Bundesamt
für Sicherheit in der
Informationstechnik

Common Criteria Protection Profile
Security Module Card Type B (PP-SMC-B)

Common Criteria

BSI-CC-PP-0053-V2

Approved by the
Federal Ministry of Health

Bundesamt für Sicherheit in der Informationstechnik

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Foreword

This ‘Protection Profile — Security Module Card Type B (PP-SMC Type B)’ is issued by Bundesamt für Sicherheit in der Informationstechnik, Germany.

The document has been prepared as a Protection Profile (PP) following the rules and formats of Common Criteria version 3.1, Revision 3 [1], [2], [3] with final interpretations of the CCIMB.

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1 PP Introduction

There exists the following Protection Profile for the Security Module Card Type B:

- "Common Criteria Protection Profile Security Module Card Type B (PP-SMC-B)", BSI-CC-PP-0053, version 2.5 from 21.April 2009.
  This Protection Profile has been prepared according the "Specification German Health Professional Card and Security Module Card"(version 2.3.0 from 04.07.2008) following the rules and formats of Common Criteria Version 2.3.

The "Common Criteria Protection Profile Security Module Card Type B (PP-SMC-B)", BSI-CC-PP-0053-V2, version 1.2 from 17.November 2009, is prepared following the rules and formats of Common Criteria Version 3.1, Revision 3.

1.1 PP reference

1	Title:	Protection Profile — Security Module Card Type B (PP-SMC-B))
	Sponsor:	Bundesamt für Sicherheit in der Informationstechnik
	Editors:	Wolfgang Killmann, Dr. Alla Gnedina, Jens Kroder, T-Systems GEI GmbH
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	Version Number:	1.2
	Registration:	BSI-CC-PP-0053-V2
	Keywords:	electronic health card, security module card

1.2 TOE Overview

2 The protection profile defines the security objectives and requirements for the electronic **Security Module Card Type B** (SMC-B, German: “Sicherheitsmodul-Karte Typ B”) based on the regulations for the German health care system. It address the security services provided by this card, mainly:

- Authentication of the cardholder by use of a PIN,
- Card-to-Card Authentication between the Security Module Card Type B (SMC-B) and a Health Professional Card (HPC) or an electronic Health Card (eHC) or another Security Module Cards with and without establishment of a trusted channel,
- Document key decipherment for an external application,

- Client-server authentication for a client,
- Creation of electronic signature for the cardholder.

3 The Target of Evaluation (TOE) is the Security Module Card Type B. The SMC-B is a contact based smart card, which is conformant to the specification documents [20], [22]. The physical characteristics shall comply with ISO/IEC 7816-1 and related standards.

4 The **TOE** comprises of

TOE_IC, consisting of:

- the circuitry of the SMC's chip (the integrated circuit, IC) and
- the IC Dedicated Software with the parts IC Dedicated Test Software and IC Dedicated Support Software

TOE_ES

- the IC Embedded Software (operating system)

TOE_APP

- the SMC Type B applications (data structures and their content)

and

TOE_GD

- the guidance documentation delivered together with the TOE.

5 The **TOE** provides the following main security services:

(1) Authentication of the cardholder by use of a PIN,

(2) Access control for the functions (3) to (9) listed below,

(3) Asymmetric card-to-card authentication between the SMC Type B and an eHC, a HPC or an SMC without establishment of a trusted channel,

(4) Asymmetric card-to-card authentication between the SMC Type B and a HPC or an SMC with establishment of a trusted channel, possibly with storage of introduction keys,

(5) Support of secure messaging by means encryption of data, decryption of data, generation of MAC and verification of MAC,

(6) Creation of digital signatures,

(7) Document key decipherment and transcipherment,

(8) Client-server authentication,

(9) Terminal Support Service including random number generation, storage of and cryptographic operation with a private key for TLS protocol ad storage of configuration data and network data.

1.2.1 TOE usage and security features for operational use

6 The **TOE** is used by an institution which is under control of an individual acting as accredited health profession in a health care environment

(1) to support medical assistants, pharmaceutical staff and other persons under control of a health professional using HPC to get access to data eHC,

(2) to support trusted channel in interaction with other smart cards,

(3) to provide services as creation of digital signatures for documents and for TLS protocol, decryption and client-server authentication for the health institution.

7 The following list provides an overview of the security services provided by the SMC-B during the usage phase. These security services together with the functions for the initialization and the personalization build the TSF scope of control. In order to refer to these services later on, short identifiers are defined:

8 **Service_User_Auth_PIN**: The human user authenticates himself with his PIN.

This service is meant for authentication of the human user to authorize access to services Service_Elec_Signature, Service_Client_Server_Auth and Service_Key_Decryption. In addition it provides privacy protection because certain data in the card (or secured by the card) can only be accessed after user authentication ([20], Chapter 7).

Functions to change the PIN or to unblock the PIN (reset the retry counter), when it was blocked (because of successive false PIN entries), are supporting this service. For the latter the PIN unblocking code (PUK) is used, this authentication will be called **Service_User_Auth_PUK**.

9 **Service_Asym_Mut_Auth_w/o_SK[1]**: Authentication of technical user using asymmetric techniques between the SMC, eHC or HPC without agreement of a symmetric key (cf. [20], chapter 15).

This service of the SMC-B includes two independent parts (a) the verification of an authentication attempt of an external entity by means of the commands GET CHALLENGE and EXTERNAL AUTHENTICATE and (b) the command INTERNAL AUTHENTICATE to authenticate themselves to an external entity (cf. to [20], 15.1.2, 15.2 for details). The algorithmic identifier '*rsaRoleCheck*' is used for the command EXTERNAL AUTHENTICATE and '*rsaRoleAuthentication*' is used for the command INTERNAL AUTHENTICATE (cf. for details to [20], section 15).

10 **Service_Asym_Mut_Auth_with_SM**: Mutual Authentication using asymmetric techniques between the SMC-B and a HPC with agreement of symmetric secure messaging keys and establishment of a secure messaging channel after successful authentication as receiver of secured

[1] The Abbreviation SK here stands for symmetric key used for establishing Secure Messaging, which is the card security protocol realising a trusted channel.

commands and sending of secured responses. The keys of a secure messaging channel are stored temporarily. This service runs a protocol in two linked together parts (a) the command INTERNAL AUTHENTICATE to authenticate themselves to an external entity and (b) the verification of an authentication attempt of an external entity by means of the commands GET CHALLENGE and EXTERNAL AUTHENTICATE (cf. for details to [20], 15.4.4). This service uses the commands INTERNAL AUTHENTICATE and EXTERNAL AUTHENTICATE with algorithmic identifier '*rsaSessionkey4SM*'.

11 **Service_Asym_Mut_Auth_with_TC**: Mutual Authentication using asymmetric techniques between the SMC-B and a HPC, SMC or eHC[2], with establishment of a trusted channel keys after successful authentication. The TOE supports secure messaging by means encryption of data, decryption of data, generation of MAC and verification of MAC.

This service of the SMC-B runs a protocol in two linked together parts (a) the command INTERNAL AUTHENTICATE to authenticate themselves to an external entity and (b) the verification of an authentication attempt of an external entity by means of the commands GET CHALLENGE and EXTERNAL AUTHENTICATE (cf. for details to [20], 15.4.4). This service uses the commands INTERNAL AUTHENTICATE and EXTERNAL AUTHENTICATE with algorithmic identifier '*rsaSessionkey4TC*' (cf. for details to [20], section 15) to establish symmetric keys of type *desSessionkey4TC* for PSO: ENCIPHER, PSO: DECIPHER PSO: COMPUTE CRYPTOGRAPHIC CHECKSUM and PSO: VERIFY CRYPTOGRAPHIC CHECKSUM.

12 **Service_Asym_Mut_Auth_with_Intro**: Mutual Authentication using asymmetric techniques between the HPC and a SMC-B with storage of introduction keys after successful authentication (cf. for details to [21], sec 6.1.4).

This service is meant for situations, where the SMC-B frequently interacts with a manageable number of HPCs, SMC-Bs and SMC-Ks. In the context of the so called "Round of introduction" a mutual authentication with negotiation of session keys is executed; these sessions keys will be stored in a persistent way as „Introduction Keys" after successful authentication. The agreed introduction keys belong individually to the corresponding authentication keys. The CHR of the involved certificate is stored as key reference after adjusting the index (first byte of CHR) to the computed key material. This service runs a protocol similar to the Service_Asym_Mut_Auth_with_SM, but the algorithmic identifier is '*rsaSessionkey4Intro*' for both authentication commands (cf. for details to [21], section 7.1.3) in order to request storage of the resulting keys. The authentication related data contain data elements for key computation. The symmetric introduction keys, which are stored this way, will be used as the asymmetric keys for agreement of symmetric trusted channel keys that were involved in the authentication procedure. Thus, an introduction object inherits certain information of the public key certificate as well as security-related properties of the private key.

[2] Note the agreement of introduction keys is intended for smart cards often working together as SMC-B and HBA but not eHC. Nevertheless this combination is possible. The SMC specification [22], sec. 6.3.11, states "PrK.SMC.AUTR_CVC is the global private key for C2C-authentication between SMC/eGK" and in table 78 the algid "rsaRoleAuthentication, rsaSessionkey4SM" are defined. Typically only rsaRoleAuthentication will be used. "rsaSessionkey4SM" makes no sense because the eHC cannot send secure messaging commands. It should be "rsaSessionkey4TC" in order to generate secured command for the eHC as reciever.

13 **Service_Sym_Mut_Auth_with_TC**: Mutual Authentication using symmetric techniques between the SMC-B[3] and an external entity with establishment of symmetric keys for secure massaging, where the TOE is the sender of the secured commands and the receiver of the secured responses.

If the TOE and a certain SMC have been introduced to each other before, i.e. had performed Service_Asym_Mut_Auth_with_Intro, then both cards can perform a symmetric authentication by using the shared introduction keys. During a successful symmetric authentication the security status "Successful verification of the SMC role identifier" is set, since the verified role identifier, the used key identifier and the access rule of the private key have been assigned to the introduction keys during the successful asymmetric authentication.

According to the protocol of this service, there are two versions of command sequences: (i) for SMC/eHC communication (cf. [20], sec. 15.4.1) (ii) SMC/HPC communication (cf. [20], sec. 15.4.2). For SMC/eHC communication the command MUTUAL AUTHENTICATE with algorithmic identifier '*desSessionkey4TC*' is received by the eHC to authenticate the SMC, to authenticate itself to the SMC and simultaneously to agree the session keys. For SMC/HPC communication firstly the command INTERNAL AUTHENTICATE with algorithmic identifier set to '*desSessionkey4TC*' (by MSE) is received by the SMC to authenticate itself to an external entity and simultaneously determine a random number, which is included in the response data. Secondly the verification of an authentication attempt of an external entity is done by means of the command EXTERNAL AUTHENTICATE with algorithmic identifier '*desSessionkey4TC*'.

A successful verification sets in the HPC and SMC-B the security status "CHA with role ID 'xx' successfully presented". A trusted channel has been established, i.e. data can be transferred to and from the HPC and SMC-B in secure messaging mode.

14 **Service_SM_Support**: The SMC-B service intermediates between an application communication in plain text and a remote smart card (e.g. HPC) communicating by means of secure messaging or encryption or using MAC. The TOE provides (i) the encryption of plaintext with the secure messaging encryption key by means of command PSO.ENCIPHER, (ii) the decryption of cipher text with the secure messaging encryption key by means of command PSO.DECIPHER, (iii) the MAC generation, i. e. the production of secured commands with cryptographic checksum data objects and with cryptogram data objects using the secure messaging encryption key by means of command PSO: COMPUTE CRYPTOGRAPHIC CHECKSUM, and (iv) the MAC verification i. e. processing of secured responses where these keys are established by card-to-card authentication with the secure messaging MAC key by means of command PSO: VERIFY CRYPTOGRAPHIC CHECKSUM.[4]

[3] Note the SMC specification [22], sec. 6.3.11, states "PrK.SMC.AUTR_CVC is the global private key for C2C-authentication between SMC/eGK" and in table 78 the algid "rsaRoleAuthentication, rsaSessionkey4SM" are defined. But "rsaSessionkey4SM" makes no sense because the eHC cannot send secure messaging commands. It should be "rsaSessionkey4TC" in order to generate secured command for the eHC.

[4] Note the use of ENVELOP command is optional (cf. [22], sec. 5.9.6 and 5.9.7, and therefore not addressed in this protection profile.

15 **Service_Sym_Mut_Auth_with_SM**: Mutual Authentication using symmetric techniques between the SMC-B and an external entity with establishment of symmetric keys for secure massaging, where the TOE is the receiver of the secured commands and sending secured responses.

If the SMC-B and a certain other SMC have been introduced to each other before, i.e. had performed Service_Asym_Mut_Auth_with_Intro, then both cards can perform a symmetric authentication by using the shared introduction keys. During a successful symmetric authentication the security status “Successful verification of the SMC role identifier” is set, since the verified role identifier, the used key identifier and the access rule of the private key have been assigned to the introduction keys during the successful asymmetric authentication.

According to the protocol of this service, firstly the command INTERNAL AUTHENTICATE with algorithmic identifier set to ‘*desSessionkey4SM*‘ (by MSE) is received by the SMC to authenticate itself to an external entity and simultaneously determine a random number, which is included in the response data. Secondly the verification of an authentication attempt of an external entity is done by means of the command EXTERNAL AUTHENTICATE with algorithmic identifier ‘*desSessionkey4SM*’.

A successful verification sets in the SMC the security status “CHA with role ID 'xx' successfully presented”. A trusted channel has been established, i.e. data can be transferred to the SMC in secure messaging mode.

16 **Service_Elec_Signature**: The SMC-B implements a PKI application, which in particular makes it possible to use the TOE as a signature-creation device for digital signatures. The cardholder authenticates himself with his PIN in order to access this service.

17 **Service_Client_Server_Auth**: The SMC-B implements a PKI application, which in particular allows using the TOE as an authentication token for a client/server authentication (by means of an asymmetric method using X.509 certificates). The cardholder authenticates himself with his PIN in order to access this service.

This service may for example be useful if the cardholder wants to access a server provided by the health insurance organisation, where confidential data of the cardholder are managed. So it can also be seen as an additional privacy feature.

18 **Service_Key_Decryption**: The SMC-B implements a PKI application, which in particular allows usage of the TOE as a data decryption token for Document Cipher Key Decipherment ([21], section 10.7) and Document Cipher Key Transcipherment. Symmetric document encipherment keys, which are themselves encrypted with the Cardholders Public Key can only be decrypted with the help of the card. The cardholder authenticates himself once with his global PIN in order to access this service.

This is meant for situations, where confidential data are stored on a server, but shall only be accessible with the cardholder’s permission. So it can also be seen as a privacy feature.

19 **Terminal Support Service**: The SMC-B provides random number generation and support for establishing TLS channels for the operational environment.

20 In detail the functionality of the SMC-B is defined in the specifications:

Specification German Health Professional Card and Security Module Card - Part 1: Commands, Algorithms and Functions of the COS Platform, Version 2.3.0, 04.07.2008, Bundesärztekammer, Kassenärztliche Bundesvereinigung, Bundeszahnärztekammer, Bundespsychotherapeutenkammer, Kassenzahnärztliche Bundesvereinigung, Bundesapothekerkammer, Deutsche Krankenhaus-Gesellschaft

Specification German Health Professional Card and Security Module Card - Part 3: SMC Applications and Functions, Version 2.3.0, 04.07.2008, Bundesärztekammer, Kassenärztliche Bundesvereinigung, Bundeszahnärztekammer, Bundespsychotherapeutenkammer, Kassenzahnärztliche Bundesvereinigung, Bundesapothekerkammer, Deutsche Krankenhaus-Gesellschaft

21 **Application note 1:** The TOE may provide an additional service for symmetric authentication e.g. as described in [20] for communication between SMC and server which is mentioned as option for the communication between the SMC and the Card Application Management System. The SMC specification [20] and [22] does not specify a Card Application Management System for the SMC administration in the Phase 7 “Smart card End-usage**”**. Therefore such functionality is not addressed in this PP but the card initialisation and personalisation by a Card Management System. It is up to the security target writer to include additional functions in the security target if necessary for the Phase 7 “Smart card End-usage**”**.

1.2.2 TOE type

22 The Target of Evaluation (**TOE**) is the Security Module Card Type B. The SMC-B is a contact based smart card.

1.2.3 TOE life cycle

23 The following description is a short summary of the SMC life cycle model based on a common model normally used for smart cards. The TOE life cycle is described in terms of the seven life cycle phases as usually defined for smartcards, see for example the SSVG-PP [17]. They are summarized in the following table.

Phase		Description
1	**Smartcard Embedded Software Development**	The **Smart card Embedded Software Developer** is in charge of • the development of the Smart card Embedded Software of the TOE, • the development of the TOE related Applications • the specification of the IC initialisation and pre-personalisation requirements (though the actual data for the IC initialisation and pre-personalisation come from Phase 4, 5 resp. 6). The purpose of the Smart card Embedded Software and Applications designed during phase 1 is to control and protect the TOE and its different configurations during phases 4 to 7 (product usage).The global security

		requirements of the TOE are such that it is mandatory during the development phase to anticipate the security threats of the other phases.
2	**IC Development**	The **IC Designer** • designs the IC, • develops the IC Dedicated Software, • provides information, software or tools to the Smart card Embedded Software Developer, and • receives the Smart card Embedded Software from the developer through trusted delivery and verification procedures. From the IC design, IC Dedicated Software and Smart card Embedded Software, the **IC Designer** • constructs the smart card IC database, necessary for the IC photomask fabrication.
3	**IC Manufacturing and Testing**	The **IC Manufacturer** is responsible for • producing the IC through three main steps: - IC manufacturing, - IC testing, and - IC pre-personalisation. The **IC Mask Manufacturer** • generates the masks for the IC manufacturing based upon an output from the smart card IC database.
4	**IC Packaging and Testing**	The **IC Packaging Manufacturer** is responsible for • the IC packaging (production of modules) and • testing.
5	**Smart card Product Finishing Process**	The **Smart card Product Manufacturer** is responsible for • the initialisation of the TOE (in form of the initialisation of the modules of phase 4) and • its testing. The smart card product finishing process comprises the embedding of the initialised modules for the TOE and the card production what may be done alternatively by the Smart card Product Manufacturer or by his customer (e. g. Personaliser or Card Issuer)**.**
6	**Smart card Personalisation**	The **Personaliser** is responsible for • the smart card personalisation and • final tests. The personalization of the smart card includes the printing of the

		(cardholder specific) visual readable data onto the physical smart card, and the writing of (cardholder specific) TOE User Data and TSF Data into the smartcard.
7	**Smartcard End-usage**	The **Smartcard Issuer** is responsible for • the smartcard product delivery to the smartcard end-user (the cardholder), and the end of life process. • The authorized personalization agent (Card Management System) are allowed to add data, modify or delete an SMC application. The TOE is used as SMC by the smartcardholder in the Operational use phase

Table 1: Smart Card Life Cycle Overview

24 The following paragraphs describe, how the application of the CC assurance classes is related to these phases.

25 The CC do not prescribe any specific life cycle model. However, in order to define the application of the assurance classes, the CC assume the following implicit life cycle model consisting of three phases:

- TOE development (including the development as well as the production of the TOE),
- TOE delivery,
- TOE operational use.

