terminal identification/authentication as required by the SFRs FIA_UID.1/PACE, FIA_UAU.1/PACE, supported by FCS_COP.1. The TA2 protocol uses the result of the PACE authentication (FIA_UID.1/PACE, FIA_UAU.1/PACE, confidentiality of the PACE passwords is ensured by FMT_MTD.1/KEY_READ) being, in turn, supported by FCS_CKM.1/DH_PACE.

Since PACE can use the PIN as the shared secret, the use and management of the PIN (FMT_MTD.1/Resume_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Change_PIN) also support to achieve this objective. FDP_RIP.1 requires erasing the temporal values of the PIN and PUK. FIA_UAU.4/PACE, FIA_UAU.5/PACE, FIA_UAU.6/PACE and FCS_CKM.4 represent some specific properties of the used protocols.To allow for a verification of the certificate chain as required in FMT_MTD.3, the CVCA's public key and certificate as well as the current date are written or updated by authorized identified role as required by FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD and FMT_MTD.1/DATE.This objective for the data exchanged is mainly achieved by FTP_ITC.1/CA2 and FTP_ITC.1/PACE using FCS_COP.1. A prerequisite for establishing this trusted channel is a successful Chip Authentication 2, cf. FIA_API.1/CA using FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, and FIA_UAU.6/CA. As a prerequisite of this trusted channel, a trusted channel is established with the PACE protocol using FIA_UID.1/PACE, FIA_UAU.1/PACE and FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, FIA_UAU.6/PACE. CA2 provides an evidence of possessing the Chip Authentication Private Key (SKPICC). FMT_MTD.1/SK_PICC governs creating/loading SKPICC, FMT_MTD.1/KEY_READ requires making this key unreadable by users. Thus its value remains confidential. FDP_RIP.1 requires erasing the values of SKPICC and session keys, here for KENC.FMT_MTD.1/PA requires that only the the personalisation agent is allowed to modify the SOC (containing amongst other, the signature of PKPICC) used for Passive Authentication. The SFRs FCS_COP.1 and FCS_RNG.1 represent the general required support for cryptographic operations.The SFRs FMT_SMF.1 and FMT_SMR.1/PACE support the related functions and roles.

OT.Data_Authenticity The security objective OT.Data_Authenticity ensures the authenticity of user- and TSF-Data (after Terminal- and the Chip Authentication 2) by enabling its verification on both the terminal-side and by an active verification by the TOE itself.This objective is mainly achieved by FTP_ITC.1/CA2 and FTP_ITC.1/PACE using FCS_COP.1. A prerequisite for establishing this trusted channel is a successful Chip Authentication 2, cf. FIA_API.1/CA using FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, and FIA_UAU.6/CA. As a prerequisite of this trusted channel, a trusted channel is established with the PACE protocol using FIA_UID.1/PACE, FIA_UAU.1/PACE and FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, FIA_UAU.6/PACE. CA2 provides an evidence of possessing the Chip Authentication Private Key (SKPICC). FMT_MTD.1/SK_PICC governs creating/loading SKPICC, FMT_MTD.1/KEY_READ requires to make this key unreadable by users. Hence its value remains confidential. FDP_RIP.1 requires to erase the values of SKPICC and session keys, here for KMAC. FMT_MTD.1/PA requires that the SOC (containing amongst other, the signature of PKPICC) used for Passive Authentication is allowed to be modified only by the personalisation agent only. Hence is to consider as trustworthy.A prerequisite for successful CA2 is an accomplished TA2 as required by FIA_UID.1/PACE, FIA_UAU.1/PACE, supported by FCS_COP.1. The TA2 protocol uses the result of the PACE authentication (FIA_UID.1/PACE, FIA_UAU.1/PACE) being, in turn, supported by FCS_CKM.1/DH_PACE. Since PACE can use the PIN as the shared secret, the use and management of the PIN (FIA_AFL.1/PACE, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN) also support achieving this objective. FDP_RIP.1 requires to erase the temporal values of the PIN and PUK.FIA_UAU.4/PACE, FIA_UAU.5/PACE, FIA_UAU.6/CA and FCS_CKM.4 represent some specific required properties of the used protocols.To allow for a verification of the certificate chain as required in FMT_MTD.3, the CVCA's public key and certificate, as well as the current date, are written or updated by authorized identified roles as required by FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD and FMT_MTD.1/DATE.The SFRs

FCS_COP.1 and FCS_RNG.1 represent the general required support for cryptographic operations.The SFRs FMT_SMF.1 and FMT_SMR.1/PACE support the related functions and roles.

OT.Data_Confidentiality The security objective OT.Data_Confidentiality ensures that the TOE always ensures confidentiality of the user- and TSF-Data stored and, after Terminal- and Chip Authentication 2, of their exchange.This objective for the data stored is mainly achieved by FDP_ACC.1/TRM and FDP_ACF.1/TRM. Enforcement of the two previous in a protected manner is ensured by FDP_UCT.1/TRM and FDP_UIT.1/TRM. A specific authorization level is achieved by terminal identification/authentication as required by the SFRs FIA_UID.1/PACE, FIA_UAU.1/PACE, supported by FCS_COP.1. The TA2 protocol uses the result of the PACE authentication (FIA_UID.1/PACE, FIA_UAU.1/PACE, confidentiality of the PACE passwords is ensured by FMT_MTD.1/KEY_READ) being, in turn, supported by FCS_CKM.1/DH_PACE. Since PACE can use the PIN as the shared secret, the use and management of the PIN (FIA_AFL.1/PACE, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Initialize_PIN) also support to achieve this objective. FDP_RIP.1 requires erasing the temporal values of the PIN and PUK.FIA_UAU.4/PACE, FIA_UAU.5/PACE, FIA_UAU.6/PACE and FCS_CKM.4 represent some specific properties of the used protocols.To allow for a verification of the certificate chain as required in FMT_MTD.3, the CVCA's public key and certificate as well as the current date are written or updated by authorized identified role as required by FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD and FMT_MTD.1/DATE.This objective for the data exchanged is mainly achieved by FTP_ITC.1/CA2 and FTP_ITC.1/PACE using FCS_COP.1. A prerequisite for establishing this trusted channel is a successful Chip Authentication 2, cf. FIA_API.1/CA using FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, and FIA_UAU.6/CA. As a prerequisite of this trusted channel, a trusted channel is established with the PACE protocol using FIA_UID.1/PACE, FIA_UAU.1/PACE and FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, FIA_UAU.6/PACE. CA2 provides an evidence of possessing the Chip Authentication Private Key (SKPICC). FMT_MTD.1/SK_PICC governs creating/loading SKPICC, FMT_MTD.1/KEY_READ requires making this key unreadable by users. Thus its value remains confidential. FDP_RIP.1 requires erasing the values of SKPICC and session keys, here for KENC.FMT_MTD.1/PA requires that only the the personalisation agent is allowed to modify the SOC (containing amongst other, the signature of PKPICC) used for Passive Authentication. The SFRs FCS_COP.1 and FCS_RNG.1 represent the general required support for cryptographic operations.The SFRs FMT_SMF.1 and FMT_SMR.1/PACE support the related functions and roles.

OT.Data_Integrity The security objective OT.Data_Integrity ensures that the TOE always ensures integrity of stored user- and TSF-Data and, after Terminal- and Chip Authentication 2, of these data exchanged (physical manipulation and unauthorized modifying). Physical manipulation is addressed by FPT_PHP.3.Unauthorized modifying of the stored data is addressed by FDP_ACC.1/TRM and FDP_ACF.1/TRM. Enforcement of the two previous in a protected manner is ensured by FDP_UCT.1/TRM and FDP_UIT.1/TRM. A specific authorization level is achieved by terminal identification/ authentication as required by the SFRs FIA_UID.1/PACE, FIA_UAU.1/PACE, supported by FCS_COP.1. The TA2 protocol uses the result of PACE authentication (FIA_UID.1/PACE, FIA_UAU.1/PACE) being, in turn, supported by FCS_CKM.1/DH_PACE. Since PACE can use the PIN as the shared secret, using and management of PIN (FIA_AFL.1/PACE, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.1/Initialize_PIN) also support achievement of this objective. FDP_RIP.1 requires erasing the temporal values of PIN, PUK. FIA_UAU.4/PACE, FIA_UAU.5/PACE and FCS_CKM.4 represent some required specific properties of the used protocols.To allow for

a verification of the certificate chain as required in FMT_MTD.3, the CVCA's public key and certificate as well as the current date are written or update by authorized identified role as required by FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD and FMT_MTD.1/DATE.Unauthorized modifying of the exchanged data is addressed by FTP_ITC.1/CA2 and FTP_ITC.1/PACE using FCS_COP.1. A prerequisite for establishing this trusted channel is a successful Chip Authentication 2, cf. FIA_API.1/CA using FCS_CKM.1/DH_PACE possessing the special properties FIA_UAU.5/PACE and FIA_UAU.6/CA. As a prerequisite of this trusted channel a trusted channel established with the PACE protocol using FIA_UID.1/PACE, FIA_UAU.1/PACE and FCS_CKM.1/DH_PACE and possessing the special properties FIA_UAU.5/PACE, FIA_UAU.6/PACE. CA2 provides an evidence of possessing the Chip Authentication Private Key (SKPICC). FMT_MTD.1/SK_PICC governs creating/loading SKPICC, and FMT_MTD.1/KEY_READ requires SKPICC to be unreadable by users; thus its value remains confidential. FDP_RIP.1 requires erasing the values of SKPICC and session keys (here: for KMAC).FMT_MTD.1/PA requires that the SOC (containing amongst other, the signature of PKPICC) used for Passive Authentication is allowed to be modified only by the personalisation agent. Hence, is to considered as trustworthy.The SFRs FCS_COP.1 and FCS_RNG.1 represent general support required for cryptographic operations.The SFRs FMT_SMF.1 and FMT_SMR.1/PACE support related functions and roles.

OT.Identification The security objective OT.Identification addresses the storage of Initialisation and Pre-Personalisation Data in its non-volatile memory, whereby they also include the IC Identification Data uniquely identifying the TOE's chip. The SFR FMT_MTD.1/INI_ENA allows only the Manufacturer to write Initialisation and Pre-personalisation Data (including the Personalisation Agent key). The SFR FMT_MTD.1/INI_DIS requires the Personalisation Agent to disable access to Initialisation and Pre-personalisation Data in the life cycle phase 'operational use'.The SFRs FMT_SMF.1 and FMT_SMR.1/PACE support the functions and roles related.

