Bundesamt
für Sicherheit in der
Informationstechnik

Common Criteria Protection Profile

electronic Health Card (eHC) – elektronische Gesundheitskarte (eGK)

Common Criteria

BSI-PP-0020-V2-2007

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Foreword

This 'Protection Profile — electronic Health Card (eHC) – elektronische Gesundheitskarte (eGK)' 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 2.3 [1], [2], [3].

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1 PP Introduction

1.1 PP reference

Title:	Protection Profile — electronic Health Card (eHC) – elektronische Gesundheitskarte (eGK)
Sponsor:	Bundesamt für Sicherheit in der Informationstechnik
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1.2 PP Overview

1 The protection profile defines the security objectives and requirements for the electronic Health Card (German: “elektronische Gesundheitskarte”) based on the regulations for the German health care system. It addresses the security services provided by this card, mainly:

- Mutual Authentication between the eHC and a Health Professional Card (HPC) or a Security Module Card (SMC),
- Mutual Authentication between the eHC and a security device (e. g. for online update of contract data in the card),
- Authentication of the cardholder by use of one of two PINs, called PIN.CH and PIN.home (which of these PINs is relevant depends on the service the cardholder wants to use),

  Note: Both of these PINs are used for general functions of the eHC. The electronic signature application (see below) requires a separate third PIN for its exclusive purposes.

- Secure storage of contractual and medical data, with respect to confidentiality, integrity and authenticity of these data,
- Authentication of the card using a private key and a X.509 certificate and
- Document content key decipherment using a private key.

Note: The eHC may contain an electronic signature application for the cardholder. This application is subject to the requirements for electronic signatures as defined in national and European law. Separate Protection Profiles exist defining such requirements, for example the SSCD-PPs [20]. Therefore the security requirements for this security feature

are not contained in this eHC-PP. Annex 7.1 gives guidance, how this eHC-PP and for example the SSCD-PP can be integrated in a Security Target.

1.3 Conformance Claim

2 This protection profile claims conformance to

- Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and general model, August 2005, version 2.3, CCIMB-2005-08-001
- Common Criteria for Information Technology Security Evaluation, Part 2: Introduction and general model, August 2005, version 2.3, CCIMB-2005-08-002
- Common Criteria for Information Technology Security Evaluation, Part 3: Security Assurance Requirements, August 2005, version 2.3, CCIMB-2005-08-003

as follows

- Part 2 extended,
- Part 3 conformant,
- Package conformant to EAL4 augmented with ADV_IMP.2, AVA_MSU.3, and AVA_VLA.4.

2 TOE Description

2.1 TOE definition

3 The Target of Evaluation (TOE) is a smart card, the electronic Health Card (eHC), which is conformant to the specification documents [5] and [6][1]. The size of the card is type ID-1 according to ISO 7810 (the usual credit-card-size).

4 The card is a card with contacts according to ISO 7816-1 to –3. If it has an additional contact less interface, none of the eHC functions shall be accessible via this interface.

5 The overall system including the TOE and its environment are intended to comply to the relevant German legal regulations, in particular the “Gesetz zur Modernisierung der Gesetzlichen Krankenversicherung” (GKV-Modernisierungsgesetz – GMG), the “Sozialgesetzbuch” (SGB) and the privacy legislation (“Datenschutzgesetze des Bundes und der Länder”).

[1] In future these specifications may be replaced by further versions. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications.

6 The TOE comprises the following parts

TOE_IC, consisting of:
- the circuitry of the eHC'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 eHC applications (data structures and their content)

and

guidance documentation delivered together with the TOE.

7 Note: The short terms TOE_IC, TOE_ES and TOE_APP will be used were appropriate in the rest of this document in order to refer to these parts of the TOE.

2.2 TOE usage and security features for operational use

8 German health insurance companies issue electronic Health Cards to patients insured by them. The card is used by the cardholders, when they use health care services, which are covered by the insurance. A picture of the patient is printed on the card in order to support identification. The eHC contains data for

- cardholder identification,
- contractual and financial information to be exchanged between cardholder and health care provider and/or the health insurance company and
- medical data, including electronic prescriptions.

(For a more detailed definition of the assets see section 3.1.)

9 In detail the functionality of the card is defined in the specifications[2]:

[5] Die Spezifikation der elektronischen Gesundheitskarte, Teil 1: Kommandos, Algorithmen und Funktionen der Betriebssystem-Plattform, Version 1.1.0, 07.02.2006, gematik

[6] Die Spezifikation der elektronischen Gesundheitskarte, Teil 2: Anwendungen und anwendungsspezifische Strukturen, Version 1.2.1, 07.09.2006, gematik

[2] In future these specifications may be replaced by further versions. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications.

10 The following list gives an overview of the main security services provided by the electronic Health Card during the usage phase. In order to refer to these services later on, short identifiers are defined.

Service_Asym_Mut_Auth_w/o_SM[3]: Mutual Authentication using asymmetric techniques between the eHC and a Health Professional Card (HPC) or a Security Module Card (SMC) without establishment of a Secure Channel ([6], section 3.5).

This service is meant for situations, where the eHC requires authentication by a HPC or SMC, but where the following data exchange is done without help of a security module.

Service_Asym_Mut_Auth_with_SM: Mutual Authentication using asymmetric techniques between the eHC and a Security Module Card (SMC) or another security module with establishment of a Secure Channel ([6], section 3.6).

This service is meant for situations, where the eHC requires authentication by a SMC or another security module, which provides similar functionality, and where the following data exchange is done with the help of this security module and can therefore be encrypted and/or secured by a MAC.

Service_Sym_Mut_Auth_with_SM: Mutual Authentication using symmetric techniques between the eHC and a security module with establishment of a Secure Channel ([6], section 3.7).

This service is meant for situations, where the eHC communicates with a central security module, which shares symmetric keys with the card. This may be a security module of the health insurance organisation, when managing the patient contractual data, or a module of the Download Service Provider, which may add new applications to the eHC (or manage the existing ones).

Service_User_Auth_PIN: The cardholder authenticates himself with one of his PINs, either PIN.CH or PIN.home.

This service is meant as a support service for some of the other services, which may require user authentication. In addition it provides privacy protection because certain data in the card (or secured by the card) can only be accessed after user authentication. In particular this applies to sensitive medical data. See the specification [6], section 3.3 for PIN management.

Functions to change the PIN or to unblock the PIN, when it was blocked (because of successive false PIN entries) are supporting this service. For the letter the PIN unblocking code (PUC) is used, this authentication will be called **Service_User_Auth_PUC**.

Service_Privacy: The cardholder may deactivate sensitive medical data in the eHC. In order to use this service he authenticates himself with his PIN.home.

[3] The Abbreviation SM here stands for Secure Messaging, which is the card security protocol realising a secure channel.

This service allows the cardholder to prevent health care providers from accessing data, which the cardholder doesn't want them to know. Note, that that the name Service_Privacy doesn't mean that this is the only privacy related service. In fact all other services also support privacy. See the specification [6], sections 4.5.2.7 and 8 for this service.

Service_Client_Server_Auth: The eHC implements a PKI application, which in particular allows using the TOE as an authentication token for an authentication of a client to a server (by means of an asymmetric method using X.509 certificates). The eHC contains two different keys and corresponding certificates for this service. For one of these keys the cardholder authenticates himself with his PIN.home in order to access this service. The other key can be used without authentication by the cardholder but requires authentication by a HPC or SMC. See the specification [6], section 5.5 ff for 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.

Note, that a potential authentication of the server to the client is not supported by the eHC.

Service_Data_Decryption: The eHC implements a PKI application, which in particular allows using the TOE as a data decryption token. Symmetric document encipherment keys, which are themselves encrypted with the cards public key can only be decrypted with the help of the card. There are two sets of asymmetric key pairs in the eHC to allow the following two possibilities of authentication for this service:

- One of the key pairs requires that the cardholder authenticates himself with his PIN.home in order to access this service.

- The other key pair requires that a HPC or SMC is authenticated using Card-To-Card authentication to access this service.

This service is meant for situations, where confidential data are stored on a server, but shall only be accessible with the cardholder's permission or with the authentication of a health professional. So it can also be seen as a privacy feature. See the specification [6], section 5.6 resp. 5.7 for this service.

Service_Card_Management: The eHC allows creation of new applications and management of existing applications to the card management system. This is secured by the service Service_Sym_Mut_Auth_with_SM. See the specification [6], sections 8 and 9 for this service.

Service_Logging: The eHC provides a file, which allows to store information about the fifty last accesses to medical data in the card. The card itself doesn't control the content of these data, it is up to the authorised persons, who have write access to these data, to write them correctly. See the specification [6], sections 4.1.7 and 4.8 for this service.

Note: The eHC may implement a PKI application, which in particular makes it possible to use the TOE as an electronic signature creation device for qualified signatures. The specification of requirements for this service is **not** covered by this PP. Annex 7.1 gives information on the combination of this PP with PPs suitable for electronic signature services.

In detail the functionality of the card is defined in the specifications[4]:

[5] Die Spezifikation der elektronischen Gesundheitskarte, Teil 1: Kommandos, Algorithmen und Funktionen der Betriebssystem-Plattform, Version 1.1.0, 07.02.2006, gematik

[6] Die Spezifikation der elektronischen Gesundheitskarte, Teil 2: Anwendungen und anwendungsspezifische Strukturen, Version 1.2.1, 07.09.2006, gematik

2.3 TOE life cycle

11 The following description is a short summary of the eHC 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 smart cards, see for example the SSVG-PP [21]. They are summarized in the following table:

Phase		Description
1	**Smartcard Embedded Software Develop-ment**	The **Smartcard Embedded Software Developer** is in charge of • the development of the Smartcard 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 Smartcard 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 Developme nt**	The **IC Designer** • designs the IC, • develops the IC Dedicated Software, • provides information, software or tools to the Smartcard Embedded Software Developer, and • receives the Smartcard Embedded Software from the developer through trusted delivery and verification procedures. From the IC design, IC Dedicated Software and Smartcard Embedded Software, the **IC Designer** • constructs the smartcard IC database, necessary for the IC photo mask fabrication.

[4] In future these specifications may be replaced by further versions. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications.

Phase		Description
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 smartcard IC database.
4	**IC Packaging and Testing**	The **IC Packaging Manufacturer** is responsible for • the IC packaging (production of modules) and • testing.
5	**Smartcard Product Finishing Process**	The **Smartcard Product Manufacturer (shorter also "Card Manufacturer")** is responsible for • the initialisation of the TOE (in form of the initialisation of the modules of phase 4) and • its testing. The smartcard product finishing process comprises the embedding of the initialised modules for the TOE and the card production what may be done alternatively by the Smartcard Product Manufacturer or by his customer (e. g. Personaliser or Card Issuer)**.**
6	**Smartcard Personalisation**	The **Personaliser** is responsible for • the smartcard 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 smart card.
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 agents (card management systems) might be allowed to add data for a new application, modify or delete an eHC application, but not to load additional executable code. Functions used for this are specifically secured functions for this usage phase (for example the require card-to-card authentication and secure messaging). This functionality doesn't imply that the card can be switched back to an earlier life cycle stage. • The TOE is used as eHC by the smart cardholder in the End-usage phase.

Table 1: Smart Card Life Cycle Overview

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

13 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

14 For the evaluation of the eHC 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 Manufacturer[5]. The writer of the ST shall define the exact boundary. However, this Protection Profile requires that the following conditions have to be met:

- 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.
- The data structures and the access rights to these data as defined in the eHC specification [5], [6] are covered by the evaluation.

Application note 1: 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:

   o 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 [5], [6].

   o 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 [5], [6], but isn't embedded in a plastic card yet.

   o 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 [5], [6] (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 (personaliser/card issuer) for loading the initialisation data into the hardware provide sufficient protection against modification and (where applicable) disclosure of these data.

[5] Therefore in the remaining text of this PP the TOE Manufacturer will be the subject responsible for everything up to TOE delivery and finer roles like "IC mask manufacturer" will not be distinguished any more.

b. The following remarks may show how some CC assurance activities apply to parts of the life cycle[6]:

- 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 personaliser/ card issuer are subject to ADO_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 ADO_IGS.

- The guidance documentation delivered by the TOE developer as part of the TOE delivery procedures are covered by AGD and ADO_IGS. Since the personaliser/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:

  - Secure handling of the personalisation of the TOE

  - Secure handling of delivery of the personalised TOE from the personaliser/card issuer to the cardholder.

  - Security measures for end-usage, which the personaliser/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 personaliser/card issuer need to contain this information connected with the requirement that the card issuer covers all such issues in his delivery documents.

[6] 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.

3 Security Problem Definition

15 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

3.1.1 Assets

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

Name of asset	Description	Acronym used in eHC Specification[7]
Personal and health insurance data (open)	Identity data or contractual data, which can be read without authentication	EF.PD, EF.VD, EF.StatusVD
Personal and health insurance data (protected)	Identity data or contractual data, which can be read only with authentication	EF.GVD
electronic prescription	A document containing one or more referrals ("Überweisungen") or medications ("Verordnungen"). Note: The eHC itself cannot control, if an electronic prescription is valid. The eHC only serves as a trusted transport medium for prescriptions. In particular this has the consequence, that the right to write prescriptions into the eGK is not equivalent with the right to sign a prescription. Signing a prescription is an additional process done by a different card, for example the HPC.	EF.eRezept_Tickets, EF.eRezept_Container, EF.StatusRezept.

[7] In future these specifications may be replaced by further versions. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications. Therefore changes in the acronyms of assets (due to changes in the specifications) are acceptable in an ST as long as it is obvious that the same asset is meant.