26 For the evaluation of the SMC the phases 1 up to 4 as defined in Table 1 are part of the TOE development in the sense of the CC. The phases 6 and 7 are part of the operational use in the sense of the CC. The phase 5 may be part of one of these CC phases or may be split between them depending on the specific model used by the TOE developer. The writer of the ST shall define the exact boundary. However, this Protection Profile requires that the following conditions have to be met:

27 All executable software in the TOE has to be covered by the evaluation. This is one of the reasons to include the assurance component ADV_IMP.2.

28 The data structures and the access rights to the health application data as defined in the SMC specification [20] are covered by the evaluation.

29 If the Card Management System or the card issuer load data onto the smart card in the phase 7 Smart card End-usage these data shall be non-executable only.

30 **Application note 2**: The following examples and remarks may help ST writers to define the boundary of TOE development.

a. The following variations for the boundary of the TOE development are acceptable:

- Phase 5 completely belongs to the TOE development, i.e. the TOE is delivered as an IC already embedded in the plastic card and containing all software and at least the data structures as defined in the specification [22].

- The TOE is delivered as an initialised module, i.e. it contains all software and at least the data structures as defined in the specification [22], but isn't embedded in a plastic card yet.

- The TOE is delivered in (at least) two parts: The hardware as a module or already embedded in a plastic card on the one hand and a file containing parts of the initialisation data on the other hand. Both parts together again contain all software and at least the data structures as defined in the specification [22] (which in particular means that all of this is evaluated during ADV activities). In this case the evaluation must also show as a result that the functions used by the customer (Card Management System / card issuer) for loading the initialisation data into the hardware provide sufficient protection against modification and (where applicable) disclosure of these data.

b. The following remarks may show how some CC assurance activities apply to parts of the life cycle[5]:

- The ALC and ACM classes, which deal with security measures in the development environment of the TOE apply to all development and production environments of Phases 1 up to 4 and those parts of Phase 5 belonging to TOE development as defined in the ST for a TOE. In particular the sites, where the software of the TOE is developed as well as the hardware development and production sites are subject to these CC classes (for example with regard to site visits). In the context of a composite evaluation some of the phases may already be covered by a IC hardware evaluation.

- The measures for delivery of the TOE to the Card Management System / card issuer are subject to ALC_DEL.

- If the third model described in a. above is used (delivery of hardware and initialisation file), the loading of the initialisation data can be interpreted as part of installation, generation and start-up and is therefore covered by AGD_PRE.

- The guidance documentation delivered by the TOE developer as part of the TOE delivery procedures are covered by AGD. Since the Card Management System / card issuer is the first "user" of the TOE after delivery, the guidance documentation is mainly directed to him. He may be defined as the administrator of the TOE or as a special user role. Since the guidance documentation in particular needs to describe all measures necessary for secure use of the TOE, it needs to contain information on the following issues:

[5] These activities already follow from the CC definitions. Therefore it is not necessary to define them as refinements to the CC assurance components. However these explicit notes may serve as a help for ST writers and TOE developers to understand the connection between the life cycle model and some CC requirements.

- Secure handling of the personalisation of the TOE
- Secure handling of delivery of the personalised TOE from the Card Management System / card issuer to the cardholder.
- Security measures for end-usage, which the Card Management System / card issuer needs to communicate to the cardholder. A simple example for this may be the requirement for the cardholder, to handle his PIN(s) securely. Since the documents accompanying the card during transport from card issuer to cardholder will probably not be available at the time of evaluation, the guidance documents for the Card Management System / card issuer need to contain this information connected with the requirement that the card issuer covers all such issues in his delivery documents.

1.2.4 Avaiable non-TOE hardware/software/firmware

The Target of Evaluation (**TOE**) is the Security Module Card Type B. The SMC-B is a contact based smart card. For the usage of this smart card an appropriate terminal resp. the health care system is necessary.

2 Conformance Claim

31 This protection profile claims conformance to

- Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and general model; Version 3.1, Revision 3, Final, July 2009, CCMB-2009-07-001
- Common Criteria for Information Technology Security Evaluation, Part 2: Security functional components; Version 3.1, Revision 3, Final, July 2009, CCMB-2009-07-002
- Common Criteria for Information Technology Security Evaluation, Part 3: Security assurance components; Version 3.1, Revision 3, Final, July 2009, CCMB-2009-07-003

as follows

- Part 2 extended,
- Part 3 conformant,
- Package conformant to EAL4 augmented with AVA_VAN.5.

This PP requires *strict* conformance of any ST or PP claiming conformance to this PP.

This PP does not claim conformance to any another Protection Profile.

3 Security Problem Definition

32 The Security Problem Definition (SPD) is the part of a PP, which describes

- **assets**, which the TOE shall protect,
- **subjects**, who are users (human or system) of the TOE or who might be threat agents (i. e. attack the security of the assets),
- **Operational security policies**, which describe overall security requirements defined by the organisation in charge of the overall system including the TOE. In particular this may include legal regulations, standards and technical specifications;
- **threats** against the assets, which shall be averted by the TOE together with its environment,
- **assumptions** on security relevant properties and behaviour of the TOE's environment.

3.1 Introduction

Assets

33 The assets to be protected by the TOE and its environment are as follows

34 Table 2: Assets of the SMC-B

Name of asset	Description	Operation by commands[6]
Certificate Service Provider self-signed Certificate (C.CA_SMC.CS)	The certificate of the Certificate Service Provider for card verifiable certificates in the health care environment C.CA_SMC.CS containing the public key PuK.CA_SMC.CS for verification of the card verifiable certificates like C.SMC.AUTR_CVC. It is part of the user data provided for the convenience of the IT environment.	SELECT, READ BINARY
Card Authentication Private Keys for role authentication (PrK.SMC.AUTR_CVC)	The Card Authentication Private Key PrK.SMC.AUTR_CVC is an asymmetric cryptographic key used for the card-to-card authentication of a SMC-B to a eHC on behalf of the cardholder. It is part of the TSF data.	INTERNAL AUTHENTICATE, EXTERNAL AUTHENTICATE
Card Verifiable Authentication	Card verifiable certificate C.SMC.AUTR_CVC for the Card	SELECT,

[6] All other access methods are forbidden (access right is set to NEVER).

Name of asset	Description	Operation by commands[6]
Certificates for role authentication (C.SMC.AUTR_CVC)	Authentication Public Keys PuK.SMC.AUTR_CVC as authentication reference data corresponding to the Authentication Private Key PrK.SMC.AUTR_CVC and used for the card-to-card authentication of the SMC-B to the eHC with or without establishing a trusted channel by means of secure messaging. It contains encoded access rights (Role ID for SMC profile 2 to 6[7]) and is signed by the SMC-B card issuer. It is part of the user data provided for use by external entities as authentication reference data of the HPC. It is stored in the file EF.C.SMC.AUTR_CVC, which integrity shall be protected.	READ BINARY
Card Authentication Private Keys as remote PIN sender (PrK.SMC.AUTD_RPS_CVC)	The Card Authentication Private Key PrK.SMC.AUTD_RPS_CVC is an asymmetric cryptographic key used for the card-to-card authentication of a SMC-B to a HPC or another SMC or RFID as remote PIN sender. It is part of the TSF data.	INTERNAL AUTHENTICATE, EXTERNAL AUTHENTICATE
Card Verifiable Authentication Certificates as remote PIN sender (C.SMC.AUTD_RPS_CVC)	Card verifiable certificate C.SMC.AUTD_RPS_CVC for the Card Authentication Public Keys PuK.SMC.AUTD_RPS_CVC as authentication reference data corresponding to the Authentication Private Key PrK.SMC.AUTD_RPS_CVC and used for the card-to-card authentication of the SMC-B to a HPC or another SMC or RFID as remote PIN sender with establishing a trusted channel by means of secure messaging. It contains encoded access rights (Role ID for SMC as PIN sender: profile 54) and is signed by	SELECT, READ BINARY

[7] Note the profiles are assign informative only, cf. [25].

Name of asset	Description	Operation by commands[6]
	the SMC-B card issuer. It is part of the user data provided for use by external entities as authentication reference data of the SMC provided for the HPC. It is stored in the file EF.C.SMC.AUTD_RPS_CVC, which integrity shall be protected.	
Card Authentication Private Keys as remote PIN receiver (PrK.SMC.AUTD_RPE_CVC)	The Card Authentication Private Key PrK.SMC.AUTD_RPE_CVC is an asymmetric cryptographic key used for the authentication of a SMC-B to another SMC as remote PIN receiver. It is part of the user data.	INTERNAL AUTHENTICATE, EXTERNAL AUTHENTICATE
Card Verifiable Authentication Certificates as remote PIN receiver (C.SMC.AUTD_RPE_CVC)	Card verifiable certificate C.SMC.AUTD_RPE_CVC for the Card Authentication Public Keys PuK.SMC.AUTD_RPE_CVC as authentication reference data corresponding to the Authentication Private Key PrK.SMC.AUTD_RPE_CVC and used for the card-to-card authentication of the SMC-B to another SMC as remote PIN receiver with establishing a trusted channel by means of secure messaging. It contains encoded access rights (Role ID for SMC as PIN receiver: profile 55) and is signed by the SMC-B card issuer. It is part of the user data provided for use by external entities as authentication reference data of the SMC-B provided for the HPC. It is stored in the file EF.C.SMC.AUTD.PRE_CVC, which integrity shall be protected.	SELECT, READ BINARY
Client-Server Authentication Private Key (PrK.HCI.AUT)	The Client-Server Authentication Private Key PrK.HCI.AUT is a asymmetric cryptographic key used for the authentication of a client application acting on behalf of the cardholder to a server. It is part of the user data.	INTERNAL AUTHENTICATE, PSO: COMPUTE DIGITAL SIGNATUR (P2='9E' or 'AC')

Name of asset	Description	Operation by commands[6]
Client-Server Authentication Certificate (C.HCI.AUT)	X.509 Certificate C.HCI.AUT for the Client-Server Authentication Public Key PuK.HCI.AUT corresponding to the Client-Server Authentication Private Key. It is part of the user data provided for use by external entities as authentication reference data of the SMC-B.	SELECT, READ BINARY
Decipher Private Key (PrK.HCI.ENC)	The Document Cipher Key Decipher Key PrK.HCI.ENC is asymmetric private key used for key decryption and key transcipherment on behalf of the cardholder. It is part of the user data.	PSO: DECIPHER, PSO: TRANSCIPHER
Encryption Certificate (C.HCI.ENC)	X.509 Certificate C.HCI.ENC for the Document Cipher Key Encipher Public Key PuK.HCI.ENC corresponding to the Document Cipher Key Decipher Key PrK.HCI.ENC. It is part of the user data provided for use by external entities.	SELECT, READ BINARY
OrganisationalElectronic Signature Private Key (PrK.HCI.OSIG)	Private key PrK.HCI.ES used for digital signature-creation. It is part of the user data and needs protection in confidentiality and integrity.	PSO: COMPUTE DIGITAL SIGNATURE (P2='9E' or 'AC')
OrganisationalElectronic Signature Public Key Certificates (C.HCI.OSIG)	The certificate C.HCI.OSIG of the Digital Signature Public Key PuK.HCI.OSIG corresponding to the Digital Signature Private Key PrK.HCI.OSIG used for the verification of the organisational electronic signatures of the health institution. They are part of the user data provided for external entities.	SELECT, READ BINARY
EF.ATR	The transparent file EF.ATR contains a constructed data object for indication of I/O buffer sizes and the DO 'Pre-issuing data' relevant for CAMS services.	SELECT, READ BINARY

Name of asset	Description	Operation by commands[6]
EF.DIR	EF.DIR contains the application templates for MF, DF.SMA, and DF.KT according to ISO/IEC 7816-4.	SELECT, READ RECORD, SEARCH RECORD, APPEND RECORD, UPDATE RECORD
EF.GDO	EF.GDO contains the DO ICC Serial Number.	SELECT, READ BINARY
EF.VERSION	The EF.Version with linear fixed record structure contains the version numbers of the specification, which the card is compliant to.	SELECT, READ RECORD, SEARCH RECORD, UPDATE RECORD
EF.SMD	EF.SMD contains SMC-B related data, e.g. special configuration data.	SELECT, READ BINARY, UPDATE BINARY, ERASE BINARY
EF.CONF	The transparent file EF.CONF stores configuration data used for connector maintenance, useful e.g. during exchange of connectors to back up and transfer pairing information to the new connector.	SELECT, READ BINARY, UPDATE BINARY, ERASE BINARY
EF.NET	EF.NET contains net configuration data used by the connector.	SELECT, READ BINARY, UPDATE BINARY, ERASE BINARY
C.SMKT.CA	C.SMKT.CA is the X.509 certificate of the Certification Authority (CA) which is the issuer of the X.509-certificate C.SMKT.AUT.	SELECT, READ BINARY
C.SMKT.AUT	C.SMKT.AUT contains the X.509 certificate for authentication of the card terminal to a specific connector	SELECT, READ BINARY
PrK.SMKT.AUT	PrK.SMKT.AUT is the private authentication key for connecting the card terminal to a specific con¬nec¬tor.	PSO: DECIPHER, INTERNAL AUTHENTICATE
Random number	Random number generation	GET RANDOM

35 Table 3: TSF data of the SMC-B

TSF data	**Description**	**Operation in terms of commands**
Root Public Key of the Certificate Service Provider (PuK.RCA.CS)	The public key PuK.RCA.CS of the Health Care Root CA for verification of the card verifiable certificate of the certificate service provider for card verifiable certificates in the health care environment (cf. to [22], sec. 6.3.14, for details). It is part of the TSF data which integrity shall be protected.	PSO VERIFY CERTIFICATE
PuK.CAMS_SMC.-AUT_CVC	PuK.CAMS_SMC.AUT_CVC (optional) is the public key for performing an asymmetric SMC/CAMS authentication procedure (with TC establishment).	EXTERNAL AUTHENTICATE
User Authentication Reference Data (PIN.SMC)	The User Authentication Reference Data are used to verify the cardholder attempt to activate certain functions of the TOE. This data include the PIN PIN.SMC and the reset retry counter PUK.SMC. The PIN.SMC and PUK.SMC are TSF data.	CHANGE RD (Option ‘00’), GET PIN STATUS, RESET RC (Option ‘00’ and ‘01’), VERIFY
PIN.CONF	PIN.CONF is a local PIN for writing and reading access to the configuration data in EF.CONF	CHANGE RD (Option ‘00’), GET PIN STATUS, RESET RC (Option ‘00’ and ‘01’), VERIFY
TOE initialization data	Data stored in the TOE during the initialization process. It is part of the TSF data.	
TOE personalization data	Data stored in the TOE during personalization process. It contains user data and TSF data.	

36 **Application note 3:** The User Authentication Reference Data (PIN.SMC) and the Public Key for CV Certification Verification (PuK.RCA.CS) are used as authentication reference by TSF for human user and card authentication. The Card Authentication Private Keys (PrK.SMC.AUT), the Client-Server Authentication Private Key (PrK.HCI.AUT), the Document Cipher Key Decipher Key (PrK.HCI.ENC) and the Digital Signature Private Key (PrK.HCI.OSIG) are used as cryptographic keys by the TOE security services provided to the user. Therefore they are assessed as user data.

Subjects

37 This protection profile considers the following subjects:

Name of subject	**Description**
Card Management System	Person(s) responsible for the manufacturing and personalization of the TOE for the Cardholder.
Cardholder	Person (acting for an organisation) for whom the SMC-B is personalized and which controls the use of the SMS. He or she knows rightfully the user authentication data (PIN and PUK).
Smart card in the role HPC, SMC or eHC	A Health Professional Card (HPC), Security Module Card (SMC) or electronic Health Card (eHC) is authenticating themselves to the TOE by means of card-2-card authentication with a card verifiable certificate with corresponding cardholder authorisation (CHA) of HPC/SMC/eHC of a specific area defining its access rights.
Terminal	External entity communicating with the TOE without successful authentication by sending commands to the TOE and receiving responses from the TOE according to ISO/IEC 7816 .
Unauthorized subject	All subjects who is trying to interact with the TOE as Card Management System, Cardholder or HPC without being authenticated for this role.

Table 4: Subjects

38 **Application note 4:** The smart cards in the health care environment possess card verifiable certificate (CVC) with cardholder authorizations (CHA) identifying them as HPC or SMC of a specific environment as defined in [20], Chapter 7. The CHA of SMC and HPC are defined in [21], Annex A.3.

3.2 Organisational Security Policies

39 OSPs will be defined in the following form:

OSP.name **Short Title**

Description.

40 The TOE and its environment shall comply to the following organization security policies (which are security rules, procedures, practices, or guidelines imposed by an organization upon its operations, see CC part 1, sec. 3.2).