OT.Prot_Abuse-Func The security objective OT.Prot_Abuse_Func aims preventing TOE's functions being not intended to be used in the operational phase from manipulating and disclosing the User- and TSF-data.This objective is achieved by FMT_LIM.1 and FMT_LIM.2 preventing misuse of test and other functionality of the TOE having not to be used in the TOE's operational life cycle phase.

OT.Prot_Inf_Leak The security objective OT.Prot_Inf_Leak aims protection against disclosure of confidential User- or/and TSF-data stored on / processed by the TOE. This objective is achieved

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

OT.Prot_Malfunction The security objective OT.Prot_Malfunction aims ensuring a correct operation of the TOE by preventing its operation outside the normal operating conditions.This objective is covered by FPT_TST.1 requiring self tests to demonstrate the correct operation of the TOE and tests of authorised users to verify the integrity of the TSF-data and the embedded software (TSF code) as well as by FPT_FLS.1 requiring entering a secure state of the TOE in case of detected failure or operating conditions possibly causing a malfunction.

OT.Prot_Phys-Tamper The security objective OT.Prot_Phys-Tamper aims protection of the confidentiality and integrity of the User- and TSF-data as well as embedded software stored in the TOE.This objective is completely covered by FPT_PHP.3 in an obvious way.

OT.Tracing The security objective OT.Tracing ensures that the TOE prevents gathering TOE tracing data by means of unambiguously identifying the electronic document remotely through establishing or listening to communication via the contactless/contact-based interface of the TOE without a priori knowledge of the correct values of shared passwords (CAN, MRZ, PIN, PUK).This objective is achieved as follows: 1.While establishing PACE communication with CAN, MRZ or PUK (non-blocking authentication / authorization data) by FIA_AFL.1/PACE, 2.while establishing PACE communication using the PIN (blocking authentication data) by FIA_AFL.1/PACE, 3.for listening to PACE communication and for establishing CA2 communication (which is of importance for the current PP, if Chip Security Object and PKPICC are card-individual) by FTP_ITC.1/PACE, 4.and for listening to CA2 communication (readable and writable user data: document details data, biographic data, biometric reference data) by FTP_ITC.1/CA2.

OT.Authentication_Secure is provided by the cryptographic algorithms specified by FCS_COP.1 and FCS_RNG.1 for (1) the mutual authentication based on an asymmetric scheme (Device Authentication), (2) the mutual authentication based on symmetric scheme, (3) the authentication of the personalisation agent and of the "TOE_Administrator", (4) the authentication of an entity based on a symmetric scheme, (5) the authentication of an entity based on an asymmetric scheme. All these requirements ensure the cryptographic robustness of the authentication mechanisms. The use of a challenge freshly generated by the TOE with FCS_RNG.1 in theses authentication protocols ensures a protection against replay attacks when authenticating external entities. FIA_AFL.1/PACE ensures a correct detection and protection of authentication failure or exhaustive attacks. The security function specified by FPT_TST.1 ensures that the security functions are performed correctly and FDP_SDI.2/Persistent guarantees the integrity of the authentication key(s) used by the TOE. FMT_SMR.1 and FMT_SMF.1 ensure the TOE can distinguish between external entities successfully authenticated (R.Admin) and can grant them dedicated rights. In case of authentication protocols involving the import of ephemeral public key on the TOE (using Card verifiable certificates), FDP_RIP.1 ensures that the key value is not kept by the TOE after usage and then can not be reused for a replay attack.This objective ensures as well the establishment of a trusted channel following a successful mutual authentication ((1) and (2)). This trusted channel ensures authenticity, integrity and confidentiality of communication. FCS_CKM.1 and FCS_COP.1 generate session keys for the secure communication from a common secret agreed between the TOE and the external entity during the mutual authentication procedure. Any incoming command shall contain a MAC computed by the issuer with the session key agreed during the mutual authentication, so that any unauthenticated or non integer command is detected by the MAC verification performed by the TOE using FCS_COP.1. The data exchanged through this trusted channel are also protected in confidentiality thanks to FCS_COP.1, ensuring they can only be disclosed to the parties authenticated during the mutual authentication step. The

encryption key is ephemeral as it is generated during the mutual authentication using a challenge freshly generated by the TOE using FCS_RNG.1, which ensures that dictionary attacks cannot be performed on encrypted data. When an integrity error is detected, or if the MAC is wrong (wrong authentication of the command issuer), the session keys (for integrity and confidentiality) are erased thanks to FCS_CKM.4 so that they cannot be reused anymore, causing the trusted channel to be irreversibly lost. In particular, it ensures that encrypted data that may be caught by an attacker cannot be reused anymore to masquerade the TOE. The type of authentication scheme used by the TOE to authenticate the administrator or perform a mutual authentication may be controlled by the "TOE_Administrator". It may enforce the TOE to allow the use of symmetric scheme ((2) and (4)) and/or asymmetric ((1) and (5)) schemes. The TSF specified by FIA_UID.1 and FIA_UAU.1 provide "TOE_Administrator" identification and authentication prior to enabling access to authorised functions. The attributes of the authenticated "TOE_Administrator" are provided by FMT_MSA.2, FMT_MSA.3 and FMT_MSA.4 for static attribute initialisation. Access control is provided by FMT_SMR.1 and FMT_SMF.1. Effort to bypass the access control by a frontal exhaustive attack is blocked by FIA_AFL.1.

OT.Lifecycle_Management ensures a correct separation of the TOE life cycle between phase 6 and 7. In phase 6, FMT_MTD.1/TOE State ensures the TOE irreversibly switches from phase 6 to phase 7 under the sole control of the Personalisation Agent. The Personalisation Agent is authenticated with a mutual authentication performed with FCS_RNG.1 and FCS_COP.1 and is authenticated with FMT_SMR.1. Effort to bypass the access control by a frontal exhaustive attack is blocked by FIA_AFL.1. In phase 7, FDP_ACC.1/Signature creation, FDP_ACC.1/SVD transfer, FDP_ACC.1/SCD/SVD_Generation, FDP_ACC.1/SCD import, FDP_ACF.1/Signature creation, FDP_ACF.1/SVD transfer, FDP_ACF.1/SCD/SVD_Generation, FDP_ACF.1/SCD import, FMT_MTD.1/Unblock, FMT_MOF.1, FMT_MTD.1/Admin, FMT_MTD.1/Signatory ensures the Personalisation Agent does not control the TOE anymore. In phase 6, the Personalisation Agent has complete control over the administrative functions of the TOE. It may import, erase, generate SCD/SVD, export SVD, manage Keys, create RAD and manage the configuration of the TOE as mandated in FMT_SMF.1, according to the security policies defined in FDP_ACC.1/SVD transfer, FDP_ACC.1/SCD/SVD_Generation, FDP_ACC.1/SCD import, FDP_ACF.1/SVD transfer, FDP_ACF.1/SCD/SVD_Generation, FDP_ACF.1/SCD import. It may as well change TOE State (FMT_MTD.1/TOE State). These functions are protected by the Personalisation Agent authentication that cannot be bypassed to access these functions with the TSF specified by FIA_UID.1 and FIA_UAU.1. FMT_MSA.1/Admin, FMT_MSA.2, FMT_MSA.3 ensure that the sole Personalisation Agent can realize these functions. Effort to bypass the access control by a frontal exhaustive attack is blocked by FIA_AFL.1.

OT.eServices implements the requirement of practically unique TOE's authentication private key, which is provided by the cryptographic algorithms specified by FCS_CKM.1/DH_PACE.

OT.TOE_AuthKey_Unique is provided by the cryptographic mechanisms specified by FCS_COP.1 for (1) the DH Computation, (2) the Certificate verification, (3) the C/S Authentication, (4) the Enc key decipherment. These requirements ensure the cryptographic robustness of these eServices. The eServices keys may be loaded, generated, and the matching public key may be exported as required by FMT_SMF.1. The Agent(s) entitled to perform such operations shall be authenticated with FMT_SMR.1 using cryptographic protocols specified by FCS_COP.1 and FCS_RNG.1 for (1) the mutual authentication based on an asymmetric scheme (Device Authentication), (2) the mutual authentication based on symmetric scheme, (3) the authentication of an entity based on a symmetric scheme, (4) the authentication of an entity based on an asymmetric scheme.

These functions are protected by the proper Agent(s) authentication that cannot be bypassed to access these functions with the TSF specified by FIA_UID.1 and FIA_UAU.1. Effort to bypass the access control by a frontal exhaustive attack is blocked by FIA_AFL.1/PACE.

9.3.2 Rationale tables of Security Objectives and SFRs

Security Objectives	Security Functional Requirements	Rationale
OT.Tamper_Resistance	FPT_PHP.3	Section 9.3.1
OT.Tamper_ID	FPT_PHP.1	Section 9.3.1
OT.EMSEC_Design	FPT_EMS.1	Section 9.3.1
OT.DTBS_Integrity_TOE	FDP_SDI.2/DTBS	Section 9.3.1
OT.Sigy_SigF	FDP_ACF.1/Signature_Creation, FDP_ACC.1/Signature_Creation, FDP_RIP.1, FDP_SDI.2/DTBS, FIA_AFL.1, FIA_UAU.1, FIA_UID.1, FMT_MOF.1, FMT_MSA.1/Signatory, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4, FMT_MTD.1/Admin, FMT_MTD.1/Signatory, FMT_SMR.1, FMT_SMF.1, FMT_MTD.1/Unblock_PIN, FCS_COP.1, FIA_AFL.1/PACE, FCS_RNG.1	Section 9.3.1
OT.Sig_Secure	FDP_SDI.2/Persistent, FPT_TST.1, FCS_COP.1	Section 9.3.1
OT.SCD_Secrecy	FCS_CKM.1, FCS_CKM.4, FDP_RIP.1, FDP_SDI.2/Persistent, FPT_FLS.1, FPT_PHP.3, FPT_TST.1, FPT_EMS.1, FDP_UCT.1/SCD, FTP_ITC.1/SCD	Section 9.3.1
OT.Lifecycle_Security	FCS_CKM.1, FCS_CKM.4, FDP_ACC.1/SCD/SVD_Generation, FDP_ACF.1/SCD/SVD_Generation, FDP_ACC.1/SVD_Transfer, FDP_ACF.1/Signature_Creation, FDP_ACC.1/Signature_Creation, FDP_ACF.1/SVD_Transfer, FMT_MOF.1, FMT_MSA.1/Admin, FMT_MSA.1/Signatory, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4, FMT_MTD.1/Admin, FMT_MTD.1/Signatory, FMT_SMR.1, FMT_SMF.1, FPT_TST.1, FCS_COP.1, FDP_ACC.1/SCD_Import, FDP_ACF.1/SCD_Import, FDP_ITC.1/SCD, FDP_UCT.1/SCD, FTP_ITC.1/SCD, FMT_MTD.1/Unblock_PIN	Section 9.3.1
OT.SCD_SVD_Corresp	FCS_CKM.1, FDP_SDI.2/Persistent, FMT_MSA.4, FMT_SMF.1	Section 9.3.1
OT.SCD_Unique	FCS_CKM.1	Section 9.3.1
OT.SCD/SVD_Gen	FDP_ACC.1/SCD/SVD_Generation, FDP_ACF.1/SCD/SVD_Generation, FIA_UAU.1, FIA_UID.1, FMT_MSA.1/Admin, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4	Section 9.3.1