Name of asset	Description	Acronym used in eHC Specification[7]
VAD (eHC)	"Verification Authentication Data": PIN codes or a resetting code entered by a cardholder to activate certain functions of the TOE. Note: These PINs are in particular **not** the same PIN as a PIN used for qualified electronic signatures. The electronic signature PIN is not listed as an asset in this PP, since it is defined in a suitable Protection Profile for electronic signatures. For the same reason signing keys (PrK.CH.ES) are not listed here.	--
RAD (eHC)	"Reference Authentication Data": The PINs and corresponding resetting code values stored in the TOE and used for comparison with the VAD entered by the cardholder. Note: Again this is **not** identical to similar values for an electronic signature provided by the eHC.	EF.PIN (containing PIN.CH, PIN.home and resetting code)
initialisation data	All data stored in the TOE during the initialisation process.	--
personalisation data	All data stored in the TOE during personalisation process.	--
logging data	Data stored in the TOE in order to document the last fifty accesses to medical data by care providers.	EF.Logging
Card Authentication Private Key	The Card Authentication Private Key is a asymmetric cryptographic key used for the authentication of an eHC to a HPC, to a SMC or to a service provider.	PrK.eGK.AUT
Card Verifiable Authentication Certificates	These data include Card verifiable certificates of the Card Authentication Public Key as authentication reference data corresponding to the Card Authentication Private Key and used for the card-to-card authentication. They contain encoded access rights (Role ID) and are signed by a certificate provider on behalf of the card issuer. In addition these data contain a certificate for the CA used in the case of two-step certificate verification. These data are part of the user data provided for use by external entities as authentication reference data of the eHC.	EF.CVC
Client-Server Authentication Private Keys	The Client-Server Authentication Private Keys are asymmetric cryptographic keys used for the authentication of a client application acting on behalf of the cardholder to a server.	PrK.CH.AUT, PrK.CH.AUTN
Decipher Private Keys	The Document Cipher Key Decipher Keys are asymmetric private keys used for document decryption on behalf of the cardholder.	PrK.CH.ENC, PrK.CH.ENCV
Display Message	A display message is used as a means for the Cardholder to check, if a secure channel is established. Note: Technically there are two Display messages, one is stored under DF.HCA and another one under DF.ESIGN. The latter is used in the context of the services Service_Client_Server_Auth and Service_Data_Decryption.	EF.DM
X.509 Certificates	The certificates for the keys used in the context of the services Service_Client_Server_Auth and Service_Data_Decryption. These certificates are provided by the card to other entities, which want to verify the validity of the card's keys used for these services.	EF.C.CH.
Public Keys for CV Certificate Verification	Public keys of Certification Authorities used for verification of the card verifiable certificates.	EF.Puk
Secret Keys for interaction with the "Health Insurance Agency Service Provider"	Two Triple-DES keys for MAC-Calculation and encryption purposes during interaction with the "Health Insurance Agency Service Provider" (The German term for this service is "Versichertenstammdaten-Dienst" (VSDD).)	SK.VSDD
Secret Keys for interaction with the "Download Service Provider"	Two Triple-DES keys for MAC-Calculation and encryption purposes during interaction with the "Download Service Provider" (also called card application management system, CAMS).	SK.CAMS
Secret Keys for interaction with the "Combined Services Provider"	Two Triple-DES keys for MAC-Calculation and encryption purposes during interaction with the "Combined Services Provider"	SK.VSDDCAMS

Name of asset	Description	Acronym used in eHC Specification[7]
permission data	These data contain information about the permissions given by the Cardholder to use specific “freiwillige Anwendungen” (these are applications in the card which may only be used if a patient has allowed this explicitly before the first use)	EF.Einwilligung
reference data (voluntary application)	Data of so called “freiwillige Anwendungen” (these are applications which may only be used if a patient has allowed this explicitly before the first use). Note: In fact the files listed in the next column only contain “pointers” to services, which are handled outside of the TOE.	EF.Verweis
emergency data	Emergency data (“Notfalldaten”) are a specific part of “medical data (voluntary application)”.	EF.eNotfalldaten, EFStatusNotfalldaten

Table 2: Assets to be protected by the TOE and its environment

3.1.2 Subjects

17 This protection profile considers the following subjects, who can interact with the TOE:

Name of subject	Description
Cardholder	The cardholder of the TOE is the legitimate user of the card, who is authenticated by use of the PIN.CH or the PIN.home. Note: The following terms are related to the cardholder: The patient is the person who uses the eGK in order to receive e. g. treatment by a doctor. Normally the patient is identical to the cardholder. However, the patient may be incapable of using the card himself (e. g. children) and the cardholder may be a different person acting on behalf of the patient. The insured person (“Versicherter”) is the person, who has the insurance relation to the health insurance company. Usually this person is again identical to the cardholder, however the latter may be for example a child of the former. However, since the TOE cannot distinguish these roles, only the cardholder is defined as a subject in this PP.
Health Professional	Person acting as health professionals providing medical care to a patient (e.g. physician, dentist, pharmacist, psychotherapist, but also other health professionals yet to be formally defined, like midwives). These health professionals hold a HPC with a Card Verifiable Certificate of the Card Authentication Key with Role ID ‘2A’, ‘3A’, ‘4A’, ‘5A’ or ‘7A’. Note: As a help for the reader of the PP these Role Ids can be interpreted as follows, where access rights for an electronic prescription can be taken as example: Role Id 2A allows to write an electronic prescription to the eHC or to change it and allows comparable rights for other medical data. So typically physicians and dentists may have this Role Id. Role Id 3A also allows to read and modify/delete an (existing) electronic prescription. Typically pharmacists may have this Role ID. Role Id 4A allows no specific rights for an electronic prescription, but may allow read and write access for certain other medical information. Typically psychotherapists may have this Role Id. Role Id 5A also allows to read and modify/delete an (existing) electronic prescription and may be the Role Id for professionals not belonging to one of the preceding groups. Role Id 7A allows to read non-medical data and the emergency data and may be the Role Id for emergency personnel. The preceding examples are not necessary for the correct and secure implementation of Roles in the eGK itself, because the eGK technically only distinguishes the Role Ids and does not “know” the profession of its users.
Medical Assistant	Persons supporting a Health Professional. These health employees hold a HPC with a Card Verifiable Certificate of the Card Authentication Key with a Role ID corresponding to that of the Health Professional, whom they support, i. e. ‘2A’, ‘3A’, ‘4A’, ‘5A’ or ‘7A’. Note that in medical institutions (e. g. hospitals) some or all of these Role Ids will also be needed for certain administrative personnel.

Name of subject	Description
Security Module Card (health care) (SMC)	This security module card is used in a health care environment in order to allow interaction with the eHC in situations, where employees without a personal card provide services. The SMC has a Card Verifiable Certificate of the Card Authentication Key with a Role ID usually corresponding to that of the Health Professional, who is responsible for its operation,, i. e. '2A', '3A', '4A', '5A' or '7A'. However, a special type of SMC for hospitals exists, which has Role Id 2A, but can be activated by HPCs with other Role Ids. In addition there is a specific additional Role Id '6A' for online transactions of pharmacies ("Mail-Order-Pharmacies").
Self Service Terminal	A self service terminal allows a cardholder of an eHC to perform certain services. The self service terminal has an SMC with a Card Verifiable Certificate of the Card Authentication Key with Role ID '1A', which is distinct from the Role Ids of the preceding subjects..
Health Insurance Agency Service Provider	The "health insurance agency service provider" interacts with the TOE on behalf of the health insurance agency. The German term for this is "Versichertenstammdaten-Dienst" (VSDD). The service provider uses a security module (e. g. in form of a SMC), which is authenticated by use of the key SK.VSDD.
TOE Manufacturer	Person(s) responsible for development and production of the TOE. Note: According to the life cycle description in section 2.3 the initialisation of the card is either done by the TOE manufacturer or by the personalisation service provider.
Personalisation Service Provider	person(s) responsible for personalisation of the card Methods to authenticate this role may be TOE specific and have to be defined in the Security target of a TOE. Note: This role is only responsible for the personalisation in phase 6 of the TOE's life cycle and has no access rights in phase 7.
Download Service Provider	person(s) responsible for Downloading additional applications (consisting of file structures, their access rights and data) into the card in phase 7 of the TOE's lifecycle. (Also called card application management system, CAMS.) The service provider uses a security module (e. g. in form of a SMC), which is authenticated by use of the key SK.CAMS. Note: There may be other more specific roles to produce data for the TOE like certificate service providers. However, since the card cannot distinguish such more specific roles technically according to an authentication mechanism in the card, such roles will not be defined as subjects in this PP. Additional authentication mechanisms and corresponding roles may be defined in an ST, for example for download procedures in the context of the application of qualified electronic signatures.
Combined Services Provider	name for the combination of the Health Insurance Agency Service Provider and the Download Service Provider (in case a decision is made to combine these services or at least to allow the use of a shared key for these services)
Other Person	All persons who interact with the TOE without being authorised (as one of the preceding roles).

Table 3: Subjects

3.1 Organizational Security Policies

18 On the one hand the overall security objectives for the eHC-System can be derived mainly from the legal requirements. On the other hand the concrete security services to be provided by the TOE are defined by the specifications. For this reason the organisational security policies define the greater part of the security needs for the eHC compared to lists of individual threats.

19 OSPs will be defined in the following form:

OSP.name Short Title

Description.

20 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).

OSP.eHC_Spec Compliance to eHC specifications

The eHC shall be implemented according to the security relevant requirements of the specifications:

[5] Die Spezifikation der elektronischen Gesundheitskarte, Teil 1: Kommandos, Algorithmen und Funktionen der Betriebssystem-Plattform, Version 1.1.0, 07.02.2006, gematik

[6] Die Spezifikation der elektronischen Gesundheitskarte, Teil 2: Anwendungen und anwendungsspezifische Strukturen, Version 1.2.1, 07.09.2006, gematik

Application note 2: These specifications may be replaced by further versions in future. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications. If a ST author or evaluator is not sure, whether this is fulfilled for some future version of the specifications, he should seek guidance from the responsible CC scheme.

OSP.Additional_Applications Protection of additional Applications

- The TOE shall provide the possibility to authorised parties to load data for additional applications to the card. Loading of additional executable code shall not be possible.
- The TOE shall separate existing applications from additional applications. This means that data structures, access rights and data contents of such additional applications can not modify the security properties, in particular access control, for the existing applications.
- By defining access rights to the files belonging to additional applications suitably it shall be possible to provide access control to such files using the mutual authentication services or the PIN authentication services as defined in section 2.2.

Application note: This OSP is designed to provide the functionality to add additional applications in a secure way and to provide support for their future security needs. For example, access to further medical data not covered by the current specifications of the eHC may require some kind of authentication either by a health professional or by the cardholder.

OSP.Electronic_Prescriptions Access to electronic prescriptions

Access to electronic prescriptions in the eHC must only be possible after authentication.

Creation or modification of these data in the eHC must only be possible in connection with a HPC.

The Cardholder in combination with a Self Service Terminal has the following rights: He can read and also delete an electronic prescription.

Access to data on an eHC for personnel without HPC may be authorized by the holder of a HPC. Such access must be logged securely.

Unauthorized access or modification of these data during transport and storage must be prevented.

OSP.User_Information Information about secure usage

The Cardholder of the eHC needs to be informed clearly about secure usage of the product.

Note: In order to use the eHC securely the user needs this information. This is also required by privacy legislation.

OSP.Legal_Decisions Legal responsibility of authorised persons

The decision, which data are legally feasible for storage on the eHC has to be made by the persons authorised to deal with the data. The same holds for the decision, when data need to be deleted.

Note: The eHC itself cannot decide about the legal relevance and medical correctness of data stored in it.

OSP.services Services provided by the card

The eHC shall provide the following services:

- Service_Asym_Mut_Auth_w/o_SM,
- Service_Asym_Mut_Auth_with_SM,
- Service_Sym_Mut_Auth_with_SM,
- Service_User_Auth_PIN and Service_User_Auth_PUC,
- Service_Privacy,
- Service_Client_Server_Auth,
- Service_Data_Decryption,
- Service_Card_Management and
- Service_Logging,

as described in section 2.2.

Note: The eHC also provides electronic signature services, however this is to be evaluated according to security requirements for electronic signatures, e. g. from another PP. Annex 7.1 gives guidance how to combine such PP with the eHC-PP.

OSP.logging Logging of access to medical data

All access to medical data (except reading access by the Cardholder himself) must be logged. Access to the log file must be protected.

OSP.Manufact Manufacturing of the Smart Card

The TOE Manufacturer shall ensure the quality and integrity of the manufacturing process and control the smart card material during development and production of the TOE.

3.2 Threats

21 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.

22 Threats will be defined in the following form:

T.name Short Title

Description, for example starting “An attacker tries to...”.

3.2.1 Threats mainly addressing TOE_ES and TOE_APP

23 The TOE shall avert the threats, which are application and operating system oriented, as specified below. As potential attackers all kinds of subjects as listed in Table 3 are considered, as far as they

- try to perform actions, which they are not allowed by their access rights as defined in this PP and
- may have expertise, resources and motivation as expected from an attacker with high attack potential.

T.Compromise_Internal_Data Compromise of confidential User or TSF data

An attacker with high attack potential tries to compromise confidential user data or TSF data through the communication interface of the TOE by sending commands or by listening to the communication between a terminal and the TOE.

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

T.Forge_Internal_Data Forge of User or TSF data

An attacker with high attack potential tries 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 functions to change the user authentication data to a known value.

T.Misuse Misuse of TOE functions

An attacker with high attack potential tries 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 to circumvent the user authentication to use the DECIPHER command for document keys without authorization. The attacker may try alter the TSF data e.g. to extend the user rights after successful card-to-card authentication.

T.Intercept Interception of Communication

An attacker with high attack potential tries to intercept the communication between the TOE and an SMC, HPC, Download Service Provider or Health Insurance Agency Service Provider in order to read, to forge, to delete or to add other data to transmitted data classified as assets.

This threat comprises several attack scenarios. A health professional reads from and writes onto eHC patient's data like medication or medical data, which an attacker may read or forge during transmission. Attacker may try to read the document keys output by the TOE as DECIPHER command response. Attackers may try to manipulate card management processes.

3.2.2 Threats mainly addressing TOE_ES and TOE_IC

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

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.

T.Information_Leakage Information Leakage from TOE's chip

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 contact less interface (emanation) or direct measurements (by contact to the chip still available even for a contact less 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).

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.

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.

3.3 Assumptions

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

26 The format for assumptions will be as follows:

A.name short title

Description.

27 The following assumptions hold for the usage environment:

A.Users Adequate usage of TOE and IT-Systems in the environment.

The cardholder of the TOE uses the TOE adequately. In particular he doesn't tell the PIN (or PINs) of the eHC to others and doesn't hand the card to unauthorised persons. Other actors (see subjects defined in section 3.1.2) use their data systems according to the overall system security requirements.