41 **OSP.SMC_Spec** **Compliance to SMC specifications**

The SMC-B shall be implemented according to the specifications:

Specification German Health Professional Card and Security Module Card - Part 1: Commands, Algorithms and Functions of the COS Platform, Version 2.3.0, 04.07.2008, Bundesärztekammer, Kassenärztliche Bundesvereinigung, Bundeszahnärztekammer, Bundespsychotherapeutenkammer, Kassenzahnärztliche Bundesvereinigung, Bundesapothekerkammer, Deutsche Krankenhaus-Gesellschaft

Specification German Health Professional Card and Security Module Card - Part 3: SMC Applications and Functions, Version 2.3.0, 04.07.2008, Bundesärztekammer, Kassenärztliche Bundesvereinigung, Bundeszahnärztekammer, Bundespsychotherapeutenkammer, Kassenzahnärztliche Bundesvereinigung, Bundesapothekerkammer, Deutsche Krankenhaus-Gesellschaft

3.3 Threats

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

43 Threats will be defined in the following form:

T.name **Short Title**

Description.

3.3.1 Threats mainly addressing TOE_ES and TOE_APP

44 The TOE shall avert the threats, which are application and operating system oriented, as specified below.

45 **T.Compromise_Internal_Data** **Compromise of confidential User or TSF data**

An attacker with high attack potential try to compromise confidential user data or TSF data through the communication interface of the TOE independent on or listening the communication between a terminal with the TOE.

This threat comprises several attack scenarios e.g. guessing of the user authentication data (PIN) or reconstruction the private decipher key using the response code for chosen cipher texts (like Bleichenbacher attack for the SSL protocol implementation).

46 **T.Forge_Internal_Data** **Forge of User or TSF data**

An attacker with high attack potential try to forge internal user data or TSF data.

This threat comprises several attack scenarios of smart card forgery. The attacker may try to alter the user data e.g. to add keys for decipherment of documents. The attacker may misuse the TSF management function to change the user authentication data to a known value.

47 **T.Misuse** **Misuse of TOE functions**

An attacker with high attack potential try to use the TOE functions to gain access to the assets without knowledge of user authentication data or any implicit authorization.

This threat comprises several attack scenarios e.g. the attacker may try circumvent the user authentication to use the DECIPHER command for document keys without authorization or to sign data with an digital signature as organisational electronic signature. The attacker may try alter the TSF data e.g. to extend the user rights after successful card-to-card authentication.

48 **T.Intercept** **Interception of Communication**

An attacker with high attack potential tries to intercept the communication between the TOE and a eHC or the TOE and HPC to read, to forge, to delete or to add other data to the transmitted sensitive data.

This threat comprises several attack scenarios. The Health Professional using the TOE reads from and writes onto eHC data like medication or medical data which an attacker may read or forge during transmission. Attacker may read the document keys output by the TOE as DECIPHER command response.

3.3.2 Threats mainly addressing TOE_IC and TOE_ES

49 **T.Abuse_Func** **Abuse of Functionality**

An attacker with high attack potential may use functions of the TOE which shall not be used in TOE operational phase in order (i) to disclose or manipulate User Data, (ii) to manipulate (explore, bypass, deactivate or change) security features or functions of the TOE or (iii) to disclose or manipulate TSF Data.

This threat address attacks using the IC as production material for the smart card and using function for personalization in the operational state after delivery of the smart card.

50 **T.Information_Leakage** **Information Leakage from smartcard**

An attacker with high attack potential may exploit information which is leaked from the TOE during its usage in order to disclose confidential data (User Data or TSF data). The information leakage may be inherent in the normal operation or caused by the attacker.

Leakage may occur through emanations, variations in power consumption, I/O characteristics, clock frequency, or by changes in processing time requirements. This leakage may be interpreted as a covert channel transmission but is more closely related to measurement of operating parameters, which may be derived either from measurements of the contactless interface (emanation) or direct measurements (by contact to the chip still available even for a contactless chip) and can then be related to the specific operation being performed. No direct contact with the IC internals is required here. Examples are the Differential Electromagnetic Analysis (DEMA) and the Differential Power Analysis (DPA). Moreover the attacker may try actively to enforce information leakage by fault injection (e.g. Differential Fault Analysis).

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

An attacker with high attack potential may cause a malfunction of TSF or of the IC Embedded Software by applying environmental stress in order to (i) deactivate or modify security features or functions of the TOE or (ii) circumvent or deactivate or modify security functions of the IC Embedded Software.

This may be achieved e.g. by operating the IC outside the normal operating conditions, exploiting errors in the IC Embedded Software or misuse of administration function. To exploit this, an attacker needs information about the functional operation.

52 **T.Phys_Tamper** **Physical Tampering**

An attacker with high attack potential may perform physical probing of the IC in order (i) to disclose User Data, (ii) to disclose/reconstruct the IC Embedded Software or (iii) to disclose TSF data. An attacker may physically modify the IC in order to (i) modify security features or functions of the IC, (ii) modify security functions of the IC Embedded Software, (iii) to modify User Data or (iv) to modify TSF data.

The physical tampering may be focused directly on the discloser or manipulation of TOE User Data (e.g. the document decipherment key) or TSF Data (e.g. authentication key of the smart card) or indirectly by preparation of the TOE to following attack methods by modification of security features (e.g. to enable information leakage through power analysis). Physical tampering requires direct interaction with the IC internals. Techniques commonly employed in IC failure analysis and IC reverse engineering efforts may be used. Before that hardware security mechanisms and layout characteristics need to be identified. Determination of software design including treatment of User Data and TSF Data may also be a pre-requisite. The modification may result in the deactivation of a security function. Changes of circuitry or data can be permanent or temporary.

3.4 Assumptions

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

54 The assumptions will be defined in the following form:

A.name **Short Title**

Description.

55 **A.Pers_Agent** **Personalization and management of the smartcard**

The Card Management System performs the personalisation and additional management steps correctly during the end-usage phase according to the specifications [20], [22] and ensures the correctness, the quality and - if necessary - the confidentiality of all data structures and data on the card.

56 **A.Users** **Adequate usage of TOE and IT-Systems**

The cardholder of the TOE uses the TOE adequately. In particular he doesn’t tell the PIN (or PINs) of the SMC-B to others and doesn’t hand the card to unauthorised persons. The Card Management System and the health professionals use their data systems according to the overall system security requirements.

4 Security Objectives

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

4.1.1 Security Objectives for the TOE

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

59 Objectives for the TOE will be defined in the following form

OT.name **short title**

Description of the objective.

60 The security objectives describe the protection of the primary assets as User Data and the secondary assets as TOE security functions data (TSF data) against threats identified in TOE environment. The security objectives as mutual supporting set ensure protection against attacks with high attack (even though not mentioned separately for each security objective).

61 **OT.AC_Pers** **Access control for personalization and management**

The TOE must ensure that the User data and the TSF data can be created, written and updated by authorized Card Management system only except the cardholder authentication reference data managed by the cardholder.

62 **OT.Data_Confident** **Confidentiality of internal data**

The TOE must ensure the confidentiality of the User Authentication Reference Data, the Card Authentication Private Keys, the Decipher Private Key, the Client-Server Authentication Private Key, and other confidential user data and TSF data under the TSF scope of control.

63 **OT.Data_Integrity** **Integrity of internal data**

The TOE must ensure the integrity of the Health Professional Data, User Authentication Reference Data, the Card Authentication Private Keys, the Decipher Private Key, the Client-Server Authentication Private Key, the Public Key for CV Certification Verification, the Card Verifiable Authentication Certificates, the Certificate Service Provider self-signed Certificate, and other user data and TSF data under the TSF scope of control.

64 **OT.Dig_Sign** **Digital signature-creation**

The TOE creates digital signature as signature-creation device for organisational electronic or digital signature.

65 **OT.Dec_Trans** **Document key decryption and transcipherment**

The TOE provides document cipher key decipherment with an internal private key and document cipher key transcipherment with internal private key and imported public key. The TOE stores a certificate for the corresponding public key.

66 **OT.DS_CSA** **Digital signature-creation for client / server authentication**

The TOE provides service for digital signature creation with an internal private signature key. It stores a certificate for the corresponding public key.

67 **OT.TSS** **Terminal support service**

The TOE provides service random number generation for the operational environment by means of command GET RANDOM and storage of and cryptographic operation with private keys for TLS protocol for card terminals to all users.

68 **OT.Trusted_Channel** **Trusted Channel**

The TOE establishes a trusted channel for protection of the confidentiality and integrity of the transmitted data between the TOE and the successful authenticated smart card on demand of the external application. The TOE supports other smart cards and applications to use the secure messaging by providing the security service the Service_SM_Support.

69 **OT.AC_Serv** **Access Control for TOE Security Services**

The TOE provides the TOE security services Service_User_Auth_PIN, Service_Asym_Mut_Auth_w/o_SK, Service_Asym_Mut_Auth_with_SM, Service_Asym_Mut_-Auth_with_TC, Service_Asym_Mut_Auth_with_Intro, Service_Sym_Mut_Auth_with_TC, Service_SM_Support, Service_Sym_Mut_Auth_with_SM, Service_Elec_Signature, Service_-Client_Server_Auth, Service_Key_Decryption, and the Terminal Support Service. The TOE shall provide the services the Service_Client_Server_Auth, the Service_Key_Decryption and the Service_Elec_Signature to the cardholder only.

70 **OT.Prot_Abuse_Func** **Protection against abuse of functionality**

The TOE prevent that functions intended for the testing, the initialization and the personalization of the TOE and which must not be accessible after TOE delivery can be abused in order (i) to disclose critical User Data, (ii) to manipulate critical User Data of the Smart Card Embedded Software, (iii) to manipulate Soft-coded Smart Card Embedded Software or (iv) bypass, deactivate, change or explore security features or functions of the TOE. Details depend, for instance, on the capabilities of the Test Features provided by the IC Dedicated Test Software which are not specified here.

71 **OT.Prot_Inf_Leak** **Protection against information leakage**

The TOE must provide protection against disclosure of confidential data (User Data or TSF data) stored and/or processed in the TOE. This includes protection against attacks by means of

- 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 (side channels) and
- by forcing a malfunction of the TOE (e.g. fault injection) and/or
- by a physical manipulation of the TOE.

72 **Application note 5:** This objective pertains to measurements with subsequent complex signal processing due to normal operation of the TOE or operations enforced by an attacker. Details correspond to an analysis of attack scenarios which is not given here.

73 **OT.Prot_Malfunction** **Protection against Malfunctions**

The TOE must ensure its correct operation. The TOE must prevent its operation outside the normal operating conditions where reliability and secure operation has not been proven or tested. The TOE will preserve a secure state to prevent errors and deactivation of security features of functions. The environmental conditions include external energy (esp. electromagnetic) fields, voltage (on any contacts), clock frequency, and temperature.

74 **Application note 6:** A malfunction of the TOE may also be caused using a direct interaction with elements on the chip surface. This is considered as being a manipulation (refer to the objective OT.Phys-Manipulation) provided that detailed knowledge about the TOE´s internals.

75 **OT.Prot_Phys_Tamper** **Protection against physical tampering**

The TOE must provide protection the confidentiality and integrity of the User Data, the TSF Data, and the IC Embedded Software. This includes protection against attacks with high attack potential by means of

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

with a prior

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

76 **Application note 7:** In order to meet the security objectives OT.Prot_Phys_Tamper the TOE must be designed and fabricated so that it requires a high combination of complex equipment, knowledge, skill, and time to be able to derive detailed design information or other information which could be used to compromise security through such a physical attack.

4.1.2 Security Objectives for the Operational Environment

77 Security objectives for the operational environment will be defined in the following form

OE.name **short title**

Description of the objective.

78 The following objectives for the operational environment correspond directly to the assumptions in section 3.4 Assumptions.

79 **OE.Perso** **Secure personalization and management**

All data structures and data on the card produced during personalisation or additional administration steps during the end-usage phase must be performed correctly according to the specifications [20], [22] and are handled correctly regarding integrity and confidentiality of these data. The Card management system ensure (i) the generation of the card-to-card authentication keys stored on smart card and the distribution of the corresponding public key in form of CV certificates including the access rights of the cardholder, (ii) writing the public key for verification of CV certificates for card-to-card authentication, (iii) the generation of the client-server authentication keys stored on smart card and the distribution of the corresponding public key in form of X.509 certificates by an public key infrastructure, (iv) the generation of the decipher key stored on the smart card and the distribution of the corresponding public key in form of X.509 certificates by an public key infrastructure. This includes in particular sufficient cryptographic quality of cryptographic keys (in accordance with the cryptographic algorithms specified for the SMC) and their confidential handling.

80 **OE.Users** **Adequate usage of TOE and IT-Systems**

The cardholder of the TOE needs to use the TOE adequately. In particular he must not tell the PIN (or PINs) of the SMC-B to others and must not hand the card to unauthorised persons. The Card Management System and the health professionals must use their data systems according to the overall system security requirements.

4.2 Security Objectives Rationale

	OT.AC_Pers	OT.AC_Serv	OT.Data_Confident	OT.Data_Integrity	OT.Dig_Sign	OT.Dec_Trans	OT.DS_CSA	OT.TSS	OT.Trusted_Channel	OT.Prot_Abuse_Func	OT.Prot_Inf_Leak	OT.Prot_Malfunction	OT.Prot_Phys_Tamper	OE.Perso	OE.Users
T.Compromise_Internal_Data			x												
T.Forge_Internal_Data				x											
T.Misuse	x	x	x	x											
T.Intercept									x						
T.Abuse_Func										x					
T.Information_Leakage											x				
T.Malfunction												x			
T.Phys_Tamper													x		
OSP.SMC_Spec	x	x	x	x	x	x	x	x	x					x	
A.Pers_Agent														x	
A.Users															x

Table 1: Security Objective Rationale

81 The treat **T.Compromise_Internal_Data** “Compromise of confidential User or TSF data” address the compromise of internal confidential data through the communication interface of the TOE independent on or listening the communication between a terminal with the TOE. This threat is directly achieved by security objectives **OT.Data_Confident** “Confidentiality of internal data” requiring the protection of the confidential user data and TSF data.

82 The protection against the treat **T.Forge_Internal_Data** “Forge of User or TSF data” is directly achieved by the security objective **OT.Data_Integrity** “Integrity of internal data” requiring the protection of the integrity of the user data and the TSF data.

83 The threat **T.Misuse** “Misuse of TOE functions” addresses the use of TOE functions without knowledge of user authentication data or any implicit authorization. The protection against this treat is mainly achieved by the security objective **OT.AC_Pers** “Access control for personalization and management” protecting the personalization functions of the TOE, **OT.AC_Serv** “Access Control for TOE Functions” for the security services used in the operational usage phase. The security objectives **OT.Data_Confident** “Confidentiality of internal data” and **OT.Data_Integrity** “Integrity of internal data” ensure the protection of the assets independent on the TOE functionality used by the attack.

84 The threat **T.Intercept** “Interception of Communication” is countered by the security objective **OT.Trusted_Channel** “Trusted Channel”. Note that according to the **OSP.SMC_Spec** “Compliance to HPC specifications” and the security objective for the TOE environment **OE.Users** “Adequate usage of TOE and IT-Systems” the external application decides whether the transmitted data are sensitive and require the protection in the confidentiality and integrity. If the application selects the security environment SE #2 (cf. the specification [22]) the TOE will protect transmitted data. If the application selects the security environment SE #1 the TOE is not required to protect the data transmitted after card-to-card authentication because they are not sensitive.

85 The threat **T.Abuse_Func** “Abuse of Functionality” is adverted directly by the security objective **OT.Prot_Abuse_Func** “Protection against abuse of functionality” preventing the use of TOE functions which are intended for the testing, the initialization and the personalization of the TOE and which must not be accessible after TOE delivery.

86 The threat **T.Information_Leakage** “Information Leakage from smart card chip” is adverted directly by the security objective **OT.Prot_Inf_Leak** “Protection against information leakage” addressing the protection against disclosure of confidential data (User Data or TSF data) stored and/or processed in the TOE by attacks including but not limited to use of side channels, fault injection or physical manipulation.

87 The threat **T.Malfunction** “Malfunction due to Environmental Stress” is adverted directly by the security objective **OT.Prot_Malfunction** “Protection against Malfunctions”.

88 The threat **T.Phys_Tamper** “Physical Tampering” is adverted directly by the security objective **OT.Prot_Phys_Tamper** “Protection against physical tampering”.

89 The organizational security policy **OSP.SMC_Spec** “Compliance to SMC specifications” is implemented by the TOE security objectives **OT.AC_Pers** “Access control for personalization and management”, **OT.Dig_Sign** “Digital signature-creation”**, OT.Dec_Trans** “Document key decryption and transcipherment**”, OT.DS_CSA** “Digital signature-creation for client / server authentication**”, OT.TSS** “Terminal support service**”, OT.Trusted_Channel** “Trusted Channel**“, OT.AC_Serv** “Access Control for TOE Functions”, **OT.Data_Confident** “Confidentiality of internal data”, **OT.Data_Integrity** “Integrity of internal data” and **OT.Trusted_Channel** “Trusted Channel” and the security objective for the TOE environment **OE.Perso** “Secure personalization and management”. The TOE security objectives OT.AC_Pers, OT.Dig_Sign, OT.Dec_Trans, OT.DS_CSA, OT.TSS and OT.Trusted_Channel implement the security services of the TOE and their related user data and TSF data as specified in [22] referenced in the OSP.SMC_Spec. OT.AC_Serv OT.Data_Confident and OT.Data_Integrity protect the services against misuse, the confidentiality and the integrity of the user data and the TSF data. The

security objective for the environment OE.Perso ensures that the Card Management System will provide genuine TOE initialized and personalized according to specification [22] to the cardholder.

90 The security objectives for the environment **OE.Perso** "Secure personalization and management" implements the assumption **A.Pers_Agent** "Personalization of the Smart Card" with respect of the concrete user and TSF data described in the specification [20] and [22] (cf. to OSP.SMC_Spec).

91 The security objectives for the environment **A.Users** "Adequate usage of TOE and IT-Systems" implements directly the assumption **OE.Users** "Adequate usage of TOE and IT-Systems".

5 Extended Components Definition

92 This protection profile uses components defined as extensions to CC part 2. Some of these components are defined in [17], other components are defined in this protection profile.

