IDEMIA SMART IDENTITY

Security Target Lite TachoDrive v4 on ID-One Cosmo X

Reference: FQR 550 0336 Ed 6 – ST

DOCUMENT EVOLUTION

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Ed 1	13/05/2022	IDEMIA	Document Creation.
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1 Security Target Introduction

1.1 ST Identification

Title	Security Target Lite TachoDrive v4 on ID-One Cosmo X
ST Identification	FQR 550 0336 Ed 6
CC Version	3.1 Revision 5
Assurance Level	EAL4+ (augmented with AVA_VAN.5, ATE_DPT.2 and ALC_DVS.2)
Compliant To Protection Profile	**[PP-TACHOGRAPH_GEN1], [PP-TACHOGRAPH_GEN2]**
PP References	BSI-CC-PP-0070 BSI-CC-PP-0091
PP Versions	V1.02 for BSI-CC-PP-0070 V1.0 for BSI-CC-PP-0091

1.2 TOE Reference

TOE Commercial Name	TachoDrive v4 on ID-One Cosmo X
TOE Version (SAAAAR Code)	'41 63 06 FF'
TOE Internal Version	'00 00 20 22'
Guidance Documents	**[AGD_PRE] and [AGD_OPE]**
Platforms Identifications: **R3** **R4** **R4+ Patch**	 R3: 093363 R4: 093364 R4 + Patch: 093364 + 099441
Platform Certificates	**[PTF_CERT]**

The product can be loaded in all versions covered by **[PTF_CERT].**

2 Technical Terms, Abbreviations and Associated References

2.1 Technical Terms

Term	Definition
Activity data	*Activity data include cardholder activities data, events and faults data and control activity data*
Application note	*Optional informative part of the ST containing sensitive supporting information that is considered relevant or useful for the construction, evaluation or use of the TOE*
Administrator	*user who performs TOE initialization, TOE personalization, or other TOE administrative functions*
Authentication data	*information used to verify the claimed identity of a user*
Authentication	*Authentication defines a procedure that verifies the identity of the communication partner. The most elegant method is based on the use of so called digital signatures*
Card identification data	*User data related to card identification as defined by requirements 190, 191, 192, 194, 215, 231 and 235*
Cardholder activities data	*User data related to the activities carried by the cardholder as defined by requirements 197, 199, 202, 212, 212a, 217, 219, 221, 226, 227, 229, 230a, 233 and 237*
Cardholder identification data	*User data related to cardholder identification as defined by requirements 195, 196, 216, 232 and 236*
Control activity data	*User data related to law enforcement controls as defined by requirements 210 and 225*
Digital Tachograph	*Recording equipment*
ECC	*(Elliptic Curve Cryptography) class of procedures providing an attractive alternative for the probably most popular asymmetric procedure, the RSA algorithm*

Term	Definition
Events and faults data	*User data related to events or faults as defined by requirements 204, 205, 207, 208 and 223*
Identification data	*Identification data include card identification data and cardholder identification data*
Integrity	*The test on the integrity of data is carried out by checking messages for changes during the transmission by the receiver. Common test procedures employ Hash functions, MACs (Message Authentication Codes) or - with additional functionality - digital signatures*
Java Card	*A smart card with a Java Card operation system*
JOP	*Java Card Open Platform, certified in accordance with a Java Card protection profile*
MAC	*Message Authentication Code. Algorithm that expands the message by means of a secret key by special redundant pieces of information, which are stored or transmitted together with the message. To prevent an attacker from targeted modification of the attached redundancy requires its protection in a suitable way*
Non repudiation	*One of the objectives in the employment of digital signatures. It describes the fact that the sender of a message is prevented from denying the preparation of the message. The problem cannot be simply solved with cryptographic routines, but the entire environment needs to be considered and respective framework conditions need to be provided by pertinent laws*
Public Key	*Publicly known key in an asymmetric cipher which is used for encryption and verification of digital signatures*
Random numbers	*Many cryptographic algorithms or protocols require a random element, mostly in form of a random number, which is newly generated in each case. In these cases, the security of the procedure depends in part on the suitability of these random numbers. As the generation of real random numbers within computers still imposes a problem (a source for real random events can in fact only be gained by exact observation of physical events, which is not easy to realize for software), so called pseudo random numbers are used instead*
Reference authentication data (RAD)	*Data persistently stored by the TOE for authentication of a user as authorised for a particular role*
Secure messaging	*Secure messaging using encryption and message authentication code ac-cording to ISO/IEC 7816-4*

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

2.2 Abbreviations

Acronym	Definition
ACD	Activity data
APP	Application
CLFDB	Ciphered Load File Data Block
CPS	Common Personalization System
DPA	Differential Power Analysis
DSK	Dump Secret Key
DSRC	Dedicated Short Range Communications
DTBS	Data to be signed
EAL	Evaluation Assurance Level
EOL	End Of Life
IC	Integrated Circuit
IDD	Identification data

Acronym	Definition
IFD	Interface Device
JOP	Java Card Open Platform
KPD	Keys to protect data
LSK	Load Secure Key
OS	Operating System
OSP	Organizational Security Policy
PIN	Personal Identification Number
PP	Protection Profile
PUK	PIN Unblocked Key
RAD	Reference authentication data
RNG	Random Number Generation
SAR	Security Assurance Requirements
SCD	Signature creation data
SF	Security Function
SFP	Security function policy
SPA	Simple Power Analysis
ST	Security Target
SVD	Signature verification data
TOE	Target Of Evaluation
TSF	TOE security functionality
VAD	Verification authentication data
VRN	Vehicle Registration Number
VU	Vehicle Unit

2.3 References

Ref.	Document title
[CC1]	Common Criteria for information Technology Security Evaluation, Part 1: Introduction and general model, CCMB-2017-04-001, Version 3.1 - Revision 5, April 2017
[CC2]	Common Criteria for information Technology Security Evaluation, Part 2: Security Functional Requirements, CCMB-2017-04-002, Version 3.1 - Revision 5, April 2017
[CC3]	Common Criteria for information Technology Security Evaluation, Part 3: Security Assurance Requirements, CCMB-2017-04-003, Version 3.1 - Revision 5, April 2017
[CEM]	Common Methodology for Information Technology Security Evaluation, Evaluation Methodology. Version 3.1. Revision 5. April 2017. CCMB-2017-04-004.
[EU - 2016/799]	Commission Implementing Regulation (EU) 2016/799 of 18 March 2016 implementing Regulation (EU) 165/2014 of the European Parliament and of the Council laying down the requirements for the construction, testing, installation, operation and repair of tachographs and their components
[EU - 2018/502]	Commission Implementing Regulation (EU) 2018/502 of 28 February 2018 amending Implementing Regulation (EU) 2016/799 laying down the requirements for the construction, testing, installation, operation and repair of tachographs and their components
[EU - 2021/1228]	Commission Implementing Regulation (EU) 2021/1228 of 16 July 2021 amending Implementing Regulation (EU) 2016/799 as regards the requirements for the construction, testing, installation, operation and repair of smart tachographs and their components (Text with EEA relevance)
[EU - 1360/2002]	Commission Regulation (EC) No. 1360/2002 'Requirements for construction, testing, installation and inspection', 05.08.2002, Annex 1B, and last amended by CR (EC) No. 432/2004 and corrigendum dated as of 13.03.2004 (OJ L 71)
[PP-TACHOGRAPH_GEN1]	Digital Tachograph– Smart card (Tachograph Card) pp0070b, Version 1.02, 15 November 2011
[PP-TACHOGRAPH_GEN2]	Digital Tachograph– Smart card (Tachograph Card) pp0091b, Version 1.0, 9 May 2017
[PP_IC]	Security IC Platform Protection Profile with Augmentation Packages Version 1.0, 13 January 2014, BSI-CC-PP-0084-2014

Ref.	Document title
[ST_PTF]	Security Target Lite ID-One Cosmo X, FQR 110 9730
[PP-JAVACARD]	Java Card System - Open Configuration Protection Profile, Version 3.0.5 December 2017, BSI-CC-PP-0099-2017
[AGD_PRE]	FQR 401 9054 Ed 7 - AGD_PRE
[AGD_OPE]	FQR 401 9055 Ed 2- AGD_OPE
[JIL-1]	Application of Attack Potential to Smartcards v3.0 - JIL document - April 2019
[JIL -2]	Composite product evaluation for Smart Cards and similar devices, Version 1.5.1, May 2018
[JCRE]	Java Card Platform Runtime Environment Specification, Classic Edition Version 3.1 November 2019, Oracle Technology Network
[JCVM]	Java Card Platform Virtual Machine Specification, Classic Edition Version 3.1 November 2019, , Oracle Technology Network
[JCAPI]	"Java Card 3.1 Classic - API" Application Programming Interfaces, Version 3.1, 2019, Oracle Technology Network
[RNG-NIST]	The NIST SP 800-90 Recommendation for Random Number Generation Using Deterministic Random Bit Generators (Revise) March 2007
[RNG-CLASS]	A proposal for: Functionality classes for random number generators, Wolfgang Killmann (T-Systems) and Werner Schindler (BSI), Version 2.0, 18 September 2011
[JIL-3]	JIL-Certification-of-Open-Smart-Card-Products-v1.1-(for_trial_use), Version 1.1, 4 February 2013
[PTF_CERT]	ANSSI-CC-2021/29v2-R01 - ID-One COSMO X

3 Target of Evaluation Overview

3.1 TOE objective

The TOE, TachoDrive v4 on ID-One Cosmo X, is the solution for Digital Tachograph first generation compliant to the Commission regulation **[EU - 1360/2002]** and second generation compliant to the European Union regulation 2014/165 and its Commision implementation **[EU - 2016/799]** amended by **[EU - 2018/502]** and **[EU - 2021/1228]**.

The TOE can be used in a recording equipment (or Vehicle Unit) of both Generation 1 as well as Generation 2 VUs.

The TOE supports a Tachograph applet for user phase that provides both Generation 1 and Generation 2 functionalities with two configurations:

1. Configuration 1: Supporting Generation 1 only functionalities (compliant to **[PP-TACHOGRAPH_GEN1]**).

2. Configuration 2: Supporting both Generation 1 and Generation 2 (version 2 or version 1) functionalities (compliant to **[PP-TACHOGRAPH_GEN2]**).

The TOE can be one of defined card, i.e. Driver, Company, Workshop and Controller. The Tachograph card type is set during the personalization phase.

The TOE is an Integrated Circuit and its embedded software. The embedded software is composed of a Tachograph Java Card applet on top of a Java Card Operating system, a Perso applet for TOE personalization and ID-One Cosmo X Platform. The Perso applet will be deleted at the end of personalization.

The TOE can be delivered under different form factor like wafer, micro-module or smartcard.

The main objectives of this ST are:

- To describe the TOE as a smartcard product for the tachograph system
- To define the TOE's limit
- To describe the assumptions, threats and security objectives for the TOE
- To describe the security requirements for the TOE
- To define the TOE security functions

3.1.1 Logical scope

TachoDrive v4 Applet is based on Java Card Open Platform.

The tachograph applet fulfils the recommendations indicated in the guidance documentation of the Java Card Open Platform (see references in **[ST_PTF]**).

The logical scope of the TOE may be depicted as follows:

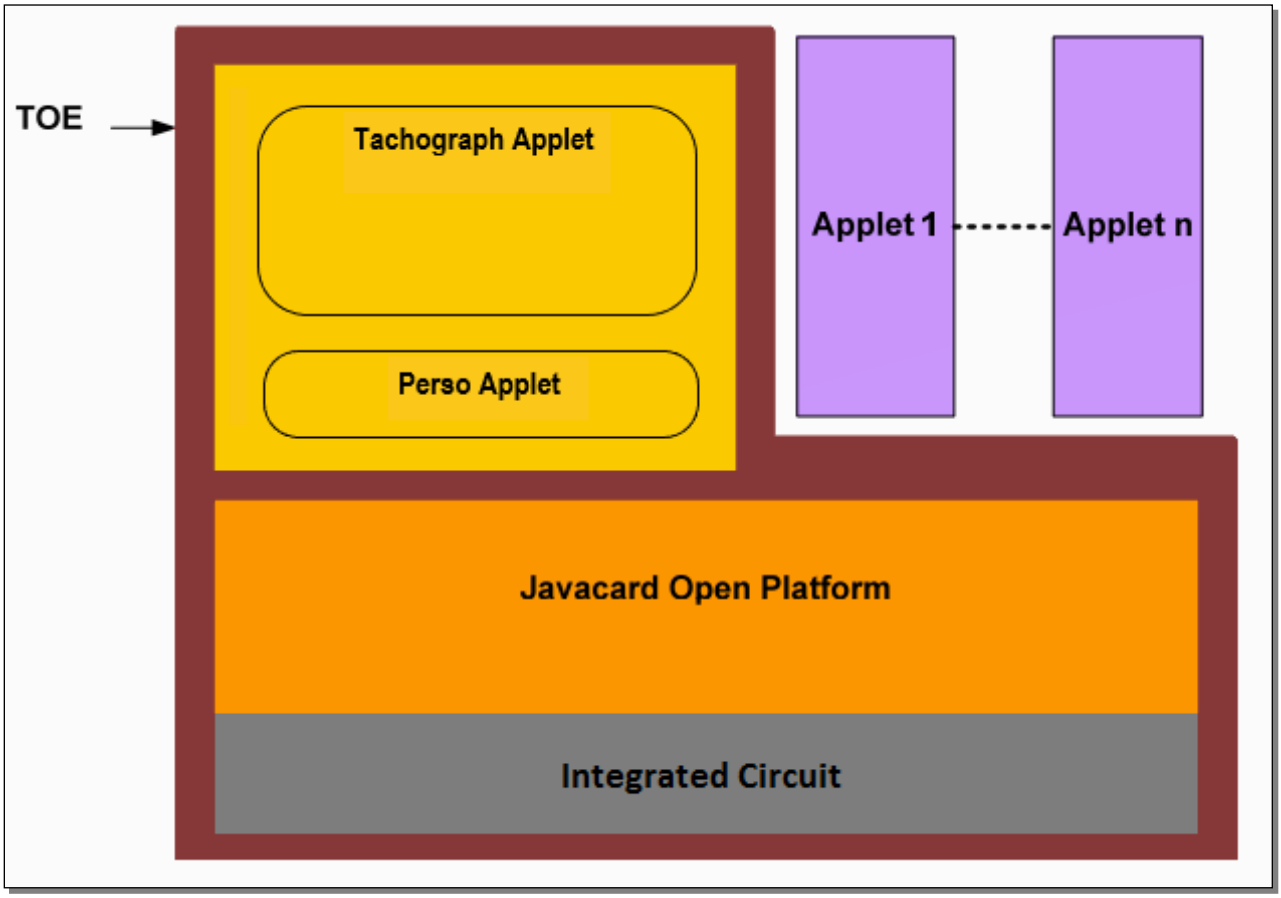

Figure 1: TachoDrive v4 Architecture

The product identification with Perso and Tachograph Applets, their AID are given in **[AGD_PRE]**.