A.Perso Secure handling of data during personalisation and additional personalisation

All data structures and data on the card produced during personalisation or additional personalisation steps during the end-usage phase are correct according to the specifications and are handled correctly regarding integrity and confidentiality of these data. This includes in particular sufficient cryptographic quality of cryptographic keys (in accordance with the cryptographic algorithms specified for the eHC) and their confidential handling. The Personalisation Service Provider controls all materials, equipment and information, which he uses to personalize authentic smart cards, in order to prevent counterfeit of the TOE.

The same requirements hold for all activities belonging to Phase 5 "Initialisation", if they are executed after TOE delivery. This holds for example if the Personalisation Service Provider also sends the initialisation data to the TOE or if the TOE is delivered by the TOE Manufacturer in form of smart card modules, which are then inserted into the plastic cards at a later stage.

4 Security Objectives

28 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.

Application note 3: The separation of the security objectives for the TOE environment follows the approach of CC version 2.4 and does not violate the CC version 2.3. The CC version 2.3 address the operational environment only.

4.1 Security Objectives for the TOE

29 This section describes the security objectives for the TOE, which address the aspects of identified threats to be countered by the TOE and organizational security policies to be met by the TOE.

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

OT.name short title

Description of the objective.

31 In order to support developers, who want to reuse results of a IC (hardware) evaluation or an evaluation of the card operating system, the security objectives are grouped according to the parts of the TOE.

32 **Application note 4**: The structuring described in the preceding paragraph does not imply that the developer of a Security Target for a specific eHC needs to follow this distinction. In other words: If for example an objective, which is listed here as TOE_ES oriented, is covered by the hardware level or by the application level of a specific card, or by a combination of these, then this is of course acceptable. The developer doesn't even need to explicitly distinguish the levels in the same way.

4.1.1 Security objectives, which are mainly TOE_App oriented

OT.Access_rights Access control policy for data in the TOE

In the End Usage Phase the TOE shall implement the access control policy **SFP_access_rules**, which is defined in the following table:

SFP_access_rules
The following subjects may interact with the TOE (see also section 3.1.2, Table 3): Cardholder, Health Professional, Medical Assistant, , Security Module Card (health care), Self Service Terminal, Health Insurance Agency Service Provider, TOE Manufacturer, Personalisation Service Provider, Download Service Provider, Combined Services Provider, Other Person
The following objects are covered by the policy (see also section 3.1.1, Table 2): Personal and health insurance data (open), Personal and health insurance data (protected), electronic prescription, VAD (eHC), RAD (eHC), logging data, Card Authentication Private Key, Card Verifiable Authentication Certificates, Client-Server Authentication Private Keys, Decipher Private Keys, Display Message, X.509 Certificates, Public Keys for CV Certificate Verification, SK.VSDD, SK.CAMS, permission data, reference data (voluntary application), emergency data. Note: initialisation data and personalisation data are terms used for data written during the corresponding life cycle phases. For the End Usage Phase all assets are covered by the data already listed above.
The following authentication methods are covered by the policy: The services Service_Asym_Mut_Auth_w/o_SM, Service_Asym_Mut_Auth_with_SM, Service_Sym_Mut_Auth_with_SM, Service_User_Auth_PIN, Service_User_Auth_PUC as defined in chapter 2 "TOE description".
The following security attributes for subjects are maintained by the TOE: For every authentication method the TOE maintains the status of successful authentication (successful PIN verification, successful mutual authentication). (These are security attributes for the connected subject, because the TOE derives the access rights from these attributes).
The following access methods are maintained by the TOE: Access is allowed only using the defined command interface of the TOE. In other words: A subject sends a command APDU as defined in the eHC specification to the TOE and the TOE processes it. Access to eHC data is not allowed via a contact-less interface.

SFP_access_rules

Requirements for encryption or MAC-protection (Using Secure Messaging) will be included in addition for access to some of the data.

The following types of access are used in the rules below:

"Read", "write", "delete", "deactivate" (this means making data invisible for other subjects, but without deleting them), "activate" (making deactivated data visible again), "use" (a command is called, which uses data internally, this is relevant for cryptographic keys).

As specific variants of the write access the following terms are used: "Modify" means to change existing data. "Append" means to add data at the end of existing data. "Create" means to create new data structures.

The following access rules are defined for the TOE's objects:

For all files and other security relevant data (PINs, keys) the TOE maintains the following access rules as defined in the eHC specification, Part 2. Note, that these rules hold for the End Usage Phase of the TOE.

Rule_1:
Personal and health insurance data (open) may be read by all subjects and written only by the Health Insurance Agency Service Provider or Combined Services Provider. Writing of these data requires secure messaging with encryption and MAC.

Rule_2:
Personal and health insurance data (protected) can be read by: Cardholder, Health Professional, Medical Assistant, Security Module Card (health care), Combined Services Provider and Health Insurance Agency Service Provider. They can be written by the Health Insurance Agency Service Provider and Combined Services Provider. Writing of these data requires secure messaging with encryption and MAC. Reading data also requires secure messaging with encryption and MAC in the case of Health Insurance Agency Service Provider, Combined Services Provider and Role Id '6A' (online access by a pharmacy).

Rule_3:
Data of type electronic prescription can be read or deleted by Health Professional with Role ID '2A', '3A' or '5A', Medical Assistant with one of the same Role IDs, Security Module Card (health care) with one of the same Role IDs. An entity with Role Id 6A (online pharmacy) can also read and delete an electronic prescription, but only with secure messaging with encryption and MAC.
The Cardholder can read the data and in combination with a Self Service Terminal he has the following rights: He can deactivate or activate and also delete an electronic prescription.
Only Health Professional with Role ID 2A, Medical Assistant with Role ID 2A and Security Module Card (health care) with Role ID 2A can write these data.
Note: Technically the ability to delete an electronic prescription is realised by the right to modify EF.eRezept_Tickets. The confidentiality of the contents of the electronic prescription is ensured by encryption of the EF.eRezept_Container with a key stored in EF.eRezept_Tickets.

Rule_4:
Data of type RAD (eHC): The PIN.CH and PIN.home may be modified by the Cardholder, the resetting code (PUC) cannot be modified. Both data can not be read by anyone. The retry counter for the PIN can be reset by the Cardholder after authentication with the PUC.
Note: VAD (eHC) stands for PIN or resetting code values, which are entered by the Cardholder in clear text and therefore require no specific rules by this policy.

Rule_5:
The logging data can be written by Health Professional, Medical Assistant, Security Module Card (health care) and by the Self Service Terminal. Only new entries can be appended, existing entries can not be modified (however, when fifty entries are full, the oldest entry is deleted, when adding a new one). Appending data also requires secure messaging with encryption and MAC in the case of Role Id '6A' (online access by a pharmacy). The data can be read by the Cardholder.

Rule_6:
The Card Authentication Private Key can never be read or written. It can be used in the services Service_Asym_Mut_Auth_w/o_SM and Service_Asym_Mut_Auth_with_SM.
These services include the verification of a CV certificate for the card or security module, with which the TOE interacts during the service.

Rule_7:
The Card Verifiable Authentication Certificates can always be read and never written.

Rule_8:
The Client-Server Authentication Private Keys and the Decipher Private Keys cannot be read or written, they can only be used in the corresponding services Service_Client_Server_Auth and Service_Data_Decryption.
For the keys PrK.CH.AUT and Prk.CH.ENC respectively both services are possible only after authentication by the Cardholder.
For the second authentication key PrK.CH.AUTN the service Service_Client_Server_Auth is allowed after authentication by Health Professional, Medical Assistant, Security Module Card (health care), all of these with Role ID 1A, 2A, 3A, 4A

SFP_access_rules
or 5A. For the second decryption key PrK.CH.ENCV the service Service_Data_Decryption is allowed after authentication by Health Professional, Medical Assistant, Security Module Card (health care) all of these with Role ID 3A (pharmacy) or 6A (online pharmacy). This requires secure messaging with encryption and MAC in the case of Role Id '6A' [8].
Rule_9: The Public Keys for CV Certificate Verification can never be written. It can be used for verification of certificates. Note: Additional Public keys may be stored temporarily in case of cross-certification. The above rule holds for the "root" key of the eHC.
Rule_10: The symmetric keys SK.VSDD, SK.VSDDCAMS and SK.CAMS cannot be read or written. They can be used for establishment of trusted channels by the service Service_Sym_Mut_Auth_with_SM.
Rule_11: Files and other data structures necessary for additional applications can be created by the Download Service Provider or the Combined Services Provider. The commands used for this require protection by secure messaging with encryption and MAC.
Rule_12: The Health Insurance Agency Service Provider, the Download Service Provider and the Combined Services Provider have the right to deactivate the complete health care application, which means that the card isn't usable as an eHC any more. They can also re-activate the application. The commands used for this require protection by secure messaging with encryption and MAC (and therefore authentication by the service Service_Sym_Mut_Auth_with_SM).
Rule_13: The Display Message can be written only by the Cardholder. It can be read only by use of secure messaging, which requires authentication using the service Service_Asym_Mut_Auth_with_SM or Service_Sym_Mut_Auth_with_SM. Note: This allows to demonstrate the establishment of a secure channel to the cardholder.
Rule_14: The X.509 Certificates of the card except EF.C.CH.AUTN can be read by everybody and all of them can be written by the Download Service Provider and the Combined Services Provider. Writing requires protection by secure messaging with encryption and MAC. Reading EF.C.CH.AUTN is allowed only for entities authenticated as Role Id '2A' or '3A'.
Rule_15: The permission data can be read by the Cardholder, and by those Health Professional, Medical Assistant, Security Module Card (health care), who have Role Ids '2A' or '3A'. Reading these data is also possible, but requires secure messaging with encryption and MAC, in the case of Role Id '6A' (online access by a pharmacy). They can be written by Health Professional with Role ID '2A' or '3A', by Medical Assistant with Role ID '2A' or '3A' and by Security Module Card (health care) with Role ID '2A' or '3A'. Writing requires additional authentication using PIN.CH.
Rule_16: The reference data (voluntary application) can be read by all subjects. They can be written by the Combined Services Provider and the Download Service Provider using secure messaging with encryption and MAC and by Health Professional, by Medical Assistant and by Security Module Card (health care) with specific Role IDs 2A or 3A together with the Cardholder (using PIN.CH).
Rule_17: The emergency data can be written by Health Professional with Role ID 2A, Medical Assistant with Role ID 2A and Security Module Card (health care) with Role ID 2A but only together with the Cardholder (PIN.CH). They can be read by all Health Professional, Medical Assistant, , Security Module Card (health care) with one of the Role Ids '2A', '7A'. They can be deactivated or activated by the Cardholder in combination with a Self Service Terminal.

Table 4: Access Control Policy for Usage Phase

Application note 5: The specifications [5] and [6] of the card may be replaced by further versions in future. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications. For the access control policy "SFP_access_rules" this is interpreted as follows: If newer versions of the specifications define the access conditions more

[8] The fact that a trusted channel was established may be checked by the Cardholder by means of the Display Message, see also Rule_13.

restrictively then the SFP above (for example allow access to a specific asset for fewer roles then defined above), this will be acceptable and an ST author may modify the SFP in this way.

4.1.2 Security Objectives, which are mainly TOE_ES oriented

33 The TOE security objectives in this section are those, which will probably be addressed by the TOE operating system.

34 The following objectives all refer to the specifications of the eHC:

[5] Die Spezifikation der elektronischen Gesundheitskarte, Teil 1: Kommandos, Algorithmen und Funktionen der Betriebssystem-Plattform, Version 1.1.0, 07.02.2006, gematik

[6] Die Spezifikation der elektronischen Gesundheitskarte, Teil 2: Anwendungen und anwendungsspezifische Strukturen, Version 1.2.1, 07.09.2006, gematik

35 The following objectives shall be upheld by the TOE:

OT.AC_Pers Access control for personalization

The TOE must ensure that the personalisation data can be written by an authorized Personalisation Service Provider only.

OT.Additional_Applications Protection of additional Applications

- The TOE shall provide the possibility to authorised parties to load data for additional applications to the card. Loading of additional executable code shall not be possible.
- The TOE shall separate existing applications from additional applications. This means that data structures, access rights and data contents of such additional applications can not modify the security properties, in particular access control, for the existing applications.
- By defining access rights to the files belonging to additional applications suitably it shall be possible to provide access control to such files using the mutual authentication services or the PIN authentication services as defined in section 2.2.

Application note: This objective is designed to provide the functionality to add additional applications in a secure way and to provide support for their future security needs.

OT.Services Services provided by the Card

The eHC shall provide the following services:

- Service_Asym_Mut_Auth_w/o_SM,
- Service_Asym_Mut_Auth_with_SM,

- Service_Sym_Mut_Auth_with_SM,
- Service_User_Auth_PIN and Service_User_Auth_PUC,
- Service_Privacy,
- Service_Client_Server_Auth,
- Service_Data_Decryption,
- Service_Card_Management and
- Service_Logging

as described in section 2.2.

Note: The eHC also provides electronic signature services, however this is to be evaluated according to security requirements for electronic signatures, e. g. from another PP. Annex 7.1 gives guidance how to combine such PP with the eHC-PP.

OT.Cryptography Implementation of cryptographic algorithms

The cryptographic algorithms required by the eHC specifications, Part 1, (see [5], section 12) are implemented according to their definition.

These algorithms are:

- RSA for Card-To-Card authentication (asymmetric authentication procedures with and without trusted channel establishment, which includes signature and verification operations) and for X.509 based data decryption and signatures. Supported RSA digital signature input formats are:

  PKCS #1 V1.5 (for signatures related to keys with x.509 certificates)

  ISO 9796-2 (with random numbers. for signatures related to keys with x.509 certificates and without random numbers for CV certificate processing)
- SHA-1, DES-3.

4.1.3 Security Objectives, which are mainly TOE_IC oriented

36 The following TOE security objectives are drawn from BSI-PP-0002 [21] and address the protection provided mainly by TOE_IC (however it may use support by the other components of the TOE) and independent off the TOE environment.

Application note 6: This should allow a developer to use the method of composite evaluation with a hardware already evaluated according to BSI-PP-0002.