5.1 Definition of the Family FCS_RNG

93 To define the IT security functional requirements of the TOE an additional family (FCS_RNG) of the Class FCS (cryptographic support) is defined here. This extended family FCS_RNG describes SFR for random number generation used for cryptographic purposes.

94 The family "Generation of random numbers (FCS_RNG)" is specified as follows.

FCS_RNG Generation of random numbers

Family behaviour This family defines quality requirements for the generation of random numbers, which are intended to be use for cryptographic purposes.

95 Component levelling:

FCS_RNG Generation of random numbers
1

FCS_RNG.1 Generation of random numbers requires that the random number generator implements defined security capabilities and the random numbers meet a defined quality metric.

96 Management: FCS_RNG.1

There are no management activities foreseen.

97 Audit: FCS_RNG.1

There are no actions defined to be auditable.

98 FCS_RNG.1 Random number generation

Hierarchical to: No other components.

Dependencies: No dependencies.

FCS_RNG.1.1 The TSF shall provide a [selection: *physical, non-physical true, deterministic, physical hybrid, deterministic hybrid*] random number generator, which implements: [assignment: *list of security capabilities*].

FCS_RNG.1.2 The TSF shall provide random numbers that meet [assignment: *a defined quality metric*].

5.2 Definition of the Family FIA_API

99 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.

100 The family “Authentication Proof of Identity (FIA_API)” is specified as follows.

FIA_API Authentication Proof of Identity

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

101 Component levelling:

FIA_API Authentication Proof of Identity
1

FIA_API.1 Authentication Proof of Identity.

102 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.

103 Audit: FIA_API.1

There are no actions defined to be auditable.

104 FIA_API.1 Authentication Proof of Identity

Hierarchical to: No other components.

Dependencies: No dependencies.

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

5.3 Definition of the Family FMT_LIM

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

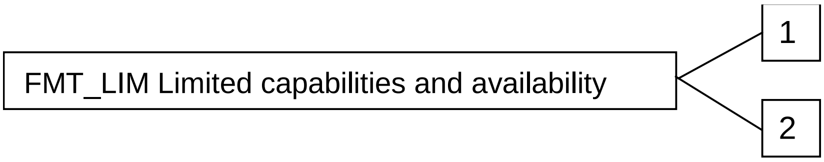
106 The family “Limited capabilities and availability (FMT_LIM)” is specified as follows.

FMT_LIM Limited capabilities and availability

Family behaviour

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

Component levelling:



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

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

107 Management: FMT_LIM.1, FMT_LIM.2

There are no management activities foreseen.

108 Audit: FMT_LIM.1, FMT_LIM.2

There are no actions defined to be auditable.

109 The TOE Functional Requirement “Limited capabilities (FMT_LIM.1)” is specified as follows.

FMT_LIM.1 **Limited capabilities**

Hierarchical to: No other components.

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*].

Dependencies: FMT_LIM.2 Limited availability.

110 The TOE Functional Requirement “Limited availability (FMT_LIM.2)” is specified as follows.

FMT_LIM.2 **Limited availability**

Hierarchical to: No other components.

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*].

Dependencies: FMT_LIM.1 Limited capabilities.

5.4 Definition of the Family FPT_EMSEC

111 The family “TOE Emanation (FPT_EMSEC)” is specified as follows.

Family behaviour

This family defines requirements to mitigate intelligible emanations.

Component levelling:

FPT_EMSEC TOE Emanation
1

FPT_EMSEC.1 TOE emanation has two constituents:

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

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

Management: FPT_EMSEC.1

There are no management activities foreseen.

Audit: FPT_EMSEC.1

There are no actions defined to be auditable.

FPT_EMSEC.1 TOE Emanation

Hierarchical to: No other components.

FPT_EMSEC.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_EMSEC.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*].

Dependencies: No dependencies.

6 Security Requirements

112 The CC allows several operations to be performed on functional components; *refinement*, *selection*, *assignment*, and *iteration* are defined in chapter C.4 of CC, part 1. Each of these operations is used in this PP.

113 The **refinement** operation is used to add detail to a requirement, and thus further restricts a requirement. Refinement of security requirements is (i) denoted by the word “refinement” in bold text and the added/changed words are in bold text, or (ii) included in text as underlined text and marked by a footnote. In cases where words from a CC requirement were deleted, a separate attachment indicates the words that were removed.

114 The **selection** operation is used to select one or more options provided by the CC in stating a requirement. Selections that have been made by the PP authors are denoted as underlined text and the original text of the component is given by a footnote. Selections to be filled in by the ST author appear in square brackets with an indication that a selection is to be made, [selection:], and are *italicized*.

115 The **assignment** operation is used to assign a specific value to an unspecified parameter, such as the length of a password. Assignments that have been made by the PP authors are denoted by showing as <u>underlined text</u> and the original text of the component is given by a footnote. Assignments to be filled in by the ST author appear in square brackets with an indication that an assignment is to be made [assignment:], and are *italicized*.

116 The **iteration** operation is used when a component is repeated with varying operations. Iteration is denoted by showing a slash "/", and the iteration indicator after the component identifier.

6.1 Security Functional Requirements for the TOE

117 This section on security functional requirements (SFR) for the TOE is divided into sub-section following the main security functionality. They are usually ordered like CC part 2 [2].

118 **Application note 8:** The following table provides an overview how the security services (listed in section 1.2) match to the SFRs.

Security Service	SFR	Comment
Human user authentication	FIA_AFL.1, FIA_ATD.1, FIA_UID.1, FIA_UAU.1, FMT_MTD.1/PIN, FMT_MTD.1/RAD_WR	Human user authentication is performed by means of the authentication reference data PIN and PUK
Card-to-card authentication	FCS_COP.1/CCA_SIGN, FCS_COP.1/CCA_VERIF, FCS_RNG.1, FIA_UID.1, FIA_UAU.1, FIA_UAU.4, FIA_UAU.5, FIA_UAU.6, FMT_MTD.1/RAD_WR, FMT_MTD.1/RAD_MOD	Card-to-card authentication according to [20], Annex E, - verification of digital signatures of certificates according to ISO 9796-2 (without random numbers) - RSA with private key for INTERNAL AUTHEN-TICATE and RSA with public key for EXTERNAL AUTHEN-TICATE with DSI according [20], Chapter 15
Authorization of SMC-B for access to data on eHC	FDP_ACC.1, FDP_ACF.1, FIA_UAU.4	Access control for the certificate with special encoded access rights to open the eHC

Security Service	SFR	Comment
Client-server authentication	FCS_COP.1/CSA	Digital signature-creation according to PKCS#1, EMSA-PKCS1-v1_5 [16]
Secure messaging	FCS_CKM.1, FCS_CKM.4, FCS_RNG.1, FCS_COP.1/3TDES, FCS_COP.1/RMAC, FDP_UCT.1, FDP_UIT.1	Secure messaging key generation is described in [20], Chapter 15 and secure messaging encryption and MAC is described in [20], Annex Chapter 13.
Document key decipherment	FCS_COP.1/RSA_DEC	Decryption of document keys according to PKCS#1, version 2.1, and ISO/IEC 7816-8, cf. [20], 6.8 and 14.8 for details
Creation of digital signatures	FCS_COP.1/SHA, FCS_COP.1/SIGN_OSIG, FDP_ACC.1, FDP_ACF.1,	For the cryptographic algorithms cf. to [9]

Table 5: Overview of SFRs used to describe the TOE security services

6.1.1 Cryptographic support (FCS)

119 The cryptographic algorithms implemented in the TOE shall meet the TR-03116 [8] and [31]. The ST writer shall iterate the relevant SFR components if the TOE supports the optional cryptographic algorithms described in [20].

6.1.1.1 Basic Algorithms

120 The TOE shall meet the requirement "Quality metric for random numbers (FCS_RNG.1)" as specified below (Common Criteria Part 2 extended).

121 **FCS_RNG.1 Quality metric for random numbers**

Hierarchical to: No other components.

Hierarchical to: No other components.

Dependencies: No dependencies.

FCS_RNG.1.1 The TSF shall provide a [selection: *physical*, *non-physical true*, *deterministic*, *physical hybrid*, *deterministic hybrid*][8] random number generator, which implements: [assignment: list of security capabilities][9].

FCS_RNG.1.2 The TSF shall provide random numbers that meet
1. each output 128 bit random number has at least an entropy of 100 bit.
2. [assignment: *other defined quality metrics*][10].

Dependencies: No dependencies.

122 **Application note 9:** This SFR requires the TOE to generate random numbers used for (i) the authentication protocols as required by FIA_UAU.4, (ii) the key agreement FCS_CKM.1 / Asym_Auth and FCS_CKM.1 /Sym_Auth for secure messaging and (iii) the terminal support service using the command GET RANDOM. The quality metric shall be chosen to resist attacks with high attack potential. With respect to the applied scheme it may also be necessary to evaluate the RNG in accordance to the 'AIS 20' [29] or 'AIS 31', [30].

123 The TOE shall meet the requirement "Cryptographic operation (FCS_COP.1)" as specified below (Common Criteria Part 2). The iterations are caused by different cryptographic algorithms to be implemented by the TOE.

124 **FCS_COP.1/SHA Cryptographic operation – Hash Algorithm**

Hierarchical to: No other components.

FCS_COP.1.1/ SHA The TSF shall perform hashing [11] in accordance with a specified cryptographic algorithm SHA-256 [12] and cryptographic key sizes none [13] that meet the following: FIPS 180-2 [14].

[8] [selection: *physical, non-physical true, deterministic, physical hybrid, deterministic hybrid*]

[9] [assignment: *list of security capabilities*]

[10] [assignment: *a defined quality metric*]

[11] [assignment: *list of cryptographic operations*]

[12] [assignment: *cryptographic algorithm*]

[13] [assignment: *cryptographic key sizes*]

[14] [assignment: *list of standards*]

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

125 **Application note 10:** This SFR requires the TOE to implement the hash functions SHA-256 (256 bit hash value) as the cryptographic primitive of the authentication mechanism.

126 **FCS_COP.1/CCA_SIGN** **Cryptographic operation – Digital Signature-Creation for Card-to-Card Authentication**

Hierarchical to: No other components.

FCS_COP.1.1/ CCA_SIGN The TSF shall perform digital signature-creation [15] in accordance with a specified cryptographic algorithm [selection: RSA_ISO9796_2_DS1_SIGN, RSASSA_PSS_SIGN] [16] and cryptographic key sizes 2048 bit modulo length [17] that meet the following: [20] [18].

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

127 **Application note 11:** This SFR requires the TOE to implement the RSA for the cryptographic primitive of the digital signature-creation for the card-to-card authentication mechanism (i.e. INTERNAL AUTHENTICATE, algorithm identifier ‘rsaSessionkey4Intro’ and ‘rsaSessionkey4SM’).

128 **FCS_COP.1/CCA_VERIF** **Cryptographic operation – Digital Signature-Verification for Card-to-Card Authentication**

Hierarchical to: No other components.

[15] [assignment: *list of cryptographic operations*]

[16] [assignment: *cryptographic algorithm*]

[17] [assignment: *cryptographic key sizes*]

[18] [assignment: *list of standards*]

FCS_COP.1.1/ CCA_VERIF The TSF shall perform digital signature-verification [19] in accordance with a specified cryptographic algorithm RSA_ISO9796_2_DS1_VERIFY [20] and cryptographic key sizes 2048 bit modulo length[21] that meet the following: [20] [22].

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

129 **Application note 12:** This SFR requires the TOE to implement the RSA for the cryptographic primitive of the digital signature-verification for the card-to-card authentication mechanism (i.e. INTERNAL AUTHENTICATE, algorithm identifier 'rsaSessionkey4Intro' and 'rsaSessionkey4SM').

130 **FCS_COP.1/3TDES Cryptographic operation – 3TDES Encryption / Decryption**

Hierarchical to: No other components.

FCS_COP.1.1/ 3DES The TSF shall perform encryption and decryption [23] in accordance with a specified cryptographic algorithm 3TDES in CBC mode [24] and cryptographic key sizes 168 bit [25] that meet the following: FIPS 46-3 [10] and [20] [26].

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

131 **Application note 13:** This SFR requires the TOE to implement the cryptographic primitive for encrypting data to be transmitted using secure messaging and for the Service_SM_Support. The key is agreed between the TSF according to the FIA_UAU.4.

[19] [assignment: *list of cryptographic operations*]

[20] [assignment: *cryptographic algorithm*]

[21] [assignment: *cryptographic key sizes*]

[22] [assignment: *list of standards*]

[23] [assignment: *list of cryptographic operations*]

[24] [assignment: *cryptographic algorithm*]

[25] [assignment: *cryptographic key sizes*]

[26] [assignment: *list of standards*]

132 **FCS_COP.1/RMAC Cryptographic operation – Retail MAC**

Hierarchical to: No other components.

FCS_COP.1.1/ MAC	The TSF shall perform generation and verification of message authentication code [27] in accordance with a specified cryptographic algorithm Retail MAC [28] and cryptographic key sizes 168 bit [29] that meet the following: ANSI X9.19 with DES and [20], Section 6.6 [30].

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

133 **Application note 14:** This SFR requires the TOE to implement the cryptographic primitive for calculating message authentication code over data to be transmitted using secure messaging and for the Service_SM_Support. The key is agreed or defined as the key for secure messaging encryption.

6.1.1.2 Cryptographic key generation (FCS_CKM.1)

134 The TOE shall meet the requirement "Cryptographic key generation (FCS_CKM.1)" as specified below (Common Criteria Part 2).

135 **FCS_CKM.1/Asym_Auth Cryptographic key generation - Asymmetric card-to-card authentication with key agreement**

Hierarchical to: No other components.

Dependencies: [FCS_CKM.2 Cryptographic key distribution or
FCS_COP.1 Cryptographic operation]
FCS_CKM.4 Cryptographic key destruction

FCS_CKM.1.1/ Asym_Auth	The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm mutual asymmetric card-to-card authentication with key agreement using RSA and SHA-256 with algorithmic identification rsaSessionkey4Intro and rsaSessionkey4SM [31]

[27] [assignment: *list of cryptographic operations*]

[28] [assignment: *cryptographic algorithm*]

[29] [assignment: *cryptographic key sizes*]

[30] [assignment: *list of standards*]

[31] [assignment: *cryptographic key generation algorithm*]

and specified cryptographic key sizes 168 bit[32] that meet the following: [8], [20] [33].

136 **Application note 15:** The **asymmetric** card-to-card authentication with key agreement [20], chap. 15, is used for **Service_Asym_Mut_Auth_with_Intro** with algorithmic identification rsaSessionkey4Intro and **Service_Asym_Mut_Auth_with_SM**. with algorithmic identification rsaSessionkey4SM. The TOE is equipped with its Card Authentication Private Key and has received and verified the Card Authentication Public Key of the communication partner. The key agreement method is the same for both algorithmic identification rsaSessionkey4Intro and rsaSessionkey4SM but result in symmetric keys for different usage: (i) introduction keys are permanently stored in the TOE and used for symmetric authentication (with or without symmetric key agreement), and (ii) temporarily stored symmetric secure messaging keys, where SMK.ENC and SMK.MAC are different. The introduction keys may be used further on for **Service_Sym_Mut_Auth_with_SM** according to FCS_CKM.1/Sym_Auth and symmetric internal or external authentication. The algorithms use the random numbers generated by TSF as required by FCS_RNG.1.

137 **FCS_CKM.1/Sym_Auth Cryptographic key generation - Symmetric authentication key**

Hierarchical to: No other components.

Dependencies: [FCS_CKM.2 Cryptographic key distribution or
FCS_COP.1 Cryptographic operation]
FCS_CKM.4 Cryptographic key destruction

FCS_CKM.1.1/ Sym_Auth The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm symmetric mutual card-to-card authentication with key agreement 3TDES and SHA-256 [34] and specified cryptographic key sizes 168 bit[35] that meet the following: [8], [20] [36].

138 **Application note 16:** The TOE may be equipped with symmetric secret introduction keys being agreed upon before (cf. [22], sec. 5.9.3) and agrees on secure messaging keys which are used for encryption and message authentication. The algorithms use the random number generated by TSF as required by FCS_RNG.1.

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

[32] [assignment*: cryptographic key sizes*]

[33] [assignment: *list of standards*]

[34] [assignment: *cryptographic key generation algorithm*]

[35] [assignment: *cryptographic key sizes*]

[36] [assignment: *list of standards*]

140 **FCS_CKM.4 Cryptographic key destruction**

Hierarchical to: No other components.

FCS_CKM.4.1 The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method [*assignment: cryptographic key destruction method*] that meets the following: [*assignment: list of standards*].

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]

141 **Application note 17:** The TOE shall destroy the Triple-DES encryption key (SMK.ENC) and the Retail-MAC message authentication keys (SMK.MAC) for secure messaging after reset or termination of secure messaging session or reaching fail secure state according to FPT_FLS.1.

6.1.1.3 Cryptographic operation (FCS_COP.1)

142 **FCS_COP.1/CSA Cryptographic operation – Digital Signature-Creation for Client-Server Authentication**

Hierarchical to: No other components.

FCS_COP.1.1/ CSA The TSF shall perform digital signature-creation for client-server authentication [37] in accordance with a specified cryptographic algorithm [selection: *RSA_ISO9796_2_DS2_SIGN*, *RSASSA-PSS-SIGN*, *RSASSA_PCKS1_V1_5_SIGN*] [38] and cryptographic key sizes 2048 bit modulo length[39] that meet the following: [8], PKCS#1 [16], [20], sec. 6.6.3.1.5 [40].

[37] [assignment: *list of cryptographic operations*]

[38] [assignment: *cryptographic algorithm*]

[39] [assignment: *cryptographic key sizes*]

[40] [assignment: *list of standards*]

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

143 **Application note 18:** This SFR requires the TOE to implement the RSA for the cryptographic primitive of the digital signature-creation for the client-server authentication mechanism according to [22], sec. 6.11.7.

144 **FCS_COP.1/RSA_DEC Cryptographic operation – RSA Decryption**

Hierarchical to: No other components.

FCS_COP.1.1/ RSA_DEC The TSF shall perform decryption [41] in accordance with a specified cryptographic algorithm RSAES-OAEP and RSAES-PKCS1-v1_5 [42] and cryptographic key sizes 2048 bit modulo length[43] that meet the following: [8], [16], [20][44].