Note : Depending on the needs, the platform can be "Closed", so as to avoid loading of applets in Use Phase.

3.1.2 Physical scope

- The IC (For form factor of the IC, refer to the **[ST_PTF]**)
- The Platform is ID-One Cosmo X
- The TachoDrive v4 Applet

The following guidance documents will be provided for the TOE:

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

All the above mentioned guidance documents will be delivered via mail in a .pgp encrypted format.

Form factor and Delivery Preparation:

1. As per the Software Development Process of IDEMIA, upon completion of development activities, particular applet will be uploaded into CPS in CAP file format. Before uploading, the applet will be verified through Oracle verifier and IDEMIA verifier.

2. During Release for Sample as project milestone, status of the applet in CPS will be changed into "Pilot version" to be used further for manufacturing samples.

3. During Software Delivery Review as the final R&D project milestone, status of the applet in CPS will be changed into "Industrial release" to be used further for mass production.

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

3.1.2.1 Physical overview

Once constructed, the TOE is a bare microchip with its external interfaces for communication. The physical medium on which the microchip is mounted is not part of the target of evaluation because it does not alter nor modify any security functions of the TOE.

3.1.3 Required non-TOE hardware/software/firmware

The TOE is the Tachograph Card (contact based smart card). It is an independent product and does not need any additional hardware/software/firmware to ensure its security.

In order to be powered up and to be able to communicate the TOE needs a card reader (integrated in the Vehicle Unit or connected to another device, e.g. a personal computer).

3.1.4 Usage and major security features of the TOE

The main security features of the TOE are as follows:

a) The TOE must preserve card identification data and user identification data stored during the card personalisation process;

b) The TOE must preserve user data stored in the card by Vehicle Units

c) The TOE must allow certain write operations onto the cards to only an authenticated VU.

Specifically the Tachograph Card aims to protect:

a) The data that is stored in such a way as to prevent unauthorised access to and manipulation of the data, and to detect any such attempts;

b) The integrity and authenticity of data exchanged between the recording equipment and the Tachograph Card.

The main security features stated above are provided by the following major security services:

a) User identification and authentication;

b) Access control to functions and stored data;

c) Alerting of events and faults;

d) Integrity of stored data;

e) Reliability of services;

f) Data exchange with a Vehicle Unit and export of data to other IT entities;

g) Cryptographic support for VU-card mutual authentication and secure messaging as well as for key generation and key agreement according to **[EU - 2016/799]** Annex 1C, Appendix 11.

Please Note: Wherever **[EU - 2016/799]** is referenced in this ST, it should be read in conjunction with the reference **[EU - 2021/1228].**

Depending on the use case and on the ability of the underlying Java Card open platform, this embedded software may be used

- in contact mode (T=0 and/or T=1 protocol)

4 Life Cycle

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

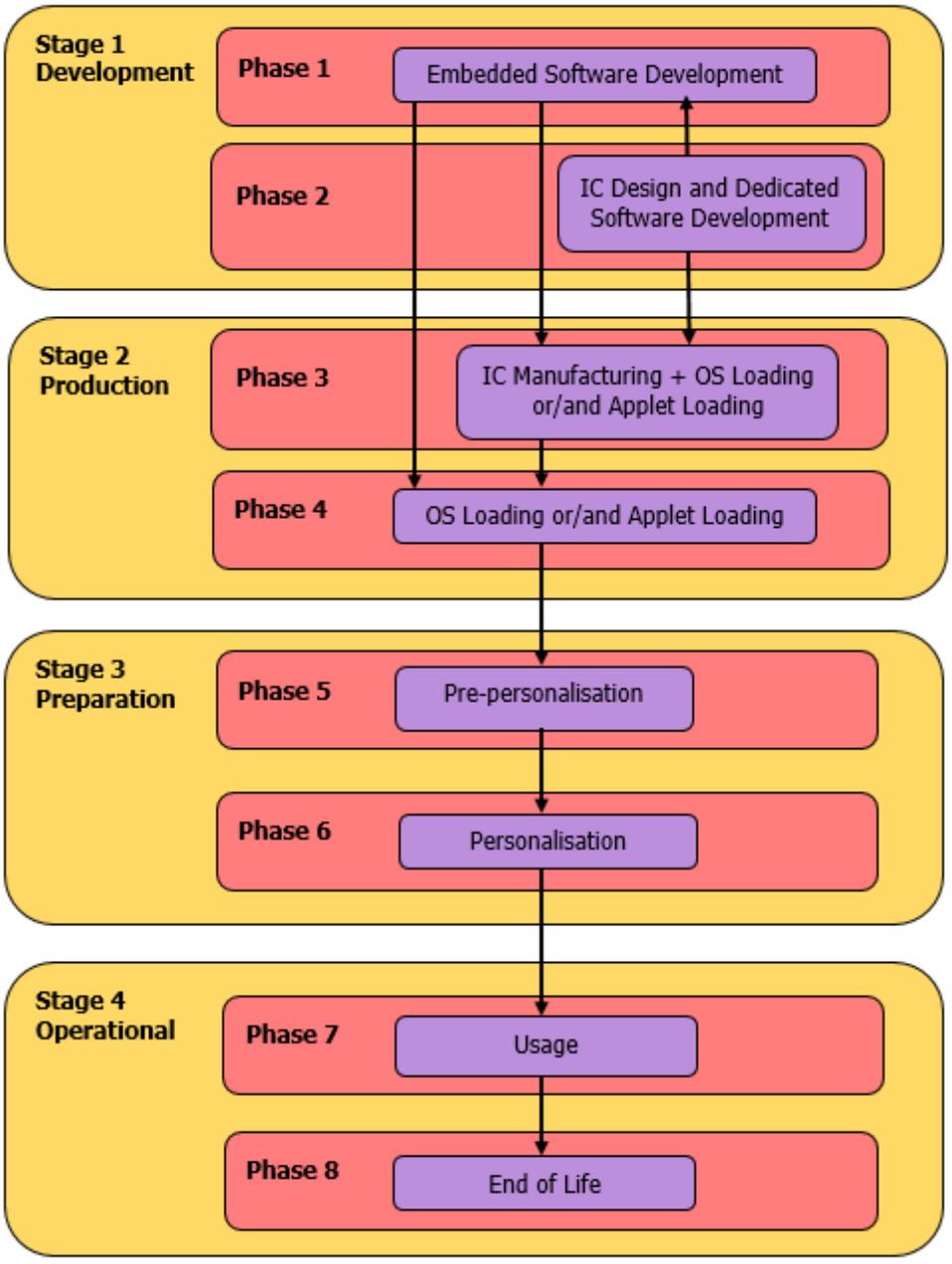

Figure 2 Life cycle Overview

4.1 Development Environment

In this environment, the following two phases take place:

- Phase 1: IC Embedded Software Development (Java Card Open Platform components and TachoDrive v4 Applet)
- Phase 2: IC Development

The IC Embedded Software Developer is in charge of the specification, development and validation of the software (Java Card Open Platform and TachoDrive v4 Applet).

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

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

Role	Actor	Site	Covered by
TachoDrive v4 Applet Developer	IDEMIA	COURBEVOIE and MANILA R&D sites	ALC
Embedded Software Developer (Java Card Open Platform)	IDEMIA	Platform Developer Refer to **[ST_PTF]**	ALC
IC Developer	INFINEON	IC Manufacturer Refer to **[ST_PTF]**	ALC

Table 1: Development R&D Sites

4.2 Production Environment

In this environment, the following two phases take place:

- Phase 3: IC Manufacturing
- Phase 4: ID-One Cosmo X Platform loading and TachoDrive v4 Applet loading

The TachoDrive v4 Applet run time code is integrated in the FLASH memory of the chip.

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

IDEMIA CC Audited Production Sites are listed below:

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

Table 2: Audited Production Sites

(Option 1) Image Loading audited IC Manufacturer site

FLASH image containing both the "ID-One Cosmo X" Java Card Platform OS along with the TachoDrive v4 Applet is securely delivered directly from the software developer (IDEMIA R&D Audited Site) to the **IC Manufacturer** (Infineon CC Audited Site) to be loaded into FLASH memory. The FLASH image is always encrypted.

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

- The TOE delivery point occurs in Phase 4, as soon as the loading of the image with ID-One Cosmo X Platform + TachoDrive v4 Applet by the IC Manufacturer has been completed.

Package	Actor for FLASH image loading	Site For FLASH image loading	Covered by CC
FLASH image containing ID-One Cosmo X Platform + TachoDrive v4 Applet	IC Manufacturer	IC Manufacturer CC Audited Production Plants specified in **[ST_PTF]**	ALC

Table 3 Option 1: Both Platform and Applet packages are loaded at IC Manufacturer Site

(Option 2) Image loading at IDEMIA and External sites

FLASH image containing both ID-One Cosmo X Platform along with TachoDrive v4 Applet is securely delivered directly from the software developer (IDEMIA R&D Audited Site) for loading to **CC Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

TOE Delivery point:

- If loading of ID-One Cosmo X Platform + TachoDrive v4 Applet is performed in Audited IDEMIA Production Sites, then TOE delivery is considered at the end of Phase 4.
- If loading of ID-One Cosmo X Platform + TachoDrive v4 Applet is performed in Non-Audited IDEMIA Production Sites or External Sites, then TOE delivery is considered after Phase 4.

Package	Actor for FLASH image loading	Site for FLASH image loading	Covered by CC
FLASH image containing the ID-One Cosmo X Platform + TachoDrive v4 Applet	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD

Table 4 Option 2: Both Platform and Applet packages are loaded at CC Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites

(Option 3) Platform loaded by IC Manufacturer, Applet loaded by IDEMIA or 3rd party

Only the ID-One Cosmo X Platform is delivered to the IC Manufacturer (Infineon Audited Sites) to be loaded.

With the ID-One Cosmo X Platform already loaded (i.e. present) on the chip, the following options (**3a or 3b (i) or 3b (ii) or 3c**) can be chosen for loading the TachoDrive v4 Applet.

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

The TachoDrive v4 Applet along with the TOE's guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

Loading of the TachoDrive v4 Applet on top of the already present ID-One Cosmo X Platform GP Java Card OS in any of these sites is accomplished by using a GP CLFDB decryption Key.

TOE Delivery points:

- If loading of the TachoDrive v4 Applet on top of already loaded ID-One Cosmo X Platform (as described below) is done in a CC Audited IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.
- If loading of the TachoDrive v4 Applet on top of already loaded ID-One Cosmo X Platform (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered after phase 4.

Package	Actor	Site	Covered by
Image containing only ID-One Cosmo X Platform	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF-CERT]	ALC
TachoDrive v4 Applet loaded through GP mechanism using CLFDB Key	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD

Table 5 Option 3(a): Platform package is loaded at IC Manufacturer Site and Applet package is loaded at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites through GP Mechanism

(Option 3b) Applet loading using the IDEMIA Resident Application

(i) TachoDrive v4 Applet along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

TachoDrive v4 Applet package is securely loaded via LSK on top of the present ID-One Cosmo X Platform Java Card OS in any of these sites. This loading is accomplished by using the IDEMIA "Resident Application" of the ID-One Cosmo X Platform.

(ii) The DUMP package (including TachoDrive v4 Applet) with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

Loading of DUMP PACKAGES in any of these sites is done through Resident Application using DSK secret production key on top of the platform already loaded by IC Manufacturer (Infineon).

TOE Delivery points:

- If loading of Applet package /DUMP Package on top of already loaded ID-One Cosmo X Platform (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.

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

Package	Actor	Site	Covered by
Image containing only ID-One Cosmo X Platform	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF-CERT]	ALC
3b (i) TachoDrive v4 Applet loaded through Resident Application using LSK format	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD
3b (ii) DUMP PACKAGE Ciphered format [DSK Secret Live Key]	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD

Table 6 Platform package is loaded at IC Manufacturer Site and Applet package is loaded through resident application using LSK format or DUMP Package in Ciphered format is loaded

(Option 3c) Applet loading in plain (unprotected) format using GP
TachoDrive v4 Applet along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **CC Audited IDEMIA Production Sites** (Refer Audited Production Sites Table).

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

TOE Delivery points:

- The loading of TachoDrive v4 Applet on top of already loaded ID-One Cosmo X Platform is done in plain (unprotected) format in Common Criteria Audited IDEMIA Production Sites. The TOE delivery is considered at the end of Phase 4.

Package	Actor	Site	Covered by
Image containing only ID-One Cosmo X Platform	IC Manufacturer	IC Manufacturer Production Plants Refer to [PTF-CERT]	ALC
TachoDrive v4 Applet in Plain Format	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC

Table 7 Option 3(c): Platform package is loaded at IC Manufacturer Site and Applet package in plain format is loaded at Audited IDEMIA Sites only

(Option 4) Platform and Applet loaded by IDEMIA or 3rd party
Only ID-One Cosmo X Platform is securely delivered directly from the software developer (IDEMIA R&D Audited Site) for loading to **CC Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

Note: Here, when the ID-One Cosmo X Platform package is loaded in Non-Audited IDEMIA Sites or External Sites, then the Platform is in self-protected mode by its secure functions

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

(Option 4a) Applet loading using GP CLFDB mechanism
TachoDrive v4 Applet along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

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

TOE Delivery points:

- If loading of the TachoDrive v4 Applet on top of already loaded ID-One Cosmo X Platform (as described below) is done in CC Audited IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.

- If loading of the TachoDrive v4 Applet onto the already loaded ID-One Cosmo X Platform (as described below) is done in Non-Audited IDEMIA Production Sites or External Sites then, TOE delivery is considered after Phase 4.

Package	Actor	Site	Covered by
Image containing only ID-One Cosmo X Platform	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD
TachoDrive v4 Applet loaded through GP mechanism using CLFDB Key	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD

Table 8 Option 4(a): Platform package is loaded at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites and Applet package is loaded at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites through GP Mechanism

(Option 4b) Applet loading using the IDEMIA Resident Application

(i) TachoDrive v4 Applet along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

Secure loading of TachoDrive v4 Applet is done via LSK on top of the present Cosmo X Java Card OS (already loaded by **Audited IDEMIA Production Sites** or **Non-Audited IDEMIA Sites** or **External Sites)** in any of these sites. This loading is accomplished by using the IDEMIA "Resident Application" of the ID-One Cosmo X Platform OS

(ii) DUMP package (including the TachoDrive v4 Applet) with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table) or **Non-Audited IDEMIA Sites** or **External Sites**.