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's chip

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

Application note 7:

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

OT.Prot_Phys_Tamper Protection against Physical Tampering

The TOE must provide protection the confidentiality and integrity of the User Data, the TSF Data, and the chip 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.

Application note 8:

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. This is addressed by the security objective OD.Assurance.

OT.Prot_Malfunction Protection against Malfunctions

The TOE must ensure its correct operation. The TOE must prevent its operation outside the normal operating conditions where reliability and secure operation has not been proven or tested. This is to prevent errors. The environmental conditions may include external energy (esp. electromagnetic) fields, voltage (on any contacts), clock frequency, or temperature.

Application note 9:
A malfunction of the TOE may also be caused using a direct interaction with elements on the chip surface. This is considered as being a manipulation (refer to the objective OT.Prot_Phys_Tamper) provided that detailed knowledge about the TOE´s internal construction is required and the attack is performed in a controlled manner.

OT.Prot_Abuse_Func Protection against Abuse of Functionality

The TOE must prevent that functions of the TOE which may not be used after TOE Delivery can be abused in order (i) to disclose critical User Data, (ii) to manipulate critical User Data of the Smartcard Embedded Software, (iii) to manipulate Soft-coded Smartcard 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.

4.2 Security Objectives for the Development and Manufacturing Environment

OD.Assurance Assurance Security Measures in Development and Manufacturing Environment

The developer and manufacturer ensure that the TOE is designed and fabricated so that it requires a 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 attack. The developer provides necessary evaluation evidence that the TOE fulfils its security objectives and is resistant against attack with high attack potential.

OD.Material Control over Smart Card Material

The TOE Manufacturer must control all materials, equipment and information, which he uses in order to produce, to initialise and to pre-personalize genuine smart card materials in order to prevent counterfeit of the TOE.

4.3 Security Objectives for the Operational Environment

OE.Users Adequate usage of TOE and IT-Systems in the environment

The Cardholder of the TOE needs to use the TOE adequately. In particular he mustn't tell the PIN (or PINs) of the eHC to others and mustn't hand the card to unauthorised persons.

OE.Legal_Decisions Legal responsibility of authorised persons

The decision, which data are legally feasible for storage on the eHC has to be made by the persons authorised to deal with the data. The same holds for the decision, when data need to be deleted. These persons must use their IT systems according to the legal requirements.

This objective holds for all subjects (or the persons controlling them, if the subjects themselves are technical devices) listed in section 3.1.2, Table 3, except the Cardholder (who's behaviour is covered by other objectives) and the category "Other Person", which includes attackers.

OE.Data_Protection Protection of sensitive data outside of the eHC

The persons responsible for the handling of sensitive data outside of the eHC (this includes medical data, PINs, cryptographic keys and sensitive personal data, see the definition of assets in Table 1.) use adequate protection for confidentiality and integrity of these data.

OE.User_Information Information about secure usage

The Cardholder of the TOE must be informed clearly about secure usage of the product.

OE.Perso Secure handling of data during personalisation and additional personalisation

All data structures and data on the card produced during personalisation or additional personalisation steps during the end-usage phase must be correct according to the specifications and must be handled correctly regarding integrity and confidentiality of these data. This includes in particular sufficient cryptographic quality of cryptographic keys (in accordance with the cryptographic algorithms specified for the eHC) and their confidential handling. The Personalisation Service Provider must control all materials, equipment and information needed to personalize authentic smart cards in order to prevent counterfeit of the TOE.

The same requirements hold for all activities belonging to Phase 5 "Initialisation", if they are executed after TOE delivery. This holds for example if the Personalisation Service Provider also sends the initialisation data to the TOE or if the TOE is delivered by the TOE Manufacturer in form of smart card modules, which are then inserted into the plastic cards at a later stage.

Application note 10:

The security objectives for the environment are very important for the security of the system, in which the eHC is used. According to the requirements defined in the assurance class AGD the user guidance of the TOE will therefore contain more detailed information about measures to support these objectives. The following considerations may be helpful for this:

- If communication between the TOE and another device is done across insecure networks, only services secured by secure messaging must be used. A typical example would be an internet apothecary. The end user must be informed about his possibilities to check this (e. g. how to use the Display Message in order to see that a secure channel was established).

- The concept of the two PINs PIN.CH and PIN.home have to be made clear to the cardholder, in particular he needs to be informed, that the PIN.home must only be used in his private environment or at a Self Service Terminal. In any other IT system of a medical practice or apothecary only PIN.HC must be used. If the cardholder wants to make real use of the privacy features like activation or deactivation of certain data, he needs to make sure that PIN.CH and PIN.home have distinct values.

- The procedures used by the card issuer in order to deliver the eHC as well as PINs and PUCs to the Cardholder must be suitable to prevent attackers from successfully intercepting and using the eHC and the PIN and/or PUC. The requirements defined by gematik in the document [7] (in the version valid at the time of evaluation) will have to be fulfilled and the guidance documentation (e. g. for the Personalisation Service Provider) will have to describe the procedures adequately.

- The environment, where the Cardholder enters his PIN, must make sure that the PIN is not intercepted on the line between the device, where the PIN is entered and the TOE.

- Similarly, all environments, where authentication (e. g. of a HPC) without secure messaging is used, must ensure that interception or modification of the sensitive data is not possible on the line between the TOE and other devices. They must also prevent unauthorised persons from sending card commands to the TOE after such type of authentication.

- If the Service_Data_Decryption is used the environment must ensure that the deciphered data (usually document encipherment keys) are not intercepted during transport outside of the TOE.

- If medical data are stored outside of the eGK, for example on a Server, then appropriate access control needs to be in place to prevent unauthorised read or write access to these data.

- Of course all parties, which have management access to the TOE (Health Insurance Agency Service Provider, Personalisation Service Provider, Download Service Provider) must ensure that their activities maintain the security of the TOE and its data.

4.4 Security Objectives Rationale

The following table shows, which Objectives for the TOE and the environment support which OSP, help to avert which threat and correspond to which assumption. The table shows, that for every OSP, threat and assumption there is at least one objective and vice versa.

	OT.AC_Pers	OT.Access_Rights	OT.Additional_Applications	OT.Services	OT.Cryptography	OT.Prot_Inf_Leak	OT.Prot_Phys_Tamper	OT.Prot_Malfunction	OT.Prot_Abuse_Func	OD.Assurance	OD.Material	OE.Users	OE.Legal_Decisions	OE.Data_Protection	OE.User_Information	OE.Perso
OSP.eHC_Spec	X	X	X	X	X											
OSP.Additional_Applications			X													X
OSP.Electronic_Prescriptions		X											X	X		
OSP.User_Information															X	
OSP.Legal_Decisions													X			
OSP.Services				X												
OSP.Logging		X		X									X			
OSP.Manufact										X	X					
T.Compromise_Internal_Data	X	X		X	X								X	X		
T.Forge_Internal_Data	X	X		X	X								X	X		
T.Misuse	X	X		X	X								X	X		
T.Intercept	X	X		X	X								X	X		
T.Phys_Tamper							X									
T.Information_Leakage						X										
T.Malfunction								X								
T.Abuse_Func									X							
A.Users												X				
A.Perso																X

Table 5: Mapping of objectives to OSPs, threats, assumptions

38 The following text describes for every OSP, Threat and Assumption, how they are covered by Security Objectives.

39 The organizational security policy **OSP.eHC_Spec** “Compliance to eHC specifications” is implemented by the following TOE security objectives:

- OT.Services requires that the TOE provides the security services, which are realised by the commands defined in the specification.
- OT.Cryptography requires that the cryptographic algorithms as defined in the specification are implemented.

- OT.Access_Rights requires that the access rights are defined according to the policy SFP_access_rules. These rules are chosen according to the access rights defined in the eHC specification, part 2, annex B.

- OT.Additional_Applications requires rules for the loading of additional applications, which is also compatible to the definitions in the specifications.

- The objectives for the TOE environment OD.Material and OE.Perso "Secure personalization" (the latter together with OT.AC_Pers "Access control for personalization" protecting the personalization functions of the TOE) ensure that the Personalisation Service Provider will provide a genuine TOE initialized and personalized according to the specification to the Cardholder.

40 **OSP.Additional_Applications** is fully covered by OT.Additional_Applications, which is essentially identical to OSP.Additional_Applications. In addition it is supported by OE.Perso because this security objective requires adequate organisational security, when loading additional applications during the operational phase.

41 **OSP.Electronic_Prescriptions** is covered by the combination of

- OT.Access_Rights, which restricts the access rights to the data in the card as required by OSP.Electronic_Prescriptions (see rule for the asset "electronic prescription").

- OE.Data_Protection, which requires adequate protection of the medical data, when handled outside of the card.

- OE.Legal_Decisions, which requires use of IT systems according to legal requirements by authorised persons. This in particular implies that the access possibilities by HPC or SMC cards to data in the eHC is used according to the legal requirements.

42 **OSP.User_Information** is fully covered by OE.User_Information, which is essentially identical to OSP.User_Information.

43 **OSP.Legal_Decisions** is fully covered by OE.Legal_Decisions, which is essentially identical to OSP.Legal_Decisions.

44 **OSP.Services** is fully covered by OT.Services, which is essentially identical to OSP.Services.

45 **OSP.Logging** is realised in cooperation between the TOE and its operational environment:

- According to OT.Services the TOE provides the service "Service_Logging". This service allows authorised users to write logging data into the card.

- According to OE.Legal_Decisions all authorised users are responsible for the correctness of the logging data, they write into the card. This compensates for the fact that the card cannot control the content of this file.

- According to OT.Access_Rights, access to the log file is protected.

46 The security objectives for the environment OD.Assurance “Assurance Security Measures in Development and Manufacturing Environment” and OD.Material “Control over Smart Card Material” implement the OSP **OSP.Manufact** “Manufacturing of the Smart Card” in the development and manufacturing of the TOE.

47 The threats **T.Compromise_Internal_Data, T.Forge_Internal_Data, T.Misuse and T.Intercept** are all countered by the following combination of objectives:

- OT.Access_Rights (supported by OT.Services, OT.Cryptography) implies that data in the TOE can only be read, written or modified according to the access rules as defined in the access control policy SFP_access_rules, which was defined in OT.Access_Rights. The support by OT.Services is needed since several rules of SFP_access_rules restrict the access to certain subjects (cardholder, health professional, etc.) the authenticity of which is made sure by services required by OT.Services (e. g. Service_User_Auth_PIN, Service_Sym_Mut_Auth_with_SM, Service_Asym_Mut_Auth_with_SM, cf. section 2.2). The support by OT.Cryptography is needed since several services required by OT.Services rely on cryptographic mechanisms required by OT.Cryptography (e. g. DES-3 for Service_Sym_Mut_Auth_with_SM, RSA for Service_Asym_Mut_Auth_with_SM).

- OT.AC_Pers protects the personalization functions of the TOE against unauthorised use.

- OE.Legal_Decisions and OE.Data_Protection imply that authorised persons, who are allowed to read, write or modify data in the card, use these rights only in an environment, where unauthorised access to these data is prevented by the environment.

  An example for this is as follows: The service Service_Asym_Mut_Auth_w/o_SM allows health professionals to access electronic prescriptions in the card. This is allowed only in a closed environment, where attackers cannot access the data transmitted between eHC and the health professionals IT equipment. For the case of transmission over insecure lines the service Service_Asym_Mut_Auth_with_SM is provided and the objectives for the environment imply that health professionals use these services adequately.

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

49 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.

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

51 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.

52 The security objective for the environment **OE.Users** “Adequate usage of TOE and IT-Systems” implements directly the assumption **A.Users** “Adequate usage of TOE and IT-Systems”.

53 The security objective for the environment OE.Perso “Secure personalization” implements the assumption **A.Perso** “Personalization of the Smart Card”.

5 Security Requirements

54 The CC allows several operations to be performed on functional requirements; *refinement*, *selection*, *assignment*, and *iteration* are defined in Part 2 of the CC. Each of these operations is used in this PP.

55 The **refinement** operation is used to add detail to a requirement, and thus further restricts a requirement. Refinement of security requirements is either

- denoted by the word “refinement” in bold text and the added/changed words are in bold text or
- 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.

56 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*.

57 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 underlined text 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*.

58 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.

5.1 Security Functional Requirements for the TOE

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

5.1.1 Cryptographic support (FCS)

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

61 **FCS_CKM.1/SM Cryptographic key generation – Secure Messaging Keys**

Hierarchical to:	No other components.
FCS_CKM.1.1/ SM	The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm card-to-card authentication with secure messaging [9] and specified cryptographic key sizes 112 bit[10] that meet the following: [6], Sections 3.6, 3.7 [11].
Dependencies:	[FCS_CKM.2 Cryptographic key distribution or FCS_COP.1 Cryptographic operation] FCS_CKM.4 Cryptographic key destruction FMT_MSA.2 Secure security attributes

62 **Application note 11:** The Key Generation is done during a mutual authentication with trusted channel establishment according to section 3.6 or 3.7 of the eHC specification, part 2 ([6]). The Authentication Protocol produces agreed parameters to generate the Triple-DES encryption key and the Retail-MAC message authentication keys for secure messaging. The algorithm uses random numbers generated by the TSF as required by FCS_RND.1.

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

64 **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*].

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

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

[11] [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] FMT_MSA.2 Secure security attributes

65 **Application note 12:** The TOE shall destroy the Triple-DES encryption session key and the Retail-MAC message authentication session keys for secure messaging after reset or termination of secure messaging session or reaching fail secure state according to FPT_FLS.1.

66 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.

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

Hierarchical to: No other components.

FCS_COP.1.1/ SHA	The TSF shall perform hashing [12] in accordance with a specified cryptographic algorithm SHA-1 [13] and cryptographic key sizes none [14] that meet the following: FIPS 180-2 [15].

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 FMT_MSA.2 Secure security attributes

Application note 13: This SFR requires the TOE to implement the hash function SHA-1.

Application note 14: Depending on the publication of the RegTP on algorithms suitable for electronic signatures [14], additional hash functions may be specified by the author of a Security Target.

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

Hierarchical to: No other components.

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

[13] [assignment: *cryptographic algorithm*]

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

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

FCS_COP.1.1/ CCA_SIGN	The TSF shall perform digital signature-creation [16] in accordance with a specified cryptographic algorithm RSA [17] and cryptographic key sizes [assignment: *cryptographic key sizes*] that meet the following: ISO/IEC9796-2 (DS scheme 1) [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 FMT_MSA.2 Secure security attributes

Application note 15: 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 according the eHC specification, part 2 ([6]).