OT.SCD_Auth_Imp	FIA_UID.1, FIA_UAU.1, FDP_ACC.1/SCD_Import, FDP_ACF.1/SCD_Import	Section 9.3.1
OT.TOE_SSCD_Auth	FIA_UAU.1, FIA_API.1	Section 9.3.1
OT.TOE_TC_SVD_Exp	FDP_ACF.1/SVD_Transfer, FDP_ACC.1/SVD_Transfer, FDP_DAU.2/SVD, FTP_ITC.1/SVD	Section 9.3.1
OT.TOE_TC_VAD_Imp	FTP_ITC.1/VAD	Section 9.3.1
OT.TOE_TC_DTBS_Imp	FDP_UIT.1/DTBS, FTP_ITC.1/DTBS	Section 9.3.1
OT.AC_Pers_EAC2	FDP_ACF.1/TRM, FDP_RIP.1, FDP_ACC.1/TRM, FMT_SMF.1, FMT_SMR.1/PACE, FMT_MTD.1/PA, FMT_MTD.1/KEY_READ, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.1/INI_ENA, FMT_MTD.1/INI_DIS, FIA_UID.1/PACE, FIA_UAU.1/PACE, FIA_AFL.1/PACE	Section 9.3.1
OT.CA2	FCS_CKM.1/DH_PACE, FIA_API.1/CA, FDP_RIP.1, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ, FCS_RNG.1, FCS_COP.1	Section 9.3.1
OT.Sens_Data_EAC2	FTP_ITC.1/CA2, FCS_CKM.1/DH_PACE, FIA_UAU.1/PACE, FIA_UAU.5/PACE, FIA_API.1/CA, FIA_UAU.6/CA, FIA_UID.1/PACE, FIA_UAU.4/PACE, FIA_UAU.6/PACE, FDP_ACF.1/TRM, FDP_ACC.1/TRM, FDP_UCT.1/TRM, FDP_UIT.1/TRM, FTP_ITC.1/PACE, FMT_SMR.1/PACE, FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.3, FMT_SMF.1, FCS_CKM.4, FDP_RIP.1, FCS_RNG.1, FCS_COP.1	Section 9.3.1
OT.Data_Authenticity	FTP_ITC.1/CA2, FCS_CKM.1/DH_PACE, FIA_UAU.1/PACE, FIA_UAU.5/PACE, FIA_API.1/CA, FIA_UAU.6/CA, FIA_UID.1/PACE, FIA_UAU.4/PACE, FIA_UAU.6/PACE, FTP_ITC.1/PACE, FMT_SMR.1/PACE, FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ,	Section 9.3.1

	FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.3, FMT_SMF.1, FCS_CKM.4, FDP_RIP.1, FCS_RNG.1, FIA_AFL.1/PACE, FCS_COP.1	
OT.Data_Confidentiality	FTP_ITC.1/CA2, FCS_CKM.1/DH_PACE, FIA_UAU.1/PACE, FIA_UAU.5/PACE, FIA_API.1/CA, FIA_UAU.6/CA, FIA_UID.1/PACE, FIA_UAU.4/PACE, FIA_UAU.6/PACE, FDP_ACF.1/TRM, FDP_ACC.1/TRM, FDP_UCT.1/TRM, FDP_UIT.1/TRM, FTP_ITC.1/PACE, FMT_SMR.1/PACE, FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.3, FMT_SMF.1, FCS_CKM.4, FDP_RIP.1, FCS_RNG.1, FIA_AFL.1/PACE, FCS_COP.1	Section 9.3.1
OT.Data_Integrity	FTP_ITC.1/CA2, FCS_CKM.1/DH_PACE, FIA_UAU.1/PACE, FIA_UAU.5/PACE, FIA_API.1/CA, FIA_UAU.6/CA, FIA_UID.1/PACE, FIA_UAU.4/PACE, FIA_UAU.6/PACE, FDP_ACF.1/TRM, FDP_ACC.1/TRM, FDP_UCT.1/TRM, FDP_UIT.1/TRM, FTP_ITC.1/PACE, FMT_SMR.1/PACE, FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.3, FPT_PHP.3, FMT_SMF.1, FCS_CKM.4, FDP_RIP.1, FCS_RNG.1, FCS_COP.1, FIA_AFL.1/PACE	Section 9.3.1
OT.Identification	FMT_SMF.1, FMT_SMR.1/PACE, 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_FLS.1, FPT_TST.1, FPT_PHP.3, FPT_EMS.1	Section 9.3.1
OT.Prot_Malfunction	FPT_FLS.1, FPT_TST.1	Section 9.3.1
OT.Prot_Phys-Tamper	FPT_PHP.3	Section 9.3.1
OT.Tracing	FIA_AFL.1/PACE, FTP_ITC.1/CA2, FTP_ITC.1/PACE	Section 9.3.1

OT.Authentication_Secure	FPT_TST.1, FMT_SMR.1, FMT_SMF.1, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4, FIA_UID.1, FIA_AFL.1, FIA_UAU.1, FDP_SDI.2/Persistent, FDP_RIP.1, FCS_COP.1, FCS_CKM.4, FCS_CKM.1, FIA_AFL.1/PACE, FCS_RNG.1	Section 9.3.1
OT.Lifecycle_Management	FMT_SMR.1, FMT_SMF.1, FMT_MOF.1, FMT_MSA.1/Admin, FMT_MSA.2, FMT_MSA.3, FMT_MTD.1/Admin, FMT_MTD.1/Signatory, FIA_UID.1, FIA_AFL.1, FIA_UAU.1, FCS_COP.1, FDP_ACC.1/SCD/SVD_Generation, FDP_ACF.1/SCD/SVD_Generation, FMT_MTD.1/TOE State, FCS_RNG.1	Section 9.3.1
OT.eServices	FCS_CKM.1/DH_PACE	Section 9.3.1
OT.TOE_AuthKey_Unique	FMT_SMR.1, FMT_SMF.1, FIA_UID.1, FIA_UAU.1, FCS_COP.1, FIA_AFL.1/PACE, FCS_RNG.1	Section 9.3.1

Table 22 Security Objectives and SFRs - Coverage

Security Functional Requirements	Security Objectives	Rationale
FPT_EMS.1	OT.EMSEC_Design, OT.SCD_Secrecy, OT.Prot_Inf_Leak	
FPT_FLS.1	OT.SCD_Secrecy, OT.Prot_Inf_Leak, OT.Prot_Malfunction	
FPT_PHP.1	OT.Tamper_ID	
FPT_PHP.3	OT.Tamper_Resistance, OT.SCD_Secrecy, OT.Data_Integrity, OT.Prot_Inf_Leak, OT.Prot_Phys-Tamper	
FPT_TST.1	OT.Sig_Secure, OT.SCD_Secrecy, OT.Lifecycle_Security, OT.Prot_Inf_Leak, OT.Prot_Malfunction, OT.Authentication_Secure	
FMT_SMR.1	OT.Sigy_SigF, OT.Lifecycle_Security, OT.Authentication_Secure, OT.Lifecycle_Management, OT.TOE_AuthKey_Unique	
FMT_SMF.1	OT.Sigy_SigF, OT.Lifecycle_Security, OT.SCD_SVD_Corresp, OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Identification, OT.Authentication_Secure, OT.Lifecycle_Management,	

	OT.TOE_AuthKey_Unique	
FMT_MOF.1	OT.Sigy_SigF, OT.Lifecycle_Security, OT.Lifecycle_Management	
FMT_MSA.1/Admin	OT.Lifecycle_Security, OT.SCD/SVD_Gen, OT.Lifecycle_Management	
FMT_MSA.1/Signatory	OT.Sigy_SigF, OT.Lifecycle_Security	
FMT_MSA.2	OT.Sigy_SigF, OT.Lifecycle_Security, OT.SCD/SVD_Gen, OT.Authentication_Secure, OT.Lifecycle_Management	
FMT_MSA.3	OT.Sigy_SigF, OT.Lifecycle_Security, OT.SCD/SVD_Gen, OT.Authentication_Secure, OT.Lifecycle_Management	
FMT_MSA.4	OT.Sigy_SigF, OT.Lifecycle_Security, OT.SCD_SVD_Corresp, OT.SCD/SVD_Gen, OT.Authentication_Secure	
FMT_MTD.1/Admin	OT.Sigy_SigF, OT.Lifecycle_Security, OT.Lifecycle_Management	
FMT_MTD.1/Signatory	OT.Sigy_SigF, OT.Lifecycle_Security, OT.Lifecycle_Management	
FIA_UID.1	OT.Sigy_SigF, OT.SCD/SVD_Gen, OT.SCD_Auth_Imp, OT.Authentication_Secure, OT.Lifecycle_Management, OT.TOE_AuthKey_Unique	
FIA_AFL.1	OT.Sigy_SigF, OT.Authentication_Secure, OT.Lifecycle_Management	
FIA_UAU.1	OT.Sigy_SigF, OT.SCD/SVD_Gen, OT.SCD_Auth_Imp, OT.TOE_SSCD_Auth, OT.Authentication_Secure, OT.Lifecycle_Management, OT.TOE_AuthKey_Unique	
FDP_SDI.2/DTBS	OT.DTBS_Integrity_TOE, OT.Sigy_SigF	
FDP_SDI.2/Persistent	OT.Sig_Secure, OT.SCD_Secrecy, OT.SCD_SVD_Corresp, OT.Authentication_Secure	
FDP_RIP.1	OT.Sigy_SigF, OT.SCD_Secrecy, OT.AC_Pers_EAC2, OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality,	