Loading of DUMP PACKAGES in any of these sites is done through Resident Application using DSK secret production key on top of the platform already loaded by **Audited IDEMIA Production Sites** or **Non-Audited IDEMIA Sites** or **External Sites**.

TOE Delivery points:

- If loading of Applet package /DUMP Package on top of already loaded ID-One Cosmo X Platform (as described below) is done in Audited IDEMIA Production Sites then, TOE delivery is considered at the end of Phase 4.

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

Package	Actor	Site	Covered by
Image containing only ID-One Cosmo X Platform	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD
4b (i) TachoDrive v4 Applet package loaded through Resident Application using LSK format	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD
4b (ii) DUMP PACKAGE Ciphered format [DSK Secret Live Key]	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD

Table 9 Platform package is loaded at Audited IDEMIA Sites or Non-Audited IDEMIA Sites or External Sites and Options and Applet package is loaded through Resident application using LSK format or DUMP Package in Ciphered format is loaded

(Option 4c) Applet loading in plain (unprotected) format using GP
TachoDrive v4 Applet along with the guidance documentation is securely delivered directly from the Software Developer (IDEMIA R&D Audited Site) to **Audited IDEMIA Production Sites** (Refer Audited Production Sites Table).

Here, there is a provision of loading the applet in plain format in Audited IDEMIA Sites **only,** on top of the platform already loaded by Audited IDEMIA Production Sites or

Non-Audited IDEMIA Sites or External Sites. This applet loading in plain format is not allowed in Non-Audited IDEMIA Sites or External Sites.

TOE Delivery points:

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

Package	Actor	Site	Covered by
Image containing only ID-One Cosmo X Platform	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC
	External Authorized Agent	Non-Audited IDEMIA Sites or External Sites	AGD
TachoDrive v4 Applet in Plain Format	IDEMIA Authorized Entity	Refer Audited Production Sites Table	ALC

Table 10 Option 4(c): Platform package is loaded at IC Manufacturer Site and Applet package in plain format is loaded at CC Audited IDEMIA Sites only

4.3 Preparation Environment

In this environment, the following two phases take place:

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

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

The TachoDrive v4 Applet is pre-personalised and personalised according to **[AGD_PRE]**.

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

At the end of Personalisation, Perso Applet is deleted.

4.4 Operational Environment

Phase 7: Use Phase

TOE is self-protected and can be used as stated (personalized and used). Once personalized according to **[AGD_PRE]**, the TOE is constructed: the security requirements of the TOE are fulfilled and the assurance levels are met.
Note that applications can be loaded onto the ID-One Cosmo X platform during this phase.
During this phase, the TOE may be used as described in **[AGD_OPE]** of the TOE.

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

5 Conformance Claims

5.1 CC Conformance

This Security Target claims conformance to **[CC2], [CC3] and [CEM]**.

The conformance to the Common Criteria is claimed as follows:

CC	Conformance rationale
Part 2	Conformance to the extended part. ▪ FCS.RNG.1: "Random number generation" ▪ FPT_EMS.1: "TOE Emanation"
Part 3	Conformance to EAL 4, augmented with ▪ AVA_VAN.5: "Advanced methodical vulnerability analysis" ▪ ATE_DPT.2: "Testing: security enforcing modules" ▪ ALC_DVS.2: "Sufficiency of security measures"

5.2 Protection Profile Reference

5.2.1 Overview

This Security Target claims a **strict conformance** to Tachograph Protection Profiles:

1. **[PP-TACHOGRAPH_GEN1]** for Configuration 1
2. **[PP-TACHOGRAPH_GEN2]** for Configuration 2

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

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

5.2.2 Conformance Rationale

5.2.2.1 Assets

Assets	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
Identification data (IDD)	✓	✓	✓
Activity data (ACD)	✓	✓	✓
Application (APP)		✓	✓
Keys to protect data (KPD)		✓	✓
Signature verification data (SVD)	✓	✓	✓
Verification authentication data (VAD)	✓	✓	✓
Reference authentication data (RAD)	✓	✓	✓
Data to be signed (DTBS)	✓	✓	✓
TOE file system, including specific identification data	✓	✓	✓
Signature creation data (SCD)			✓ Covered by Keys to Protect Data (KPD)
Secret messaging keys (SMK)			✓ Covered by Keys to Protect Data (KPD)

5.2.2.2 Users/Subjects

Users/Subjects	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
Administrator	✓	✓	✓
Vehicle Unit	✓	✓	✓
Other Device	✓	✓	✓
Attacker	✓	✓	✓

5.2.2.3 Threats

Threats	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
T.Identification_Data	✓	✓	✓
T.Application		✓	✓
T.Activity_Data	✓	✓	✓
T.Data_Exchange	✓	✓	✓
T.Clone		✓	✓
T.Personalisation_Data	✓		✓ Covered by A.Personalisation_Phase and OE.Personalisation_Phase

5.2.2.4 Organisational Security Policies

Organizational Security Policies	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
P.Crypto		✓	✓
P.EU_Specifications	✓		✓ Covered by the TOE meeting the updated **[EU - 2016/799]**

5.2.2.5 Assumptions

Assumptions	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
A.Personalisation_Phase	✓	✓	✓

5.2.2.6 Security Objectives for the TOE

Security Objectives for the TOE	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
O.Card_Identification_Data	✓	✓	✓
O.Card_Activity_Storage	✓	✓	✓
O.Protect_Secret		✓	✓
O.Data_Access	✓	✓	✓
O.Secure_Communications	✓	✓	✓
O.Crypto_Implement		✓	✓
O.Software_Update		✓	✓

5.2.2.7 Security Objectives for the Operational Enviroment

Security Objectives for the Operational Environment	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
OE.Personalisation_Phase	✓	✓	✓
OE.Crypto_Admin		✓	✓
OE.EOL		✓	✓
OE.Tachograph_Components	✓		✓ Covered by OE.Crypto_Admin

5.2.2.8 Security Functional Requirements

Security Functional Requirements	[PP-TACHOGRAPH_GEN1]	[PP-TACHOGRAPH_GEN2]	ST
FAU_ARP.1		✓	✓
FAU_SAA.1	✓	✓	✓
FCO_NRO.1	✓	✓	✓
FDP_ACC.2	✓	✓	✓
FDP_ACF.1	✓	✓	✓
FDP_DAU.1	✓	✓	✓
FDP_ETC.1	✓	✓	✓
FDP_ETC.2	✓	✓	✓
FDP_ITC.1	✓	✓	✓
FDP_ITC.2		✓	✓
FDP_RIP.1	✓	✓	✓
FDP_SDI.2	✓	✓	✓
FIA_AFL.1(1:C)	✓	✓	✓
FIA_AFL.1(2:W)	✓	✓	✓
FIA_ATD.1	✓	✓	✓
FIA_UAU.3	✓	✓	✓
FIA_UAU.4	✓	✓	✓
FIA_UID.2		✓	✓
FIA_USB.1	✓	✓	✓
FPR_UNO.1	✓	✓	✓
FPT_EMS.1	✓	✓	✓
FPT_FLS.1	✓	✓	✓
FPT_PHP.3	✓	✓	✓
FPT_TST.1	✓	✓	✓
FCS_CKM.1(1)		✓	✓
FCS_CKM.2(1)		✓	✓
FCS_CKM.4(1)		✓	✓
FCS_COP.1(1:AES)		✓	✓

FCS_COP.1(2:SHA-2)		✓	✓
FCS_COP.1(3: ECC)		✓	✓
FCS_RNG.1		✓	✓
FIA_UAU.1(1)		✓	✓
FPT_TDC.1(1)		✓	✓
FTP_ITC.1(1)		✓	✓
FCS_CKM.1(2)	✓	✓	✓
FCS_CKM.2(2)	✓	✓	✓
FCS_CKM.4(2)	✓	✓	✓
FCS_COP.1(4:TDES)	✓	✓	✓
FCS_COP.1(5:RSA)	✓	✓	✓
FCS_COP.1(6:SHA-1)		✓	✓
FIA_UAU.1(2)	✓	✓	✓
FPT_TDC.1(2)	✓	✓	✓
FTP_ITC.1(2)	✓	✓	✓
FIA_UID.1	✓		✓ Covered by FIA_UID.2

6 Security Problem Definition

6.1 Assets

The assets to be protected by the TOE and its environment within phase 7 of the TOE's life-cycle are the application data defined below.

6.1.1 Primary Assets

D.IDENTIFICATION_DATA

Asset	Definition
Identification data (IDD)	Card identification data, user identification data

D.ACTIVITY_DATA

Asset	Definition
Activity data (ACD)	Activity data

6.1.2 Secondary Assets

D.APPLICATION

Asset	Definition
Application (APP)	Tachograph application.

D.KEYS_TO_PROTECT_DATA

Asset	Definition
Keys to protect data (KPD)	Enduring private keys and session keys used to protect security data and user data held within and transmitted by the TOE, and as a means of authentication.

D.SIGNATURE_VERIFICATION_DATA

Asset	Definition
Signature verification data (SVD)	Public keys certified by Certification Authorities, used to verify electronic signatures.

D.VERIFICATION_AUTHENTICATION_DATA

Asset	Definition
Verification authentication data (VAD)	Authentication data provided as input for authentication attempt as authorised user (i.e. entered PIN on workshop cards).

D.REFERENCE_AUTHENTICATION_DATA

Asset	Definition
Reference authentication data (RAD)	Data persistently stored by the TOE for verification of the authentication attempt as authorised user (i.e. reference PIN on workshop cards).

D.DATA_TO_BE_SIGNED

Asset	Definition
Data to be signed (DTBS)	The complete electronic data to be signed (including both user message and signature attributes).

D.TOE_FILE_SYSTEM

Asset	Definition
TOE file system, including specific identification data	File structure, access conditions, identification data concerning the IC and the Smartcard Embedded Software as well as the date and time of the personalisation

All primary assets represent User Data in the sense of the CC. The secondary assets also have to be protected by the TOE in order to achieve a sufficient protection of the primary assets. The secondary assets represent TSF and TSF-data in the sense of the CC. Security data and user data, stored by the Tachograph Card, need to be protected against unauthorised modification and disclosure. User data include card and human user identification data and activity data (see Glossary for more details), and match User Data in the sense of the CC. Security data are defined as specific data needed to support security enforcement, and match the TSF data in the sense of the CC.

6.2 Subjects and external entities

Following are the subjects, who can interact with the TOE.

S.ADMIN

Role	Definition
Administrator	Usually active only during Initialisation/Personalisation (Phase 6) – listed here for the sake of completeness.

S.VU

Role	Definition
Vehicle Unit	Vehicle Unit (authenticated), to which the Tachograph Card is connected (S.VU).

S.Non-VU

Role	Definition
Other Device	Other device (not authenticated) to which the Tachograph Card is connected (S.Non-VU).

S.ATTACKER

Role	Definition
Attacker	A human or a process located outside the TOE and trying to undermine the security policy defined by the current ST, especially to change properties of the maintained assets. For example, a driver could be an attacker if he misuses the driver card. An attacker is assumed to possess at most a high attack potential.

Application note 3: This table defines the subjects in the sense of **[CC1]** which can be recognised by the TOE independently of their nature (human or process). As result of an appropriate identification and authentication process, the TOE creates – for each of the respective external entities except the Attacker, who is listed for completeness – an 'image' inside and 'works' then with this TOE internal image (also called subject in **[CC1]**). From this point of view, the TOE itself does not distinguish between "subjects" and "external entities".

6.3 Threats

This section describes the threats to be averted by the TOE independently or in collaboration with its IT environment. These threats arise from the assets protected by the TOE and the method of TOE's use in the operational environment. The threats are defined as follows:

T.IDENTIFICATION_DATA

Label	**Threat**
T.IDENTIFICATION_DATA	Modification of Identification Data - A successful modification of identification data held by the TOE (IDD, see sec. 3.1, e.g. the type of card, or the card expiry date or the user identification data) would allow an attacker to misrepresent driver activity.

T.APPLICATION

Label	Threat
T.APPLICATION	Modification of Tachograph application - A successful modification or replacement of the Tachograph application stored in the TOE (APP, see sec. 3.1), would allow an attacker to misrepresent human user (especially driver) activity.

T.ACTIVITY_DATA

Label	Threat
T.ACTIVITY_DATA	Modification of Activity Data - A successful modification of activity data stored in the TOE (ACD, see sec. 3.1,) would allow an attacker to misrepresent human user (especially driver) activity.

T.DATA_EXCHANGE

Label	Threat
T.DATA_EXCHANGE	Modification of Activity Data during Data Transfer - A successful modification of activity data (ACD deletion, addition or modification, see sec. 3.1) during import or export would allow an attacker to misrepresent human user (especially driver) activity.

T.CLONE

Label	Threat
T.CLONE	Cloning of cards – An attacker could read or copy secret cryptographic keys from a Tachograph card and use it to create a duplicate card, allowing an attacker to misrepresent human user (especially driver) activity.

T.Personalisation_Data

DataDisclosure or Modification of Personalisation Data A successful modification of personalisation data (such as TOE file system, cryptographic keys, RAD) to be stored in the TOE or disclosure of cryptographic material during the personalisation would be a threat to the security of the TOE. The threat addresses the execution of the TOE's personalisation process and its security.

6.4 Organisational Security Policies

This section shows the organisational security policies that are to be enforced by the TOE, its operational environment, or a combination of the two. The organisational security policies are provided in the following table.

P.CRYPTO

Label	Organisational Security Policy
P.Crypto	The cryptographic algorithms and keys described in [EU – 2016/799] Annex 1C, Appendix 11 shall be used where data confidentiality, integrity, authenticity and/or non-repudiation need to be protected.

P.EU_SPECIFICATIONS

EU Specifications Conformance All Tachograph system components (Vehicle Unit, Motion Sensor and Tachograph Card) are specified by the EU documents [EU – 1360/2002] to Appendix 11 of Annex 1B. To ensure the interoperability between the components all Tachograph Card and Vehicle Unit requirements concerning handling, construction and functionality inclusive the specified cryptographic algorithms and key length have to be fulfilled.

6.5 Assumptions

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

A.PERSONALISATION_PHASE

Personalisation Phase Security - All data structures and data on the card produced during the Personalisation Phase, in particular during initialisation and/or personalisation are correct according to [EU – 2016/799] Annex 1C are handled correctly so as to preserve the integrity and confidentiality of these data. This includes in particular sufficient cryptographic quality of cryptographic keys for the end-usage (in accordance with the cryptographic algorithms specified for Tachograph Cards) and their confidential handling. The Personalisation Service Provider controls all materials, equipment and information, which is used for initialisation and/or personalisation of authentic smart cards, in order to prevent counterfeit of the TOE.