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

145 **Application note 19:** This SFR requires the TOE to implement the RSA for the cryptographic primitive of the RSA decryption to [20], sec. 14.8.3, and [22], sec. 6.11.8.

146 **FCS_COP.1/RSA_TRANS Cryptographic operation – RSA Transcipherment**

Hierarchical to: No other components.

[41] [assignment: *list of cryptographic operations*]

[42] [assignment: *cryptographic algorithm*]

[43] [assignment: *cryptographic key sizes*]

[44] [assignment: *list of standards*]

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

FCS_COP.1.1/ RSA_TRANS The TSF shall perform encryption and transcipherment [45] in accordance with a specified cryptographic algorithm RSAES-OAEP and RSAES-PKCS1-v1_5 [46] and cryptographic key sizes 2048 bit modulo length[47] that meet the following: [8], [16], [20][48].

147 **Application note 20:** This SFR requires the TOE to implement the RSA for the cryptographic primitive of the RSA transcipherment to [20], sec. 14.8.7, and [22], 6.11.8. The private key PrK.HP.ENC shall be selected using PSO: MANAGE SECURITY ENVIRONMENT and the public key shall be imported together with data to be transciphered in the command PSO: TRANSCIPHER.

148 **FCS_COP.1/SIGN_OSIG Cryptographic operation – Digital Signature-Creation for Digital Signatures**

Hierarchical to: No other components.

FCS_COP.1.1/ SIGN_OSIG The TSF shall perform digital signature-creation [49] in accordance with a specified cryptographic algorithm SHA-256 and [selection: *RSASSA PKCS#1 V1.5, RSA ES PKCS#1 V1.5, RSA ISO9796-2 DS2, other appropriate certified algorithms*][50] and cryptographic key sizes 2048 bit modulo length[51] that meet the following: [assignment: *list of standards*].

[45] [assignment: *list of cryptographic operations*]

[46] [assignment: *cryptographic algorithm*]

[47] [assignment: *cryptographic key sizes*]

[48] [assignment: *list of standards*]

[49] [assignment: *list of cryptographic operations*]

[50] [assignment: *cryptographic algorithm*]

[51] [assignment: *cryptographic key sizes*]

Dependencies: [FDP_ITC.1 Import of user data without security attributes, or
FDP_ITC.2 Import of user data with security attributes, or
FCS_CKM.1 Cryptographic key generation]
FCS_CKM.4 Cryptographic key destruction

149 **Application note 21:** This SFR requires the TOE to implement the RSA for the cryptographic primitive for SMC-B the creation of digital signatures [20], chapter 6.6.3. The [22], chapter 6.11.6, specifies the RSA module length 2048 bit of PrK.HCI.OSIG to create organisational digital signatures.

6.1.2 Identification and Authentication

6.1.2.1 Authentication failure handling (FIA_AFL.1)

150 The TOE shall meet the requirement “Authentication failure handling (FIA_AFL.1)” as specified below (Common Criteria Part 2).

151 **FIA_AFL.1/PIN Authentication failure handling – PIN.SMC**

Hierarchical to: No other components.

Dependencies: FIA_UAU.1 Timing of authentication.

FIA_AFL.1.1/PIN The TSF shall detect when 3[52] unsuccessful authentication attempts occur related to consecutive failed human user authentication with the PIN.SMC [53].

FIA_AFL.1.2/PIN When the defined number of unsuccessful authentication attempts has been [selection: *met or surpassed*], the TSF shall block the PIN.SMC for authentication until successful unblock with resetting code for this PIN.SMC [54].

152 **FIA_AFL.1/PUK Authentication failure handling – PUK.SMC**

Hierarchical to: No other components.

[52] [selection: [assignment: *positive integer number*], *an administrator configurable positive integer within* [assignment*: range of acceptable values*]]

[53] [assignment*: list of authentication events*]

[54] [assignment: *list of actions*]

Dependencies: FIA_UAU.1 Timing of authentication.

FIA_AFL.1.1/PUK The TSF shall detect when 10[55] **~~unsuccessful~~[56]**authentication attempts occur related to human user authentication to unblock PIN.SMC[57].

FIA_AFL.1.2/PUK When the defined number of **~~unsuccessful~~[58]** authentication attempts has been [selection: *met or surpassed*], the TSF shall block the PUK.SMC[59].

153 **Application note 22:** The component FIA_AFL.1/PIN address the human user authentication by means of the PIN.SMC for the health care application and for digital signature generation with signature key PrK.HCI.OSIG in DF.ESIGN. The specification [20], sec. 4, describes the VERIFY command to authenticate with the PIN, the CHANGE REREENCE DATA command to change a unblocked PIN and the RESET RETRY COUNTER command to unblock and optionally change the PIN.

154 The TOE shall meet the requirement "Verification of secrets (FIA_SOS.1)" as specified below (Common Criteria Part 2).

155 **FIA_SOS.1 Verification of secrets**

Hierarchical to: No other components.

Dependencies: No dependencies.

FIA_SOS.1.1 The TSF shall provide a mechanism to verify that secrets
(1) **PIN.SMC** meet minimum length of 6 digits and maximum 8 digits[60],
(2) **PUK.SMC meet length of 8 digits**[61].

156 **Application note 23:** The refinement lists the requirements for different secrets (instead of 2 times iteration of the component).

6.1.2.2 User attribute definition (FIA_ATD.1)

157 The TOE shall meet the requirement "User attribute definition (FIA_ATD.1)" as specified below (Common Criteria Part 2).

[55] [selection: [assignment: *positive integer number*], *an administrator configurable positive integer within* [assignment*: range of acceptable values*]]

[56] This refinenment is made according the gematic specifications.

[57] [assignment*: list of authentication events*]

[58] This refinenment is made according the gematic specifications.

[59] [assignment: *list of actions*]

[60] [assignment: *a defined quality metric*]

[61] Refinement: "(2) PUK.SMC meet length of 8 digits"

158 **FIA_ATD.1 User attribute definition**

Hierarchical to: No other components.

FIA_ATD.1.1 The TSF shall maintain the following list of security attributes belonging to individual users:

(1) identity and role of entities authenticated with introduction keys

(2) role of other authenticated users [62].

Dependencies: No dependencies.

159 **Application note 24:** The component FIA_ATD.1 applies to (i) the human user authentication, i.e. the cardholder, and to (ii) the card-to-card authentication where the identity (i.e. the ICCSN.ICC) and the role (i.e. Role ID) are encoded in the CHA of the CV certificate (cf. [20] Chapter 7 for details).

6.1.2.3 Timing of identification (FIA_UID.1)

160 The TOE shall meet the requirement “Timing of identification (FIA_UID.1)” as specified below (Common Criteria Part 2).

161 **FIA_UID.1 Timing of identification**

Hierarchical to: No other components.

FIA_UID.1.1 The TSF shall allow

(1) reading the ATR

(2) reading EF.ATR, EF.DIR, EF.GDO, EF.SMD, EF.NET, EF.VERSION and EFs containing certificates EF.C.*.*,

(3) reading security status information using command GET PIN STATUS and GET SECURITY STATUS KEY,

(4) execution of INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_CVC according to FIA_API.1,

(5) execution of the command GET RANDOM,

(6) execution of EXTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_CVC, PrK.SMC.AUTD_RPS_CVC, PrK.SMC.AUTR_CVC and PuK.CAMS_SMC.AUT_CVC

(7) execution of PSO: VERIFY CERTIFICATE with PuK.RCA.CS

(8) execution of PSO: DECIPHER and INTERNAL AUTHENTICATE with

[62] [assignment: *list of security attributes*]

PrK.SMKT.AUT

(9) [assignment: *list of TSF-mediate actions*] [63]

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.

Dependencies: No dependencies.

162 **Application note 25:** The ST writer shall perform the missing operation in FIA_UID.1.1. According to the specification [22] the list of data objects with read access condition includes but is not limited to the Card Verifiable Authentication Certificates and the X.509 Certificates. The card management system may create DF and EF in MF and DF, and define their access conditions.

6.1.2.4 Timing of authentication (FIA_UAU.1)

163 The TOE shall meet the requirement "Timing of authentication (FIA_UAU.1)" as specified below (Common Criteria Part 2).

164 **FIA_UAU.1 Timing of authentication**

Hierarchical to: No other components.

FIA_UAU.1.1 The TSF shall allow

(1) reading the ATR

(2) reading EF.ATR, EF.DIR, EF.GDO, EF.SMD, EF.NET, EF.VERSION and EFs containing certificates EF.C.*.* ,

(3) reading security status information using command GET PIN STATUS and GET SECURITY STATUS KEY,

(4) execution of the command GET RANDOM,

(5) identification by providing the users certificate,

(6) execution of INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_CVC according to FIA_API.1,

(7) execution of EXTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_CVC, PrK.SMC.AUTD_RPS_CVC, PrK.SMC.AUTR_CVC and PuK.CAMS_SMC.AUT_CVC

(8) execution of PSO: VERIFY CERTIFICATE with PuK.RCA.CS

(9) execution of PSO: DECIPHER and INTERNAL AUTHENTICATE

[63] [assignment: *list of TSF-mediated actions*]

with PrK.SMKT.AUT

(10) [assignment: *list of TSF mediated actions*][64]

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.

Dependencies: FIA_UID.1 Timing of identification.

165 **Application note 26:** The ST writer shall perform the missing operation in FIA_UAU.1.1. According to the specification [22] the list of data objects with read access condition includes but is not limited to the Health Professional Data, the Card Verifiable Authentication Certificates and the X.509 Certificates. The card management system may create DF and EF in MF and DF, and define their access conditions.

6.1.2.5 Single-use authentication mechanisms (FIA_UAU.4)

166 The TOE shall meet the requirements of “Single-use authentication mechanisms (FIA_UAU.4)” as specified below (Common Criteria Part 2).

167 **FIA_UAU.4 Single-use authentication mechanisms**

Hierarchical to: No other components.

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

(1) external device authentication by means of executing the command EXTERNAL AUTHENTICATE with symmetric or asymmetric key,

(2) external device authentication by means of executing the command MUTUAL AUTHENTICATE with symmetric or asymmetric key,

(3) secure messaging channel[65].

Dependencies: No dependencies.

168 **Application note 27:** The command EXTERNAL AUTHENTICATE may be used as part of the mutual card-to-card authentication mechanisms Service_Asym_Mut_Auth_w/o_SK, and Service_Asym_Mut_Auth_with_SM or independent on mutual authentication. It uses the fresh

[64] [assignment: *list of TSF-mediated actions*]

[65] [assignment: *identified authentication mechanism(*s)]

generated by the TOE random data RND.ICC (see also FCS_RNG.1) as challenge to prevent reuse of a response generated in a successful authentication attempt.

169 The TOE shall meet the requirement "Multiple authentication mechanisms (FIA_UAU.5)" as specified below (Common Criteria Part 2).

170 **FIA_UAU.5 Multiple authentication mechanisms**

Hierarchical to: No other components.

Dependencies: No dependencies.

FIA_UAU.5.1 The TSF shall provide

(1) human user authentication with PIN.SMC and PUK.SMC,

(2) execution of the command EXTERNAL AUTHENTICATE as part of the Service_Asym_Mut_Auth_w/o_SK,

(3) execution of the command EXTERNAL AUTHENTICATE as part of the Service_Asym_Mut_Auth_with_SM,

(4) execution of the command EXTERNAL AUTHENTICATE as part of the Service_Sym_Mut_Auth_with_SM,

(5) secure messaging channel[66]

to support user authentication.

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

(1) The TSF shall authenticate the Cardholder with Cardholder Authentication Reference Data for PIN.SMC

(2) The TSF shall authenticate the Cardholder with Authentication Reference Data for PUK.SMC to authorize changing and unblocking PIN.SMC.

(3) The TSF shall authenticate the Security Module Card with Root Public Key of the Certificate Service Provider and Card verifiable certificate with a corresponding cardholder authorization of SMC [67].

171 The TOE shall meet the requirement "Re-authenticating (FIA_UAU.6)" as specified below (Common Criteria Part 2).

[66] [assignment: *list of multiple authentication mechanisms*]

[67] [assignment: *rules describing how the multiple authentication mechanisms provide authentication*]

172 **FIA_UAU.6 Re-authenticating**

Hierarchical to: No other components.

FIA_UAU.6.1 The TSF shall re-authenticate the user under the conditions successful established secure messaging as receiver of commands [68].

Dependencies: No dependencies.

173 **Application note 28:** The specification [20] states in section 13.1.1.2 item (N341): “If no Secure Messaging is indicated in the CLA byte (see [ISO7816-4] Clause 5.1.1) and SessionkeyContext.flagSessionEnabled has the value SK4SM, then (i.) flagSessionEnabled MUST be set to the value noSK, (ii.) the security status of the key that was involved in the negotiation of the session keys MUST be deleted by means of clearSecurityStatus(...).”

174 The TOE shall meet the requirement “Authentication Proof of Identity (FIA_API.1)” as specified below (Common Criteria Part 2 extended).

175 **FIA_API.1 Authentication Proof of Identity**

Hierarchical to: No other components.

Dependencies: No dependencies.

FIA_API.1.1 The TSF shall provide a

(1) INTERNAL AUTHENTICATE with PrK.SMC.AUTR_CVC[69] to prove the identity of the role SMC[70]
(2) **INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_-CVC to prove the identity of the PIN receiver,**
(3) **INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPS_-CVC to prove the identity of the PIN sender,**
(4) **INTERNAL AUTHENTICATE with PrK.HCI.AUT to prove the identity of the SMC client.**[71]

Application note 29: The refinement adds a list of authentication mechanisms and roles as defined in clause 1 for FIA_API.1.1 (instead of 4 times iteration of the component). The role SMC is represented by one of the CHA profile 2 to 5 or 7. Note the client / server authentication uses the command INTERNAL AUTHENTICATE as well but with other algorithm identification.

[68] [assignment: *list of conditions under which re-authentication is required*]

[69] [assignment: *authentication mechanism*]

[70] [assignment: *authorized user or rule*]

(1) [71] Refinement: “(2) INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_CVC to prove the identity of the PIN receiver, (3) INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPS_CVC to prove the identity of the PIN sender, (4) INTERNAL AUTHENTICATE with PrK.HCI.AUT to prove the identity of the SMC client”

6.1.3 Access Control

6.1.3.1 Subset Access Control (FDP_ACC.1)

176 The following Security Function Policy (SFP) **SMC Access Control SFP** is defined for the requirements “Subset Access Control (FDP_ACC.1)”, “Security attribute based access control (FDP_ACF.1)”, “Import of user data without security attributes (FDP_ITC.1)”, “Basic data exchange confidentiality (FDP_UCT.1)”, “Data exchange integrity (FDP_UIT.1)” and “Static attribute initialisation (FMT_MSA.3)**”**.

“The TOE provides the security services with private keys for the Cardholder only. The TOE protects the communication with the outside world in confidentiality and integrity on demand of the IT environment.”

177 The TOE shall meet the requirement “Complete Access Control (FDP_ACC.1)” as specified below (Common Criteria Part 2).

178 **FDP_ACC.1 Subset Access Control**

Hierarchical to: No other components.

FDP_ACC.1.1 The TSF shall enforce the SMC Access Control SFP [72] on

1. the subjects
   - (a) the Card Management System (identified by Aut(PuK.CAMS_SMC.AUT_CVC)),
   - (b) the Cardholder (identified by PIN.SMC),
   - (c) the HPC/SMC (identified by Aut(‘D27600004000’||’xx’)),
   - (d) the eHC
   - (e) The Configuration Agent (identified by PIN.CONF) and
   - (f) (unauthorised) Terminal
2. the objects
   - (a) MF, DF.ESIGN, DF.KT and DF.SMA
   - (b) Global Data Object (EF.GDO),
   - (c) EF.ATR,
   - (d) EF.DIR,
   - (e) EF.Version,
   - (f) EF.CONF
   - (g) Net related data (EF.NET),
   - (h) SMC related Data (EF.SMD),
   - (i) EF.C.SMKT.CA and EF.C.SMKT.AUT
   - (j) Card Authentication Private Keys (PrK.SMC.AUTR_CVC, PrK.SMC.AUTD_RPS_CVC, and PrK.SMC.AUTD_RPE_CVC),
   - (k) Client-Server Authentication Private Key (PrK.HCI.AUT),
   - (l) Decipher Private Key (PrK.HCI.ENC),
   - (m) Card Terminal to Connector Authentication Private Key for connecting (PrK.SMKT.AUT)
   - (n) Organisational Electronic Signature Private Key (PrK.HCI.OSIG),
   - (o) Card Verifiable Certificates (EF.C.SMC.AUTR_CVC, EF.C.CA_SMC.CS, EF.C.SMC.AUTD_RPE_CVC, EF.C.SMC.AUTD_RPS_CVC),
   - (p) X.509 certificates (EF.C.HCI.AUT, EF.C.HCI.ENC, EF.C.HCI.OSIG);
   - (q) PIN.SMC and PIN.CONF
   - (r) PuK.RCA.CS and PuK.CAMS_SMC.AUT_CVC
3. operations by commands defined in table 2[73].

[72] [assignment: *access control SFP*]

Dependencies: FDP_ACF.1 Security attribute based access control

179 **Application note 30:** The subjects and objects are described in section 3.1 Introduction. The User Authentication Reference Data (PIN.SMC and PUK.SMC) and the public key for CV certificate verification (PuK.RCA.CS) are TSF data.

6.1.3.2 Security attribute based access control (FDP_ACF.1)

180 The TOE shall meet the requirement "Security attribute based access control (FDP_ACF.1)" as specified below (Common Criteria Part 2).

181 **FDP_ACF.1 Security attribute based access control**

Hierarchical to: No other components.

FDP_ACF.1.1 The TSF shall enforce the SMC Access Control SFP[74] to objects based on the following: authentication status of user [75].