	OT.Data_Integrity, OT.Authentication_Secure	
FDP_ACC.1/Signature_Creation	OT.Sigy_SigF, OT.Lifecycle_Security	
FDP_ACF.1/Signature_Creation	OT.Sigy_SigF, OT.Lifecycle_Security	
FCS_COP.1	OT.Sigy_SigF, OT.Sig_Secure, OT.Lifecycle_Security, OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Authentication_Secure, OT.Lifecycle_Management, OT.TOE_AuthKey_Unique	
FCS_CKM.4	OT.SCD_Secrecy, OT.Lifecycle_Security, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Authentication_Secure	
FCS_CKM.1	OT.SCD_Secrecy, OT.Lifecycle_Security, OT.SCD_SVD_Corresp, OT.SCD_Unique, OT.Authentication_Secure	
FDP_ACC.1/SVD_Transfer	OT.Lifecycle_Security, OT.TOE_TC_SVD_Exp	
FDP_ACF.1/SVD_Transfer	OT.Lifecycle_Security, OT.TOE_TC_SVD_Exp	
FDP_ACC.1/SCD/SVD_Generation	OT.Lifecycle_Security, OT.SCD/SVD_Gen, OT.Lifecycle_Management	
FDP_ACF.1/SCD/SVD_Generation	OT.Lifecycle_Security, OT.SCD/SVD_Gen, OT.Lifecycle_Management	
FTP_ITC.1/SCD	OT.SCD_Secrecy, OT.Lifecycle_Security	
FDP_UCT.1/SCD	OT.SCD_Secrecy, OT.Lifecycle_Security	
FDP_ITC.1/SCD	OT.Lifecycle_Security	
FDP_ACC.1/SCD_Import	OT.Lifecycle_Security, OT.SCD_Auth_Imp	
FDP_ACF.1/SCD_Import	OT.Lifecycle_Security, OT.SCD_Auth_Imp	
FTP_ITC.1/SVD	OT.TOE_TC_SVD_Exp	
FDP_DAU.2/SVD	OT.TOE_TC_SVD_Exp	
FIA_API.1	OT.TOE_SSCD_Auth	
FDP_UIT.1/DTBS	OT.TOE_TC_DTBS_Imp	
FTP_ITC.1/VAD	OT.TOE_TC_VAD_Imp	

FTP_ITC.1/DTBS	OT.TOE_TC_DTBS_Imp	
FCS_RNG.1	OT.Sigy_SigF, OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Authentication_Secure, OT.Lifecycle_Management, OT.TOE_AuthKey_Unique	
FCS_CKM.1/DH_PACE	OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.eServices	
FIA_UID.1/PACE	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FIA_UAU.1/PACE	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FIA_UAU.4/PACE	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FIA_UAU.5/PACE	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FIA_UAU.6/PACE	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FIA_UAU.6/CA	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FIA_AFL.1/PACE	OT.Sigy_SigF, OT.AC_Pers_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Tracing, OT.Authentication_Secure, OT.TOE_AuthKey_Unique	
FIA_API.1/CA	OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality,	

	OT.Data_Integrity	
FDP_ACC.1/TRM	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Confidentiality, OT.Data_Integrity	
FDP_ACF.1/TRM	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Confidentiality, OT.Data_Integrity	
FDP_UCT.1/TRM	OT.Sens_Data_EAC2, OT.Data_Confidentiality, OT.Data_Integrity	
FDP_UIT.1/TRM	OT.Sens_Data_EAC2, OT.Data_Confidentiality, OT.Data_Integrity	
FTP_ITC.1/PACE	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Tracing	
FMT_SMR.1/PACE	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Identification	
FMT_MTD.1/CVCA_INI	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/CVCA_UPD	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/DATE	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/PA	OT.AC_Pers_EAC2, OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/SK_PICC	OT.CA2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/KEY_READ	OT.AC_Pers_EAC2, OT.CA2, OT.Sens_Data_EAC2,	

	OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/Initialize_PIN	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/Resume_PIN	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/Change_PIN	OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/Unblock_PIN	OT.Sigy_SigF, OT.Lifecycle_Security, OT.AC_Pers_EAC2, OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/TOE State	OT.Lifecycle_Management	
FMT_MTD.3	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity	
FMT_MTD.1/INI_ENA	OT.AC_Pers_EAC2, OT.Identification	
FMT_MTD.1/INI_DIS	OT.AC_Pers_EAC2, OT.Identification	
FTP_ITC.1/CA2	OT.Sens_Data_EAC2, OT.Data_Authenticity, OT.Data_Confidentiality, OT.Data_Integrity, OT.Tracing	
FMT_LIM.1	OT.Prot_Abuse-Func	
FMT_LIM.2	OT.Prot_Abuse-Func	

Table 23 SFRs and Security Objectives

9.3.3 Dependencies

9.3.3.1 SFRs Dependencies

Requirements	CC Dependencies	Satisfied Dependencies
FCS_RNG.1	No Dependencies	
FCS_CKM.1/DH_PACE	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_COP.1, FCS_CKM.4
FIA_UID.1/PACE	No Dependencies	
FIA_UAU.1/PACE	(FIA_UID.1)	FIA_UID.1/PACE
FIA_UAU.4/PACE	No Dependencies	
FIA_UAU.5/PACE	No Dependencies	
FIA_UAU.6/PACE	No Dependencies	
FIA_UAU.6/CA	No Dependencies	
FIA_AFL.1/PACE	(FIA_UAU.1)	FIA_UAU.1/PACE
FIA_API.1/CA	No Dependencies	
FDP_ACC.1/TRM	(FDP_ACF.1)	FDP_ACF.1/TRM
FDP_ACF.1/TRM	(FDP_ACC.1) and (FMT_MSA.3)	FDP_ACC.1/TRM
FDP_UCT.1/TRM	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/TRM, FTP_ITC.1/PACE
FDP_UIT.1/TRM	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/TRM, FTP_ITC.1/PACE
FTP_ITC.1/PACE	No Dependencies	
FMT_SMR.1/PACE	(FIA_UID.1)	FIA_UID.1/PACE
FMT_MTD.1/CVCA_INI	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/CVCA_UPD	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/DATE	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/PA	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/SK_PICC	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/KEY_READ	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1

FMT_MTD.1/Initialize_PIN	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/Resume_PIN	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/Change_PIN	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/Unblock_PIN	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/TOE State	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMR.1, FMT_SMF.1
FMT_MTD.3	(FMT_MTD.1)	FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE
FMT_MTD.1/INI_ENA	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FMT_MTD.1/INI_DIS	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1/PACE, FMT_SMF.1
FTP_ITC.1/CA2	No Dependencies	
FMT_LIM.1	No Dependencies	
FMT_LIM.2	No Dependencies	
FPT_EMS.1	No Dependencies	
FPT_FLS.1	No Dependencies	
FPT_PHP.1	No Dependencies	
FPT_PHP.3	No Dependencies	
FPT_TST.1	No Dependencies	
FMT_SMR.1	(FIA_UID.1)	FIA_UID.1
FMT_SMF.1	No Dependencies	
FMT_MOF.1	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_SMF.1
FMT_MSA.1/Admin	(FDP_ACC.1 or FDP_IFC.1) and (FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_SMF.1, FDP_ACC.1/Signature_Creation, FDP_ACC.1/SVD_Transfer, FDP_ACC.1/SCD/SVD_Generation, FDP_ACC.1/SCD_Import
FMT_MSA.1/Signatory	(FDP_ACC.1 or FDP_IFC.1) and (FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_SMF.1, FDP_ACC.1/Signature_Creation
FMT_MSA.2	(FDP_ACC.1 or FDP_IFC.1) and (FMT_MSA.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_MSA.1/Admin, FMT_MSA.1/Signatory, FDP_ACC.1/Signature_Creation, FDP_ACC.1/SCD/SVD_Generation

FMT_MSA.3	(FMT_MSA.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_MSA.1/Admin, FMT_MSA.1/Signatory
FMT_MSA.4	(FDP_ACC.1 or FDP_IFC.1)	FDP_ACC.1/Signature_Creation, FDP_ACC.1/SCD/SVD_Generation
FMT_MTD.1/Admin	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_SMF.1
FMT_MTD.1/Signatory	(FMT_SMF.1) and (FMT_SMR.1)	FMT_SMR.1, FMT_SMF.1
FIA_UID.1	No Dependencies	
FIA_AFL.1	(FIA_UAU.1)	FIA_UAU.1
FIA_UAU.1	(FIA_UID.1)	FIA_UID.1
FDP_SDI.2/DTBS	No Dependencies	
FDP_SDI.2/Persistent	No Dependencies	
FDP_RIP.1	No Dependencies	
FDP_ACC.1/Signature_Creation	(FDP_ACF.1)	FDP_ACF.1/Signature_Creation
FDP_ACF.1/Signature_Creation	(FDP_ACC.1) and (FMT_MSA.3)	FMT_MSA.3, FDP_ACC.1/Signature_Creation
FCS_COP.1	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FCS_CKM.4, FCS_CKM.1, FDP_ITC.1/SCD
FCS_CKM.4	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2)	FCS_CKM.1, FDP_ITC.1/SCD
FCS_CKM.1	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_COP.1, FCS_CKM.4
FDP_ACC.1/SVD_Transfer	(FDP_ACF.1)	FDP_ACF.1/SVD_Transfer
FDP_ACF.1/SVD_Transfer	(FDP_ACC.1) and (FMT_MSA.3)	FMT_MSA.3, FDP_ACC.1/SVD_Transfer
FDP_ACC.1/SCD/SVD_Generation	(FDP_ACF.1)	FDP_ACF.1/SCD/SVD_Generation
FDP_ACF.1/SCD/SVD_Generation	(FDP_ACC.1) and (FMT_MSA.3)	FMT_MSA.3, FDP_ACC.1/SCD/SVD_Generation
FTP_ITC.1/SCD	No Dependencies	
FDP_UCT.1/SCD	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FTP_ITC.1/SCD, FDP_ACC.1/SCD_Import
FDP_ITC.1/SCD	(FDP_ACC.1 or FDP_IFC.1) and (FMT_MSA.3)	FMT_MSA.3, FDP_ACC.1/SCD_Import

FDP_ACC.1/SCD_Import	(FDP_ACF.1)	FDP_ACF.1/SCD_Import
FDP_ACF.1/SCD_Import	(FDP_ACC.1) and (FMT_MSA.3)	FMT_MSA.3, FDP_ACC.1/SCD_Import
FTP_ITC.1/SVD	No Dependencies	
FDP_DAU.2/SVD	(FIA_UID.1)	FIA_UID.1
FIA_API.1	No Dependencies	
FDP_UIT.1/DTBS	(FDP_ACC.1 or FDP_IFC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.1/Signature_Creation, FTP_ITC.1/DTBS
FTP_ITC.1/VAD	No Dependencies	
FTP_ITC.1/DTBS	No Dependencies	

Table 24 SFRs Dependencies

Rationale for the exclusion of Dependencies

The dependency FMT_MSA.3 of FDP_ACF.1/TRM is discarded. The access control TSF according to FDP_ACF.1/TRM uses security attributes that have been defined during personalisation, and that are fixed over the whole life time of the TOE. No management of these security attributes (i.e. SFR FMT_MSA.1 and FMT_MSA.3) is necessary.