7 Security Objectives

7.1 Security Objectives for the TOE

This section identifies the security objectives for the TOE and for its operational environment. The security objectives are a concise and abstract statement of the intended solution to the problem defined by the security problem definition. The role of the security objectives is threefold:

- Provide a high-level, natural-language solution of the problem;
- Divide this solution into two part-wise solutions, that reflect that different entities each have to address a part of the problem;
- Demonstrate that these part-wise solutions form a complete solution to the problem.

7.1.1 Security Objectives

O.CARD_IDENTIFICATION_DATA

Label	Security objective for the TOE
O.Card_Identification_Data	Integrity of Identification Data - The TOE must preserve the integrity of card identification data and user identification data stored during the card personalisation process.

O.CARD_ACTIVITY_STORAGE

Label	Security objective for the TOE
O.Card_Activity_Storage	Integrity of Activity Data - The TOE must preserve the integrity of user data stored in the card by Vehicle Units.

O.PROTECT_SECRET

Label	Security objective for the TOE
O.Protect_Secret	Protection of secret keys – The TOE must preserve the confidentiality of its secret cryptographic keys, and must prevent them from being copied.

O.DATA_ACCESS

Label	Security objective for the TOE
O.Data_Access	User Data Write Access Limitation - The TOE must limit user data write access to authenticated Vehicle Units.

O.SECURE_COMMUNICATIONS

Label	Security objective for the TOE
O.Secure_Communications	Secure Communications - The TOE must support secure communication protocols and procedures between the card and the Vehicle Unit when required.

O.CRYPTO_IMPLEMENT

Label	Security objective for the TOE
O.Crypto_Implement	Cryptographic operation – The cryptographic functions must be implemented as required by [EU – 2016/799] Annex 1C, Appendix 11.

O.SOFTWARE_UPDATE

Label	Security objective for the TOE
O.Software_Update	Software updates - Where updates to TOE software are possible, the TOE must accept only those that are authorised.

7.2 Security Objectives for the Operational Environment

The security objectives for the operational environment address the protection that must be provided by the TOE environment, independent of the TOE itself, and are listed in the table below.

OE.PERSONALISATION_PHASE

Label	Security objective for the operational environment
OE.PERSONALISATION_PHASE	**Secure Handling of Data in Personalisation Phase** - All data structures and data on the card produced during the Personalisation Phase, in particular during initialisation and/or personalisation must be correct according to [EU – 2016/799] Annex 1C, and must be handled so as to preserve the integrity and confidentiality of the data. The Personalisation Service Provider must control all materials, equipment and information that are used for initialisation and/or personalisation of authentic smart cards, in order to prevent counterfeit of the TOE. The execution of the TOE's personalisation process must be appropriately secured with the goal of data integrity and confidentiality.

OE.CRYPTO_ADMIN

Label	Security objective for the operational environment
OE.CRYPTO_ADMIN	Implementation of Tachograph Components – All requirements from [EU – 2016/799] concerning handling and operation of the cryptographic algorithms and keys must be fulfilled.

OE.EOL

Label	Security objective for the operational environment
OE.EOL	End of life - When no longer in service the TOE must be disposed of in a secure manner, which means, as a minimum, that the confidentiality of symmetric and private cryptographic keys has to be safeguarded.

OE.TACHOGRAPH_COMPONENTS

Implementation of Tachograph Components All Tachograph system components (Vehicle Unit, Motion Sensor and Tachograph Card) are specified by the EU documents [EU – 1360/2002] to Appendix 11 of Annex 1B. To ensure the interoperability between the components all Vehicle Unit requirements concerning handling, construction and functionality inclusive the specified cryptographic algorithms and key length have to be fulfilled.

7.3 Security Objectives Rationale

7.3.1 Threats

T.IDENTIFICATION_DATA T.IDENTIFICATION_DATA is addressed by O.CARD_IDENTIFICATION_DATA, which requires that the TOE preserve the integrity of card identification and user identification data stored during the card personalisation process. O.CRYPTO_IMPLEMENT and OE.CRYPTO_ADMIN require the implementation and management of strong cryptography to support this.

T.APPLICATION T.APPLICATION is addressed by O.SOFTWARE_UPDATE, which requires any update of the Tachograph application to be authorised. This is supported by O.CRYPTO_IMPLEMENT and O.PROTECT_SECRET, which support the integrity checking of software, and the authorisation of any updates, and by OE.EOL, which requires the card to be disposed of in a secure manner when no longer in use.

T.ACTIVITY_DATA is addressed by O.CARD_ACTIVITY_STORAGE and O.DATA_ACCESS. The unalterable storage of Activity data as defined in the security objective O.CARD_ACTIVITY_STORAGE counters directly the threat T.ACTIVITY_DATA. In addition, the security objective O.DATA_ACCESS limits the user data write access to authenticated Vehicle Units so that the modification of activity data by regular card commands can be conducted only by authenticated card interface devices.

O.CRYPTO_IMPLEMENT and OE.CRYPTO_ADMIN require the implementation and management of strong cryptography to support this.

T.DATA_EXCHANGE T.DATA_EXCHANGE is addressed by O.SECURE_COMMUNICATIONS, which requires that the TOE use secure communication protocols for data exchange with card interface devices, as required by applications. O.CRYPTO_IMPLEMENT and OE.CRYPTO_ADMIN require the implementation and management of strong cryptography to support this. O.PROTECT_SECRET requires secret keys used in the exchange to remain confidential.

T.CLONE T.CLONE is addressed by O.PROTECT_SECRET. The TOE is required to prevent an attacker from extracting cryptographic keys for cloning purposes by preserving their confidentiality, and preventing them from being copied. This is supported by OE.EOL, which requires the card to be disposed of in a secure manner when no longer in use.

T.Personalisation_Data T.Personalisation_Data is addressed by the security objective of the operational environment OE.PERSONALISATION_PHASE which requires correct and secure handling of the personalisation data regarding integrity and confidentiality. It prevents the modification and disclosure of the personalisation data as well as the disclosure of cryptographic material during the execution of the personalisation process.

7.3.2 Organisational Security Policies

P.CRYPTO P.CRYPTO requires the use of specified cryptographic algorithms and keys, and this is addressed through the corresponding O.CRYPTO_IMPLEMENT objective.

P.EU_SPECIFICATIONS The OSP P.EU_SPECIFICATIONS is covered by all objectives of the TOE and the objective for the environment OE.TACHOGRAPH_COMPONENTS. The security objectives of the TOE O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.DATA_ACCESS and O.SECURE_COMMUNICATIONS require that the corresponding measures are implemented by the Tachograph Cards as specified by the EU documents. The objective for the environment OE.TACHOGRAPH_COMPONENTS requires this for the Vehicle Unit.

7.3.3 Assumptions

A.PERSONALISATION_PHASE A.PERSONALISATION_PHASE is supported through the corresponding environment objective OE.PERSONALISATION_PHASE, which requires that data is correctly managed during that phase to preserve its confidentiality and integrity. OE.CRYPTO_ADMIN requires correct management of cryptographic material.

7.3.4 SPD and Security Objectives

Threats	Security Objectives	Rationale
T.IDENTIFICATION_DATA	O.CARD_IDENTIFICATION_DATA, O.CRYPTO_IMPLEMENT, OE.CRYPTO_ADMIN	Section 7.3.1
T.APPLICATION	O.PROTECT_SECRET, O.CRYPTO_IMPLEMENT, O.SOFTWARE_UPDATE, OE.EOL	Section 7.3.1
T.ACTIVITY_DATA	O.CARD_ACTIVITY_STORAGE, O.DATA_ACCESS, O.CRYPTO_IMPLEMENT, OE.CRYPTO_ADMIN	Section 7.3.1
T.DATA_EXCHANGE	O.PROTECT_SECRET, O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT, OE.CRYPTO_ADMIN	Section 7.3.1
T.CLONE	O.PROTECT_SECRET, OE.EOL	Section 7.3.1
T.Personalisation_Data	OE.PERSONALISATION_PHASE	Section 7.3.1

Table 11 Threats and Security Objectives - Coverage

Security Objectives	Threats	Rationale
O.CARD_IDENTIFICATION_DATA	T.IDENTIFICATION_DATA	
O.CARD_ACTIVITY_STORAGE	T.ACTIVITY_DATA	
O.PROTECT_SECRET	T.APPLICATION, T.DATA_EXCHANGE, T.CLONE	
O.DATA_ACCESS	T.ACTIVITY_DATA	
O.SECURE_COMMUNICATIONS	T.DATA_EXCHANGE	

O.CRYPTO_IMPLEMENT	T.IDENTIFICATION_DATA, T.APPLICATION, T.ACTIVITY_DATA, T.DATA_EXCHANGE	
O.SOFTWARE_UPDATE	T.APPLICATION	
OE.PERSONALISATION_PHASE	T.Personalisation_Data	
OE.CRYPTO_ADMIN	T.IDENTIFICATION_DATA, T.ACTIVITY_DATA, T.DATA_EXCHANGE	
OE.EOL	T.APPLICATION, T.CLONE	
OE.TACHOGRAPH_COMPONENTS		

Table 12 Security Objectives and Threats - Coverage

Organisational Security Policies	Security Objectives	Rationale
P.CRYPTO	O.CRYPTO_IMPLEMENT	Section 7.3.2
P.EU_SPECIFICATIONS	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.DATA_ACCESS, OE.TACHOGRAPH_COMPONENTS, O.SECURE_COMMUNICATIONS	Section 7.3.2

Table 13 OSPs and Security Objectives - Coverage

Security Objectives	Organisational Security Policies	Rationale
O.CARD_IDENTIFICATION_DATA	P.EU_SPECIFICATIONS	
O.CARD_ACTIVITY_STORAGE	P.EU_SPECIFICATIONS	
O.PROTECT_SECRET		
O.DATA_ACCESS	P.EU_SPECIFICATIONS	
O.SECURE_COMMUNICATIONS	P.EU_SPECIFICATIONS	
O.CRYPTO_IMPLEMENT	P.CRYPTO	
O.SOFTWARE_UPDATE		
OE.PERSONALISATION_PHASE		
OE.CRYPTO_ADMIN		
OE.EOL		
OE.TACHOGRAPH_COMPONENTS	P.EU_SPECIFICATIONS	

Table 14 Security Objectives and OSPs - Coverage

Assumptions	Security Objectives for the Operational Environment	Rationale
A.PERSONALISATION_PHASE	OE.PERSONALISATION_PHASE, OE.CRYPTO_ADMIN	Section 7.3.3

Table 15 Assumptions and Security Objectives for the Operational Environment - Coverage

Security Objectives for the Operational Environment	Assumptions	Rationale
OE.PERSONALISATION_PHASE	A.PERSONALISATION_PHASE	
OE.CRYPTO_ADMIN	A.PERSONALISATION_PHASE	
OE.EOL		
OE.TACHOGRAPH_COMPONENTS		

Table 16 Security Objectives for the Operational Environment and Assumptions - Coverage

8 Extended Requirements

8.1 Extended Families

8.1.1 Extended Family FPT_EMS - TOE Emanation

8.1.1.1 Description

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

8.1.1.2 Extended Components

Extended Component FPT_EMS.1

Description

This family defines requirements to mitigate intelligible emanations.

FPT_EMS.1 TOE Emanation has two constituents:

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

Definition

FPT_EMS.1 TOE Emanation

FPT_EMS.1.1 The TOE shall not emit [assignment: types of emissions] in excess of [assignment: specified limits] enabling access to [assignment: list of types of TSF data] and [assignment: list of types of user data]

FPT_EMS.1.2 The TSF shall ensure [assignment: type of users] are unable to use the following interface [assignment: type of connection] to gain access to [assignment: list of types of TSF data] and [assignment: list of types of user data]

Dependencies: No dependencies.

8.1.2 Extended Family FCS_RNG - Random number generation

8.1.2.1 Description

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

8.1.2.2 Extended Components

Extended Component FCS_RNG.1

Description

A physical random number generator (RNG) produces the random number by a noise source based on physical random processes. A non-physical true RNG uses a noise source based on non-physical random processes like human interaction (key strokes, mouse movement). A deterministic RNG uses a random seed to produce a pseudorandom output. A hybrid RNG combines the principles of physical and deterministic RNGs.

Definition

FCS_RNG.1 Random number generation

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

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

Dependencies: No dependencies.

9 Security Requirements

9.1 Security Functional Requirements

Security Function Policy: AC_SFP The Security Function Policy Access Control (AC_SFP) for Tachograph Cards in the end-usage phase based on the [EU – 2016/799] Annex 1C Appendix 2 Chapter 3 and 4 is defined as follows: The AC_SFP is only relevant for the end-usage phase of the Tachograph Card, i.e. after the personalisation of the card has been completed. Access Rules: The AC_SFP controls the access of subjects to objects on the basis of security attributes. The Access Condition (AC) defines the conditions under which a command executed by a subject is allowed to access a certain object. The possible commands are described in the Tachograph Card specification [EU – 2016/799] Chapter 3.5. Following Access Conditions are defined in the Tachograph Card specification [EU – 2016/799] Chapter 3.3:

• ALW (Always)- The command can be executed without restrictions.

• NEV (Never)- The command can never be executed.

• PLAIN-C- The command APDU is sent in plain.

• PWD- The command may only be executed if the workshop card PIN has been successfully verified.

• EXT-AUT-G1- The command may only be executed if the External Authenticate command for the generation 1 authentication has been successfully performed.

• SM-MAC-G1- The APDU (command and response) must be applied with generation 1 secure messaging in authentication-only mode.

• SM-C-MAC-G1- The command APDU must be applied with generation 1 secure messaging in authentication only mode.

• SM-R-ENC-G1- The response APDU must be applied with generation 1 secure messaging in encryption mode.

• SM-R-ENC-MAC-G1- The response APDU must be applied with generation 1 secure messaging in encrypt-then-authenticate mode.

• SM-MAC-G2- The APDU (command and response) must be applied with generation 2 secure messaging in authentication-only mode.

• SM-C-MAC-G2- The command APDU must be applied with generation 2 secure messaging in authentication only mode.

• SM-R-ENC-MAC-G2- The response APDU must be applied with generation 2 secure messaging in encrypt-then-authenticate mode

For each type of Tachograph Card the Access Rules (which make use of the Access Conditions described above) for the different objects are implemented according to the requirements in the Tachograph Card Specification [EU – 2016/799] Chapter 4. These access rules cover in particular the rules for the export and import of data.