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

Hierarchical to: No other components.

FCS_COP.1.1/ CCA_VERIF	The TSF shall perform digital signature-verification [19] in accordance with a specified cryptographic algorithm RSA [20] and cryptographic key sizes [assignment: *cryptographic key sizes*] that meet the following: ISO/IEC9796-2 (DS scheme 1) [21].
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 FMT_MSA.2 Secure security attributes

70 **Application note 16:** 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 according to eHC specification, part 2 ([6]).

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16 [assignment: *list of cryptographic operations*]

17 [assignment: *cryptographic algorithm*]

18 [assignment: *list of standards*]

19 [assignment: *list of cryptographic operations*]

20 [assignment: *cryptographic algorithm*]

21 [assignment: *list of standards*]

71 **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 [22] in accordance with a specified cryptographic algorithm RSA [23] and cryptographic key sizes [assignment: *cryptographic key sizes*] that meet the following: PKCS#1 [19] [24].
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 FMT_MSA.2 Secure security attributes

72 **Application note 17:** 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 eHC specification, Part 2 [6].

73 **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 [25] in accordance with a specified cryptographic algorithm RSA [26] and cryptographic key sizes [assignment: *cryptographic key sizes*] that meet the following: PKCS#1, [19] [27].
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 FMT_MSA.2 Secure security attributes

74 **Application note 18:** This SFR requires the TOE to implement the RSA for the cryptographic primitive of the RSA decryption.

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22 [assignment: *list of cryptographic operations*]

23 [assignment: *cryptographic algorithm*]

24 [assignment: *list of standards*]

25 [assignment: *list of cryptographic operations*]

26 [assignment: *cryptographic algorithm*]

27 [assignment: *list of standards*]

75 **FCS_COP.1/TDES Cryptographic operation – TDES Encryption / Decryption**

Hierarchical to: No other components.

FCS_COP.1.1/ TDES	The TSF shall perform encryption and decryption [28] in accordance with a specified cryptographic algorithm Triple-DES in CBC mode [29] and cryptographic key sizes 112 bit [30] that meet the following: FIPS 46-3 [16] [31].
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 FMT_MSA.2 Secure security attributes

76 **Application note 19:** This SFR requires the TOE to implement the cryptographic primitive for secure messaging and for possible other uses of TDES.

77 **FCS_COP.1/MAC 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 [32] in accordance with a specified cryptographic algorithm Retail MAC [33] and cryptographic key sizes 112 bit [34] that meet the following: ANSI X9.19 with DES[35].
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 FMT_MSA.2 Secure security attributes

78 **Application note 20:** This SFR requires the TOE to implement the cryptographic primitive for secure messaging.

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28 [assignment: *list of cryptographic operations*]

29 [assignment: *cryptographic algorithm*]

30 [assignment: *cryptographic key sizes*]

31 [assignment: *list of standards*]

32 [assignment: *list of cryptographic operations*]

33 [assignment: *cryptographic algorithm*]

34 [assignment: *cryptographic key sizes*]

35 [assignment: *list of standards*]

79 The TOE shall meet the requirement “Quality metric for random numbers (FCS_RND.1)” as specified below (Common Criteria Part 2 extended).

80 **FCS_RND.1 Quality metric for random numbers**

Hierarchical to: No other components.

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

Dependencies: No dependencies.

81 **Application note 21:** This SFR requires the TOE to generate random numbers used for (i) the authentication protocols as required by FIA_UAU.4, and (ii) the key agreement FCS_CKM.1/SM for secure messaging. The quality metric shall be chosen to ensure the strength of function high.

5.1.2 Identification and Authentication

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

83 **FIA_AFL.1/PIN Authentication failure handling – eHC-PIN**

Hierarchical to: No other components.

FIA_AFL.1.1/PIN The TSF shall detect when [selection: [assignment: *positive integer number*], “*an administrator configurable positive integer within* [assignment*: range of acceptable values*]*”*] unsuccessful authentication attempts occur related to consecutive failed human user authentication for the health care application [36].

FIA_AFL.1.2/PIN When the defined number of unsuccessful authentication attempts has been met or surpassed, the TSF shall block the PIN for authentication until successful unblock with resetting code [37].

Dependencies: FIA_UAU.1 Timing of authentication.

Application note 22: The component FIA_AFL.1/PIN addresses the human user authentication by means of the PINs (PIN.CH and PIN.home) for the health care application. The security target writer shall select the parameters with respect to the high strength of the authentication function, e.g. a PIN length of six and a retry counter value of three are acceptable.

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

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

Application note 23: For the electronic signature service a specific PIN will be used, for which this SFR may be iterated.

84 **FIA_AFL.1/PUC Authentication Failure Handling – eHC-PIN-unblocking code**

Hierarchical to: No other components.

FIA_AFL.1.1/PUC	The TSF shall detect when [assignment*: positive integer number]*[38] successful or[39] unsuccessful authentication attempts occur related to usage of the eHC-PIN unblocking code[40].
FIA_AFL.1.2/PUC	When the defined number of successful or[41] unsuccessful authentication attempts has been met or surpassed, the TSF shall [assignment: *list of actions, which at least includes: block the PIN unblocking code*][42].

Dependencies: FIA_UAU.1 Timing of authentication

85 **Application note 24:** The component FIA_AFL.1/PUC address the human user authentication by means of the PIN unblocking code for the PINs used for the health care application. The ST writer shall consider the effect for the high strength of the authentication function.

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

87 **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: identity and role[43].

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

[39] refinement: not only unsuccessful but also successful attempts shall be counted here – obviously this refinement is valid, because the original requirement is still fulfilled

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

[41] refinement: not only unsuccessful but also successful attempts shall be counted here – obviously this refinement is valid, because the original requirement is still fulfilled

[42] [assignment: *list of actions*] with refinement of the list of actions – obviously this refinement is valid, because the original requirement is still fulfilled

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

Dependencies: No dependencies.

88 **Application note 25:** The component FIA_ATD.1 applies to (i) the human user authentication, i.e. the cardholder, whose identity is given in the Personal and health insurance data (open), 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 CV certificate.

89 **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 the Card Verifiable Authentication Certificate,
(3) reading the Certificate Service Provider Certificate,
(4) [assignment: *list of TSF-mediated actions*] [44]
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.

90 **Application note 26:** This SFR is meant to support the access control policy **SFP_access_rules**. Note, that access rules for initialisation and personalisation phases are defined by management SFRs (FMT_MTD.1, see section 5.1.5 and the corresponding application notes). The ST writer may complete the list of allowed actions by all actions allowed to a non-authorised user according to the specification. This list must be consistent to the security policy “SFP_access_rules” and the other SFRs in this PP.

44

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

92 **FIA_UAU.1 Timing of authentication**

Hierarchical to: No other components.

FIA_UAU.1.1 The TSF shall allow [assignment: *list of TSF-mediated actions, including*

(1) reading the ATR

(2) reading the Card Verifiable Authentication Certificate,

(3) reading the Certificate Service Provider self-signed Certificate,

(4) Identification by providing the users eHC-PIN

(5) identification by providing the users certificate][45]

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.

93 **Application note 27:** This SFR is meant to support the access control policy **SFP_access_rules**. Note, that access rules for initialisation and personalisation phases are defined by management SFRs (FMT_MTD.1, see section 5.1.5, and the corresponding application notes). The ST writer may complete the list of allowed actions by other actions allowed to a non-identified user according to the specification. This list must be consistent to the security policy “SFP_access_rules” and the other SFRs in this PP.

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

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

95 **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 Card-to-Card Authentication Mechanism [46].

Dependencies: No dependencies.

96 **Application note 28:** The Card-to-Card Authentication Mechanism required in this protection profile is based on asymmetric cryptographic primitives as required by FCS_COP.1/CCA_SIGN and FCS_COP.1/CCA_VERIF or on symmetric cryptography using FCS_COP.1/TDES and uses the freshness generated by the TOE random data (see FCS_RND.1) as challenge to prevent reuse of a response generated in a successful authentication attempt.

5.1.3 Access Control

97 The Security Function Policy (SFP) **SFP_access_rules,** which as defined in the security objective OT.Access_Rights (section 4.1.1), is used in the requirements “Complete Access Control (FDP_ACC.2)”, “Security attribute based access control (FDP_ACF.1)”, “Basic data exchange confidentiality (FDP_UCT.1)” and “Basic data exchange confidentiality (FDP_UCT.1)”.

98 The access control policy **SFP_access_rules** is only defined for the End Usage phase of the TOE. Note, that access rules for initialisation and personalisation phases are defined by management SFRs (FMT_MTD.1, see section 5.1.5), not by an explicit policy.

99 The following SFRs require the TOE to enforce the security policy SFP_access_rules. Note that all subjects, objects, security attributes, access methods and access rules are defined already in this policy. Therefore all of the following SFRs simply refer to this policy in all assignments.

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

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

FDP_ACC.2 Complete Access Control

Hierarchical to: FDP_ACC.1.

FDP_ACC.2.1 The TSF shall enforce the SFP_access_rules[47] on all subjects and objects defined by SFP_access_rules[48] and all operations among subjects and objects covered by the SFP.

FDP_ACC.2.1 The TSF shall ensure that all operations between any subject in the TSC and any object within the TSC are covered by an access control SFP.

Dependencies: FDP_ACF.1

101 **Application note 29:** Keys and other data for creation of qualified signatures are out of scope of this protection profile.

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

FDP_ACF.1 Security attribute based access control

Hierarchical to: No other components.

FDP_ACF.1.1 The TSF shall enforce the SFP_access_rules[49] to objects based on the following: all subjects and objects together with their respective security attributes as defined in SFP_access_rules[50].

FDP_ACF.1.2 The TSF shall enforce the following rules to determine if an operation among controlled subjects and controlled objects is allowed: rules for all access methods and the access rules defined in SFP_access_rules[51].

FDP_ACF.1.3 The TSF shall explicitly authorize access of subjects to objects based on the following additional rules: none[52].

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47 *[assignment: access control SFP]*

48 [assignment: *list of subjects and objects*]

49 [assignment: *access control SFP*]

50 [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*]

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

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

FDP_ACF.1.4 The TSF shall explicitly deny access of subjects to objects based on the: rules for all access methods and the access rules defined in SFP_access_rules[53].

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

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

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, data in all files, which are not freely accessible]*[54].

Dependencies: No dependencies.

104 **Application note 30:** 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 deallocation and those which can be deleted upon allocation. Note that the SSCD-PP requires to delete secret signature keys upon deallocation 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). Note in this context that the eHC concept allows management of applications during operational use. Therefore it is theoretically possible that a newly created file uses memory areas, which belonged to another file before. Therefore the operating system must ensure that contents of the old file are not accessible by reading the new file.

105 The TOE shall meet the requirement "Stored Data Integrity (FDP_SDI.2)" as specified below (Common Criteria Part 2).

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

[54] [*assignment: list of objects*] with refinement of the list of objects – obviously this refinement is valid, because the original requirement is still fulfilled

FDP_SDI.2 Stored Data Integrity

Hierarchical to: FDP_SDI.1.

FDP_SDI.2.1 The TSF shall monitor user data stored within the TSC for integrity errors[55] on all objects, based on the following attributes: *[assignment: user data attributes – the attributes shall be chosen in a way that at least the following data are included:*

- *PINs,*
- *cryptographic keys,*
- *security relevant status variables of the card (e. g. authentication status for the PIN or for mutual authenticate),*
- *input data for electronic signatures,*
- *user data in files on the card,*
- *file management information (like access rules for files), and*
- *the card life cycle status]*[56].

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

1. Prohibit the use of the altered data

2. inform the connected entity about integrity error[57].

Dependencies: No dependencies.

106 **Application note 31:** 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).

5.1.4 Inter-TSF-Transfer

107 **Application note 32:** FDP_UCT.1, FDP_UIT.1 and FTP_ITC.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 **SFP_access_rules** defined in objective OT.Access_Rights (section 4.1.1).

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

[55] *[assignment: integrity errors]*

[56] *[assignment: user data attributes]* with refinement of the list of user data attributes – obviously this refinement is valid, because the original requirement is still fulfilled

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

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

Hierarchical to: No other components.

FDP_UCT.1.1 The TSF shall enforce the SFP access rules [58] to be able to transmit and receive[59] objects 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]

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

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

112 **FDP_UIT.1 Data exchange integrity**

Hierarchical to: No other components.

FDP_UIT.1.1 The TSF shall enforce the SFP access rules [60] to be able to transmit and receive [61] user data in a manner protected from modification, deletion, insertion and replay [62] errors.

FDP_UIT.1.2 The TSF shall be able to determine on receipt of user data, whether modification, deletion, insertion and replay [63] 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]

113 **Application note 34**: The TOE supports secure messaging with MAC (cf. FCS_COP.1/MAC) after card-to-card authentication with secure messaging.

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

59 [selection*: transmit, receive*]

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

61 [selection*: transmit, receive*]

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

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

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

115 **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 a remote 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 the remote trusted IT product[64] to initiate communication via the trusted channel.

FTP_ITC.1.3 The TSF shall initiate communication via the trusted channel for all functions requiring a trusted channel as defined by SFP access rules[65].

Dependencies: No dependencies.

5.1.5 Security Management

116 **Application note 35**: The SFR FMT_SMF.1 and FMT_SMR.1 provide basic requirements to the management of the TSF data.

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

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 security management functions:

1. Initialization
2. Personalization
3. the “Service_Card_Management”

[64] [selection: *the TSF, the remote trusted IT product*]

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

4. Modification of the PIN [66].

Dependencies: No Dependencies

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

FMT_SMR.1 Security roles

Hierarchical to: No other components.

FMT_SMR.1.1	The TSF shall maintain the roles Health Professional, Medical Assistant, Security Module Card (health care), Self Service Terminal, Health Insurance Agency Service Provider, Combined Services Provider, Cardholder, Download Service Provider, Personalisation Service Provider, TOE Manufacturer [67].
FMT_SMR.1.2	The TSF shall be able to associate users with roles.

Dependencies: FIA_UID.1.