9.3.3.2 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.5	(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 25 SARs Dependencies

9.3.4 Rationale for the Security Assurance Requirements

The assurance level for this Security Traget is EAL5 augmented. EAL5 allows a developer to attain a reasonably high assurance level without the need for highly specialized processes and practices. It is considered to be the highest level that could be applied to an existing product line without undue expense and complexity. As such, EAL5 is appropriate for commercial products that can be applied to moderate to high security functions. Augmentation results from the selection of:

AVA_VAN.5 Advanced methodical vulnerability analysis ALC_DVS.2 Sufficiency of security measures

9.3.5 AVA_VAN.5 Advanced methodical vulnerability analysis

The TOE is intended to function in a variety of signature creation systems for qualified electronic signatures. Due to the nature of its intended application, i.e., the TOE may be issued to users and may not be directly under the control of trained and dedicated administrators. As a result, it is imperative that misleading, unreasonable and conflicting guidance is absent from the guidance documentation, and that secure procedures for all modes of operation have been addressed. Insecure states should be easy to detect. The TOE shall be shown to be highly resistant to penetration attacks to meet the security objectives OT.SCD_Secrecy, OT.Sigy_SigF and OT.Sig_Secure.

9.3.6 ALC_DVS.2 Sufficiency of security measures

Development security is concerned with physical, procedural, personnel and other technical measures that may be used in the development environment to protect the TOE. Due to the nature of the TOE, there is a need to justify the sufficiency of these procedures to protect

the confidentiality and the integrity of the TOE. The TOE shall be protected in confidentiality and integrity during its development to meet the security objective OT.Lifecycle_Security.

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.

The security functionalities concerning the IC and the JC Platform are described in [ST-IC], [ST-PL] and are not redefined in this security target, although they must be considered for the TOE.

10.1.1 Chip security functionalities

The full list of the IC Platform security functionalities can be checked in the IC Platform Security Target [ST-IC].

10.1.2 Platform security functionalities

The full list of the JC Platform security functionalities can be checked in the JC Platform Security Target [ST-PL].

10.1.3 Application security functionalities

SF.AUTHENTICATION

Only authenticated terminals can get access to the user data stored on the TOE. The ID-A applet offers several authentication schemes enabling to authenticate different roles, such as:

- The signatory entitled to use the services offered by the card. It is called "User Authentication".
- The device communicating with the card, to establish a trusted channel (secure messaging) and protect the communication. It is called "Device authentication".
- The administrator of a service, to administrate some features. It is called "Role authentication".

The **User authentication** is based on the submission of a PIN/password or biometry (i.e., knowledge based).

- Knowledge based: The Authentication of the user relies on a shared secret (PIN), known by both the holder and the smartcard. The Card holder is authenticated by the means of the VERIFY command. For each SCD separate signatory's RADs (PINs) are assigned. The verification process uses a velocity checking mechanism, thus a remaining tries counter and a maximum error counter are defined for each PIN. If the verification fails, the tries counter is decremented by one and an error status that contains the remaining attempts is returned by the application. When all available tries have failed, the PIN is blocked and can no longer be used. Note that a successful verification of the PIN resets its remaining tries counter to the maximum error counter.

The **Device Authentication** aims at authenticating both entities willing to communicate and securing the communication between the card and a service provider (it might be a terminal, a server, etc).

- Authentication Scheme: The smart card implements a mutual authentication scheme. This one relies either on 3DES or AES Cipher block and used to:

- Authenticate the terminal and the card.
- Generate two temporary keys that will be further used to compute session keys for the secure messaging in the subsequent commands.
- Initialize the counter used at each checksum computation.

o PACE Authentication: PACE establishes Secure Messaging between the ID-A application and a terminal based on weak (short) passwords:

- Strong session keys are provided independent of the strength of the password.
- The entropy of the password(s) used to authenticate the terminal can be very low (e.g., 6 digits are sufficient in general).

The detailed specification of the PACE protocol can be found in [ICAO9303]. As opposed to the original context in which PACE is used, i.e., before the application selection, the ID-A application simply considers the PACE protocol as another way to initiate secure messaging with the terminal. In other words, PACE is a precondition that may or may not be required before executing any command.

o EAC2 as defined in [TR-03110-2] which consists of two parts:

- Chip Authentication aims at authenticating the chip and initiates a secure communication channel to communicate. The protocol in Version 2 provides explicit authentication of the chip by verifying the authentication token and implicit authentication of the stored data by performing Secure Messaging using the new session keys.
- Terminal Authentication protocol uses the secure messaging established by the Chip Authentication Mechanism to protect the confidentiality and integrity of the sensitive data during their transmission from the TOE to the terminal. Therefore, Terminal Authentication can only be performed if Chip Authentication has been successfully executed.

The **Role Authentication** presents the procedure to authenticate an external entity to the card in order to associate to it a specific role (e.g. access rights). Two schemes may be used, relying either on 3DES, AES or RSA Cipher block. The following procedure describes:

o The cryptographic operation that allows the authentication

o The specification of the associated role in the card This feature is described in [IAS_ECC]. In ID-A, the Access conditions "Secure Messaging" mandates both a successful terminal authentication and an active secure messaging session. This security function manages authentication failure: when the "highest value in the configurable range of positive numbers fixed by the Administrator" unsuccessful authentication attempts have been met, the TSF shall block the RAD. This security functionality allows the following operations to be performed before the user is authenticated:

o Identification of the user,

o Establishing a trusted path between the HID and the TOE,

o Establishing a trusted channel between the SCA and the TOE,

o Establishing a trusted channel between the CGA and the TOE.

SF.APP_CRYPTO

This SF performs high level cryptographic operations:

o key generation:

- SF.APP_CRYPTO performs RSA CRT key generation of size 1024, 1536, 2048, 3072 and 4096 bits in conformance with RSA PKCS#1 v2.1.

- SF.APP_CRYPTO performs Elliptic curves key generation of size 192,224,256, 320, 384,512 and 521 bits in conformance with ANS X9.62.

o Digital signature generation:
- the signature generation function shall have an access condition based upon previous authentication of user.
- signature generation by using ECDSA algorithm with cryptographic key sizes of 192,224,256, 320, 384,512 and 521(provided by the cryptographic library of the Platform).
- signature generation by using RSA algorithm with cryptographic key sizes of 1024, 1536, 2048, 3072 and 4096 bits (provided by Platform).

o SCD/SVD key pair consistency check: SF.APP_CRYPTO performs SCD/SVD consistency check before signature generation by signature generation followed by signature verification. If the signature verification does not match the signature generation, then the key pair is not consistent.

o Key agreement using anonymous DH with key sizes 1024, 1536, 2048, 3072 and 4096 bits.

o PACE Authentication (IM and GM) with ECDH(192,224,256, 320,384, 512, 521 bits), AES(128 192 256 bits) and DES(128).

o Secure messaging (encryption and decryption) using:
- Triple DES in CBC mode (key size 112 bits).
- AES in CBC mode (key sizes 128,192,256 bits).

o Secure messaging (message authentication code) using:
- ISO/IEC 9797-1 algorithm 3 padding 2 (3DES) with key size 112 bits.
- AES CMAC with key sizes 128,192 and 256 bits.

o Ciphering Key Decryption using:
- RSA-OAEP SHA-1 and SHA-256, RSA PKCS#1v1.5 with key sizes 1024, 1536, 2048, 3072, and 4096 bits
- ECDH with key sizes 192, 224, 256, 320, 384, 512, and 521 bits

o Authentication cryptogram creation/verification: SF.APP_CRYPTO performs the following authentication cryptogram calculation/verification:
- Mutual authentication based on TDES or AES
- PACE authentication based on [ICAO9303]

o Random number generation that meet FCS_RNG.1 Quality metric for random numbers of [ST-PL].

o Client Server Authentication using RSA-PKCS#1v1.5 and RSA-PKCS#1v2.1

o Symmetric Role Authentication using TDES and AES

o Asymmetric Role authentication using RSA with ISO/IEC 9796-2 with SHA-1 SHA-224 SHA-256 SHA-384 or SHA-512 with key sizes 1024, 1536 or 2048 bits

o Symmetric Device Authentication using TDES and AES

o Certificate verification for IAS PKI using RSA

o Certificate verification foe EAS PKI using ECDSA

o Asymmetric Internal Device Authentication using RSA

o Asymmetric External Device Authentication using RSA

o EACv2 Terminal Authentication using ECDSA

o EACv2 Chip Authentication using ECDH

o Hashing algorithms SHA-1, SHA-224, SHA-256, SHA-384 and SHA-512

o GP Secret data encryption using SCP02 and SCP03.

- Symmetric Encryption and Decryption using AEC-CBC mode with key sizes 128, 192, 256 bits
- Data Hashing: SF.APP_CRYPTO performs SHA-1, SHA-224, SHA-256, SHA-384 and SHA-512 in conformance with NIST FIPS PUB 180-2, in order to calculate a hash value.
- Certificate Calculation and verification.
- RSA and ECC based key decipherment.

All cryptographic functionalities are provided by the platform (see [ST-PL].

SF.MANAGEMENT

This SF manages the access to objects (files, directories, data and secrets) stored in the ID-A file system. It also controls write access of initialization, pre-personalisation and personalisation data. This SF ensures secure management of secrets such as cryptographic keys. It also covers access to keys as well as secure key deletion. This SF controls all the operations relative to the RAD/VAD management, including the Cardholder (signatory) authentication:

- RAD creation: the RAD is stored and is associated to a maximum successful presentation number (usage counter) and to a maximum error number.
- VAD verification: the RAD can be accessed only if its format and integrity are correct and if the usage counter has not reached 0. If the RAD is blocked, then it cannot be used anymore until unblocked.
- RAD ratification counter: The number of authentication attempts is limited by a counter associated to the RAD. The counter is decremented each time the VAD verification fails. The RAD cannot be used any longer if the counter reaches zero.
- RAD usage counter: the usage counter is decremented each time the RAD is verified successfully. When this counter reaches 0, the RAD cannot be verified anymore.
- RAD modification: the RAD can be changed by the cardholder (loading a new value). The RAD is managed and stored by the application. The operations on RAD and VAD are performed thanks to services offered by the platform.