9.1.1 TOE Security Requirements

FAU_ARP.1 Security alarms

FAU_ARP.1.1 The TSF shall take **the following actions:**

a) For user authentication failures and activity data input integrity errors – respond to the VU through SW1 SW2 status words, as defined in [EU – 2016/799] Annex 1C, Appendix 2;

b) For self test errors and stored data integrity errors - respond to any VU command with an 0x64 00 status word indicating the error

upon detection of a potential security violation.

FAU_SAA.1 Potential violation analysis

FAU_SAA.1.1 [Editorially Refined] The TSF shall be able to detect failure events as user authentication failures, self test errors, stored data integrity errors and activity data input integrity errors, to apply a set of rules in monitoring the audited events and based upon these rules indicate a potential violation of the enforcement of the SFRs.

FAU_SAA.1.2 The TSF shall enforce the following rules for monitoring audited events:

a) Accumulation or combination of

- **user authentication failure,**
- **self test error,**
- **stored data integrity error,**
- **activity data input integrity error**

known to indicate a potential security violation;

b) **None**.

Application Note:

The events user authentication failure, self test error, stored data integrity error and activity data input integrity error may occur in combination or as single failure event. The vehicle unit is informed of such events through the SW1 SW2 status words in responses to vehicle unit requests. The vehicle unit then stores events indicated by the TOE.

FDP_ACC.2 Complete access control

FDP_ACC.2.1 The TSF shall enforce the **AC SFP** on

Subjects:

- **S.VU (a vehicle unit in the sense of [EU – 2016/799] Annex 1C)**
- **S.Non-VU (other card interface devices)**

Objects:

User data

- **User Identification data**
- **Activity data**

Security data

- **Cryptographic keys (see Table 16, Table 17, Table 19 and Table 20 of [PP-**

TACHOGRAPH_GEN2])

- **PIN (for Workshop card)**

TOE application code

TOE file system

Card identification data

Master file contents and all operations among subjects and objects covered by the SFP.

FDP_ACC.2.2 The TSF shall ensure that all operations between any subject controlled by the TSF and any object controlled by the TSF are covered by an access control SFP.

FDP_ACF.1 Security attribute based access control

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

Subjects:

- **S.VU (in the sense of [EU – 2016/799] Annex 1C)**
- **S.Non-VU (other card interface devices)**

Objects:

User data

- **User identification data**
- **Activity data**

Security data

- **Cryptographic keys (see Table 16, Table 17, Table 19 and Table 20 of [PP-TACHOGRAPH_GEN2])**
- **PIN (for Workshop card)**

TOE application code

TOE file system (Attribute: access conditions)

Card identification data

Master file contents.

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

GENERAL_READ

- **Driver card, workshop card: user data may be read from the TOE by any user**
- **Control card, company card: user data may be read from the TOE by any user, except user identification data stored in the 1 st generation tachograph application, which may be read by S.VU only**

IDENTIF_WRITE

- **All card types: card identification data and user identification data may only be written once and before the end of Personalisation**
- **No user may write or modify identification data during the end-usage phase of the card life-cycle**

ACTIVITY_WRITE

- **All card types: activity data may be written to the card by S.VU only**

SOFT_UPGRADE

- **All card types: TOEapplication code may only be upgraded following successful authentication**

FILE_STRUCTURE

- **All card types: files structure and access conditions shall be created before Personalisation is completed and then locked from any future modification or deletion by any user without successful authentication by the party responsible for card initialisation**.

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

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

SECRET KEYS

- **The TSF shall prevent access to secret cryptographic keys other than for use in the TSF's cryptographic operations, or in case of a workshop card only, for exporting the SensorInstallationSecData to a VU, as specified in [EU – 2016/799] Annex 1C, Appendix 2**.

FDP_DAU.1 Basic Data Authentication

FDP_DAU.1.1 The TSF shall provide a capability to generate evidence that can be used as a guarantee of the validity of **activity data**.

FDP_DAU.1.2 The TSF shall provide **S.VU and S.Non-VU** with the ability to verify evidence of the validity of the indicated information.

FDP_ETC.1 Export of user data without security attributes

FDP_ETC.1.1 The TSF shall enforce the **AC SFP** when exporting user data, controlled under the SFP(s), outside of the TOE.

FDP_ETC.1.2 The TSF shall export the user data without the user data's associated security attributes

FDP_ETC.2 Export of user data with security attributes

FDP_ETC.2.1 The TSF shall enforce the **AC SFP** when exporting user data, controlled under the SFP(s), outside of the TOE.

FDP_ETC.2.2 The TSF shall export the user data with the user data's associated security attributes.

FDP_ETC.2.3 The TSF shall ensure that the security attributes, when exported outside the TOE, are unambiguously associated with the exported user data.

FDP_ETC.2.4 The TSF shall enforce the following rules when user data is exported from the TOE: **none**.

FDP_ITC.1 Import of user data without security attributes

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

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

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

FDP_ITC.2 Import of user data with security attributes

FDP_ITC.2.1 The TSF shall enforce the **Input Sources SFP** when importing user data, controlled under the SFP, from outside of the TOE.

FDP_ITC.2.2 The TSF shall use the security attributes associated with the imported user data.

FDP_ITC.2.3 The TSF shall ensure that the protocol used provides for the unambiguous association between the security attributes and the user data received.

FDP_ITC.2.4 The TSF shall ensure that interpretation of the security attributes of the imported user data is as intended by the source of the user data.

FDP_ITC.2.5 The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE:

- **unauthenticated inputs from external sources shall not be accepted as executable code;**
- **if application software updates are permitted they shall be verified using cryptographic security attributes before being implemented**.

Application Note:

Software updates are not possible after card is issued to the customer. Updates are only possible before Operational Phase and that too with the help of Platform Security functions.

FDP_RIP.1 Subset residual information protection

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

FDP_SDI.2 Stored data integrity monitoring and action

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

FDP_SDI.2.2 Upon detection of a data integrity error, the TSF shall **warn the entity connected.**

The following data persistently stored by TOE have the user data attribute "IntegrityControlledData":

- **PINs (i.e. objects instance of class OwnerPin orsubclass of interface PIN)**
- **keys (i.e. objects instance of classes implemented the interface Key)**
- **Activity Data and Identification User Data**

If the maximum is reached (15) the Kill card is launched.

FIA_AFL.1(1:C) Authentication failure handling

FIA_AFL.1.1(1:C) The TSF shall detect when **1** unsuccessful authentication attempts occur related to **authentication of a card interface device**.

FIA_AFL.1.2(1:C) [Editorially Refined] When the defined number of unsuccessful authentication attempts has been **met**, the TSF shall **a)warn the entity connected, b)assume the user to be S.Non-VU**.

FIA_AFL.1(2:WC) Authentication failure handling

FIA_AFL.1.1(2:WC) The TSF shall detect when **5** unsuccessful authentication attempts occur related to **PIN verification of Workshop Card**.

FIA_AFL.1.2(2:WC) [Editorially Refined] When the defined number of unsuccessful authentication attempts has been **met**, the TSF shall

a) warn the entity connected,

b) block the PIN check procedure such that any subsequent PIN check attempt will fail,

c) be able to indicate to subsequent users the reason for the blocking.

FIA_ATD.1 User attribute definition

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

a) User_group (Vehicle_Unit, Non_Vehicle_Unit);

b) User_ID (VRN and registering member state for subject S.VU).

FIA_UAU.3 Unforgeable authentication

FIA_UAU.3.1 The TSF shall **prevent** use of authentication data that has been forged by any user of the TSF.

FIA_UAU.3.2 The TSF shall **prevent** use of authentication data that has been copied from any other user of the TSF.

FIA_UAU.4 Single-use authentication mechanisms

FIA_UAU.4.1 The TSF shall prevent reuse of authentication data related to **key based authentication mechanisms as defined in [EU – 2016/799] Appendix 11, Chapters 4 and 10**.

FIA_UID.2 User identification before any action

FIA_UID.2.1 The TSF shall require each user to be successfully identified before allowing any other TSF-mediated actions on behalf of that user.

Application Note:

The identification of the user is initiated following insertion of the card into a card reader and power-up of the card.

FIA_USB.1 User-subject binding

FIA_USB.1.1 The TSF shall associate the following user security attributes with subjects acting on the behalf of that user:

a) User_group (Vehicle_Unit for S.VU, Non_Vehicle_Unit for S.Non-VU);

b) User_ID (VRN and registering member state for subject S.VU).

FIA_USB.1.2 The TSF shall enforce the following rules on the initial association of user security attributes with subjects acting on the behalf of users:

GENERAL_READ

- **Driver card, workshop card: user data may be read from the TOE by any user**
- **Control card, company card: user data may be read from the TOE by any user, except user identification data stored in the 1st generation tachograph application, which may be read by S.VU only**.

FIA_USB.1.3 The TSF shall enforce the following rules governing changes to the user security attributes associated with subjects acting on the behalf of users:

IDENTIF_WRITE

- **All card types: card identification data and user identification data may only be written once and before the end of Personalisation**
- **No user may write or modify identification data during the end-usage phase of the card life-cycle**

ACTIVITY_WRITE

- **All card types: activity data may be written to the card by S.VU only**.

FPR_UNO.1 Unobservability

FPR_UNO.1.1 The TSF shall ensure that **attackers** are unable to observe the operation **any operation involving authentication and/or cryptographic operations** on **security and activity data** by **any user**.

FPT_FLS.1 Failure with preservation of secure state

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

a) Reset;

b) Power supply cut-off;

c) Deviation from the specified values of the power supply;

d) Unexpected abortion of TSF execution due to external or internal events

(especially interruption of a transaction before completion).

FPT_PHP.3 Resistance to physical attack

FPT_PHP.3.1 The TSF shall resist **physical manipulation and physical probing** to the **TOE components implementing the TSF** by responding automatically such that the SFRs are always enforced.

Application Note:

The physical manipulation and physical probing include: changing operational conditions every times: the frequency of the external clock, power supply, and temperature.

FPT_TST.1 TSF testing

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

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

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

FPT_EMS.1 TOE Emanation

FPT_EMS.1.1 The TOE shall not emit **Side channel emission** in excess of **limits specified by the state-of-the-art attacks on smart card IC** enabling access to **private keys or session keys** and **RAD**

FPT_EMS.1.2 The TSF shall ensure **any users** are unable to use the following interface **smart card circuit contacts** to gain access to **private keys or session keys** and **RAD**

FCS_RNG.1 Random number generation

FCS_RNG.1.1 The TSF shall provide a **deterministic** random number generator that implements **CTR_DRBG as defined in [RNG-NIST]**.

FCS_RNG.1.2 The TSF shall provide random numbers that meet **The average Shannon entropy per internal random bit exceeds 0.994**.

9.1.2 Security functional requirements for external communications (2nd Generation)

The security functional requirements in this section are required to support communications specifically with 2nd generation vehicle units.

FCS_CKM.1(1) Cryptographic key generation

FCS_CKM.1.1(1) The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **cryptographic key derivation algorithms specified in [EU – 2016/799] Annex 1C, Appendix 11, Section 10 (for VU**

authentication and for the secure messaging session key) and specified cryptographic key sizes **key sizes required by [EU – 2016/799] Annex 1C, Appendix 11, Part B** that meet the following: **AES keys and Elliptic curves keys as specified in [EU – 2016/799] Annex 1C, Appendix 11, Section 10**.

FCS_CKM.2(1) Cryptographic key distribution

FCS_CKM.2.1(1) The TSF shall distribute cryptographic keys in accordance with a specified cryptographic key distribution method **secure messaging AES session key agreement as specified in [EU – 2016/799] Annex 1C, Appendix 11, Part B** that meets the following: **[EU – 2016/799] Annex 1C, Appendix 11, Part B**.

Application Note:

FCS_CKM.1(1) and FCS_CKM.2(1) relate to session key agreement with the vehicle unit.

FCO_NRO.1 Selective proof of origin

FCO_NRO.1.1 [Editorially Refined] The TSF shall be able to generate evidence of origin for transmitted **data to be downloaded to external media** at the request of the **recipient** in accordance with [EU – 2016/799] Annex 1C, Appendix 11, sections 6.1 and 14.2.

FCO_NRO.1.2 The TSF shall be able to relate the **user identity by means of digital signature** of the originator of the information, and the **hash value over the data to be downloaded to external media** of the information to which the evidence applies.

FCO_NRO.1.3 The TSF shall provide a capability to verify the evidence of origin of information to **recipient** given **that the digital certificate used in the digital signature for the downloaded data has not expired (see [EU – 2016/799] Appendix 11, sections 6.2 and 14.3]**.

Application Note:

Note that FCO_NRO.1 applies only to driver cards and workshop cards, as those are the only cards capable of creating a signature over downloaded data. See [EU – 2016/799] Appendix 11, sections 6 and 14.

FCS_CKM.4(1) Cryptographic key destruction

FCS_CKM.4.1(1) [Editorially Refined] The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method **Key.clearKey() method** that meets the following

- **Requirements in Table 20 of [PP-TACHOGRAPH_GEN2];**
- **Temporary private and secret cryptographic keys shall be destroyed in a manner that removes all traces of the keying material so that it cannot be recovered by either physical or electronic means**
- **Java Card API" specification [JCAPI]**.

FCS_COP.1(1:AES) Cryptographic operation

FCS_COP.1.1(1:AES) The TSF shall perform **the following:**

a) ensuring authenticity and integrity of data exchanged between a vehicle unit and a tachograph card;

b) where applicable, ensuring confidentiality of data exchanged between a vehicle unit and a tachograph card;

c) decrypting confidential data sent by a vehicle unit to a remote early detection communication reader over a DSRC connection, and verifying the authenticity of that data; in accordance with a specified cryptographic algorithm **AES** and cryptographic key sizes **128, 192, 256 bits** that meet the following: **FIPS PUB 197: Advanced Encryption Standard, [EU – 2016/799] Annex 1C, Appendix 11**.

FCS_COP.1(2:SHA-2) Cryptographic operation

FCS_COP.1.1(2:SHA-2) The TSF shall perform **cryptographic hashing** in accordance with a specified cryptographic algorithm **SHA-256, SHA-384, SHA-512** and cryptographic key sizes **not applicable** that meet the following: **Federal Information Processing Standards Publication FIPS PUB 180-4: Secure Hash Standard (SHS), [EU – 2016/799] Annex 1C, Appendix 11**.