119 **Application note 36**: The Cardholder, Health Professional, Medical Assistant, Security Module Card (health care), Self Service Terminal, Health Insurance Agency Service Provider, Combined Services Provider and Download Service Provider are authenticated by services defined in this PP. The method, how the TOE authenticates Personalisation Service Provider and TOE Manufacturer may be product specific, because these roles are not relevant during the End Usage phase. In cases, where personalisation is done in the same secure environment as the manufacturing, it is also allowed that the two roles Personalisation Service Provider and TOE Manufacturer are fulfilled by the same persons. In this case it is also accepted that (if for example personalisation is done immediately after initialisation) only one identification/authentication procedure is done to allow both processes instead of requiring two distinct identifications and authentications.

120 **Application note 37**: 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.

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

122 **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

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

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

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. [68]

Dependencies: FMT_LIM.2 Limited availability.

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

124 **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. [69]

Dependencies: FMT_LIM.1 Limited capabilities.

125 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.

FMT_MTD.1/Ini Management of TSF data - Initialisation

Hierarchical to: No other components.

FMT_MTD.1.1/Ini The TSF shall restrict the ability to write [70] the initialisation data [71] to the TOE Manufacturer [72].

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

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

[70] [selection: *change default, query, modify, delete, clear*, [assignment: *other operations*]]

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

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

Dependencies: FMT_SMF.1 Specification of management functions
FMT_SMR.1 Security roles

126 **Application note 38**: As discussed in section 2.3 “TOE life cycle” the delivery of the TOE might be organised in a way, that hardware and initialisation data are two separate parts of the TOE during delivery. However, this is allowed only in connection with a method, which makes sure that the initialisation data are not modified by the party, which stores them into the hardware. The method used to guarantee the authenticity of the data implicitly also authenticates the TOE manufacturer as the source of the data. So the SFR FMT_MTD.1/Ini is fulfilled even if the command(s) to write the initialisation data is sent technically by a party different from the TOE manufacturer.

FMT_MTD.1/Pers Management of TSF data - Personalisation

Hierarchical to: No other components.

FMT_MTD.1.1/Pers The TSF shall restrict the ability to write [73] the personalisation data [74] to the Personalisation Service Provider [75].

Dependencies: FMT_SMF.1 Specification of management functions
FMT_SMR.1 Security roles

127 **Application note 39**: Note, that the management of applications during the end usage phase is not a task for the “Personalisation Service Provider” but for the “Download Service Provider”.

128 **FMT_MTD.1/CMS Management of TSF data – Card Management**

Hierarchical to: No other components.

FMT_MTD.1.1/CMS The TSF shall restrict the ability to write [76] the

1. File structures for additional Applications,
2. Cryptographic Keys for additional applications,
3. PINs and other user authentication reference data for additional applications and
4. Access Rights for additional applications [77]

to the Download Service Provider. [78].

[73] [selection: *change default, query, modify, delete, clear*, [assignment: *other operations*]]

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

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

[76] [selection: *change default, query, modify, delete, clear*, [assignment: *other operations*]]

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

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

Dependencies: FMT_SMF.1 Specification of management functions
FMT_SMR.1 Security roles

129 **FMT_MTD.1/PIN Management of TSF data – Human User Authentication data**

Hierarchical to: No other components.

FMT_MTD.1.1/PIN The TSF shall restrict the ability to modify and unblock [79] the PIN [80] to the Cardholder [81].

Dependencies: FMT_SMF.1 Specification of management functions
FMT_SMR.1 Security roles

130 **Application note 40**: 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 PUC and the new PIN. He or she unblocks the PIN by means of (i) the command RESET RETRY COUNTER and providing the PUC and the new PIN or (ii) the command RESET RETRY COUNTER and providing the PUC (without a new PIN).

131 **Application note 41**: The following SFR addresses the protection of the keys as part of the TSF data. Note that other keys are user data under protection according to SFR FDP_ACF.1.

132 **FMT_MTD.1/KEY_MOD Management of TSF data – Key Management**

Hierarchical to: No other components.

FMT_MTD.1.1/KEY_MOD The TSF shall restrict the ability to modify [82] the Public Key for CV Certification Verification [83] to none [84].

Dependencies: FMT_SMF.1 Specification of management functions
FMT_SMR.1 Security roles

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79 [selection: *change default, query, modify, delete, clear*, [assignment: *other operations*]]

80 [assignment: *list of TSF data*]

81 [assignment: *the authorised identified roles*]

82 [selection: *change default, query, modify, delete, clear*, [assignment: *other operations*]]

83 [assignment: *list of TSF data*]

84 [assignment: *the authorised identified roles*]

5.1.6 General Security Functions

133 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 SFR “Non-bypassability of the TSP (FPT_RVM.1)” and “TSF domain separation (FPT_SEP.1)” together with “Limited capabilities (FMT_LIM.1)”, “Limited availability (FMT_LIM.2)” and “Resistance to physical attack (FPT_PHP.3)” prevent bypassing, deactivation and manipulation of the security features or misuse of TOE functions.

134 The TOE shall meet the requirement “TOE Emanation (FPT_EMSEC.1)” as specified below (Common Criteria Part 2 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 PUC[85]

and

2. Card Authentication Private Keys,
3. Client-Sever Authentication Private Key,
4. Document Cipher Key Decipher Key,
5. secure messaging keys [86].

FPT_EMSEC.1.2 The TSF shall ensure any user [87] are unable to use the following interface smart card circuit contacts [88] to gain access to

1. PIN and PUC[89]

and

2. Card Authentication Private Key,
3. Client-Sever Authentication Private Key
4. Document Cipher Key Decipher Key
5. secure messaging keys [90].

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

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

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

Dependencies: No other components.

135 **Application note 42**: 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 TOE has to provide a smart card interface with contacts according to ISO/IEC 7816-2 but the integrated circuit may have additional contacts or a contact less 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.

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

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

138 **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 [91].

Dependencies: ADV_SPM.1 Informal TOE security policy model

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

140 **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 [92] to the TSF [93] by responding automatically such that the TSP is not violated.

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88 [assignment: *type of connection*]

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

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

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

Dependencies: No dependencies.

141 **Application note 43**: 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.

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

143 **FPT_TST.1 TSF testing**

Hierarchical to:	No other components.
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*]] to demonstrate the correct operation of *[selection: [assignment: parts of TSF], the TSF]*.
FPT_TST.1.2	The TSF shall provide authorised users with the capability to verify the integrity of*[selection: [assignment: parts of TSF data], TSF data]*.
FPT_TST.1.3	The TSF shall provide authorised users with the capability to verify the integrity of stored TSF executable code.
Dependencies:	FPT_AMT.1.

144 **Application note 44**: If the chip uses state of the art smart card technology it will run 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 in different variants depending on the type of storage. Those parts of the code stored in read only memory may be tested during initial start-up by the "authorised user" Manufacturer in the Phase 2 Manufacturing. Those parts stored in re-writable memory (e. g. EEPROM) may be tested automatically at every start-up of the chip, which means, that the user "everybody" is authorised to start this test. Other self tests may run automatically to detect failure and to preserve a 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 operations in the SFR as suitable for the concrete product under evaluation. The vulnerability analysis done during the evaluation of

92 [assignment: *physical tampering scenarios*]

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

the class AVA for the specific product will show, if the tests are sufficient to maintain a secure state.

145 The following security functional requirements support the separation and the protection of TSF.

146 The TOE shall meet the requirement “Non-bypassability of the TSP (FPT_RVM.1)” as specified below (Common Criteria Part 2).

147 **FPT_RVM.1 Non-bypassability of the TSP**

Hierarchical to: No other components.

FPT_RVM.1.1 The TSF shall ensure that TSP enforcement functions are invoked and succeed before each function within the TSC is allowed to proceed.

Dependencies: No dependencies.

148 The TOE shall meet the requirement “TSF domain separation (FPT_SEP.1)” as specified below (Common Criteria Part 2).

149 **FPT_SEP.1 TSF domain separation**

Hierarchical to: No other components.

FPT_SEP.1.1 The TSF shall maintain a security domain for its own execution that protects it from interference and tampering by untrusted subjects.

FPT_SEP.1.2 The TSF shall enforce separation between the security domains of subjects in the TSC.

Dependencies: No dependencies.

150 **Application note 45**: 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 chip Embedded Software. The security enforcing functions and application data shall be separated in way preventing any inference.

5.2 Security Assurance Requirements for the TOE

151 The assurance components for the evaluation of the TOE and its development and operating environment are those taken from the

Evaluation Assurance Level 4 (EAL4)

and augmented by taking the following components:

ADV_IMP.2, AVA_MSU.3 and AVA_VLA.4.

152 The minimum strength of function is SOF-high. This protection profile does not contain any security functional requirement for which an explicit strength of function claim is required.

5.3 Security Requirements for the environment

153 This protection profile does not describe security functional requirements for the IT environment.

154

5.4 Security Requirements Rationale

5.4.1 Security Functional Requirements Coverage

155 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.Access_Rights	OT.Additional_Applications	OT.Services	OT.Cryptography	OT.Prot_Inf_Leak	OT.Prot_Phys_Tamper	OT.Prot_Malfunction	OT.Prot_Abuse_Func
FCS_CKM.1/SM				X	X				
FCS_CKM.4				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/CSA				X	X				
FCS_COP.1/RSA_DEC				X	X				
FCS_COP.1/TDES				X	X				
FCS_COP.1/MAC				X	X				
FCS_RND.1				X	X				
FIA_AFL.1/PIN		X		X					
FIA_AFL.1/PUC		X		X					

	OT.AC_Pers	OT.Access_Rights	OT.Additional_Applications	OT.Services	OT.Cryptography	OT.Prot_Inf_Leak	OT.Prot_Phys_Tamper	OT.Prot_Malfunction	OT.Prot_Abuse_Func
FIA_ATD.1		X		X					
FIA_UID.1	X	X		X					
FIA_UAU.1	X	X		X					
FIA_UAU.4				X					
FDP_ACC.2		X		X					
FDP_ACF.1		X		X					
FDP_RIP.1		X	X						
FDP_SDI.2		X							
FDP_UCT.1		X		X					
FDP_UIT.1		X		X					
FTP_ITC.1		X		X					
FMT_SMF.1	X	X	X	X					
FMT_SMR.1	X	X	X	X					
FMT_LIM.1		X	X						X
FMT_LIM.2		X	X						X
FMT_MTD.1/Ini	X	X	X	X					
FMT_MTD.1/Pers	X	X	X	X					
FMT_MTD.1/CMS		X	X	X					
FMT_MTD.1/PIN		X	X	X					
FMT_MTD.1/KEY_MOD		X	X	X					
FPT_EMSEC.1						X			
FPT_FLS.1						X		X	
FPT_PHP.3						X	X	X	
FPT_TST.1						X		X	
FPT_RVM.1		X	X			X		X	X
FPT_SEP.1		X	X			X		X	X

Table 6: Coverage of Security Objectives for the TOE by SFRs

5.4.2 Functional Requirements Sufficiency

156 The security objective **OT.AC_Pers** “Access control for personalization” is implemented by following SFRs:

(i) the SFR FMT_SMR.1 defines the Personaliser as known role of the TOE and the SFR FMT_SMF.1 defines personalization as security management function,

(ii) the SFR 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 SFR FMT_MTD.1/Pers limit right to write personalisation data to the Personalisation Service Provider and

(iv) the SFR FMT_MTD.1/INI limiting the right to write any data before personalisation to the TOE Manufacturer, which in particular implies that the Personaliser role shall be created by the TOE Manufacturer.

157 The security objective **OT.Access_Rights** is the central security requirement for the TOE. Therefore it is supported by many of the SFRs. It is mainly implemented by

(i) the SFRs FDP_ACC.2 and FDP_ACF.1, which require to implement the access rules defined in the security policy SFP_access_rules as defined in OT.Access_Rights,

and supported by

(ii) SFRs FIA_AFL.1/PIN, FIA_AFL.1/PUC, FIA_ATD.1, FMT_SMF.1, FMT_SMR.1, FMT_MTD/PIN, which all support the security of the Cardholders eHC-PIN and PUC.

(iii) SFRs FIA_UID.1 and FIA_UAU.1, which support timing of Identification and authentication,

(iv) SFRs FDP_RIP.1 and FDP_SDI.2 (as well as all the more low-level oriented SFRs, which are not repeated here) prevent unwanted knowledge of secret data or unauthorised modification of the assets.

(v) the SFRs FDP_UCT.1, FDP_UIT.1 and FTP_ITC.1 provide the trusted channel for the protection of the confidentiality and integrity of transmitted data, which is required by some of the rules in SFP_access_rules.

(vi) the SFRs FMT_MTD.1/Ini, FMT_MTD.1/Pers, FMT_MTD.1/CMS, FMT_MTD.1/KEY_MOD restrict the management of applications to authorised subjects and FMT_LIM.1 and FMT_LIM.2 prevent unauthorised use of management functions. Together they prevent the attempt to use management commands in order to bypass the access control policy.

(vii) FPT_RVM.1 and FPT_SEP.1 (together with the SFRs against low-level attacks, which are not repeated here) prevent any bypass of the access rules with methods below the command level.

158 The security objective **OT.Additional_Applications** covers the rules for the download of additional applications into the TOE. Therefore it is mainly supported by

(i) FMT_MTD.1/CMS, which restricts download of additional applications to the Download Service Provider (as also required by SFP_access_rules).

(ii) The other SFRs on management functions FMT_SMF.1, FMT_SMR.1, FMT_LIM.1, FMT_LIM.2, FMT_MTD.1/Ini, FMT_MTD.1/Pers, FMT_MTD.1/PIN,

FMT_MTD.1/KEY_MOD support this, because they restrict other management functions to authorised subjects

(iii) A more “low level” support is given by FPT_SEP.1, FPT_RVM.1 and FDP_RIP.1, which require domain separation (which holds in particular separation between existing and additional applications), non-bypassability of security functions and the deletion of secret data before any memory area is re-used. (All hardware-oriented SFRs, which are not repeated here, also support non-bypassability.)

159 The security objective **OT.Services** addresses the implementation and the access control of the TOE security services. The security services are implemented by the following SFR:

(i) the TOE security service **Service_Asym_Mut_Auth_w/o_SM** is implemented by the SFR FCS_COP.1/CCA_SIGN, FCS_COP.1/CCA_VERIF, FCS_COP.1/SHA, FCS_RND.1 and FIA_UAU.4.