This SF manages the security environment of the application and:

- Maintains the roles (e.g. Signatory and Administrator).
- Controls if the authentication required for a specific operation has been performed with success.
- Manages restriction to security function access and to security attribute modification.
- Ensures that only secure values are accepted for security attributes. This security functionality restricts the ability to perform the function Signature creation SFP to Signatory. This security functionality ensures that only Administrator is authorized to
  - Modify Initialization SFP and Signature creation SFP attributes
  - Specify alternative default values

This SF provides the electronic signature application with access control and ensures that the following operations are executed by authorized roles:

- Export of SVD to CGA
- Generation of SCD/SVD pair by the Signatory
- Creation of RAD by the Administrator
- Signing of DTBS/R by S.Signatory

This SF manages Session key generation: Session keys are protected in integrity and confidentiality during generation. This SF enforces secure storage of the session keys during generation. This SF manages Secret destruction: This SF calls the security function of the JC Platform to erase keys.

This SF manages Secret loading: Loading of a secret is always done by an authorized user through a secure command. This command is accepted only after authentication of the authorized user.

This SF manages Secret transfer: This SF manages the secure transfer of every secret to the crypto processor when used for cryptographic operation. Access control is enforced by the APDU methods as specified in the interface defined in the functional specification.

SF.TRUSTED_CHANNEL

This SF realizes a secure communication channel to verify authenticity and integrity as well as securing confidentiality of user data between the TOE and other devices connected.

The ID-A Package performs the following secure messaging tasks with external applications (SCA, HID or CGA) for protection of the communication data as the DTBS, authentication data as the VAD or for ensuring the integrity of the SVD:

- PACE or mutual authentication or EAC2 or device authenthentication with privacy protection used to establish session keys for secure messaging.
- Encryption and decryption of the transmitted message.
- MAC generation and verification for secure messaging.
- ECDH key agreement.
- Secure hash computation.
- Random number generation.

This SF manages four modes of secure channel during the personalisation phase:

- No secure messaging
- Integrity mode
- Confidentiality mode
- Integrity and confidentiality mode

SF.APP_INTEGRITY

This security functionality monitors the integrity of sensitive user data and the integrity of the DTBS/R. The integrity of persistently stored data such as SCD, RAD and SVD is monitored using the platform features (see [ST-PL])). In case of integrity error this TSF will:

- Prohibit the use of the altered data, and
- Inform the S.Signatory about integrity error. This TSF also monitors the integrity of the access conditions of created data objects and also ensures that no residual information is available after a RAD update or clearance.

SF.RATIF

A counter is associated to a secret key, to a password and to the VAD, which is used to count the number of successive unsuccessful authentication attempts. The counter is reinitialised when the authentication is successful. If the counter reaches its maximum value, then the related secret is suspended or blocked and cannot be used anymore.

SF.ESERVICE

This security function enables to perform electronic services. It is active in phase 7. This security function offers the following electronic services:

- o C/S authentication
- o Decryption key decipherment
- o Certificate verification
- o Symmetric encryption and decryption

SF.ADM_AUTH

This security function manages the authentication of external entities by the TOE. It is only active in phase 7. This security function enables the TOE to authenticate external entities and may be either realized using symmetric or asymmetric cryptography. This security function manages as well the validation process of the role associated to the authentication key used by the external entity. Upon successful authentication, the associated role is authenticated. Each key is associated to an error counter (it may be infinite) which aims at ensuring its protecting against brute force attacks. Upon each wrong authentication, it decrements the error counter (if present), and restores it to its maximum value upon a successful authentication. When the error counter has reached '00', the security function blocks the usage of the key, and bans the authentication of the associated role. This security function allows the authentication of the following roles:

- o TOE_Administrator
- o User_Admin

10.2 SFRs and TSS

10.2.1 SFRs and TSS - Rationale

All SSCD parts

Protection of the TSF (FPT)

FPT_EMS.1 is met by SF.APP_INTEGRITY and SF.MANAGEMENT which ensure secure execution of cryptographic operations on keys.

FPT_FLS.1 is met by JC Platform and the IC that ensure that failures in the TSF are detected and that the proper actions (reset, card termination) are taken in order to preserve a secure sate of the TOE. It is also met by SF.APP_INTEGRITY that monitors the integrity of sensitive user data and the integrity of the DTBS/R.

FPT_PHP.1 is met by SF.APP_INTEGRITY, the JC Platform and the IC that ensure that physical tampering of the TOE is detected and that the proper actions (reset, card termination) are taken, so that is can be determined if a physical tampering has occurred.

FPT_PHP.3 is met by the JC Platform and the IC that ensures that physical tampering of the TOE is detected and that the proper actions (reset, card termination) in order to protect the TOE.It is also met by SF.APP_INTEGRITY that monitors the integrity of sensitive data.

FPT_TST.1 is met by JC Platform and the IC that performs a set of self-tests at start-up, thus checking the correct operation of the TSF, and that verifies the integrity of the stored

executable code before or during its execution and by SF.APP_INTEGRITY that provides means to verify the integrity of the data stored on the TOE.

Security management (FMT)

FMT_SMR.1 is met by SF.AUTHENTICATION that provides user authentication as administrator or as signatory and by SF.MANAGEMENT that grants to the administrator and to the signatory specific access rights, thus defining roles for the TOE.

FMT_SMF.1 requires that the TSF shall be capable of performing the following management functions: (1) Creation and modification of the reference authentication data (RAD), (2) Enabling the signature-creation function, (3) Modification of the security attribute SCD/SVD management, SCD operational, (4) Change the default value of the security attribute SCD Identifier, (5) none. This is realized by SF.MANAGEMENT.

FMT_MOF.1 is met by SF.MANAGEMENT and SF.AUTHENTICATION that ensures that only authenticated signatory can perform DTBS signature.

FMT_MSA.1/Admin is met by SF.AUTHENTICATION and SF.MANAGEMENT that manage the access right policy of the TOE.

FMT_MSA.1/Signatory is met by SF.AUTHENTICATION and SF.MANAGEMENT that manage the access right policy of the TOE.

FMT_MSA.2 is met by SF.AUTHENTICATION and SF.MANAGEMENT that manage the access right policy of the TOE and in particular manages the security attributes.

FMT_MSA.3 is met by SF.AUTHENTICATION and SF.MANAGEMENT that manage the access right policy of the TOE and in particular manage the security attributes, their initialisation and their access rights.

FMT_MSA.4 requires that the TSF shall use the following rules to set the value of security attributes: (1) if S.Admin successfully generates an SCD/SVD pair without S.Sigy being authenticated the security attribute 'SCD operational of the SCD' shall be set to 'no' as a single operation; (2) if S.Sigy successfully generates an SCD/SVD pair the security attribute 'SCD operational of the SCD' shall be set to 'yes' as a single operation. This is realized by SF.MANAGEMENT and SF.AUTHENTICATION.

FMT_MTD.1/Admin

- is met by SF.MANAGEMENT that manages the authentication function and ensure that only authenticated administrator can create the RAD.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/Signatory

- is met by SF.MANAGEMENT that manages the authentication function and ensure that only authenticated signatory can modify the RAD.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

Identification and authentication (FIA)

FIA_UID.1

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to autorized functions.

FIA_AFL.1

- This SFR is met by SF.AUTHENTICATION and SF.MANAGEMENT.
- This SFR is also met by SF.RATIF that ensures that the RAD is blocked after a defined number of failed successive signatory authentication attempts.

FIA_UAU.1

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to autorized functions.
- is met by SF.TRUSTED_CHANNEL that provides a trusted secure messaging with CGA and SCA.

User data protection (FDP)

FDP_SDI.2/DTBS is met by SF.APP_INTEGRITY, that ensures the integrity of data stored in the TOE, by the JC Platform and the IC that ensure that the proper reaction is taken (reset or card termination) if an integrity error is detected, so that the user knows an error had occurred and that no altered data can be used.

FDP_SDI.2/Persistent is met by SF.APP_INTEGRITY, that ensures the integrity of data stored in the TOE, by the JC Platform and the IC that ensure that the proper reaction is taken (reset or card termination) if an integrity error is detected, so that the user knows an error had occurred and that no altered data can be used.

FDP_RIP.1 is met by SF.MANAGEMENT that ensures erasure of data in FLASH and in RAM (e.g. after the signature creation process), and in particular of SCD, VAD and RAD.

FDP_ACC.1/Signature_Creation is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that all the access conditions are met before a dedicated operation can be performed, and in particular that only a user authenticated as signatory can perform signature of DTBS loading from an authorized SCA with a RSA key pair whose consistency has been verified, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_ACF.1/Signature_Creation is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that all the access conditions are met before a dedicated operation can be performed, and in particular that only a user authenticated as signatory can perform signature of DTBS loading from an authorized SCA with a RSA key pair whose consistency has been verified, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

Cryptographic support (FCS)

FCS_COP.1

- is met by SF.APP_CRYPTO that provides RSA key pair consistency check.
- is met by SF.APP_CRYPTO that provides electronic signature generation compliant with RSA PKCS#1 v2.1.
- is met by SF.APP_CRYPTO that provides TDES in CBC mode or AES in CBC mode for encryption and decryption.
- is met by SF.APP_CRYPTO that provides ISO/IEC 9797-1 algorithm 3 padding 2 (3DES) or CMAC (AES) for integrity.
- is met by SF.AUTHENTICATION that provides Symmetric and Asymmetric Mutual Authentications.
- is met by SF.TRUSTED_CHANNEL that provides secure messaging with CGA and SCA.
- is met by SF.APP_CRYPTO that provides Data Hashing.
- is met by SF.APP_CRYPTO that provides signtaure verification.
- is met by SF.AUTHENTICATION that provides PACE authentication, and
- is met by SF.APP_CRYPTO that provides TDES in CBC mode or AES in CBC mode for encryption and decryption.

- o is met by SF.TRUSTED_CHANNEL that provides secure messaging with CGA and SCA.
- o is met by SF.AUTHENTICATION that provides PACE authentication, and
- o is met by SF.APP_CRYPTO that provides TDES in CBC mode or AES in CBC mode for MAC calculation.
- o is met by SF.TRUSTED_CHANNEL that provides secure messaging with CGA and SCA.

FCS_CKM.4 is met by SF.MANAGEMENT, as SF.MANAGEMENT manages the secure destruction of secret, and in particular of the SCD.

SSCD parts 2, 4 and 5 only

Cryptographic support (FCS)

FCS_CKM.1

- o is met by SF.APP_CRYPTO that ensures that the TOE generates SCD/SVD cryptographic key pairs.
- o is also met by SF.APP_CRYPTO, which provides RSA calculation.
- o is also met by SF.MANAGEMENT, which ensures the protection of the keys during generation.