FCS_COP.1(3:ECC) Cryptographic operation

FCS_COP.1.1(3:ECC) The TSF shall perform **the following cryptographic operations:**

a) digital signature generation;

b) digital signature verification;

c) cryptographic key agreement;

d) mutual authentication between a vehicle unit and a tachograph card;

e) ensuring authenticity, integrity and non-repudation of data downloaded from a tachograph card in accordance with a specified cryptographic algorithm **[EU – 2016/799] Annex 1C, Appendix 11, Part B, ECDSA, ECKA-EG** and cryptographic key sizes **in accordance with [EU – 2016/799], Appendix 11, Part B** that meet the following: **[EU – 2016/799] Annex 1C, Appendix 11, Part B; FIPS PUB 186-4: Digital Signature Standard; BSI Technical Guideline TR-03111 – Elliptic Curve Cryptography – version 2, and the standardized domain parameters in the table below.**

Name	Size (bits)	Object Identifier
NIST P-256	256	secp256r1
BrainpoolP256r1	256	brainpoolP256r1
NIST P-384	384	secp384r1
BrainpoolP384r1	384	brainpoolP384r1
BrainpoolP512r1	512	brainpoolP512r1
NIST P-521	521	secp521r1

Table for Standardised domain parameters.

Application Note:

Where a symmetric algorithm, an asymmetric algorithm and/or a hashing algorithm are used together to form a security protocol, their respective key lengths and hash sizes shall be of (roughly) equal strength. Table for Cipher Suites below shows the allowed cipher suites. ECC keys sizes of 512 bits and 521 bits are considered to be equal in strength.

Cipher suit ID	ECC key size (bits)	AES key length (bits)	Hashing algorithm	MAC length (bytes)
CS#1	256	128	SHA-256	8
CS#2	384	192	SHA-384	12
CS#3	512/521	256	SHA-512	16

Table for Cipher Suites

FIA_UAU.1(1) Timing of authentication

FIA_UAU.1.1(1) The TSF shall allow **a) Driver card, workshop card – export of user data with security attributes (card data download function) and export of user data without security attributes as allowed by the applicable access rules in [EU – 2016/799] Annex 1C, Appendix 2;**

b) Control card, company card – export of user data without security attributes as allowed by the applicable access rules in [EU – 2016/799] Annex 1C, Appendix 2 on behalf of the user to be performed before the user is authenticated.

FIA_UAU.1.2(1) [Editorially Refined] The TSF shall require each user to be successfully authenticated using the method described in [EU – 2016/799] Annex 1C, Appendix 11, Chapter 10 before allowing any other TSF-mediated actions on behalf of that user.

Application Note:

FIA_UAU.1.1(1) a) allows non secured readers to get signed downloaded data from driver and workshop cards, without any previous authentication. This can be used by company download tools, which are considered as "other devices" in the sense of protection Profile of Digital Tachograph – Tachograph Card, Version 1.0, 9 May 2017. Such download tools, and also vehicle units, are also allowed to read driver and workshop card data in a non secured mode (without any previous authentication). This is allowed by [[EU – 2016/799] Annex 1C, Appendix 2 access rules (see section 4, access rules = 'ALW'). Similarly, FIA_UAU.1.1(1) b) allows "other devices" (without having performed any authentication) to access data from control and company cards, following [EU – 2016/799] Annex 1C, Appendix 2, Section 4 access rules.

FPT_TDC.1(1) Inter-TSF basic TSF data consistency

FPT_TDC.1.1(1) [Editorially Refined] The TSF shall provide the capability to consistently interpret **secure messaging attributes as defined by [EU – 2016/799] Annex 1C, Appendix 11]** when shared between the TSF and a **vehicle unit**.

FPT_TDC.1.2(1) [Editorially Refined] The TSF shall use **the interpretation rules (communication protocols) as defined by [EU – 2016/799] Annex 1C, Appendix 11]** when interpreting the TSF data from a **vehicle unit.**

FTP_ITC.1(1) Inter-TSF trusted channel

FTP_ITC.1.1(1) [Editorially Refined] The TSF shall provide a communication channel between itself and the **vehicle unit** 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(1) The TSF shall permit **another trusted IT product** to initiate communication via the trusted channel.

FTP_ITC.1.3(1) [Editorially Refined] The TSF shall **use** the trusted channel for **all commands and responses exchanged with a vehicle unit after successful chip authentication and until the end of the session].**

Application Note:

The requirements for establishing the trusted channel are given in [EU – 2016/799] Appendix 11, Chapter 10 (for 2nd generation vehicle units).

9.1.3 Security functional requirements for external communications (1st generation)

FCS_CKM.1(2) Cryptographic key generation

FCS_CKM.1.1(2) The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **cryptographic key derivation algorithms specified in [EU – 2016/799] Annex 1C, Appendix 11, Section 4 (for the secure messaging session key)** and specified cryptographic key sizes **112 bits** that meet the following: **two-key TDES as specified in [EU – 2016/799] Annex 1C, Appendix 11 Part A, Chapter 3**.

FCS_CKM.2(2) Cryptographic key distribution

FCS_CKM.2.1(2) The TSF shall distribute cryptographic keys in accordance with a specified cryptographic key distribution method **for triple DES session keys as specified in [EU – 2016/799] Annex 1C, Appendix 11 Part A** that meets the following: **[EU – 2016/799] Annex 1C, Appendix 11 Part A, Chapter 3**.

FCS_CKM.4(2) Cryptographic key destruction

FCS_CKM.4.1(2) [Editorially Refined] The TSF shall destroy cryptographic keys in accordance with a specified cryptographic key destruction method **Key.clearKey() method** that meets the following

- **Requirements in Table 16 and Table 17 of [PP-TACHOGRAPH_GEN2];**
- **Temporary private and secret cryptographic keys shall be destroyed in a manner that removes all traces of the keying material so that it cannot be recovered by either physical or electronic means**
- **Java Card API" specification [JCAPI]**.

FCS_COP.1(4:TDES) Cryptographic operation

FCS_COP.1.1(4:TDES) The TSF shall perform **the cryptographic operations (encryption, decryption, Retail-MAC)** in accordance with a specified cryptographic algorithm **Triple DES** and cryptographic key sizes **112 bits** that meet the following: **[EU – 2016/799] Annex 1C, Appendix 11 Part A, Chapter 3**.

FCS_COP.1(5:RSA) Cryptographic operation

FCS_COP.1.1(5:RSA) The TSF shall perform **the cryptographic operations (encryption, decryption, signing, verification)** in accordance with a specified cryptographic algorithm **RSA** and cryptographic key sizes **1024 bits** that meet the following: **[EU – 2016/799] Annex 1C, Appendix 11 Part A, Chapter 3**.

FCS_COP.1(6:SHA-1) Cryptographic operation

FCS_COP.1.1(6:SHA-1) The TSF shall perform **cryptographic hashing** in accordance with a specified cryptographic algorithm **SHA-1** and cryptographic key sizes **not applicable** that meet the following: **Federal Information Processing Standards Publication FIPS PUB 180-4: Secure Hash Standard (SHS)**.

FIA_UAU.1(2) Timing of authentication

FIA_UAU.1.1(2) The TSF shall allow **a) Driver card, workshop card – export of user data with security attributes (digital signature used in card data download function, see [EU – 2016/799] Annex 1C, Appendix 11, Chapters 6 and 14)) and export of user data without security attributes as allowed by the applicable access rules in [EU – 2016/799] Annex 1C, Appendix 2;**

b) Control card, company card – export of user data without security attributes as allowed by the applicable access rules in [EU – 2016/799] Annex 1C, Appendix 2 on behalf of the user to be performed before the user is authenticated.

FIA_UAU.1.2(2) [Editorially Refined] The TSF shall require each user to be successfully authenticated using the method described in [EU – 2016/799] Annex 1C, Appendix 11, Chapter 5 before allowing any other TSF-mediated actions on behalf of that user.

FPT_TDC.1(2) Inter-TSF basic TSF data consistency

FPT_TDC.1.1(2) [Editorially Refined] The TSF shall provide the capability to consistently interpret **secure messaging attributes as defined by [EU – 2016/799] Annex 1C, Appendix 11 Chapter 5** when shared between the TSF and a **vehicle unit.**

FPT_TDC.1.2(2) [Editorially Refined] The TSF shall use **the interpretation rules (communication protocols) as defined by [EU – 2016/799] Annex 1C, Appendix 11 Part A, Chapter 5** when interpreting the TSF data from **vehicle unit.**

FTP_ITC.1(2) Inter-TSF trusted channel

FTP_ITC.1.1(2) [Editorially Refined] The TSF shall provide a communication channel between itself and **the vehicle unit** 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(2) The TSF shall permit **another trusted IT product** to initiate communication via the trusted channel.

FTP_ITC.1.3(2) [Editorially Refined] The TSF shall use the trusted channel for **data import from and export to a vehicle unit in accordance with [EU – 1360/2002] Appendix 2.**

Application Note:

The requirements for establishing the trusted channel are given in [EU – 2016/799] Appendix 11, Chapter 5 (for 1st generation vehicle units).

9.2 Security Assurance Requirements

The Evaluation Assurance Level is EAL4 augmented with AVA_VAN.5, ATE_DPT.2 and ALC_DVS.2.

9.3 Security Requirements Rationale

9.3.1 Objectives

9.3.1.1 Security Objectives for the TOE

Security Objectives

O.CARD_IDENTIFICATION_DATA In the case of a detected integrity error the TOE will indicate the corresponding violation by FAU_ARP.1 and FAU_SAA.1.

Access to TSF data, especially to the identification data, is regulated by the security function policy defined in the components FDP_ACC.2 and FDP_ACF.1, which explicitly denies write access to personalised identification data.

Integrity of the stored data within the TOE, specifically the integrity of the identification data, is required by FDP_SDI.2 component.

FPT_EMS.1 requires the TOE to limit emanations, thereby protecting the confidentiality of identification data.

FPT_FLS.1 requires that any failure state should not expose identification data, or compromise its integrity.

FPT_PHP.3 requires the TOE to resist attempts to access identification data through manipulation or physical probing.

FPT_TST.1 requires tests to be carried out to assure that the integrity of the identification data has not been compromised.

O.CARD_ACTIVITY_STORAGE In the case of a detected integrity error the TOE will indicate the corresponding violation by FAU_ARP.1 and FAU_SAA.1.

Access to card activity data is regulated by the security function policy defined in FDP_ACC.2 and FDP_ACF.1 COMPONENETS, which explicitly restricts write access of user data to authorised vehicle units.

Integrity of the stored data within the TOE, specifically the integrity of the card activity data, is required by FDP_SDI.2 component.

FPT_EMS.1 requires the TOE to limit emanations, thereby protecting the confidentiality of card activity data.

FPT_FLS.1 requires that any failure state should not expose card activity data, or compromise its integrity.

FPT_PHP.3 requires the TOE to resist attempts to access identification data through manipulation or physical probing.

FPT_TST.1 Requires tests to be carried out to assure that the integrity of card activity data has not been compromised.

O.PROTECT_SECRET FDP_ACC.2 and FDP_ACF.1 requires that the TOE prevent access to secret keys other than for the TOE's cryptographic operations.

FDP_RIP.1 requires the secure management of storage resources within the TOE to prevent data leakage.

FPR_UNO.1 requirement safeguards the unobservability of secret keys used in cryptographic operations.

FPT_EMS.1 requires the TOE to limit emanations, thereby protecting the confidentiality of the keys.

FPT_PHP.3 requires the TOE to resist attempts to gain access to the keys through manipulation or physical probing.

O.DATA_ACCESS Access to user data is regulated by the security function policy defined in FDP_ACC.2 FDP_ACF.1 components, which explicitly restricts write access of user data to authorised vehicle units.

FIA_AFL.1(1:C), FIA_AFL.1(2:WC) and FIA_UID.2 components require that if authentication fails the TOE reacts with a warning to the connected entity, and the user is assumed not to be an authorised vehicle unit.

FIA_ATD.1 and FIA_USB.1 definition of user security attributes supplies a distinction between vehicle units and other card interface devices.

FIA_UAU.1(1) and FIA_UAU.1(2) requirements ensure that write access to user data is not possible without a preceding successful authentication process.

FIA_UAU.3 prevents the use of forged credentials during the authentication process.

FPT_EMS.1 requires the TOE to limit emanations, thereby protecting the authentication process.

FPT_FLS.1 requires that any failure state should not allow unauthorised write access to the card.

FPT_PHP.3 requires the TOE to resist attempts to interfere with authentication through manipulation or physical probing.

FPT_TST.1 requires that tests be carried out to assure that the integrity of the TSF and identification data has not been compromised.

O.SECURE_COMMUNICATIONS During data exchange and upon detection of an integrity error of the imported data FAU_ARP.1 and FAU_SAA.1 will indicate the corresponding violation and will provide a warning to the entity sending the data.

The necessity for the use of a secure communication protocol as well as the access to the relevant card´s keys are defined within FDP_ACC.2 and FDP_ACF.1.

FDP_ETC.1, FDP_ITC.1 and FTP_ITC.1(1) and FTP_ITC.1(2) requirements provide for a secure data exchange (i.e. the data import and export) between the TOE and the card interface device by using a trusted channel. This includes assured identification of its end

points and protection of the data transfer from modification and disclosure. By this means, both parties are capable of verifying the integrity and authenticity of received data. The trusted channel assumes a successful preceding mutual key based authentication process between the TOE and the card interface device.

Within the TOE's end-usage phase, the TOE offers a data download functionality with specific properties. The TOE provides the capability to generate an evidence of origin for the data downloaded to the external media, to verify this evidence of origin by the recipient of the data downloaded, and to download the data to external media in such a manner that the data integrity can be verified through FCO_NRO.1, FDP_DAU.1 and FDP_ETC.2.

FDP_RIP.1 requires the secure management of storage resources within the TOE to prevent data leakage.

FIA_UAU.3 and FIA_UAU.4 requirements support the security of the trusted channel, as the TOE prevents the use of forged authentication data, and as the TOE's input for the authentication tokens and for the session keys within the preceding authentication process is used only once.

FPR_UNO.1 requirement safeguards the unobservability of the establishing process of the trusted channel, and the unobservability of the data exchange itself, both of which contribute to a secure data transfer.

FCS_CKM.1(1), FCS_CKM.1(2), FCS_CKM.2(1), FCS_CKM.2(2), FCS_CKM.4(1), FCS_CKM.4(2), FCS_COP.1(1:AES), FCS_COP.1(2:SHA-2), FCS_COP.1(3:ECC), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA), FCS_COP.1(6:SHA-1) and FCS_RNG.1. The trusted channel assumes a successful preceding mutual key based authentication process between the TOE and the card interface device with agreement of session keys.

FCS_COP.1(1:AES), FCS_COP.1(2:SHA-2), FCS_COP.1(3:ECC), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA) and FCS_COP.1(6:SHA-1) also realizes the securing of the data exchange itself. Random numbers are generated in support of cryptographic key generation for authentication.