(ii) the TOE security service **Service_Asym_Mut_Auth_with_SM** is implemented by the SFR FCS_CKM.1/SM, FCS_CKM.4, FCS_COP.1/CCA_SIGN, FCS_COP.1/CCA_VERIF, FCS_COP.1/SHA, FCS_RND.1, FCS_COP.1/TDES, FCS_COP.1/MAC and FIA_UAU.4. The trusted channel established by this service is described by SFRs FDP_UCT.1, FDP_UIT.1 and FTP_ITC.1.

(iii) the TOE security service **Service_Sym_Mut_Auth_with_SM** is implemented by the SFR FCS_CKM.1/SM, FCS_CKM.4, FCS_RND.1, FCS_COP.1/TDES, FCS_COP.1/MAC and FIA_UAU.4. The trusted channel established by this service is described by SFRs FDP_UCT.1, FDP_UIT.1 and FTP_ITC.1.

(iv) the TOE security services **Service_User_Auth_PIN** and **Service_User_Auth_PUC** are implemented by the SFRs FIA_AFL.1/PIN, FIA_AFL.1/PUC, FIA_ATD.1, FMT_SMF.1, FMT_SMR.1, FMT_MTD/PIN, which all support the security of the Cardholders eHC-PIN and PUC. Also it is supported by FDP_ACC.2 and FDP_ACF.1, because these SFRs require implementation of SFP_access_rules, which involves PIN authentication.

(v) the TOE security service **Service_Privacy** is implemented mainly by the SFRs FDP_ACC.2 and FDP_ACF.1, because the possibility for the Cardholder to delete electronic prescription data is defined as a rule in SFP_access_rules, which is mainly supported by these two SFRs (in fact all other SFRs supporting OT.Access_Rights, as listed for that objective, also support this service).

(vi) the TOE security service **Service_Client_Server_Auth** is implemented by the SFR FCS_COP.1/CSA

(vii) the TOE security service **Service_Data_Decryption** is implemented by the SFR FCS_COP.1/RSA_DEC.

(viii) the TOE security service **Service_Card_Management** is implemented by the SFRs already listed for the service **Service_Sym_Mut_Auth_with_SM**, because this service is used for authentication of the Download Service Provider and for the establishment of secure messaging for the trusted channel. Also the SFRs listed for the objective OT.Additional_Applications support this service.

(ix) the TOE security service **Service_Logging** is implemented by access rules for the asset logging data defined in SFP_access_rules, so it is realised mainly by the SFRs FDP_ACC.2 and FDP_ACF.1 (and in fact all other SFRs supporting OT.Access_Rights, as listed for that objective, also support this service).

The human user authentication and the access control for all of these security services is implemented mainly by the SFRs FDP_ACC.1 and FDP_ACF.1, because the policy SFP_access_control includes rules for the use of the services. (This is described in SFP_access_control in the form of rules for the use of the keys, which are relevant for the services.)

160 The TOE security objective **OT.Cryptography** is implemented by the SFRs of the FCS class. They include Triple-DES as used for secure messaging, SHA-1, the RSA variants listed in the objective and random number generation.

161 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.

(iv) The SFR FPT_RVM.1 and FPT_SEP.1 ensure that the TSF dealing with sensitive information or the TSF preventing information leakage can not be bypassed or corrupted.

162 The security objective **OT.Prot_Phys_Tamper** “Protection against physical tampering” is implemented directly by the SFR FPT_PHP.3.

163 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_RVM.1 and FPT_SEP.1 ensure that the TSF detecting errors or insecure operational can not by bypassed or corrupted.

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

164 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 FPT_RVM.1 and FPT_SEP.1 ensure that the protection of TOE functions intended for the testing, the initialization and the personalization of the TOE can not by bypassed or corrupted.

5.4.3 Dependency Rationale

SFR	Dependencies	Support of the Dependencies
FCS_CKM.1/SM	[FCS_CKM.2 Cryptographic key distribution or FCS_COP.1 Cryptographic operation], FCS_CKM.4 Cryptographic key destruction, FMT_MSA.2 Secure security attributes	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], FMT_MSA.2 Secure security attributes	FCS_CKM.1, justification 1 for non-satisfied dependencies
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, FMT_MSA.2 Secure security attributes	justification 2 for non-satisfied dependencies
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, FMT_MSA.2 Secure security attributes	justification 3 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	justification 3 for non-satisfied dependencies

SFR	Dependencies	Support of the Dependencies
	security attributes or FCS_CKM.1 Cryptographic key generation], FCS_CKM.4 Cryptographic key destruction, FMT_MSA.2 Secure security attributes	
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, FMT_MSA.2 Secure security attributes	justification 3 for non-satisfied dependencies
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, FMT_MSA.2 Secure security attributes	justification 3 for non-satisfied dependencies
FCS_COP.1/TDES	[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, FMT_MSA.2 Secure security attributes	FCS_CKM.1, FCS_CKM.4, justification 1 for non-satisfied dependencies
FCS_COP.1/MAC	[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, FMT_MSA.2 Secure security attributes	FCS_CKM.1, FCS_CKM.4, justification 1 for non-satisfied dependencies
FCS_RND.1	-	-
FIA_AFL.1/PIN	FIA_UAU.1 Timing of authentication	fulfilled
FIA_AFL.1/PUC	FIA_UAU.1 Timing of authentication	fulfilled
FIA_ATD.1	-	-
FIA_UID.1	-	-
FIA_UAU.1	FIA_UID.1 Timing of identification	fulfilled

SFR	Dependencies	Support of the Dependencies
FIA_UAU.4	-	-
FDP_ACC.2	FDP_ACF.1 Security attribute based access control	fulfilled
FDP_ACF.1	FDP_ACC.1 Subset access control, FMT_MSA.3 Static attribute initialization	FDP_ACC.2, justification 4 for non-satisfied dependencies
FDP_RIP.1	-	-
FDP_SDI.1	-	-
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.2
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.2
FTP_ITC.1	-	-
FMT_SMF.1	-	-
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_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/Pers	FMT_SMF.1 Specification of management functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/CMS	FMT_SMF.1 Specification of management functions, FMT_SMR.1 Security roles	fulfilled
FMT_MTD.1/KEY_MOD	FMT_SMF.1 Specification of management functions, FMT_SMR.1 Security roles	fulfilled
FPT_EMSEC.1	-	-

SFR	Dependencies	Support of the Dependencies
FPT_FLS.1	ADV_SPM.1	fulfilled by EAL4
FPT_PHP.3	-	-
FPT_RVM.1	-	-
FPT_SEP.1	-	-
FPT_TST.1	FPT_AMT.1 Abstract machine testing	justification 5 for non-satisfied dependencies

Table 7: Dependency rationale overview

165 Justification for non-satisfied dependencies:

No. 1: The TSF according to SFR FCS_CKM.1/SM and FCS_CKM.4 generate and destroy automatically the secure messaging keys used for FCS_COP.1/TDES and FCS_COP.1/MAC. 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 have to describe the management security attributes of theses keys.

No. 2: The cryptographic algorithm SHA-1 does not use any cryptographic key. Therefore none of the listed SFR are needed to be defined for this specific instantiation of FCS_COP.1.

No. 3: The SFR FCS_COP.1/CCA_SIGN, FCS_COP.1/CCA_VERIF, FCS_COP.1/CSA 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 SFR are needed to be defined for this specific instantiations of FCS_COP.1.

No. 4: The access control TSF according to FDP_ACF.1 uses security attributes which are defined during the personalization and are fixed over the whole life time of the TOE. No management of these security attribute (i.e. SFR FMT_MSA.1 and FMT_MSA.2) is necessary here.

No. 5: The TOE comprises the software and the hardware of the card, there is no underlying abstract machine the TSF relies upon. Hence the dependency of FPT_TST.1 (TSF self test) upon FPT_AMT.1 (Abstract machine testing) is not relevant here.

5.4.4 Rationale for the Assurance Requirements

166 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.

167 The selection of component ADV_IMP.2 provide a higher assurance for the implementation of the TOE especially for the absence of unintended functionality.

168 In the component AVA_MSU.3, an analysis of the guidance documentation by the developer is required to provide additional assurance that the objective has been met, and this analysis is validated and confirmed through testing for insecure states performed by the evaluator.

169 The TOE shall be shown to be resistant to penetration attacks with high attack potential as described in the threats. Therefore the component AVA_VLA.4 was chosen in order to meet the security objectives

170 The minimal strength of function “high” was selected to ensure resistance against direct attacks on functions based on probabilistic or permutational mechanisms.

171 The component ADV_IMP.2 has the following dependencies:

- ADV_LLD.1 Descriptive low-level design,
- ADV_RCR.1 Informal correspondence demonstration,
- ALC_TAT.1 Well-defined development tools.

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

172 The component AVA_MSU.3 has the following dependencies:

- ADO_IGS.1 Installation, generation, and start-up procedures,
- ADV_FSP.1 Informal functional specification,
- AGD_ADM.1 Administrator guidance,
- AGD_USR.1 User guidance.

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

173 The component AVA_VLA.4 has the following dependencies:

- ADV_FSP.1 Informal functional specification,
- ADV_HLD.2 Security enforcing high-level design,
- ADV_IMP.1 Subset of the implementation of the TSF,
- ADV_LLD.1 Descriptive low-level design,
- AGD_ADM.1 Administrator guidance,
- AGD_USR.1 User guidance.

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

5.4.5 Security Requirements – Mutual Support and Internal Consistency

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.

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 5.4.4 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 5.4.3 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 analysed, and non-dissolved dependencies are appropriately explained.
- 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 eHC specification.
  - The chosen SFRs of classes FIA and FDP support the access control policy SFP_access_control as defined in the objective OT.Access_Rights.
  - The chosen SFRs of class FMT support the secure management of TSF data in a way, which is consistent to the policy SFP_access_control.
  - The SFRs of all these classes (FCS, FIA, FDP, FMT) together provide the eHC services as defined in the TOE description (section 2.2).
  - The remaining SFRs, chosen from class FPT define low level protection of the TOE against any attempt to bypass the security policy SFP_access_control or the services defined in the specification.

  In detail these connections between the SFRs can be seen from section 5.4.2.
- 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 section 5.4.4. Furthermore, as also discussed in section 5.4.4, 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.

6 Extended Components Definition

174 This protection profile uses components defined as extensions to CC part 2. Some of these components are defined in [21], other components are defined in this protection profile.

6.1 Definition of the Family FCS_RND

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

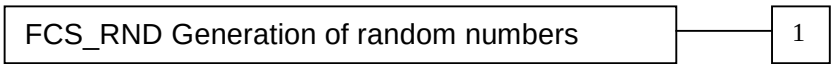
176 The family “Generation of random numbers (FCS_RND)” is specified as follows.

FCS_RND 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.

Component levelling:



FCS_RND.1	Generation of random numbers requires that random numbers meet a defined quality metric.
Management:	FCS_RND.1 There are no management activities foreseen.
Audit:	FCS_RND.1 There are no actions defined to be auditable.
FCS_RND.1	Quality metric for random numbers
Hierarchical to:	No other components.
FCS_RND.1.1	The TSF shall provide a mechanism to generate random numbers that meet [assignment: *a defined quality metric*].
Dependencies:	No dependencies.

6.2 Definition of the Family FMT_LIM

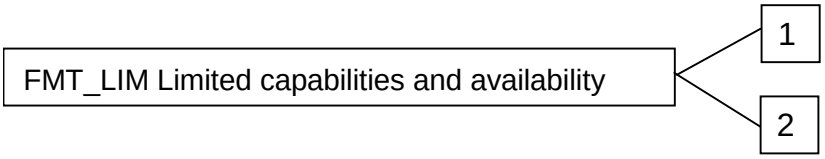
177 The family “Limited capabilities and availability (FMT_LIM)” is specified as follows.

FMT_LIM Limited capabilities and availability

Family behaviour

This family defines requirements that limits 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 requires that the TSF is built to provide only the capabilities (perform action, gather information) necessary for its genuine purpose.

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

Management: FMT_LIM.1, FMT_LIM.2

There are no management activities foreseen.

Audit: FMT_LIM.1, FMT_LIM.2

There are no actions defined to be auditable.

178 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.

179 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.

180 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.

181 **Application note 46**: 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

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.

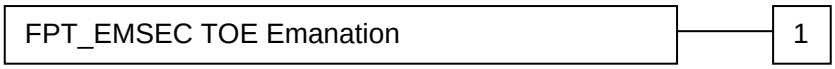
6.3 Definition of the Family FPT_EMSEC

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

Family behaviour

This family defines requirements to mitigate intelligible emanations.

Component levelling:



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 other components.

7 Annexes

7.1 Annex: Guidance on integration of this PP with other PPs in a Security Target

7.1.1 PP conformance

The Common Criteria parts 1 [1] and 3 [3] describe how a security target may claim conformance to one or more protection profiles. The rules for a compliance claim may be summarized as follows (for details refer to [1], section B.2.8 “PP claims”, and [3], section 10.5, assurance component ASE_PPC.1):

(1) The developer shall provide any PP claims as part of the ST (cf. ASE_PPC.1.1D) and each PP claim shall identify the PP for which compliance is being claimed, including qualifications needed for that claim (cf. ASE_PPC.1.1C).

(2) The ST includes all security objectives for the TOE contained in the PP for which compliance is being claimed.

(3) The ST includes all security functional requirements for the TOE (or their hierarchical components) contained in the PP for which compliance is being claimed where all operations shall be performed or completed.

(4) The ST includes all security assurance requirements or their hierarchical components. The ST may require additional security assurance requirements.

(5) The ST may include additional security functional and assurance requirements which must not weaken or contradict the security requirements of the PP.

The developer shall provide the PP claims rationale for each provided PP claim (cf. ASE_PPC.1.2D).

The following section discuss how a ST may be written claiming compliance to this PP for the eHC and one (or both) of the PP SSCD[94], the BSI-PP-0005-2002 or BSI-PP-0006-2002. The author of the security target writer should pay intention to the technology independence of the BSI-PP-0005-2002 and BSI-PP-0006-2002 (cf. chapter 2 of those PPs) and smart card specific descriptions of the current PP. These approaches result in different text of similar security objectives or security requirements.