User data protection (FDP)

FDP_ACC.1/SVD_Transfer is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user can perform a dedicated operation, and in particular that only users authenticated as administrator or signatory can perform SVD export, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_ACF.1/SVD_Transfer is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user can perform a dedicated operation, and in particular that only users authenticated as administrator or signatory can perform SVD export, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_ACC.1/SCD/SVD_Generation is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user under specific conditions can perform a dedicated operation, and in particular that only users authenticated as administrator or signatory can perform SCD/SVD generation, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_ACF.1/SCD/SVD_Generation is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user under specific conditions can perform a dedicated operation, and in particular that only users authenticated as administrator or signatory can perform SCD/SVD generation, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

SSCD parts 3 and 6 only

Trusted path/channels (FTP)

FTP_ITC.1/SCD is met by SF.AUTHENTICATION and SF.MANAGEMENT that enforce the access right policy for SCD Import and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to set up a trusted channel between the TOE and a CSP to protect the exchanged data (SCD) from modification and disclosure.

User data protection (FDP)

FDP_UCT.1/SCD is met by SF.AUTHENTICATION and SF.MANAGEMENT that ensure that all the conditions are met before allowing a SCD import and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to protect the SCD from disclosure during its import.

FDP_ITC.1/SCD is met by SF.AUTHENTICATION and SF.MANAGEMENT that ensure that all the required conditions are met before allowing a SCD import operation.

FDP_ACC.1/SCD_Import is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user can perform a dedicated operation, and in particular that only users authenticated as administrator or signatory can perform SCD import, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_ACF.1/SCD_Import is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user can perform a dedicated operation, and in particular that only users authenticated as administrator or signatory can perform SCD import, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

SSCD part 4 only

Trusted path/channels (FTP)

FTP_ITC.1/SVD is met by SF.AUTHENTICATION and SF.MANAGEMENT that enforce the access right policy for SVD Transfer and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to set up a trusted channel between the TOE and a CGA to protect the exchanged data (SVD) from modification and disclosure.

User data protection (FDP)

FDP_DAU.2/SVD is met by SF.AUTHENTICATION and SF.TRUSTED_CHANNEL to ensure that exported SVD to the CGA is authenticated and unmodified.

Identification and authentication (FIA)

FIA_API.1

- The TOE supports RSA calculations in order to generate signatures (SF.APP_CRYPTO).
- The TOE supports the establishment of a trusted channel/path based on 3DES or AES mutual authentication with negotiation of symmetric cryptographic keys used for the protection of the communication data with respect to confidentiality and integrity (SF.TRUSTED_CHANNEL, SF.APP_CRYPTO).

SSCD parts 5 and 6 only

User data protection (FDP)

FDP_UIT.1/DTBS requires that integrity of the DTBS/R to be signed is to be verified, as well as the DTBS/R is not altered by the TOE. This is provided by the trusted channel integrity verification mechanisms (SF.TRUSTED_CHANNEL, SF.APP_CRYPTO).

Trusted path/channels (FTP)

FTP_ITC.1/VAD is met by SF.AUTHENTICATION, SF.MANAGEMENT that enforce the access right policy for VAD transfer and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to set up a trusted channel between the TOE and a HID to protect the exchanged data (VAD) from modification and disclosure.

FTP_ITC.1/DTBS is met by SF.AUTHENTICATION and SF.MANAGEMENT that enforce the access right policy for DTBS Import and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to set up a trusted channel between the TOE and a SCA to protect the exchanged data (DTBS) from modification and disclosure.

Additional SFRs

FCS_RNG.1

- is met by SF.APP_CRYPTO and SF.AUTHENTICATION.

FCS_CKM.1/DH_PACE

- is met by SF.APP_CRYPTO that ensures that the TOE generates SCD/SVD cryptographic key pairs for PACE.
- is also met by SF.APP_CRYPTO, which provides DH calculation.
- is also met by SF.MANAGEMENT, which ensures the protection of the keys during generation.

FIA_UID.1/PACE

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to authorized functions.

FIA_UAU.1/PACE

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to authorized functions.
- is met by SF.TRUSTED_CHANNEL that provides a trusted secure messaging with CGA and SCA.

FIA_UAU.4/PACE

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to authorized functions.

- is met by SF.TRUSTED_CHANNEL that provides a trusted secure messaging with CGA and SCA.

FIA_UAU.5/PACE

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to authorized functions.
- is met by SF.TRUSTED_CHANNEL that provides a trusted secure messaging with CGA and SCA.

FIA_UAU.6/PACE

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to authorized functions.
- is met by SF.TRUSTED_CHANNEL that provides a trusted secure messaging with CGA and SCA.

FIA_UAU.6/CA

- is met by SF.AUTHENTICATION and SF.MANAGEMENT that provide user identification and user authentication prior to enabling access to authorized functions.
- is met by SF.TRUSTED_CHANNEL that provides a trusted secure messaging with CGA and SCA.

FIA_AFL.1/PACE

- This SFR is met by SF.AUTHENTICATION and SF.MANAGEMENT.
- This SFR is also met by SF.RATIF that ensures that the PIN or PUK is suspended after a defined number of failed successive signatory PACE authentication attempts.
- This SFR is also met by SF.RATIF that ensures that the PIN or PUK is blocked after a defined number of failed successive signatory PACE authentication attempts.
- This SFR is also met by SF.RATIF that ensures that the PIN, PUK or CAN is suspended until the next successful authentication attempt by an configurable amount of time after a defined number of failed signatory PACE authentication attempts.

FIA_API.1/CA

- The TOE supports the establishment of a trusted channel/path based on 3DES or AES mutual authentication with negotiation of cryptographic keys used for the protection of the communication data with respect to confidentiality and integrity (SF.TRUSTED_CHANNEL, SF.APP_CRYPTO).

FDP_ACC.1/TRM

- is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user under specific conditions can perform a dedicated operation, and in particular that only users authenticated as authenticated terminal, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_ACF.1/TRM

- o is met by SF.MANAGEMENT, SF.AUTHENTICATION that ensure that only an authorized user under specific conditions can perform a dedicated operation, and in particular that only users authenticated as authenticated terminal, and by SF.MANAGEMENT, which verify that each received command security status is consistent with the security status of the TOE.

FDP_UCT.1/TRM

- o is met by SF.AUTHENTICATION and SF.MANAGEMENT that ensure that all the conditions are met before allowing user data transmision and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to protect user data from disclosure during its import.

FDP_UIT.1/TRM requires that integrity of user data to be authenticated. This is provided by the trusted channel integrity verification mechanisms (SF.TRUSTED_CHANNEL, SF.APP_CRYPTO).

FTP_ITC.1/PACE

- o is met is met by SF.AUTHENTICATION and SF.MANAGEMENT that enforce the access right policy for data exchange between the TOE and a PACE terminal and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to set up a trusted channel between the TOE and a PACE terminal to protect the exchanged data from modification and disclosure.

FMT_SMR.1/PACE

- o is met by SF.AUTHENTICATION that provides user authentication for PACE and by SF.MANAGEMENT that grants to the users specific access rights, thus defining roles for the TOE.

FMT_MTD.1/CVCA_INI

- o is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated personalisation agent can write initial CVCA (public key, meta-data of the certificate, current date).
- o is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/CVCA_UPD

- o is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated Country Verifying Certification Authority can update CVCA (public key, meta-data of the certificate).
- o is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/DATE

- o is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated users (Country Verifying Certification Authority, Document Verifier or EAC2 terminal) can modify the current date of CVCA.
- o is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/PA

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated personalisation agent can write SOC and SOD selected in Access Control SFP.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/SK_PICC

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated personalisation agent can load SKPICC selected in Access Control SFP.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/KEY_READ

- is met by SF.MANAGEMENT that manages the authentication function and ensures that none can read PACE passwords and SKPICC.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/Initialize_PIN

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated authenticated personalisation agent can write PIN, PUK and CAN, selected in Access Control SFP.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/Resume_PIN

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated electronic document holder can resume suspended PIN selected in Access Control SFP.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/Change_PIN

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated users (electronic document holder or an authorized terminal) can change blocked PIN selected in Access Control SFP.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/Unblock_PIN

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated users (electronic document holder or an authorized terminal) can unblock blocked PIN selected in Access Control SFP.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/TOE State is met by SF.MANAGEMENT and SF.ADM_AUTH.

FMT_MTD.3

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only secure values are accepted for TSF data of the Terminal Authentication protocol 2 and the Access Control SFP.

FMT_MTD.1/INI_ENA

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated Manufacturer can write Initialisation Data and Pre-personalisation Data.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FMT_MTD.1/INI_DIS

- is met by SF.MANAGEMENT that manages the authentication function and ensures that only authenticated Personalisation Agent can read out Initialisation Data and Pre-personalisation Data.
- is met by SF.AUTHENTICATION that provides the authentication protocol.

FTP_ITC.1/CA2

- is met is met by SF.AUTHENTICATION and SF.MANAGEMENT that enforce the access right policy for data exchange between the TOE and an EAC2 terminal and by SF.TRUSTED_CHANNEL, SF.APP_CRYPTO that provide cryptographic means to set up a trusted channel between the TOE and an EAC2 terminal to protect the exchanged data from modification and disclosure.

FMT_LIM.1

- is met by SF.MANAGEMENT and SF.AUTHENTICATION.

FMT_LIM.2

- is met by SF.MANAGEMENT and SF.AUTHENTICATION.