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

1. the (unauthorised) Terminal is allowed
   (a) to select the MF, DF.SMA, DF.KT and DF.ESIGN by the means of the command SELECT
   (b) to read by means of commands SELECT and READ BINARY the EF.ATR, EF.GDO, EF.SMD, EF.NET, EF.C.SMKT.CA, and EF.C.SMKT.AUT
   (c) to read by means of commands SELECT, READ RECORD and SEARCH RECORD the EF.DIR and EF.VERSION,
   (d) to read by means of commands SELECT and READ BINARY the Card Verifiable Authentication Certificates (EF.C.CA_SMC.CS, EF.C.SMC.AUTR_CVC, EF.C.SMC.AUTD_RPE_CVC, and EF.C.SMC.AUTD_RPS_CVC),
   (e) to read by means of commands SELECT and READ BINARY the

[73] [assignment: *list of subjects, objects, and operations among subjects and objects covered by the SFP*]

[74] [assignment: *access control SFP*]

[75] [assignment: *list of subjects and objects controlled under the indicated SFP, and. for each, the SFP-relevant security attributes, or named groups of SFP-relevant security attributes*]

X.509 certificates (EF.C.HCI.AUT, EF.C.HCI.ENC, EF.C.HCI.OSIG),

(f) to execute the command EXTERNAL AUTHENTICATE with PrK.SMC.AUTR_CVC, PrK.SMC.AUTD_RPS_CVC, and PrK.SMC.AUTD_RPE_CVC, PuK.CAMS_SMC.AUT_CVC

(g) to execute the command INTERNAL AUTHENTICATE with PrK.SMC.AUTD_RPE_CVC and PrK.SMKT.AUT,

(h) to execute the command GET RANDOM

(i) to execute the command PSO: VERIFY CERTIFICATE with PuK.RCA.CS,

(j) to execute the command PSO: DECIPHER with PrK.SMKT.AUT,

(k) to execute CHANGE REFERENCE DATA (Opt. '00'), GET PIN Status, RESET RETRY COUNTER (Opt. '00' or '01') and VERIFY with PIN.SMC, and PIN.CONF;

2. the Cardholder is allowed

   (a) to execute the command INTERNAL AUTHENTICATE with PrK.SMC.AUTR_CVC, PrK.HCI.AUT

   (b) to execute the command PSO: DECIPHER with PrK.HCI.ENC,

   (c) to execute the command PSO: TRANSCIPHER with PrK.HCI.ENC and imported public key,

   (d) to execute the command PSO: COMPUTE DIGITAL SIGNATURE (P2='9E' or 'AC') with PrK.HCI.OSIG and PrK.HCI.AUT,

   (e) to execute the commands UPDATE BINARY and ERASE BINARY with EF.SMD, and EF.NET,

   (f) to perform all actions a terminal is allowed to perform.;

3. a successful authenticated HPC is allowed

   (a) to execute the command INTERNAL AUTHENTICATE using with PrK.SMC.AUTR_CVC,

   (b) to execute the commands UPDATE BINARY and ERASE BINARY with EF.SMD

   (c) to perform all actions a terminal is allowed to perform,

4. a successful authenticated CAMS is allowed

   (a) to execute the command LOAD APPLICATION with MF and DF.SMA,

   (b) to execute the command UPDATE RECORD with EF.DIR and

[76] [assignment: *rules governing access among controlled subjects and controlled objects using controlled operations on controlled objects*]

EF.VERSION,

(c) to execute the command Append Record with EF.DIR,

5. a successful authenticated HPC/SMC is allowed

(a) to execute the command Internal Authenticate with PrK.SMC.AUTD_RPS_CVC,

6. a successful authenticated Configuration Agent is allowed

(a) to execute the commands Select, Read Binary, Update Binary, and Erase Binary with EF.CONF [76].

FDP_ACF.1.3 The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: none[77].

FDP_ACF.1.4 The TSF shall explicitly deny access of subjects to objects based on the following additional rules: no other access than defined in FDP_ACF.1.2 to the objects listed in FDP_ACC.1.1 is allowed to any subject[78].

Dependencies: FDP_ACC.1 Subset access control
FMT_MSA.3 Static attribute initialization

182 The TOE shall meet the requirement "Import of user data without security attributes (FDP_ITC.1)" as specified below (Common Criteria Part 2).

183 FDP_ITC.1 Import of user data without security attributes

Hierarchical to: No other components.

Dependencies: [FDP_ACC.1 Subset access control, or
FDP_IFC.1 Subset information flow control]
FMT_MSA.3 Static attribute initialisation

FDP_ITC.1.1 The TSF shall enforce the SMC Access Control SFP [79] when importing user data, controlled under the SFP, from outside of the TOE.

[77] [assignment: *rules, based on security attributes, that explicitly authorise access of subjects to objects*]

[78] [assignment: *rules, based on security attributes, that explicitly deny access of subjects to objects*]

[79] [assignment: *access control SFP(s) and/or information flow control SFP(s)*]

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

FDP_ITC.1.3 The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE: [assignment: *additional importation control rules*].

184 The TOE shall meet the requirement “Residual Information Protection (FDP_RIP.1)” as specified below (Common Criteria Part 2).

185 **FDP_RIP.1 Residual Information Protection**

Hierarchical to: No other components.

FDP_RIP.1.1 The TSF shall ensure that any previous information content of a resource is made unavailable upon the [selection*: allocation of the resource to, deallocation of the resource from*] the following objects: [assignment*: list of objects at least including: PINs, secret and private cryptographic keys,* [assignment: *list of other objects*]][80].

Dependencies: No dependencies.

186 **Application note 31**: The writer of the Security Target may want to use iterations of FDP_RIP.1 in order to distinguish between data, which must be deleted already upon de-allocation and those which can be deleted upon allocation. Note that the SSCD-PP requires deletion of secret signature keys upon de-allocation and that this is advisable for all PINs and secret/private cryptographic keys in general. For secret user data deletion upon allocation should be sufficient (depending on the resistance of the concrete TOE against physical attacks). The ST writer should consider also data in all files, which are not freely accessible as the possible completion of the assignment : *list of other objects*.

187 The TOE shall meet the requirement “Stored Data Integrity monitoring and action (FDP_SDI.2)” as specified below (Common Criteria Part 2).

188 **FDP_SDI.2 Stored Data Integrity monitoring and action**

Hierarchical to: FDP_SDI.1. Stored Data Integrity monitoring

[80] [assignment: *list of objects*]

FDP_SDI.2.1 The TSF shall monitor user data stored in containers controlled by the TSF for <u>integrity errors</u>[81] on all objects, based on the following attributes: <u>[assignment*: user data attributes – the attributes shall be chosen in a way that at least the following data are included:*</u>

- <u>*PINs,*</u>
- <u>*cryptographic keys,*</u>
- <u>*security relevant status variables of the card (e. g. authentication status for the PIN or for mutual authenticate)*</u>
- <u>*input data for electronic signatures*</u>
- <u>*user data in files on the card,*</u>
- <u>*file management information (like access rules for files), and*</u>
- <u>*the card life cycle status*]</u>[82].

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

1. <u>Prohibit the use of the altered data,</u>
2. <u>inform the connected entity about integrity error</u>[83].

Dependencies: No dependencies.

189 **Application note 32:** The writer of the Security Target may want to use iterations of FDP_SDI.2, for example in order to distinguish between different types of data (compare the SSCD-PP, where this is done for persistent data on the one hand and other data on the other hand).

6.1.3.3 Inter-TSF-Transfer

190 **Application note 30:** FDP_UCT.1, FDP_UIT.1 require the TOE to protect User Data transmitted between the TOE and a connected device by secure messaging with encryption and message authentication codes after successful authentication of the remote device. The authentication mechanisms as part of the Card-to-Card Authentication Mechanism include the key agreement for the encryption and the message authentication key to be used for secure messaging. The rules for the data transfer are defined in the security policy SMC Access Control SFP defined in the preceding section.

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

192 **FDP_UCT.1 Basic data exchange confidentiality**

Hierarchical to: No other components.

[81] [assignment: *integrity errors*]

[82] [assignment: *user data attributes*]

[83] [assignment: *action to be taken*]

FDP_UCT.1.1 The TSF shall enforce the SMC Access Control SFP [84] to transmit and receive[85] user data in a manner protected from unauthorised disclosure.

Dependencies: [FTP_ITC.1 Inter-TSF trusted channel, or FTP_TRP.1 Trusted path]
[FDP_ACC.1 Subset access control, or FDP_IFC.1 Subset information flow control]

193 **Application note 33**: The SMC-B supports secure messaging with TDES encryption (cf. SFR FCS_COP.1/3TDES) after card-to-card authentication.

194 The TOE shall meet the requirement "Data exchange integrity (FDP_UIT.1)" as specified below (Common Criteria Part 2).

195 **FDP_UIT.1 Data exchange integrity**

Hierarchical to: No other components.

FDP_UIT.1.1 The TSF shall enforce the SMC Access Control SFP [86] to transmit and receive [87] user data in a manner protected from modification, deletion, insertion and replay [88] errors.

FDP_UIT.1.2 The TSF shall be able to determine on receipt of user data, whether modification, deletion, insertion and replay [89] has occurred.

Dependencies: [FDP_ACC.1 Subset access control, or FDP_IFC.1 Subset information flow control]
[FTP_ITC.1 Inter-TSF trusted channel, or FTP_TRP.1 Trusted path]

196 **Application note 34**: The SMC-B supports secure messaging with MAC (cf. FCS_COP.1/RMAC) after card-to-card authentication.

[84] [assignment: *access control SFP(s) and/or information flow control SFP(s)*]

[85] [selection: *transmit, receive*]

[86] [assignment: *access control SFP(s) and/or* i*nformation flow control SFP(s)*]

[87] [selection: *transmit, receive*]

[88] [selection: *modification, deletion, insertion, replay*]

[89] [selection: *modification, deletion, insertion, replay*]

197 The TOE shall meet the requirement "Inter-TSF trusted channel (FTP_ITC.1)" as specified below (Common Criteria Part 2).

198 **FTP_ITC.1 Inter-TSF trusted channel**

Hierarchical to: No other components.

FTP_ITC.1.1 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 The TSF shall permit another trusted IT product[90] to initiate communication via the trusted channel.

FTP_ITC.1.3 The TSF shall initiate communication via the trusted channel for commands and responses after successful card-to-card authentication with SM key agreement[91].

Dependencies: No dependencies.

199 **Application note 35:** The specification [20], Chapter 13 and 15, describes the use of secure messaging as trusted channel. The remote trusted IT product (may be a security module of SMC or a HPC) may initiate the trusted channel using Service_Asym_Mut_Auth_with_SM. The TOE enforces secure messaging after asymmetric card-to-card authentication with algorithm 'rsaSessionkey4SM' (i.e. Service_Asym_Mut_Auth_with_SM). If the external entity sent any command in plain the security status of the HPC/SMC reached after this authentication is lost and the secure messaging keys deleted (cf. [20], Annex, Chapter 13).

6.1.4 Security Management

200 **Application note 36**: The SFR FMT_SMF.1 and FMT_SMR.1 provide basic requirements to the management of the TSF data.

201 The TOE shall meet the requirement "Specification of Management Functions (FMT_SMF.1)" as specified below (Common Criteria Part 2).

[90] [selection: *the TSF, another trusted_IT product*]

[91] [assignment: *list of functions for which a trusted channel is required*]

202 **FMT_SMF.1 Specification of Management Functions**

Hierarchical to: No other components.

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

1. Initialization,
2. Personalization,
3. Card management,
4. Modification of the PIN [92].

Dependencies: No Dependencies

203 The TOE shall meet the requirement "Security roles (FMT_SMR.1)" as specified below (Common Criteria Part 2).

204 **FMT_SMR.1 Security roles**

Hierarchical to: No other components.

FMT_SMR.1.1 The TSF shall maintain the roles Manufacturer, Personalisation Agent, Card Management system, Cardholder, HPC/SMC, and Configuration Agent [93].

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

Hierarchical to: FIA_UID.1 Timing of identification

205 **Application note 37**: The Certificate Holder authorization (CHA) Role ID are defined in [21], annex A.3.

206 **Application note 38**: The SFR FMT_LIM.1 and FMT_LIM.2 address the management of the TSF and TSF data to prevent misuse of test features of the TOE over the life cycle phases. The functional requirements FMT_LIM.1 and FMT_LIM.2 assume that there are two types of mechanisms (limited capabilities and limited availability) which together shall provide protection in order to enforce the policy. This also allows that

i. the TSF is provided without restrictions in the product in its user environment but its capabilities are so limited that the policy is enforced

[92] [assignment: *list of management functions to be provided by the TSF*]

[93] [assignment: *the authorised identified roles*]

or conversely

ii. the TSF is designed with high functionality but is removed or disabled in the product in its user environment.

The combination of both requirements shall enforce the policy.

207 The TOE shall meet the requirement "Limited capabilities (FMT_LIM.1)" as specified below (Common Criteria Part 2 extended).

208 **FMT_LIM.1 Limited capabilities**

Hierarchical to: No other components.

FMT_LIM.1.1 The TSF shall be designed in a manner that limits their capabilities so that in conjunction with "Limited availability (FMT_LIM.2)" the following policy is enforced: Deploying Test Features after TOE Delivery does not allow User Data to be disclosed or manipulated, TSF data to be disclosed or manipulated, software to be reconstructed and no substantial information about construction of TSF to be gathered which may enable other attacks [94].

Dependencies: FMT_LIM.2 Limited availability.

209 The TOE shall meet the requirement "Limited availability (FMT_LIM.2)" as specified below (Common Criteria Part 2 extended).

210 **FMT_LIM.2 Limited availability**

Hierarchical to: No other components.

FMT_LIM.2.1 The TSF shall be designed in a manner that limits their availability so that in conjunction with "Limited capabilities (FMT_LIM.1)" the following policy is enforced: Deploying Test Features after TOE Delivery does not allow User Data to be disclosed or manipulated, TSF data to be disclosed or manipulated, software to be reconstructed and no substantial information about construction of TSF to be gathered which may enable other attacks [95].

Dependencies: FMT_LIM.1 Limited capabilities.

211 The TOE shall meet the requirement "**Secure security attributes** (FMT_MSA.2)" as specified below (Common Criteria Part 2).

[94] [assignment: *Limited capability and availability policy*]

[95] [assignment: *Limited capability and availability policy*]

212 **FMT_MSA.2** **Secure security attributes**

Hierarchical to: No other components.

Dependencies: [FDP_ACC.1 Subset access control, or
FDP_IFC.1 Subset information flow control]
FMT_MSA.1 Management of security attributes
FMT_SMR.1 Security roles

FMT_MSA.2.1 The TSF shall ensure that only secure values are accepted for [assignment: *list of security attributes*].

213 The TOE shall meet the requirement “Static attributes initialisation (FMT_MSA.3)” as specified below (Common Criteria Part 2).

214 **FMT_MSA.3** **Static attribute initialisation**

Hierarchical to: No other components.

Dependencies: FMT_MSA.1 Management of security attributes
FMT_SMR.1 Security roles

FMT_MSA.3.1 The TSF shall enforce the SMC Access Control SFP [96] to provide restrictive[97] default values for security attributes that are used to enforce the SFP.

FMT_MSA.3.2 The TSF shall allow the none[98] to specify alternative initial values to override the default values when an object or information is created.

215 **Application note 39**: The following five SFRs address the protection of the management of the TSF data: Initialization Data, Pre-personalization Data, User Authentication Reference Data (i.e. PIN and PUK), Public Key for CV Certification Verification. Note that the Card Authentication Private Keys, the Client-Server Authentication Keys, the Decipher Private Key and the SMC-B Electronic Signature Private Key are user data under protection according to SFR FDP_ACF.1.

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

[96] [assignment: *access control SFP, information flow control SFP*]

[97] [selection, choose one of: *restrictive, permissive, [assignment: other property]*]

[98] [assignment: *the authorised identified roles*]

217 **FMT_MTD.1/INI Management of TSF data – Writing of Initialization Data and Pre-personalization Data**

Hierarchical to: No other components.

FMT_MTD.1.1/INI The TSF shall restrict the ability to write [99] the Initialization Data and Pre-personalization Data [100] to the Manufacturer [101].

Dependencies: FMT_SMF.1 Specification of Management Functions
FMT_SMR.1 Security roles

218 **FMT_MTD.1/RAD_WR Management of TSF data – Writing of Authentication Reference Data**

Hierarchical to: No other components.

FMT_MTD.1.1/RAD_WR The TSF shall restrict the ability to write [102] the

1. User Authentication Reference Data and
2. public keys of the root for CV certificate verification [103]

to the Personalisation Agent [104].

Dependencies: FMT_SMF.1 Specification of Management Functions
FMT_SMR.1 Security roles

219 **FMT_MTD.1/RAD_MOD Management of TSF data – Modification of Authentication Reference Data**

Hierarchical to: No other components.

FMT_MTD.1.1/RAD_MOD The TSF shall restrict the ability to modify [105] the public keys of the root for CV certificate verification [106] to nobody [107].

[99] [selection: *change_default, query, modify, delete, clear*, [assignment: *other operations*]]

[100] [assignment: *list of TSF data*]

[101] [assignment: *the authorised identified roles*]

[102] [selection: *change_default, query, modify, delete, clear*, [assignment: *other operations*]]

[103] [assignment: *list of TSF data*]

[104] [assignment: *the authorised identified roles*]

[105] [selection: *change_default, query, modify, delete, clear*, [assignment: *other operations*]]

Dependencies: FMT_SMF.1 Specification of Management Functions
FMT_SMR.1 Security roles

220 **FMT_MTD.1/PIN** **Management of TSF data – Management of the Human User Authentication Data**

Hierarchical to: No other components.

FMT_MTD.1.1/PIN The TSF shall restrict the ability to modify and unblock [108] the PIN [109] to the Cardholder [110].

Dependencies: FMT_SMF.1 Specification of Management Functions
FMT_SMR.1 Security roles

221 **Application note 40**: The SFR FMT_MTD.1/RAD_WR address the first writing of the authentication reference data of the Cardholder (i.e. PIN and PUK) and of the technical components (i.e. public keys of the PKI roots) e.g. in the personalisation process. The modification of existing authentication reference data are separated to different roles and addressed by different SFR FMT_MTD.1/RAD_MOD and FMT_MTD.1/PIN. Note, the specification [22] does not describe detailed access conditions for the public keys because their implementation is specific for the operating system. The cardholder modifies his or her PIN as special case of the User Authentication Reference Data by means of (i) the command CHANGE REFERENCE DATA and providing the old and the new PIN or (ii) the command RESET RETRY COUNTER and providing the PUK and the new PIN. He or she unblocks the PIN by means of (i) the command RESET RETRY COUNTER and providing the PUK and the new PIN or (ii) the command RESET RETRY COUNTER and providing the PUK (without a new PIN).