7.1.2 Security Objectives

The ST claiming compliance to the PP eHC and one (or both) of the PP SSCD (i.e. the BSI-PP-0005-2002 or BSI-PP-0006-2002) shall include all security objectives of the respective PPs. Note, these PP contain similar security objectives which should be stated in parallel because the address different assets. Some of them may be combined if appropriate rationale is given.

For example, the security objectives OT.AC_Pers in this eHC PP and the security objectives OT.Lifecycle and OT.Init in the PP SSCD address the security of the initialization and personalization of the TOE. The OT.AC_Pers, OT.Lifecycle and OT.Init limit personalization to authorized users but relates to different data. The PP SSCD allows for safe destruction of the signature-creation data (SCD) which end the SSCD life cycle. The SCD may be re-generated starting a new life cycle.

7.1.3 Security Functional Requirements

The ST shall include all security functional requirements (SFR) of all PP for which compliance is being claimed. The protection profiles HPC, eHC and SSCD define almost all SFR with performed operation. The ST writer shall perform all operation which are not performed already in these PP. The instantiations of the SFR components either address different security features of the TOE or describe the same security features in a consistent way.

The ST writer should be aware of the different roles and identities handled by the TOE.

Note that the roles Cardholder and Signatory will be assigned to the same person but in different context:

[94] Note however, that the German Digital Signature Act includes no requirement to claim one of the SSCD PPs in order to evaluate an application for qualified digital signatures. Therefore an ST author may also consider to take relevant contents from one of these PPs without claiming formal conformance.

- The user authenticated for the role Cardholder may use the health application but the can not use the signature-creation data (SCD) in the signature application.

- The user authenticated for the role Signatory may use the SCD in the signature application but the can not use the health application.

- The ST shall define different authentication reference data for both roles. The values of these authentication reference data may be chosen independent on each other. This is a result of the German signature ordinance and their technical interpretation given by Bundesnetzagentur.

The instantiations of components of the families FDP_ACC, FDP_ACF, FDP_UCT and FDP_UIT of the PP HPC, eHC and SSCD enforce different security functional policies defined for different subjects, objects and operations:

- the Personalisation SFP, the Signature-creation SFP and SVD Export SFP for SSCD Type 2 and 3, where the SCD Import SFP is enforced in case of SSCD Type 2 and the Initialisation SFP is enforced in case of SSCD Type 3 only,

- this eHC PP enforces the eHC SFP "**SFP_access_rules**".

Note that the PP SSCD, HPC and eHC require the TOE to provide trusted channel to remote trusted products. The smart card specific PP HPC and eHC assume to use secure messaging as mechanism to establish the trusted channel. The PP SSCD as being technology independent does not require the TOE to use mechanisms secure messaging.

The instantiations SFR components of the class FCS address different cryptographic mechanisms. Note that the PP HPC and eHC use the digital signature-creation for card-to-card authentication and the client-server-authentication where the PP SSCD address the digital signature-creation for electronic signature of the data to be signed (DTBS). These digital signature use specific cryptographic algorithms and keys.

The PP SSCD, HPC and eHC use slightly different approach to describe the TSF protection.

The instantiation of the SFR FPT_EMSEC.1 TOE emanation are very similar in the PP SSCD, PP HPC and PP eHC:

- they are not operated in respect of the types and limits of emanation,

- they list specific sets of user data and TSF data to protect, and

- only the PP HPC and eHC specify the smart card circuit interface as the interface of the connection which the ST should use for a smart card as SSCD as well.

The FPT_FLS.1 Failure with preservation of secure state is common to the PP SSCD, the PP HPC and the PP eHC where the PP SSCD does not perform the operation but the PP HPC and eHC assign the exposure of operating condition and the failure detected by self tests. Thus the ST writer may use the list of failure defined in the PP HPC and eHC or may add other failure in which the TOE preserve a secure state.

The SFR FPT_AMT.1 Abstract machine testing is used in PP SSCD only and is missing in the PP HPC and eHC. The PP SSCD include the component FPT_AMT.1 because the TOE may be hardware or software implementing the SCD. E.g. the TOE may include the hardware cave implementing the SFR FPT_PHP.3 for physical protection but may not include all computer hardware inside this cave. In case of a smart card the ST will

- on the one hand define the TOE as smart card i.e. consisting of all the hardware, the software and the health application and the signature-creation application and

- on the other hand require abstract machine testing i.e. the TSF to perform testing to demonstrate the security assumptions made about the underlying abstract machine upon which the TSF relies.

In case of a smart card a test of the arithmetic coprocessor may be seen form the software part of the TOE view as test of the “underlying abstract machine” and form the hardware part of the TOE as self test (normally described by means of the SFR FPT_TST.1). Thus the ST writer should explain that the self tests of the hardware platform on which the software is running fulfil the SFR FPT_AMT.1 even if the “underlying abstract machine” is part of the TOE.

7.1.4 Security Assurance Requirements

The ST compliant with the PP SSCD and one of the PP HPC or eHC will include at least

- the assurance package EAL4 and as augmentations

- the assurance components ADV_IMP.2 contained in the PP HPC and eHC,

- the assurance components AVA_MSU.3 and AVA_VLA.4 contained in all three PP.

7.2 Glossary and Acronyms

Some types of terms are not described here, but at specific places in the text:
- The services provided by the TOE are defined in section 2.2
- The life cycle phases of the TOE are defined in section 2.3, Table 1.
- Assets (sensitive data) protected by the TOE are defined in section 3.1.1, Table 2.
- The subjects interacting with the TOE are defined in section 3.1.2, Table 3.

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).
IC dedicated software	The part of the TOE’s software, which is provided by the hardware manufacturer
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.

Term	Definition
Initialisation Data	Any data defined by the TOE Manufacturer and injected into the non-volatile memory by the Integrated Circuits manufacturer (Phase 2). These data are for instance used for traceability and for IC identification (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.
Mutual Authentication	Type of those cryptographic protocols, were two entities mutually verify the authenticity of each other, for smart cards this is realised by suitable sequences of amt card commands and responses
Personalization	The process by which personal data are brought into the TOE before it is handed to the cardholder
*Rule_**	Naming convention for access control rules in this PP, defined in SFP_access_rules.
Secure Channel	A connection between two devices, which is secured against interception or modification of the transmitted data. The TOE realises a secure channel to other devices using secure messaging.
secure messaging in encrypted mode	Secure messaging using encryption and message authentication code according to ISO/IEC 7816-4
*Service_****	Services provided by the TOE (e. g. Service_Privacy) are defined in section 2.2.
TSF data	Data created by and for the TOE, that might affect the operation of the TOE (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
*A.***	Naming convention for assumptions in this PP, e. g. A.Users, see section 3.3
BMG	Bundesministerium für Gesundheit (the German Federal Ministry of Health)
*BSI-PP-****	Naming convention for Protection Profiles registered by BSI
CC	Common Criteria
CCIMB	Common Criteria Implementation Management Board
COS	Card Operating System
DES3	Data Encryption Standard 3 (symmetric cryptographic algorithm used by the TOE, also called Triple-DES)
EAL	Evaluation Assurance Level
eGK	elektronische Gesundheitskarte
eHC	electronic Health Card
HEC	Health Employee Card (technically a type of HPC)
HPC	Health Professional Card
MAC	Message Authentication Code
OSP	Operational Security Policy
*OSP.****	Naming convention for organisational security policies in this PP, e. g. OSP.User_Information (see section 3.1).
*OT.****	Naming convention for security objectives for the TOE in this PP, e. g. OT.Access_Rights (see section 4.1.
PIN	Personal Identification Number
PKI	Public Key Infrastructure
PUC	PIN Unblocking Code
PP	Protection Profile
RAD	Reference Authentication Data (see Table 2).
RSA	Rivest Shamir Adleman (an asymmetric cryptographic algorithm used by the TOE)

Acronyms	Term
SAR	Security assurance requirements
SHA-1	Secure Hash Algorithm 1 (a cryptographic hash algorithm)
SFP	Security Functional Policy
SFP_access_rules	Name of the security functional policy defining the access rights to assets (data) in the TOE. It is defined in OT.Access_Rights (see section 4.1.1) and used by access control SFRs (see section 5.1.
SFR	Security functional requirement
SM	Secure Messaging
SMC	Security Module Card
SSCD-PP	Secure Signature Creation Device Protection Profile, see [20]
SSVG-PP	Secure Silicon Vendor's Protection Profile, see [21]
*T.****	Naming convention used for naming threats in this PP, for example T.Forge_Internal_Data, see section 3.2.
Triple-DES	A symmetric encryption algorithm used by the TOE for secure messaging.
TOE	Target of Evaluation
TOE_App	Application Part of the TOE
TOE_ES	TOE Embedded Software (operating system of the TOE)
TOE_IC	The integrated circuit of the TOE, the hardware part together with IC dedicated software
TSF	TOE security functions
VAD	Verification Authentication Data (see Table 2).
X.509	A certificate format

7.3 Literature

Common Criteria

[1] Common Criteria for Information Technology Security Evaluation, Part 1: Introduction and General Model; Version 2.3, August 2005, CCIMB-2005-08-001

[2] Common Criteria for Information Technology Security Evaluation, Part 2: Security Functional Requirements; Version 2.3, August 2005, CCIMB-2005-08-002

[3] Common Criteria for Information Technology Security Evaluation, Part 3: Security Assurance Requirements; Version 2.3, August 2005, CCIMB-2005-08-003

[4] Common Methodology for Information Technology Security Evaluation CEM, Version 2.3, August 2005, CCIMB-2005-08-004

eHC specifications and further documents related to the German eHC

Note: The following specifications may be replaced by further versions in future. This PP allows the evaluation of cards, which are implemented according to such newer versions, as long as the security properties defined in this PP remain valid for those newer versions of these specifications.

[5] Die Spezifikation der elektronischen Gesundheitskarte, Teil 1: Kommandos, Algorithmen und Funktionen der Betriebssystem-Plattform, Version 1.1.0, 07.02.2006, gematik

[6] Die Spezifikation der elektronischen Gesundheitskarte, Teil 2: Anwendungen und anwendungsspezifische Strukturen, Version 1.2.1, 07.09.2006, gematik

[7] Beschreibung der zulässigen PIN- und PUC-Verfahren für die eGK, Version 0.9.0, 26.10.2006, gematik
Note: This document needs to be used in the version valid at the time of evaluation, see the web site www.gematik.de for contact.

Note: Most of the following documents, which were developed by the bIT4health group, are available online at www.dimdi.de/de/ehealth/karte/bit4health.

[8] Erarbeitung einer Strategie zur Einführung der Gesundheitskarte, Sicherheitsanforderungen, Version 1.1, Project group bIT4health on behalf of the German Federal Ministry of Health and Social Security (Bundesministerium für Gesundheit und soziale Sicherung), 12. August 2004

[9] Erarbeitung einer Strategie zur Einführung der Gesundheitskarte, Sicherheitsarchitektur, Version 1.1, Project group bIT4health on behalf of the German Federal Ministry of Health and Social Security (Bundesministerium für Gesundheit und soziale Sicherung), 12. August 2004

[10] Erarbeitung einer Strategie zur Einführung der Gesundheitskarte, Use Case Modell Teil 1, Version 1.1, Project group bIT4health on behalf of the German Federal Ministry of Health and Social Security (Bundesministerium für Gesundheit und soziale Sicherung) , 12. August 2004

[11] Erarbeitung einer Strategie zur Einführung der Gesundheitskarte, Use Case Modell Teil 2, Version 1.1, Project group bIT4health on behalf of the German Federal Ministry of Health and Social Security (Bundesministerium für Gesundheit und soziale Sicherung), 12. August 2004

[12] Erarbeitung einer Strategie zur Einführung der Gesundheitskarte, Gesammelte Referenzen der bIT4health-Dokumente, Version 1.1, Project group bIT4health on behalf of the German Federal Ministry of Health and Social Security (Bundesministerium für Gesundheit und soziale Sicherung), 12. August 2004

[13] Erarbeitung einer Strategie zur Einführung der Gesundheitskarte, Glossar des Projekts bIT4health, Version 1.1, Project group bIT4health on behalf of the German Federal Ministry of Health and Social Security (Bundesministerium für Gesundheit und soziale Sicherung), 12. August 2004

Cryptography

[14] „Geeignete Algorithmen zur Erfüllung der Anforderungen nach §17 Abs. 1 bis 3 SigG vom 22. Mai 2001 in Verbindung mit Anlage 1 Abschnitt I Nr. 2 SigV vom 22. November 2001“, January 2005

Note: The newest officially published version of the preceding document shall be used.

[15] ISO/IEC 14888-3: Information technology – Security techniques – Digital signatures with appendix – Part 3: Certificate-based mechanisms, 1999

[16] FEDERAL INFORMATION PROCESSING STANDARDS PUBLICATION FIPS PUB 46-3, DATA ENCRYPTION STANDARD (DES), Reaffirmed 1999 October 25, U.S. DEPARTMENT OF COMMERCE/National Institute of Standards and Technology

[17] Federal Information Processing Standards Publication 180-2 SECURE HASH STANDARD (+ Change Notice to include SHA-224), U.S. DEPARTMENT OF COMMERCE/National Institute of Standards and Technology, 2002 August 1

[18] Federal Information Processing Standards Publication 186-2 DIGITAL SIGNATURE STANDARD (DSS) (+ Change Notice), U.S. DEPARTMENT OF COMMERCE/National Institute of Standards and Technology, 2002 August 1

[19] PKCS #1: RSA Cryptography Specifications, Version 2.1. RSA Laboratories, 14.6.2002

Protection Profiles

[20] Protection Profile Secure Signature Creation Device Type 2 resp Type 3, , registered and certified by Bundesamt für Sicherheit in der Informationstechnik (BSI) under the reference BSI-PP-0005-2002T resp. BSI-PP-0006-2002T, also short SSCD-PPs or CWA14169

[21] PP conformant to Smartcard IC Platform Protection Profile, Version 1.0, July 2001; registered and certified by Bundesamt für Sicherheit in der Informationstechnik (BSI) under the reference BSI-PP-0002-2001, also short SSVG-PP

[22] Smartcard Integrated Circuit Platform Augmentations, Version 1.00, March 8th, 2002