10.2.2 Association tables of SFRs and TSS

Security Functional Requirements	TOE Summary Specification
FPT_EMS.1	SF.APP_INTEGRITY, SF.MANAGEMENT
FPT_FLS.1	SF.APP_INTEGRITY
FPT_PHP.1	SF.APP_INTEGRITY
FPT_PHP.3	SF.APP_INTEGRITY
FPT_TST.1	SF.APP_INTEGRITY
FMT_SMR.1	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_SMF.1	SF.MANAGEMENT
FMT_MOF.1	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MSA.1/Admin	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MSA.1/Signatory	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MSA.2	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MSA.3	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MSA.4	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MTD.1/Admin	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MTD.1/Signatory	SF.MANAGEMENT, SF.AUTHENTICATION

FIA_UID.1	SF.AUTHENTICATION, SF.MANAGEMENT
FIA_AFL.1	SF.MANAGEMENT, SF.AUTHENTICATION, SF.RATIF
FIA_UAU.1	SF.AUTHENTICATION, SF.MANAGEMENT, SF.TRUSTED_CHANNEL
FDP_SDI.2/DTBS	SF.APP_INTEGRITY
FDP_SDI.2/Persistent	SF.APP_INTEGRITY
FDP_RIP.1	SF.MANAGEMENT
FDP_ACC.1/Signature_Creation	SF.MANAGEMENT, SF.AUTHENTICATION
FDP_ACF.1/Signature_Creation	SF.MANAGEMENT, SF.AUTHENTICATION
FCS_COP.1	SF.APP_CRYPTO, SF.AUTHENTICATION, SF.TRUSTED_CHANNEL
FCS_CKM.4	SF.MANAGEMENT
FCS_CKM.1	SF.APP_CRYPTO, SF.MANAGEMENT
FDP_ACC.1/SVD_Transfer	SF.MANAGEMENT, SF.AUTHENTICATION
FDP_ACF.1/SVD_Transfer	SF.MANAGEMENT, SF.AUTHENTICATION
FDP_ACC.1/SCD/SVD_Generation	SF.MANAGEMENT, SF.AUTHENTICATION
FDP_ACF.1/SCD/SVD_Generation	SF.MANAGEMENT, SF.AUTHENTICATION
FTP_ITC.1/SCD	SF.MANAGEMENT, SF.APP_CRYPTO, SF.TRUSTED_CHANNEL, SF.AUTHENTICATION
FDP_UCT.1/SCD	SF.TRUSTED_CHANNEL, SF.APP_CRYPTO, SF.AUTHENTICATION, SF.MANAGEMENT
FDP_ITC.1/SCD	SF.MANAGEMENT, SF.AUTHENTICATION
FDP_ACC.1/SCD_Import	SF.MANAGEMENT, SF.AUTHENTICATION
FDP_ACF.1/SCD_Import	SF.MANAGEMENT, SF.AUTHENTICATION
FTP_ITC.1/SVD	SF.MANAGEMENT, SF.TRUSTED_CHANNEL, SF.APP_CRYPTO, SF.AUTHENTICATION
FDP_DAU.2/SVD	SF.AUTHENTICATION, SF.TRUSTED_CHANNEL
FIA_API.1	SF.APP_INTEGRITY, SF.TRUSTED_CHANNEL
FDP_UIT.1/DTBS	SF.TRUSTED_CHANNEL, SF.APP_CRYPTO
FTP_ITC.1/VAD	SF.TRUSTED_CHANNEL, SF.APP_CRYPTO, SF.AUTHENTICATION, SF.MANAGEMENT
FTP_ITC.1/DTBS	SF.TRUSTED_CHANNEL, SF.APP_CRYPTO, SF.MANAGEMENT, SF.AUTHENTICATION
FCS_RNG.1	SF.APP_CRYPTO, SF.AUTHENTICATION
FCS_CKM.1/DH_PACE	SF.APP_CRYPTO, SF.MANAGEMENT, SF.ESERVICE
FIA_UID.1/PACE	SF.AUTHENTICATION, SF.MANAGEMENT
FIA_UAU.1/PACE	SF.AUTHENTICATION, SF.MANAGEMENT, SF.TRUSTED_CHANNEL
FIA_UAU.4/PACE	SF.AUTHENTICATION, SF.MANAGEMENT,

	SF.TRUSTED_CHANNEL
FIA_UAU.5/PACE	SF.AUTHENTICATION, SF.MANAGEMENT, SF.TRUSTED_CHANNEL
FIA_UAU.6/PACE	SF.AUTHENTICATION, SF.MANAGEMENT, SF.TRUSTED_CHANNEL
FIA_UAU.6/CA	SF.AUTHENTICATION, SF.MANAGEMENT, SF.TRUSTED_CHANNEL
FIA_AFL.1/PACE	SF.AUTHENTICATION, SF.MANAGEMENT, SF.RATIF
FIA_API.1/CA	SF.TRUSTED_CHANNEL, SF.APP_CRYPTO
FDP_ACC.1/TRM	SF.AUTHENTICATION, SF.MANAGEMENT
FDP_ACF.1/TRM	SF.AUTHENTICATION, SF.MANAGEMENT
FDP_UCT.1/TRM	SF.TRUSTED_CHANNEL, SF.AUTHENTICATION, SF.APP_CRYPTO, SF.MANAGEMENT
FDP_UIT.1/TRM	SF.TRUSTED_CHANNEL, SF.APP_CRYPTO
FTP_ITC.1/PACE	SF.MANAGEMENT, SF.APP_CRYPTO, SF.TRUSTED_CHANNEL, SF.AUTHENTICATION
FMT_SMR.1/PACE	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/CVCA_INI	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/CVCA_UPD	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/DATE	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/PA	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/SK_PICC	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/KEY_READ	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/Initialize_PIN	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/Resume_PIN	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/Change_PIN	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/Unblock_PIN	SF.AUTHENTICATION, SF.MANAGEMENT
FMT_MTD.1/TOE State	SF.MANAGEMENT, SF.ADM_AUTH
FMT_MTD.3	SF.AUTHENTICATION
FMT_MTD.1/INI_ENA	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_MTD.1/INI_DIS	SF.AUTHENTICATION, SF.MANAGEMENT
FTP_ITC.1/CA2	SF.MANAGEMENT, SF.APP_CRYPTO, SF.TRUSTED_CHANNEL, SF.AUTHENTICATION
FMT_LIM.1	SF.MANAGEMENT, SF.AUTHENTICATION
FMT_LIM.2	SF.MANAGEMENT, SF.AUTHENTICATION

Table 26 SFRs and TSS - Coverage

TOE Summary Specification	Security Functional Requirements
SF.AUTHENTICATION	FCS_RNG.1, FIA_UID.1/PACE, FIA_UAU.1/PACE, FIA_UAU.4/PACE, FIA_UAU.5/PACE, FIA_UAU.6/PACE, FIA_UAU.6/CA, FIA_AFL.1/PACE, FDP_ACC.1/TRM, FDP_ACF.1/TRM, FDP_UCT.1/TRM, FTP_ITC.1/PACE, FMT_SMR.1/PACE, FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.3, FMT_MTD.1/INI_ENA, FMT_MTD.1/INI_DIS, FTP_ITC.1/CA2, FMT_LIM.1, FMT_LIM.2, FMT_SMR.1, FMT_MOF.1, FMT_MSA.1/Admin, FMT_MSA.1/Signatory, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4, FMT_MTD.1/Admin, FMT_MTD.1/Signatory, FIA_UID.1, FIA_AFL.1, FIA_UAU.1, FDP_ACC.1/Signature_Creation, FDP_ACF.1/Signature_Creation, FCS_COP.1, FDP_ACC.1/SVD_Transfer, FDP_ACF.1/SVD_Transfer, FDP_ACC.1/SCD/SVD_Generation, FDP_ACF.1/SCD/SVD_Generation, FTP_ITC.1/SCD, FDP_UCT.1/SCD, FDP_ITC.1/SCD, FDP_ACC.1/SCD_Import, FDP_ACF.1/SCD_Import, FTP_ITC.1/SVD, FDP_DAU.2/SVD, FTP_ITC.1/VAD, FTP_ITC.1/DTBS
SF.APP_CRYPTO	FCS_RNG.1, FCS_CKM.1/DH_PACE, FIA_API.1/CA, FDP_UCT.1/TRM, FDP_UIT.1/TRM, FTP_ITC.1/PACE, FTP_ITC.1/CA2, FCS_COP.1, FCS_CKM.1, FTP_ITC.1/SCD, FDP_UCT.1/SCD, FTP_ITC.1/SVD, FDP_UIT.1/DTBS, FTP_ITC.1/VAD, FTP_ITC.1/DTBS
SF.MANAGEMENT	FCS_CKM.1/DH_PACE, FIA_UID.1/PACE, FIA_UAU.1/PACE, FIA_UAU.4/PACE, FIA_UAU.5/PACE, FIA_UAU.6/PACE, FIA_UAU.6/CA, FIA_AFL.1/PACE, FDP_ACC.1/TRM, FDP_ACF.1/TRM, FDP_UCT.1/TRM, FTP_ITC.1/PACE, FMT_SMR.1/PACE, FMT_MTD.1/CVCA_INI, FMT_MTD.1/CVCA_UPD, FMT_MTD.1/DATE, FMT_MTD.1/PA, FMT_MTD.1/SK_PICC, FMT_MTD.1/KEY_READ, FMT_MTD.1/Initialize_PIN, FMT_MTD.1/Resume_PIN, FMT_MTD.1/Change_PIN, FMT_MTD.1/Unblock_PIN, FMT_MTD.1/TOE State, FMT_MTD.1/INI_ENA, FMT_MTD.1/INI_DIS, FTP_ITC.1/CA2, FMT_LIM.1, FMT_LIM.2, FPT_EMS.1, FMT_SMR.1, FMT_SMF.1, FMT_MOF.1, FMT_MSA.1/Admin, FMT_MSA.1/Signatory, FMT_MSA.2, FMT_MSA.3, FMT_MSA.4, FMT_MTD.1/Admin, FMT_MTD.1/Signatory, FIA_UID.1, FIA_AFL.1, FIA_UAU.1, FDP_RIP.1, FDP_ACC.1/Signature_Creation, FDP_ACF.1/Signature_Creation, FCS_CKM.4,

	FCS_CKM.1, FDP_ACC.1/SVD_Transfer, FDP_ACF.1/SVD_Transfer, FDP_ACC.1/SCD/SVD_Generation, FDP_ACF.1/SCD/SVD_Generation, FTP_ITC.1/SCD, FDP_UCT.1/SCD, FDP_ITC.1/SCD, FDP_ACC.1/SCD_Import, FDP_ACF.1/SCD_Import, FTP_ITC.1/SVD, FTP_ITC.1/VAD, FTP_ITC.1/DTBS
SF.TRUSTED_CHANNEL	FIA_UAU.1/PACE, FIA_UAU.4/PACE, FIA_UAU.5/PACE, FIA_UAU.6/PACE, FIA_UAU.6/CA, FIA_API.1/CA, FDP_UCT.1/TRM, FDP_UIT.1/TRM, FTP_ITC.1/PACE, FTP_ITC.1/CA2, FIA_UAU.1, FCS_COP.1, FTP_ITC.1/SCD, FDP_UCT.1/SCD, FTP_ITC.1/SVD, FDP_DAU.2/SVD, FIA_API.1, FDP_UIT.1/DTBS, FTP_ITC.1/VAD, FTP_ITC.1/DTBS
SF.APP_INTEGRITY	FPT_EMS.1, FPT_FLS.1, FPT_PHP.1, FPT_PHP.3, FPT_TST.1, FDP_SDI.2/DTBS, FDP_SDI.2/Persistent, FIA_API.1
SF.RATIF	FIA_AFL.1/PACE, FIA_AFL.1
SF.ESERVICE	FCS_CKM.1/DH_PACE
SF.ADM_AUTH	FMT_MTD.1/TOE State

Table 27 TSS and SFRs - Coverage