FMT_MTD.1/RAD_SMC **Management of TSF data – Human User Authentication Data**

Hierarchical to: No other components.

[106] [assignment: *list of TSF data*]

[107] [assignment: *the authorised identified roles*]

[108] [selection: *change_default, query, modify, delete, clear*, [assignment: *other operations*]]

[109] [assignment: *list of TSF data*]

[110] [assignment: *the authorised identified roles*]

FMT_MTD.1.1/ RAD_SMC The TSF shall restrict the ability to
(1) read [111] the PIN.SMC [112],
(2) disable the PIN.SMC,
(3) read the PUK.SMC,
(4) disable the PUK.SMC, [113]
to none [114].

Dependencies: FMT_SMF.1 Specification of Management Functions
FMT_SMR.1 Security roles

6.1.5 SFR for TSF Protection

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

223 The TOE shall meet the requirement "**TOE Emanation** (FPT_EMSEC.1)" as specified below (CC extended):

FPT_EMSEC.1 TOE Emanation

Hierarchical to: No other components.

FPT_EMSEC.1.1 The TOE shall not emit [*assignment: types of emissions*] in excess of [assignment: *specified limits*] enabling access to

1. PIN and PUK[115]

and

2. Card Authentication Private Keys,
3. Client-Sever Authentication Private Key,

[111] [selection: *change_default, query, modify, delete, clear*, [assignment: *other operations*]]

[112] [assignment: *list of TSF data*]

[113] Refinement "(2) disable the PIN.SMC, (2) read the PUK.SMC, (3) disable the PUK.SMC,"

[114] [assignment: *the authorised identified roles*]

4. Document Cipher Key Decipher Key,
5. Digital Signature Private Key,
6. secure messaging keys [116].

FPT_EMSEC.1.2 The TSF shall ensure any authorized user [117] are unable to use the following interface smart card circuit contacts [118] to gain access to

1. PIN and PUK[119]

and

2. Card Authentication Private Key,
3. Client-Sever Authentication Private Key
4. Document Cipher Key Decipher Key
5. Digital Signature Private Key,
6. secure messaging keys [120].

Dependencies: No dependencies.

224 **Application note 41**: The TOE shall prevent attacks against the listed secret data where the attack is based on external observable physical phenomena of the TOE. Such attacks may be observable at the interfaces of the TOE or may 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 smart card. The SMC-B has to provide a smart card interface with contacts according to ISO/IEC 7816-2 [20] but the integrated circuit may have additional contacts or a contactless interface as well. Examples of measurable phenomena include, but are not limited to variations in the power consumption, the timing of signals and the electromagnetic radiation due to internal operations or data transmissions.

225 The following security functional requirements address the protection against forced illicit information leakage.

[115] [assignment: *list of types of TSF data*]

[116] [assignment: *list of types of user data*]

[117] [assignment: *type of users*]

[118] [assignment: *type of connection*]

[119] [assignment: *list of types of TSF data*]

[120] [assignment: *list of types of user data*]

226 The TOE shall meet the requirement "Failure with preservation of secure state (FPT_FLS.1)" as specified below (Common Criteria Part 2).

227 **FPT_FLS.1 Failure with preservation of secure state**

Hierarchical to: No other components.

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

1. exposure to operating conditions where therefore a malfunction could occur,
2. failure detected by TSF according to FPT_TST.1 [121].

Dependencies: No dependencies.

228 The TOE shall meet the requirement "Resistance to physical attack (FPT_PHP.3)" as specified below (Common Criteria Part 2).

229 **FPT_PHP.3 Resistance to physical attack**

Hierarchical to: No other components.

FPT_PHP.3.1 The TSF shall resist physical manipulation and physical probing [122] to the TSF [123] by responding automatically such that the SFRs are always enforced.

Dependencies: No dependencies.

230 **Application note 42**: The TOE will implement appropriate measures to continuously counter physical manipulation and physical probing. Due to the nature of these attacks (especially manipulation) the TOE can by no means detect attacks on all of its elements. Therefore, permanent protection against these attacks is required ensuring that the TSP could not be violated at any time. Hence, "automatic response" means here (i) assuming that there might be an attack at any time and (ii) countermeasures are provided at any time.

231 The TOE shall meet the requirement "TSF testing (FPT_TST.1)" as specified below (Common Criteria Part 2).

232 **FPT_TST.1 TSF testing**

Hierarchical to: No other components.

[121] [assignment: *list of types of failures in the TSF*]

[122] [assignment: *physical tampering scenarios*]

[123] [assignment: *list of TSF devices/elements*]

FPT_TST.1.1 The TSF shall run a suite of self tests [selection*: during initial start-up, periodically during normal operation, at the request of the authorised user, at the conditions* [assignment*: conditions under which self test should occur*][124]] to demonstrate the correct operation of the TSF [125].

FPT_TST.1.2 The TSF shall provide authorised users with the capability to verify the integrity of TSF data[126].

FPT_TST.1.3 The TSF shall provide authorised users with the capability to verify the integrity of [selection: [assignment: *parts of TSF*, *TSF*]].

Dependencies: No dependencies.

233 **Application note 43**: Those parts of the TOE which support the security functional requirements “TSF testing (FPT_TST.1)” and “Failure with preservation of secure state (FPT_FLS.1)” shall be protected from interference of the other security enforcing parts of the SMC-B chip Embedded Software. The security enforcing functions and health application data shall be separated in way preventing any inference.

234 **Application note 44**: If SMC-B chip uses state of the art smart card technology it will run the some self tests at the request of the authorised user and some self tests automatically. E.g. a self test for the verification of the integrity of stored TSF executable code required by FPT_TST.1.3 may be executed during initial start-up by the “authorised user” Card Management system in the Phase 2 Manufactoring. Other self tests may run automatically to detect failure and to preserve of secure state according to FPT_FLS.1 in the Phase 4 Operational Use, e.g. to check a calculation with a private key by the reverse calculation with the corresponding public key as countermeasure against Differential Failure Attacks. The security target writer shall perform the operation claimed by the concrete product under evaluation.

6.2 Security Assurance Requirements for the TOE

235 The security assurance requirements for the evaluation of the TOE and its development and operating environment are those taken from the

Evaluation Assurance Level 4 (EAL4)

and augmented by taking the following component:

AVA_VAN.5.

[124] [assignment*: conditions under which self test should occur*]

[125] [selection: [assignment: *parts of TSF*], *the TSF*]

[126] [selection: [assignment: *parts of TSF data*], *TSF data*]

6.3 Security Requirements Rationale

236 The explicitly stated security requirements are taken form the Security IC Platform Protection Profile, Version 1.0, 15.06.2007; registered and certified by Bundesamt für Sicherheit in der Informationstechnik (BSI) under the reference BSI-CC-PP-0035 [17]. This PP provides a justification why the SFRs FCS_RNG.1 and FMT_LIM.1 resp. FMT_LIM.2 defined in chapter 5 Extended Components Definition are necessary to address smart card specific security functional requirements. This justification is valid for the current PP as well. The extended family FCS_RNG describes SFR for random number generation used for cryptographic purposes. The family FMT_LIM describes the functional requirements for the Test Features of the TOE. The new functional requirements were defined in the class FMT because this class addresses the management of functions of the TSF. The examples of the technical mechanism used in the TOE show that no other class is appropriate to address the specific issues of preventing the abuse of functions by limiting the capabilities of the functions and by limiting their availability.

237 The definition of the family FPT_EMSEC is taken from the *Protection Profile Secure Signature Creation Device* [18], chapter 6.6.1. This family describes the functional requirements for the limitation of intelligible emanations. The TOE shall prevent attacks against 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. Limit of Emissions requires to not emit intelligible emissions enabling access to TSF data or user data. Interface Emanation requires not emit interface emanation enabling access to TSF data or user data.

238 The family FIA_API is defined to describe the functional requirements for the proof of the claimed identity for the authentication verification by an external entity. The other families of the class FIA address the verification of the identity of an external entity. This family defines functions provided by the TOE to prove their identity and to be verified by an external entity in the TOE IT environment. Therefore the FIA_API.1 is defined to provide a INTERNAL AUTHENTICATE with different keys to prove the identity of the different authorized users or rules.

6.3.1 Security Functional Requirements Coverage

239 The following table shows, which SFRs for the TOE support which security objectives of the TOE. The table shows, that every objective is supported by at least one SFR and that every SFR supports at least one objective.

	OT.AC_Pers	OT.AC_Serv	OT.Data_Confident	OT.Data_Integrity	OT.Dig_Sign	OT.Dec_Trans	OT.DS_CSA	OT.TSS	OT.Trusted_Channel	OT.Prot_Abuse_Func	OT.Prot_Inf_Leak	OT.Prot_Malfunction	OT.Prot_Phys_Tamper
FCS_RNG.1		x						x	x				
FCS_COP.1/SHA		x							x				
FCS_COP.1/CCA_SIGN		x							x				
FCS_COP.1/CCA_VERIF		x							x				
FCS_COP.1/3TDES		x							x				
FCS_COP.1/RMAC		x							x				
FCS_CKM.1/Asym_Auth		x							x				
FCS_CKM.1/Sym_Auth		x							x				
FCS_CKM.4		x							x				
FCS_COP.1/CSA							x	x					
FCS_COP.1/RSA_DEC						x		x					
FCS_COP.1/RSA_TRANS						x							
FCS_COP.1/SIGN_OSIG					x								
FIA_AFL.1/PIN		x											
FIA_AFL.1/PUK		x											
FIA_SOS.1		x											
FIA_ATD.1		x											
FIA_UID.1	x	x						x					
FIA_UAU.1	x	x						x					
FIA_UAU.4		x							x				
FIA_UAU.5		x							x				
FIA_UAU.6		x							x				
FIA_API.1		x					x		x				
FDP_ACC.1	x	x	x	x	x	x	x	x					
FDP_ACF.1	x	x	x	x	x	x	x	x					
FDP_ITC.1					x	x							
FDP_RIP.1			x										
FDP_SDI.2				x									
FDP_UCT.1									x				
FDP_UIT.1									x				
FTP_ITC.1									x				
FMT_SMF.1	x	x											
FMT_SMR.1	x	x											
FMT_LIM.1		x								x			
FMT_LIM.2		x								x			
FMT_MSA.2		x				x	x						
FMT_MSA.3		x											
FMT_MTD.1/INI	x		x										
FMT_MTD.1/RAD_WR	x	x											
FMT_MTD.1/RAD_MOD		x											
FMT_MTD.1/PIN	x	x	x										

	OT.AC_Pers	OT.AC_Serv	OT.Data_Confident	OT.Data_Integrity	OT.Dig_Sign	OT.Dec_Trans	OT.DS_CSA	OT.TSS	OT.Trusted_Channel	OT.Prot_Abuse_Func	OT.Prot_Inf_Leak	OT.Prot_Malfunction	OT.Prot_Phys_Tamper
FMT_MTD.1/RAD_SMC	x	x											
FPT_EMSEC.1			x			x	x				x		
FPT_FLS.1			x	x							x	x	
FPT_PHP.3			x	x							x	x	x
FPT_TST.1			x	x							x	x	

Table 6: Security functional requirements rationale

6.3.2 Security Requirements Sufficiency

240 The security objective **OT.AC_Pers** “Access control for personalization and management” mainly implemented by following SFRs:

(i) The SFR **FMT_SMR.1** defines the Card Management System as known role of the TOE and the SFR **FMT_SMF.1** defines personalization as security management function.

(ii) The SFRs **FIA_UID.1** and **FIA_UAU.1** require identification and authentication as necessary precondition for the personalization (i.e. this TSF mediated function is not allowed before the user is identified and successfully authenticated).

(iii) The SFRs **FDP_ACC.1** and **FDP_ACF.1** limit the management activities for user data to the Card Management System.

(iv) The SFR **FMT_MTD.1/RAD_WR** limits the management of the authentication reference data of the Cardholder and the PKI root for the card-to-card authentication to the Card Management System.

(v) The SFR **FMT_MTD.1/PIN** prevents disabling of reference authentication data, **FMT_MTD.1/RAD_SMC** serves for management of the Human User Authentication Data.

(vi) The SFR **FMT_MDT.1/INI** defines that the Card Management System role shall create the initial roles.

241 The security objective **OT.AC_Serv** “Access Control for TOE Security Services” addresses the implementation and the access control of the TOE security services. The security services are implemented by the following SFRs:

(i) The TOE security service Service_Asym_Mut_Auth_w/o_SK is implemented by the SFRs **FCS_COP.1/CCA_SIGN**, **FCS_COP.1/CCA_VERIF**, **FCS_RNG.1** and **FIA_UAU.5**.

(ii) The TOE security services Service_Asym_Mut_Auth_with_SM, Service_Asym_Mut_Auth_with_TC, Service_Asym_Mut_Auth_with_Intro, Service_Sym_Mut_Auth_with_TC and Service_Sym_Mut_Auth_with_SM are implemented by the SFRs **FCS_COP.1/SHA, FCS_CKM.1/Asym_Auth, FCS_CKM.1/Sym_Auth FCS_CKM.4**, **FCS_COP.1/CCA_SIGN**, **FCS_COP.1/CCA_VERIF**, **FCS_RNG.1**, **FCS_COP.1/3TDES**, **FCS_COP.1/RMAC, FIA_UAU.4, FIA_UAU.5** and **FIA_UAU.6**.

The human user authentication as cardholder and the access control for these security services are implemented by following SFRs:

(i) The SFR **FMT_SMR.1** defines the Cardholder as known role of the TOE and **FIA_ATD.1** binds his identity and role for the authentication and the SFR **FMT_SMF.1** defines Initialisation, Personalisation, Card management and Modification of the PIN as security management functions.

(ii) The SFR **FIA_SOS.1** enforces the quality of reference authentication data.

(iii) The SFRs **FIA_AFL.1/PIN** and **FIA_AFL.1/PUK** protect the PIN against guessing.

(iv) The SFR **FIA_API.1** implements authentication Proof of Identity of the role SMC, PIN receiver, PIN sender and SMC client.

(v) The SFR **FIA_UAU.5** defines PIN and PUK authentication as authentication mechanism for human user.

(vi) The SFRs **FMT_LIM.1** and **FMT_LIM.2** prevent the misuse of TOE functions intended for the testing, the initialization and the personalization of the TOE in the operational phase of the TOE,

(vii) The SFRs **FMT_MTD.1/PIN**, **FMT_MTD.1/RAD_SMC**, and **FIA_AFL.1/PIN** protect and limit the management of the authentication reference data to the Cardholder.

(viii) The SFR **FMT_MTD.1/RAD_WR** limits the management of the authentication reference data of the Cardholder and the PKI root for the card-to-card authentication to the Card Management System, the SFR **FMT_MTD.1/RAD_MOD** limits the management of the public keys of the root.

(ix) The SFRs **FIA_UID.1** and **FIA_UAU.1** require identification and authentication as necessary precondition for the use of the security services except Service_Asym_Mut_Auth_with_SM (i.e. this TSF mediated function is not allowed before the user is identified and successfully authenticated), and **FIA_UAU.6** requires to re-authenticate the remote communication entity for each data package recived by secure messaging.

(x) The SFRs **FDP_ACC.1** and **FDP_ACF.1** control the use of the security services by human user.

(xi) The SFRs **FMT_MSA.2** and **FMT_MSA.3** ensure secure security attributes of cryptographic keys and other objects.

242 The security objective **OT.Data_Confident** "Confidentiality of internal data" is implemented by following SFRs:

(i) The SFR **FMT_MTD.1/PIN** protects the confidentiality of the PIN and PUK as cardholder authentication reference data against reading.

(ii) The SFR **FMT_MDT.1/INI** defines that the Card Management System role shall create the initial roles.

(iii) The SFRs **FDP_ACC.1** and **FDP_ACF.1** protect the confidentiality of the private keys.

(iv) The SFR **FDP_RIP.1** protects the misuse of residual user data.

(v) The SFRs **FPT_EMSEC.1**, **FPT_FLS.1**, **FPT_PHP.3** and **FPT_TST.1** protect the confidential user data and TSF data against general smart card attacks.

243 The security objective **OT.Data_Integrity** "Integrity of internal data" is implemented by following SFRs:

(i) The SFRs **FDP_ACC.1** and **FDP_ACF.1** protect the integrity of the data under the TOE.

(ii) The SFR **FDP_SDI.2** protects the internal stored user data against alteration.

(iii) The SFRs **FPT_FLS.1**, **FPT_PHP.3** and **FPT_TST.1** protect the confidential user data and TSF data against general smart card attacks.

244 The security objective **OT.Dig_Sign** "Digital signature-creation" is implemented by **FCS_COP.1/SIGN_OSIG**, by the TSF **FDP_ITC.1**, which enforces the SMC Access Control SFP when importing user data, controlled under the SFP, from outside of the TOE and by the SFRs **FDP_ACC.1** and **FDP_ACF.1**, which protect the integrity of the data under the TOE.

245 The security objective **OT.DEC_TRANS** "Document key decryption and transcipherment" addresses document cipher key decipherment with an internal private key and document cipher key transcipherment with internal private key and imported public key. It is implemented by the SFRs:

(i) The SFRs **FCS_COP.1/RSA_DEC** and **FCS_COP.1/RSA_TRANS** provide the cryptographic operations.

(ii) The SFRs **FDP_ACC.1** and **FDP_ACF.1** enforce access control for the service.

(iii) The SFR **FDP_ITC.1** addresses import of the public key for transcipherment without security attributes.

(iv) The SFR **FMT_MSA.2** enforces secure security attributes of the private key.

(v) The SFR **FPT_EMSEC.1** protects the confidentiality of the private key during cryptographic operation.

246 The security objective **OT.DS_CSA** "Digital signature-creation for client / server authentication" address service for digital signature creation with an internal private signature key and is implemented by the SFRs:

(i) The SFR **FCS_COP.1/CSA** provides the cryptographic operation.