FPT_TDC.1(1) and FPT_TDC.1(2) requires a consistent interpretation of the security related data shared between the TOE and the card interface device.

O.CRYPTO_IMPLEMENT FDP_DAU.1 and FDP_SDI.2 requires approved cryptographic algorithms for digital signatures in support of data authentication.

FIA_UAU.3 and FIA_UAU.4 requires approved cryptographic algorithms are required to prevent the forgery, copying or reuse of authentication data.

FCS_CKM.1(1), FCS_CKM.1(2), FCS_CKM.2(1), FCS_CKM.2(2), FCS_CKM.4(1), FCS_CKM.4(2) and FCS_RNG.1 Key generation, distribution and destruction must be done using approved methods. Random numbers are generated in support of cryptographic key generation for authentication.

FCS_COP.1(1:AES), FCS_COP.1(2:SHA-2), FCS_COP.1(3:ECC), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA) and FCS_COP.1(6:SHA-1) requires aproved cryptographic algorithms for all cryptographic operations.

O.SOFTWARE_UPDATE FDP_ACC.2 and FDP_ACF.1 require that users cannot update TOE software.

FPT_PHP.3 requires the TOE to resist physical attacks that may be aimed at modifying software.

FDP_ITC.2 ensures Import of user data with security attributes.

9.3.2 Rationale tables of Security Objectives and SFRs

Security Objectives	Security Functional Requirements	Rationale
O.CARD_IDENTIFICATION_DATA	FAU_ARP.1, FAU_SAA.1, FDP_ACC.2, FDP_ACF.1, FDP_SDI.2, FPT_FLS.1, FPT_PHP.3, FPT_TST.1, FPT_EMS.1	Section 9.3.1
O.CARD_ACTIVITY_STORAGE	FAU_ARP.1, FAU_SAA.1, FDP_ACC.2, FDP_ACF.1, FDP_SDI.2, FPT_FLS.1, FPT_PHP.3, FPT_TST.1, FPT_EMS.1	Section 9.3.1
O.PROTECT_SECRET	FDP_ACC.2, FDP_ACF.1, FDP_RIP.1, FPR_UNO.1, FPT_PHP.3, FPT_EMS.1	Section 9.3.1
O.DATA_ACCESS	FDP_ACC.2, FDP_ACF.1, FIA_AFL.1(1:C), FIA_AFL.1(2:WC), FIA_ATD.1, FIA_UAU.3, FIA_UID.2, FIA_USB.1, FPT_FLS.1, FPT_PHP.3, FPT_TST.1, FIA_UAU.1(1), FIA_UAU.1(2), FPT_EMS.1	Section 9.3.1
O.SECURE_COMMUNICATIONS	FAU_ARP.1, FAU_SAA.1, FCO_NRO.1, FDP_ACC.2, FDP_ACF.1, FDP_DAU.1, FDP_ETC.1, FDP_ETC.2, FDP_ITC.1, FDP_RIP.1, FIA_UAU.3, FIA_UAU.4, FPR_UNO.1, FCS_CKM.1(1), FCS_CKM.2(1), FCS_CKM.4(1), FCS_COP.1(1:AES), FCS_COP.1(2:SHA-2), FCS_COP.1(3:ECC), FPT_TDC.1(1), FCS_CKM.1(2), FCS_CKM.2(2), FCS_CKM.4(2), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA), FCS_COP.1(6:SHA-1), FPT_TDC.1(2), FTP_ITC.1(2), FTP_ITC.1(1), FCS_RNG.1	Section 9.3.1
O.CRYPTO_IMPLEMENT	FDP_DAU.1, FDP_SDI.2, FIA_UAU.3, FIA_UAU.4, FCS_CKM.1(1), FCS_CKM.2(1), FCS_CKM.4(1), FCS_COP.1(1:AES), FCS_COP.1(2:SHA-2), FCS_COP.1(3:ECC), FCS_CKM.1(2), FCS_CKM.2(2), FCS_CKM.4(2), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA), FCS_COP.1(6:SHA-1), FCS_RNG.1	Section 9.3.1
O.SOFTWARE_UPDATE	FDP_ACC.2, FDP_ACF.1, FPT_PHP.3, FDP_ITC.2	Section 9.3.1

Table 17 Security Objectives and SFRs - Coverage

Security Functional Requirements	Security Objectives	Rationale
FAU_ARP.1	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.SECURE_COMMUNICATIONS	
FAU_SAA.1	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.SECURE_COMMUNICATIONS	
FDP_ACC.2	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.PROTECT_SECRET, O.DATA_ACCESS, O.SECURE_COMMUNICATIONS, O.SOFTWARE_UPDATE	
FDP_ACF.1	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.PROTECT_SECRET, O.DATA_ACCESS, O.SECURE_COMMUNICATIONS, O.SOFTWARE_UPDATE	
FDP_DAU.1	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FDP_ETC.1	O.SECURE_COMMUNICATIONS	
FDP_ETC.2	O.SECURE_COMMUNICATIONS	
FDP_ITC.1	O.SECURE_COMMUNICATIONS	
FDP_ITC.2	O.SOFTWARE_UPDATE	
FDP_RIP.1	O.PROTECT_SECRET, O.SECURE_COMMUNICATIONS	
FDP_SDI.2	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.CRYPTO_IMPLEMENT	
FIA_AFL.1(1:C)	O.DATA_ACCESS	
FIA_AFL.1(2:WC)	O.DATA_ACCESS	
FIA_ATD.1	O.DATA_ACCESS	
FIA_UAU.3	O.DATA_ACCESS, O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FIA_UAU.4	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FIA_UID.2	O.DATA_ACCESS	
FIA_USB.1	O.DATA_ACCESS	
FPR_UNO.1	O.PROTECT_SECRET, O.SECURE_COMMUNICATIONS	
FPT_FLS.1	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.DATA_ACCESS	
FPT_PHP.3	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.PROTECT_SECRET, O.DATA_ACCESS, O.SOFTWARE_UPDATE	

FPT_TST.1	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.DATA_ACCESS	
FPT_EMS.1	O.CARD_IDENTIFICATION_DATA, O.CARD_ACTIVITY_STORAGE, O.PROTECT_SECRET, O.DATA_ACCESS	
FCS_RNG.1	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_CKM.1(1)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_CKM.2(1)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCO_NRO.1	O.SECURE_COMMUNICATIONS	
FCS_CKM.4(1)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_COP.1(1:AES)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_COP.1(2:SHA-2)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_COP.1(3:ECC)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FIA_UAU.1(1)	O.DATA_ACCESS	
FPT_TDC.1(1)	O.SECURE_COMMUNICATIONS	
FTP_ITC.1(1)	O.SECURE_COMMUNICATIONS	
FCS_CKM.1(2)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_CKM.2(2)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_CKM.4(2)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_COP.1(4:TDES)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_COP.1(5:RSA)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FCS_COP.1(6:SHA-1)	O.SECURE_COMMUNICATIONS, O.CRYPTO_IMPLEMENT	
FIA_UAU.1(2)	O.DATA_ACCESS	
FPT_TDC.1(2)	O.SECURE_COMMUNICATIONS	
FTP_ITC.1(2)	O.SECURE_COMMUNICATIONS	

Table 18 SFRs and Security Objectives

9.3.3 Dependencies

9.3.3.1 SFRs Dependencies

Requirements	CC Dependencies	Satisfied Dependencies
FAU_ARP.1	(FAU_SAA.1)	FAU_SAA.1
FAU_SAA.1	(FAU_GEN.1)	
FDP_ACC.2	(FDP_ACF.1)	FDP_ACF.1
FDP_ACF.1	(FDP_ACC.1) and (FMT_MSA.3)	FDP_ACC.2

FDP_DAU.1	No Dependencies	
FDP_ETC.1	(FDP_ACC.1 or FDP_IFC.1)	FDP_ACC.2
FDP_ETC.2	(FDP_ACC.1 or FDP_IFC.1)	FDP_ACC.2
FDP_ITC.1	(FDP_ACC.1 or FDP_IFC.1) and (FMT_MSA.3)	FDP_ACC.2
FDP_ITC.2	(FDP_ACC.1 or FDP_IFC.1) and (FPT_TDC.1) and (FTP_ITC.1 or FTP_TRP.1)	FDP_ACC.2, FPT_TDC.1(1), FTP_ITC.1(1), FPT_TDC.1(2), FTP_ITC.1(2)
FDP_RIP.1	No Dependencies	
FDP_SDI.2	No Dependencies	
FIA_AFL.1(1:C)	(FIA_UAU.1)	FIA_UAU.1(1), FIA_UAU.1(2)
FIA_AFL.1(2:WC)	(FIA_UAU.1)	FIA_UAU.1(1), FIA_UAU.1(2)
FIA_ATD.1	No Dependencies	
FIA_UAU.3	No Dependencies	
FIA_UAU.4	No Dependencies	
FIA_UID.2	No Dependencies	
FIA_USB.1	(FIA_ATD.1)	FIA_ATD.1
FPR_UNO.1	No Dependencies	
FPT_FLS.1	No Dependencies	
FPT_PHP.3	No Dependencies	
FPT_TST.1	No Dependencies	
FPT_EMS.1	No Dependencies	
FCS_RNG.1	No Dependencies	
FCS_CKM.1(1)	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_CKM.2(1), FCS_CKM.4(1), FCS_COP.1(1:AES), FCS_COP.1(3:ECC)
FCS_CKM.2(1)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(1), FCS_CKM.4(1)
FCO_NRO.1	(FIA_UID.1)	FIA_UID.2
FCS_CKM.4(1)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(1)
FCS_COP.1(1:AES)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(1), FCS_CKM.4(1)
FCS_COP.1(2:SHA-2)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	
FCS_COP.1(3:ECC)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FDP_ITC.2, FCS_CKM.4(1)

FIA_UAU.1(1)	(FIA_UID.1)	FIA_UID.2
FPT_TDC.1(1)	No Dependencies	
FTP_ITC.1(1)	No Dependencies	
FCS_CKM.1(2)	(FCS_CKM.2 or FCS_COP.1) and (FCS_CKM.4)	FCS_CKM.2(2), FCS_CKM.4(2), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA)
FCS_CKM.2(2)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(2), FCS_CKM.4(2)
FCS_CKM.4(2)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(2)
FCS_COP.1(4:TDES)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(1), FCS_CKM.4(1), FCS_CKM.1(2), FCS_CKM.4(2)
FCS_COP.1(5:RSA)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	FDP_ITC.1, FDP_ITC.2, FCS_CKM.1(1), FCS_CKM.4(1), FCS_CKM.1(2), FCS_CKM.4(2)
FCS_COP.1(6:SHA-1)	(FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2) and (FCS_CKM.4)	
FIA_UAU.1(2)	(FIA_UID.1)	FIA_UID.2
FPT_TDC.1(2)	No Dependencies	
FTP_ITC.1(2)	No Dependencies	

Table 19 SFRs Dependencies

Rationale for the exclusion of Dependencies

The dependency FAU_GEN.1 of FAU_SAA.1 is discarded. The dependency FAU_GEN.1 (Audit Data Generation) is not applicable to the TOE. Tachograph cards do not generate audit records but react with an error response. The detection of failure events implicitly covered in FAU_SAA.1 is clarified by a related refinement of the SFR.

The dependency FMT_MSA.3 of FDP_ACF.1 is discarded. The access control TSF specified in FDP_ACF.1 uses security attributes that are defined during the Personalisation Phase, and are fixed over the whole lifetime of the TOE. No management of these security attributes (i.e. SFR FMT_MSA.3) is necessary here, either during personalization, or within the usage phase of the TOE.

The dependency FMT_MSA.3 of FDP_ITC.1 is discarded. The access control TSF specified in FDP_ACF.1 uses security attributes that are defined during the Personalisation Phase, and are fixed over the whole lifetime of the TOE. No management of these security attributes (i.e. SFR FMT_MSA.3) is necessary here, either during personalization, or within the usage phase of the TOE.

The dependency FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2 of FCS_COP.1(2:SHA-2) is discarded. Not applicable as no keys are used for SHA-2.

The dependency FCS_CKM.4 of FCS_COP.1(2:SHA-2) is discarded. Not applicable as no keys are used for SHA-2.

The dependency FCS_CKM.1 or FDP_ITC.1 or FDP_ITC.2 of FCS_COP.1(6:SHA-1) is discarded. Not applicable as no keys are used for SHA-1.

The dependency FCS_CKM.4 of FCS_COP.1(6:SHA-1) is discarded. Not applicable as no keys are used for SHA-1.

9.3.3.2 SARs Dependencies

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

ATE_IND.2	(ADV_FSP.2) and (AGD_OPE.1) and (AGD_PRE.1) and (ATE_COV.1) and (ATE_FUN.1)	ADV_FSP.4, AGD_OPE.1, AGD_PRE.1, ATE_COV.2, ATE_FUN.1
AVA_VAN.5	(ADV_ARC.1) and (ADV_FSP.4) and (ADV_IMP.1) and (ADV_TDS.3) and (AGD_OPE.1) and (AGD_PRE.1) and (ATE_DPT.1)	ADV_ARC.1, ADV_FSP.4, ADV_IMP.1, ADV_TDS.3, AGD_OPE.1, AGD_PRE.1, ATE_DPT.2

Table 20 SARs Dependencies

9.3.4 Rationale for the Security Assurance Requirements

EAL4 augmented with ATE_DPT.2, ALC_DVS.2 and AVA_VAN.5

9.3.5 AVA_VAN.5 Advanced methodical vulnerability analysis

The selection of the component AVA_VAN.5 provides a higher assurance than the pre-defined EAL4 package, namely requiring a vulnerability analysis to assess the resistance to penetration attacks performed by an attacker possessing a high attack potential.

9.3.6 ATE_DPT.2 Testing: security enforcing modules

The selection of the component ATE_DPT.2 provides a higher assurance than the pre-defined EAL4 package due to requiring the functional testing of SFR-enforcing modules

9.3.7 ALC_DVS.2 Sufficiency of security measures

Development security is concerned with physical, procedural, personnel and other technical measures that may be used in the development environment to protect the TOE and the embedding product. The standard ALC_DVS.1 requirement mandated by EAL4 is not enough. Due to the nature of the TOE and embedding product, ALC_DVS.2 is the most adequate for a manufacturing process in which several actors (Platform Developer, Operator, Application Developers, IC Manufacturer, etc) exchange and store highly sensitive informations (confidential code, cryptographic keys, personalisation data, etc).