(ii) The SFR **FIA_API.1** describes digital signature-creation for client / server authentication as authentication of the TOE to a server.

(iii) The SFRs **FDP_ACC.1** and **FDP_ACF.1** enforce access control for the service.

(iv) The SFR **FMT_MSA.2** enforces secure security attributes of the private key.

(v) The SFR **FPT_EMSEC.1** protects the confidentiality of the private key during cryptographic operation.

247 The security objective **OT.TSS** "Terminal support service" requires the TOE to provide a service of random number generation for the operational environment by means of command GET RANDOM and cryprographic operation with private keys for TSL protocol for card terminal to all users. It is implemented by the SFRs:

(i) The SFR **FCS_RNG.1** provides the random number generation.

(ii) The SFRs **FIA_UID.1** and **FIA_UAU.1** allow usage of this service before the user is identified.

(iii) The SFRs **FDP_ACC.1** and **FDP_ACF.1** enforce access control for the services.

(iv) The SFR **FCS_COP.1/CSA** performs digital signature-creation for client-server authentication and **FCS_COP.1/RSA_DEC** performs decryption in accordance with a specified cryptographic algorithm.

248 The security objective **OT.Trusted_Channel** "Trusted Channel" as part of the TOE security services Service_Asym_Mut_Auth_with_SM are implemented by following SFRs:

(i) The SFRs **FCS_CKM.1/Asym_Auth**, **FCS_CKM.1/Sym_Auth** and **FCS_RNG.1** establish and **FCS_CKM.4** destructs the secure messaging keys.

(ii) The SFRs **FCS_COP.1/3TDES** and **FCS_COP.1/RMAC** providing encryption, decryption, MAC calculation and MAC verification,

(iii) The SFRs **FCS_COP.1/SHA**, **FCS_COP.1/CCA_Sign**, **FCS_COP.1/CCA_VERIF** provide the necessary cryptographic primitives for user authentication used to enforce **OT.Trusted_Channel.**

(iv) The SFRs **FDP_UCT.1, FDP_UIT.1** and **FTP_ITC.1** provide the protection of the confidentiality and integrity of the transmitted data

(v) The SFR **FIA_UAU.4** ensures the use of fresh cryptographic keys for the trusted channel,

(vi) The SFR **FIA_UAU.5** provides multiple authentication mechanisms to support user authentication.

(vii) the SFR **FIA_UAU.6** re-authenticates the communicating entity by checking the MAC of each commands received from this entity.

(viii) The SFR **FIA_API.1** implements authentication Proof of Identity of the role SMC, PIN receiver, PIN sender and SMC client.

249 The security objective **OT.Prot_Abuse_Func** “Protection against abuse of functionality” is implemented by the following SFR:

(i) The SFR **FMT_LIM.1** and **FMT_LIM.2** prevent the misuse of TOE functions intended for the testing, the initialization and the personalization of the TOE in the operational phase of the TOE.

(ii) The SFR **FMT_MSA.2** ensures that only secure values are accepted for security attributes.

250 The security objective **OT.Prot_Inf_Leak** “Protection against information leakage” is implemented by the following SFR:

(i) The SFR **FPT_EMSEC.1** protects user data and TSF data against information leakage through side channels.

(ii) The SFR **FPT_TST.1** detects errors and the SFR **FPT_FLS.1** preserves a secure state in case of detected error which may cause information leakage e.g. trough differential fault analysis.

(iii) The SFR **FPT_PHP.3** resists physical manipulation of the TOE hardware to enforce information leakage e.g. by deactivation of countermeasures or changing the operational characteristics of the hardware.

251 The security objective **OT.Prot_Malfunction** “Protection against Malfunctions” is implemented by the following SFR:

(i) The SFR **FPT_TST.1** detects errors and the SFR **FPT_FLS.1** prevents information leakage by preserving a secure state in case of detected errors or insecure operational conditions where reliability and secure operation has not been proven or tested.

(ii) The SFR **FPT_PHP.3** resists physical manipulation of the TOE hardware controlling the operational conditions e.g. sensors.

252 The security objective **OT.Prot_Phys_Tamper** "Protection against physical tampering" is implemented directly by the **SFR FPT_PHP.3**.

6.3.3 Dependency Rationale

SFR	Dependencies	Support of the Dependencies
FCS_RNG.1	No dependencies	n.a.
FCS_COP.1/SHA	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	The cryptographic algorithm SHA-256 does not use any cryptographic key. Therefore none of the listed SFRs are needed to be defined for this specific instantiation of FCS_COP.1/SHA.
FCS_COP.1/CCA_SIGN	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	justification 2 for non-satisfied dependencies
FCS_COP.1/CCA_VERIF	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	justification 2 for non-satisfied dependencies
FCS_COP.1/3TDES	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	FCS_CKM.1, FCS_CKM.4, justification 1 for non-satisfied dependencies
FCS_COP.1/RMAC	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	FCS_CKM.1, FCS_CKM.4, justification 1 for non-satisfied dependencies
FCS_CKM.1/Asym_Auth	[FCS_CKM.2 Cryptographic key	FCS_CKM.4, FCS_COP.1,

SFR	Dependencies	Support of the Dependencies
	distribution or FCS_COP.1 Cryptographic operation] FCS_CKM.4 Cryptographic key destruction	justification 1 for non-satisfied dependencies
FCS_CKM.1/Sym_Auth	[FCS_CKM.2 Cryptographic key distribution or FCS_COP.1 Cryptographic operation] FCS_CKM.4 Cryptographic key destruction	FCS_CKM.4, FCS_COP.1, justification 1 for non-satisfied dependencies
FCS_CKM.4	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation]	FCS_CKM.1/Asym_Auth FCS_CKM.1/Sym_Auth, justification 1 for non-satisfied dependencies
FCS_COP.1/CSA	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	justification 2 for non-satisfied dependencies, FMT_MSA.2, FCS_CKM.4
FCS_COP.1/RSA_DEC	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	justification 2 for non-satisfied dependencies, FCS_CKM.4
FCS_COP.1/RSA_TRANS	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	FDP_ITC.1 for the public key, justification 2 for non-satisfied dependencies, FCS_CKM.4
FCS_COP.1/SIGN_OSIG	[FDP_ITC.1 Import of user data without security attributes, or FDP_ITC.2 Import of user data with security attributes, or FCS_CKM.1 Cryptographic key generation] FCS_CKM.4 Cryptographic key destruction	FCS_CKM.1, FCS_CKM.4, justification 2 for non-satisfied dependencies

SFR	Dependencies	Support of the Dependencies
FIA_AFL.1/PIN	FIA_UAU.1 Timing of authentication	fulfilled
FIA_AFL.1/PUK	FIA_UAU.1 Timing of authentication	fulfilled
FIA_ATD.1	No dependencies	n.a.
FIA_SOS.1	No dependencies	n.a.
FIA_API.1	No dependencies	n.a.
FIA_UID.1	No dependencies	n.a.
FIA_UAU.1	FIA_UID.1 Timing of identification	fulfilled
FIA_UAU.4	No dependencies	n.a.
FIA_UAU.5	No dependencies	n.a.
FIA_UAU.6	No dependencies	n.a.
FDP_ACC.1	FDP_ACF.1 Security attribute based access control	fulfilled
FDP_ACF.1	FDP_ACC.1 Subset access control, FMT_MSA.3 Static attribute initialization	fulfilled
FDP_ITC.1	FDP_ACC.1 Subset access control, or FDP_IFC.1 Subset information flow control] FMT_MSA.3 Static attribute initialisation	FDP_ACC.1, FMT_MSA.3
FDP_RIP.1	No dependencies	n.a.
FDP_SDI.2	No dependencies	n.a.
FDP_UCT.1	[FTP_ITC.1 Inter-TSF trusted channel, or FTP_TRP.1 Trusted path], [FDP_ACC.1 Subset access control, or FDP_IFC.1 Subset information flow control]	Fulfilled by FTP_ITC.1 and FDP_ACC.1
FDP_UIT.1	[FTP_ITC.1 Inter-TSF trusted channel, or FTP_TRP.1 Trusted path], [FDP_ACC.1 Subset access control, or FDP_IFC.1 Subset information flow control]	Fulfilled by FTP_ITC.1 and FDP_ACC.1
FTP_ITC.1	No dependencies	n.a.
FMT_SMF.1	No dependencies	n.a.
FMT_SMR.1	FIA_UID.1 Timing of identification	fulfilled
FMT_LIM.1	FMT_LIM.2	fulfilled
FMT_LIM.2	FMT_LIM.1	fulfilled
FMT_MSA.2	[FDP_ACC.1 Subset access control, or FDP_IFC.1 Subset information flow	FDP_ACC.1, FMT_SMR.1,

SFR	Dependencies	Support of the Dependencies
	control] FMT_MSA.1 Management of security attributes FMT_SMR.1 Security roles	see justification 3 for non-satisfied dependencies
FMT_MSA.3	FMT_MSA.1 Management of security attributes FMT_SMR.1 Security roles	FMT_SMR.1 fulfilled; there is no need for management of security attributes, see justification 3 for non-satisfied dependencies
FMT_MTD.1/INI	FMT_SMF.1 Specification of Management Functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/PIN	FMT_SMF.1 Specification of Management Functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/RAD_CH	FMT_SMF.1 Specification of Management Functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/RAD_SMC	FMT_SMF.1 Specification of Management Functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/RAD_WR	FMT_SMF.1 Specification of Management Functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/RAD_MOD	FMT_SMF.1 Specification of Management Functions, FMT_SMR.1 Security roles	fulfilled
FPT_EMSEC.1	No dependencies	n.a.
FPT_FLS.1	No dependencies	n.a.
FPT_PHP.3	No dependencies	n.a.
FPT_TST.1	No dependencies	n.a.

Table 2: Dependency rationale overview

253 Justification for non-satisfied dependencies:

No. 1: The TSF according to SFR FCS_CKM.1 and FCS_CKM.4 generate and destroy automatically the secure messaging keys used for FCS_COP.1/3TDES and FCS_COP.1/RMAC. If the TOE does not support the optional management of logical channels it will be no need for security attributes of these keys. If the TOE support the management of logical channels the security target will describe the management security attributes of theses keys (cf. Application note 35).

No. 2: The SFRs FCS_COP.1/CCA_SIGN, FCS_COP.1/CCA_VERIF, FCS_COP.1/CSA, FCS_COP.1/SIGN_OSIG, FCS_COP.1/RSA_TRANS and FCS_COP.1/RSA_DEC use keys which are loaded or generated during the personalisation and are not updated or deleted over the life time of the TOE. Therefore none of the listed SFRs is needed to define for this specific instantiations of FCS_COP.1.

No. 3: The access control TSF according to FDP_ACF.1 uses security attributes which are defined during the personalization and are fixed over the whole life time of the TOE. No management of these security attribute (i.e. SFRs FMT_MSA.1 and FMT_MSA.2) is necessary here.

6.3.4 Rationale for the Assurance Requirements

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

255 The TOE shall be shown to be resistant to penetration attacks with high attack potential as described in the threats and security objectives. Therefore the component AVA_VAN.5 was included to meet the security objectives.

256 The component AVA_VAN.5 has the following dependencies:

- ADV_ARC.1 Security architecture description
- ADV_FSP.4 Complete functional specification
- ADV_TDS.3 Basic modular design
- ADV_IMP.1 Implementation representation of the TSF
- AGD_OPE.1 Operational user guidance
- AGD_PRE.1 Preparative procedures
- ATE_DPT.1 Testing: basic design

All of these are met or exceeded in the EAL4 assurance package.

6.3.5 Security Requirements – Mutual Support and Internal Consistency

257 The following part of the security requirements rationale shows that the set of security requirements for the TOE consisting of the security assurance requirements (SARs) and the security functional requirements (SFRs) together forms a mutually supportive and internally consistent whole.

258 The analysis of the TOE´s security requirements with regard to their mutual support and internal consistency demonstrates:

The assurance class EAL4 is an established set of mutually supportive and internally consistent assurance requirements. The dependency analysis for the additional assurance components in section 6.3.4 Rationale for the Assurance Requirements shows that the assurance requirements are mutually supportive and internally consistent as all (additional) dependencies are satisfied and no inconsistency appears.

The dependency analysis in section 6.3.3 Dependency Rationale for the security functional requirements shows that the basis for mutual support and internal consistency between all defined functional requirements is satisfied. All dependencies between the chosen functional components are analyzed, and non-satisfied dependencies are appropriately explained.

259 The following additional reasons support consistency and mutual supportiveness of the SFRs. The chosen SFRs of class FCS implement the cryptographic algorithms as required by the SMC specification. The chosen SFRs of classes FIA and FDP support the access control policy SMC Access Control SFP as defined in the objective OT.AC_Pers and OT.AC_Serv. The chosen SFRs of class FMT support the secure management of TSF data in a way, which is consistent to the policy SMC Access Control SFP. The SFRs of all these classes (FCS, FIA, FDP, FMT) together provide the HPC/SMC services as defined in the TOE description (chapter 2 TOE Description). The remaining SFRs, chosen from class FPT define low level protection of the TOE against any attempt to bypass the security policy SMC Access Control SFP or the services defined in the specification.

In detail these connections between the SFRs can be seen from section 6.3.3 Dependency Rationale.

260 Inconsistency between functional and assurance requirements could only arise if there are functional-assurance dependencies which are not met, a possibility which has been shown not to arise in sections 6.3.3 Dependency Rationale and 6.3.4 Rationale for the Assurance Requirements. Furthermore, as also discussed in section 6.3.4 Rationale for the Assurance Requirements, the chosen assurance components are adequate for the functionality of the TOE. So the assurance requirements and security functional requirements support each other and there are no inconsistencies between the goals of these two groups of security requirements.

7 PP Application Notes

7.1 Glossary and Acronyms

Term	Definition
Application note	Optional informative part of the PP containing additional supporting information that is considered relevant or useful for the construction, evaluation, or use of the TOE (cf. CC part 1, section B.2.7).
Card-to-Card authentication	Authentication protocols between smart cards using the commands EXTERNAL AUTHENTICATE, INTERNAL AUTHENTICATE and MUTUAL AUTHENTICATE without key agreement, with agreement of

Term	Definition
	symmetric keys as introduction keys (e.g. desSessionkey4Intro), trusted channel keys (e.g. desSessionkey4TC) or secure messaging keys (e.g. desSessionkey4SM).
Digital signature	Asymmetric cryptographic mechanism to proof the integrity of data as being originated by the signer and to verify the integrity of data as being originated by the signer.
Health Professional Data	Personal data identifying the Health Professional holding the HPC as natural person
IC Dedicated Support Software	That part of the IC Dedicated Software (refer to above) which provides functions after TOE Delivery. The usage of parts of the IC Dedicated Software might be restricted to certain phases.
IC Dedicated Test Software	That part of the IC Dedicated Software (refer to above) which is used to test the TOE before TOE Delivery but which does not provide any functionality thereafter.
Initialisation Data	Any data defined by the TOE Card Management systemr and injected into the non-volatile memory by the Integrated Circuits manufacturer (Phase 2). These data are for instance used for traceability and for IC identification (IC identification data).
Integrated circuit (IC)	Electronic component(s) designed to perform processing and/or memory functions. The eHC’s chip is a integrated circuit.
Personalization	The process by which personal data are brought into the TOE before it is handed to the cardholder
Secure messaging in encrypted mode	Secure messaging using encryption and message authentication code according to ISO/IEC 7816-4
Security Module Card	Smart card providing security services in the health care environment.
Trusted channel	Common Criteria [1], para. 89: a means by which a TSF and a remote trusted IT product can communicate with necessary confidence. HPC specification [20], Kap. 15: communication using secure messaging while the HPC is using a secure messaging key desSessionKey4SM to receive and to answer commands and the SMC is using a trusted channel key desSessionKey4TC to encrypt commands,, to calculate MAC for commands to decrypt command responses and to verify MAC of command responses.
TSF data	Data created by and for the TOE, that might affect the operation of the TOE

Term	Definition
	(CC part 1 [1]).
User data	Data created by and for the user, that does not affect the operation of the TSF (CC part 1 [1]).

Acronyms

Acronyms	Term
C.SMC.AUTR_CVC	Card Verifiable Authentication Certificate for role authentication
C.SMC.AUTD_RPS_CVC	Card Verifiable Authentication Certificate as remote PIN sender
C.HCI.AUT	Client-Server Authentication Public Key Certificate
C.HCI.ENC	Document Cipher Key Encipher Public Key Certificate
C.HCI.OSIG	Organisational Electronic Signature Public Key Certificate
CA	Certification authority
CC	Common Criteria
CSP	Certification service provider
eHC	Electronic health card
HPC	Health professional card
PIN.SMC	The User Authentication Reference Data used to verify the cardholder attempting to activate certain functions of the TOE.
PrK.HCI.AUT	Private key for client-server authentication
PrK.HCI.ENC	Private key to decipher document encryption keys
PrK.HCI.OSIG	Organisational Electronic Signature Private Key
PrK.SMC.AUTD_RPS_CVC	Card Authentication Private Key as remote PIN sender
PrK.SMC.AUTR_CVC	Card Authentication Private Key for role authentication between TOE and external SMC
PuK.HCI.AUT	Client-Server Authentication Public Key

Acronyms	Term
PuK.HCI.ENC	Document Cipher Key Encipher Public Key
PuK.HCI.OSIG	Organisational Electronic Signature Public Key Certificates
PuK.CA_SMC.CS	Public key of certification service provider used for verification of card verifiable certificates
PuK.RCA.CS	Root Public Key of the Certificate Service Provide
PUK.SMC	The User Authentication Reference Data used to unblock the cardholder authentication data PIN.SMC.
PuK.SMC.AUTR_CVC	Card Authentication Public Key for role authentication between TOE and external SMC
PuK.SMC.AUTD_RPS_CVC	Card Authentication Public Key as remote PIN sender
SAR	Security assurance requirements
SFR	Security functional requirement
SMC(-B)	Security module card (Type B)
ST	security target
TOE	Target of Evaluation
TSF	TOE security functionality

7.2 Literature

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