10 TOE Summary Specification

10.1 TOE Summary Specification

The TOE inherits all the security functions provided by the underlying Java Card Open Platform (refer Security Target **[ST_PTF]**). On top of these, it adds some supplemental security functions that are described hereafter.

SF.ACCESS_CONTROL_IN_READING

This function controls read access to files and enforces the security policy for data retrieval. This security function applies in phase 7. Prior to any file reading, it ensures the correct access conditions are met:

- The needed subject is authenticated (when needed)
- Expected secure messaging level is applied (when needed)

The function ensures that, for Driver card and workshop card, user data may be read from the TOE by any user, and for Control card and company card: Read Access conditions are provided to all users of TOE. User identification data stored in the 1st generation tachograph application, can be read by S.VU only.

It ensures the key stored in the filesystem of the workshop (KWC) can only be returned protected in confidentiality.

This function also ensures the readilibity of the card by card interface device of a Vehicle Unit or any card reader, in accordance with associated access rights.

SF.ACCESS_CONTROL_IN_WRITING

This function controls write access to files and enforces the security policy for data writing. This security function applies in phase 7. Prior to any file writing, it ensures the correct access conditions are met:

- If the Subject is identified as S.VU, it has access to write activity data to the card.
- Expected secure messaging level is applied (when needed).

The function ensures that for all card types: Card identification data and User identification data may only be written once and before the end of Personalisation and activity data may be written to the card by S.VU only.

Modification of identification data during the end-usage phase of the card life-cycle is not permitted.

It ensures that interpretation of the security attributes of the imported user data is as intended by the source of the user data.

SF.AUTHENTICATION_DURING_PHASE7

This security function is in charge of the mutual authentication, during phase 7 of Tachograph life cycle between the TOE and the IFD. This security function identifies a Vehicle Unit by verifying that it has a valid public key certificate signed by the MSCA. It ensures that the vehicle unit is in possession of the corresponding private key. This is done by sending a random number that the vehicle unit in turn signs with the private key. The TOE then verifies the signature using the copy of public key stored in the TOE during personalization. After a successful verification of a vehicle unite its VRN and Registering Member State is stored in the card.

This security function enables to create a trusted channel by generating a shared ephemeral secret key and a secret dynamic non replay counter (SSC). This trusted channel enables to fulfill access conditions mandated to get access rights to files (Read/Update). The authentication protocol prevents the use of forged data authentication by using randomness. This security function is supported by SF.CRYPTOGRAPHIC_OPERATIONS.

This security function supports export of user data with/without security attributes by the applicable access rules on behalf of the user before the user authentication is actually performed.

Specific to workshop cards there is another functionality implemented for PIN Verification. In case of unsuccesful attempts while PIN Verification, the card will respond with Error messages handled through SF.ERROR_MESSAGES_AND_EXCEPTIONS.

SF.CLEARING_OF_SENSITIVE_INFORMATION

This security function ensures the clearing of sensitive information.

In phase 7

- Session key, secret dynamic non replay counter (SSC), and authentication state are securely erased when a new authentication is started, or when the TOE is powered off/on
- Session key and SSC are securely erased in case an error is detected in the incoming command (wrong MAC) or when more than 240 commands under secure messaging have been received
- Authentication state is securely erased in case an error occurs in the authentication protocols.

SF.CRYPTOGRAPHIC_OPERATIONS

This security function ensures the usage of the secure cryptographic functionalities (including random numbers generation) that are resistant against attacks with high potential (AVA_VAN.5). These functionalities are provided by the underlying platform. This security functionality supports the others one by providing them Cryptographic operations.

SF.CRYPTOGRAPHIC_OPERATIONS performes the following cryptographic operations:

Key Generation:

- SF.CRYPTOGRAPHIC_OPERATIONS generates AES keys of size 128, 192 and 256 bits.
- SF.CRYPTOGRAPHIC_OPERATIONS generates T-DES keys of size 112 bits (2 individual keys of 64 bits each out of which 16 are parity bits all set to 0).
- SF.CRYPTOGRAPHIC_OPERATIONS generates RSA keys of size 1024 bits.
- SF.CRYPTOGRAPHIC_OPERATIONS generates ECC keys with domain parameters as described in Table for Standardised domain parameters.

Digital Signature Generation and Verification:

- SF.CRYPTOGRAPHIC_OPERATIONS generates and verifies digital signatures using RSA algorithm with cryptographic key size of 1024 bits.
- SF.CRYPTOGRAPHIC_OPERATIONS generates and verifies digital signatures using ECC algorithm with the domain parameters as mentioned in Standardised domain parameters.

Cryptographic Hashing:

- SF.CRYPTOGRAPHIC_OPERATIONS performs cryptographic hashing in accordance with SHA-1, SHA-256, SHA-384 and SHA-512.

Encryption and Decryption:

- SF.CRYPTOGRAPHIC_OPERATIONS performs Encyption, Decryption and Retail MAC using T-DES.
- SF.CRYPTOGRAPHIC_OPERATIONS performs Encyption, Decryption and CMAC using AES.
- SF.CRYPTOGRAPHIC_OPERATIONS performs Encyption and Decryption using RSA.

Cryptographic Key Agreement:

- SF.CRYPTOGRAPHIC_OPERATIONS performs Cryptographic Key Agreement using ECC.

Mutual Authentication:

- SF.CRYPTOGRAPHIC_OPERATIONS performs Mutual Authentication between the card and vehicle unit using ECC.

Random Number Generation:

- SF.CRYPTOGRAPHIC_OPERATIONS performs Random Number Generation that meets the class DRG.3

Application Note:

More details related to key sizes of the cryptographic operations can be found in SFRs

- FCS_COP.1(1:AES)
- FCS_COP.1(2:SHA-2)
- FCS_COP.1(3:ECC)
- FCS_COP.1(4:TDES)
- FCS_COP.1(5:RSA)
- FCS_COP.1(6:SHA-1)

SF.ERROR_MESSAGES_AND_EXCEPTIONS

This security function is in charge of Handling Authentication failure Messages by:

- Warning the connected entity and assume the user to be a S.Non-VU.
- Block the PIN check procedure such that any subsequent PIN check attempt will fail for Workshop cards and be able to indicate to subsequent users the reason for the blocking.

The Security Function also caters to cardholder authentication failures, self test errors, stored data integrity errors, and activity data input integrity errors also.

SF.PHYSICAL_PROTECTION

This security function protects the TOE against physical attacks. It ensures their detection and provides counteractions.

SF.RAD_MANAGEMENT

This security function is in charge of the management of RAD in phase 7. In particular it is in charge of:

- Verification of VAD in phase 7

SF.SAFE_STATE_MANAGEMENT

This security function ensures that the TOE gets back to a secure state when

- An error is detected by the SF_SELF_TEST

- A tearing occurs (during a copy of data in EEPROM) This security function ensures that when such a case occurs, the TOE is either switched in the state "kill card" or becomes mute and gets back in the idle state (all ephemeral states are reset)

SF.SECURE_MESSAGING

This security function ensures the authenticity and integrity of the communication between the TOE and the IFD (namely a Vehicle Unit). A trusted channel is established after a successful mutual authentication based on a key transport protocol. This security functions relies on a checksum computed over the incoming command, and the outgoing data using Triple DES(for 1st Generation) and AES(for 2nd Generation) algorithm with the secure messaging session key. Moreover, this security function ensures the confidentiality of the content of some file when being read. In such cases, the data are encrypted with the secure messaging session key using Triple DES(for 1st Generation) and AES(for 2nd Generation)algorithms.

In order to protect the TOE against deletion, insertion or replay of protected commands, this security function manages as well a dynamic counter (SSC). This counter is increased each time a protected incoming command/outgoing data is processed. This security function is supported by SF.CRYPTOGRAPHIC_OPERATIONS.

SF.SELF_TESTS

The TOE performs self tests on the TSF data it stores to protect the TOE. In particular, this security function is in charge of:

- Detecting DFA
- Performing self tests of the random generator and cryptographic routines (DES, RSA)
- Monitoring of the integrity of keys, RAD, files, files attributes and TSF data
- Monitoring the integrity of the executable code
- Protecting the cryptographic operation
- Monitoring the correct operation of the executable code

The integrity checking of all the data is checked each time they are accessed. The self tests of the random generator and of the cryptographic routines are made at start up, as well as the integrity checks of the executable code. The protection of the cryptographic operation,of the executable code operation, and against DFA is made during TOE operation. This security function is supported by SF.CRYPTOGRAPHIC_OPERATIONS.

SF.SIGNATURE

This secure function ensures the signature generation of the TOE's file and its verification. For signature generation, it performs the hash computation of the currently selected, using SHA-1 algorithm and its signature with the TOE's private key. The signature verification is performed by unwrapping it with the public key imported on the TOE (using SF.KEY_MANAGEMENT) and the reference hash provided by the outside. This security function is supported by SF.CRYPTOGRAPHIC_OPERATIONS.

10.2 SFRs and TSS

10.2.1 SFRs and TSS - Rationale

TOE Security Requirements

FAU_ARP.1 The FAU_ARP.1 SFR is enforced by the SF.ERROR_MESSAGES_AND_EXCEPTIONS functionality.

The security function reports all the defined errors via SW1 SW2.

FAU_SAA.1 The FAU_SAA.1 SFR is enforced by the SF.ERROR_MESSAGES_AND_EXCEPTIONS functionality.

This security function detects all the mentioned errors and failures and ensures that the SFR is enforced.

FDP_ACC.2 The FDP_ACC.2 SFR is enforced by the SF.ACCESS_CONTROL_IN_READING, SF.ACCESS_CONTROL_IN_WRITING and SF.AUTHENTICATION_DURING_PHASE7 functionality.

The SF.ACCESS_CONTROL_IN_READING and SF.ACCESS_CONTROL_IN_WRITING in combination with SF.AUTHENTICATION_DURING_PHASE7 help identify S.VU and enforce the AC SFP.

FDP_ACF.1 The FDP_ACF.2 SFR is enforced by the SF.ACCESS_CONTROL_IN_READING, SF.ACCESS_CONTROL_IN_WRITING and SF.AUTHENTICATION_DURING_PHASE7 functionality.

The SF.ACCESS_CONTROL_IN_READING and SF.ACCESS_CONTROL_IN_WRITING in combination with SF.AUTHENTICATION_DURING_PHASE7 help identify S.VU and enforce the AC SFP.

FDP_DAU.1 The FDP_DAU.1 SFR is enforced by SF.SIGNATURE functionality.

The operations listed in the FDP_DAU.1 SFR can only be performed by the SF.SIGNATURE functionality and thus the SFR cannot be bypassed.

FDP_ETC.1 The FDP_ETC.1 SFR is enforced by SF.ACCESS_CONTROL_IN_READING and SF.ERROR_MESSAGES_AND_EXCEPTIONS functionalities.

SF.ACCESS_CONTROL_IN_READING ensures proper access conditions with regards to AC SFP are met and SF.ERROR_MESSAGES_AND_EXCEPTIONS handles any data integrity errors.

FDP_ETC.2 The FDP_ETC.2 SFR is enforced by SF.ACCESS_CONTROL_IN_READING and SF.ERROR_MESSAGES_AND_EXCEPTIONS functionalities.

SF.ACCESS_CONTROL_IN_READING ensures proper access conditions with regards to AC SFP are met and SF.ERROR_MESSAGES_AND_EXCEPTIONS handles any data integrity errors.

FDP_ITC.1 The FDP_ITC.1 SFR is enforced by SF.ACCESS_CONTROL_IN_WRITING and SF.ERROR_MESSAGES_AND_EXCEPTIONS functionalities.

SF.ACCESS_CONTROL_IN_WRITING ensures proper access conditions with regards to AC SFP are met and SF.ERROR_MESSAGES_AND_EXCEPTIONS handles any data integrity errors.

FDP_ITC.2 The FDP_ITC.2 SFR is enforced by SF.ACCESS_CONTROL_IN_WRITING and SF.ERROR_MESSAGES_AND_EXCEPTIONS functionalities.

SF.ACCESS_CONTROL_IN_WRITING ensures proper access conditions with regards to AC SFP are met and SF.ERROR_MESSAGES_AND_EXCEPTIONS handles any data integrity errors.

FDP_RIP.1 The FDP_RIP.1 SFR is enforced by the SF.CLEARING_OF_SENSITIVE_INFORMATION functionality.

The previous information content of a resource is made unavailable by SF.CLEARING_OF_SENSITIVE_INFORMATION functionality and thus the SFR cannot be bypassed.

FDP_SDI.2 The FDP_SDI.2 SFR is enforced by the SF.SELF_TESTS and SF_ERROR_MESSAGES_AND_EXCEPTIONS functionalities.

SF.SELF_TESTS along with SF.ERROR_MESSAGES_AND_EXCEPTIONS are able to detect, via self tests, if there are any integrity errors in the stored data thus making sure FDP_SDI.2 is not bypassed.

FIA_AFL.1(1:C) The FIA_AFL.1(1:C) SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7 and SF.ERROR_MESSAGES_AND_EXCEPTIONS functionalities.

SF.AUTHENTICATION_DURING_PHASE7 is able to identify the when the a failed authentication attempt happens and the error is reported though SF.ERROR_MESSAGES_AND_EXCEPTIONS.

FIA_AFL.1(2:WC) The FIA_AFL.1(2:WC) SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7, SF.ERROR_MESSAGES_AND_EXCEPTIONS and SF.RAD_MANAGEMENT functionalities.

SF.RAD_MANAGEMENT and SF.AUTHENTICATION_DURING_PHASE7 are able to identify if the number of failed authentication attempts has crossed the maximum allowed number and block the PIN beyond that. The error is reported by SF.ERROR_MESSAGES_AND_EXCEPTIONS thus ensuring that the SFR is not bypassed.

FIA_ATD.1 The FIA_ATD.1 SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7 functionality.

SF.AUTHENTICATION_DURING_PHASE7 can authenticate and identify users as S.VU and S.NON-VU and stores the attributes related to S.VU upon succesful authentication.

FIA_UAU.3 The FIA_UAU.3 SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7 functionality.

SF.AUTHENTICATION_DURING_PHASE7 ensures that only a VU in possession of the correct private key corresponding to the public key certificates signed by MSCA gets identified as S.VU and forged data cannot be used.

FIA_UAU.4 The FIA_UAU.4 SFR is enforced by the SF.CLEARING_OF_SENSITIVE_INFORMATION and SF.AUTHENTICATION_DURING_PHASE7 functionality.

SF.CLEARING_OF_SENSITIVE_INFORMATION and SF.AUTHENTICATION_DURING_PHASE7 ensures that keys after usage are destroyed and cannot be reused.

FIA_UID.2 The FIA_UID.2 SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7 functionality.

The user (i.e. applet) identification can only be performed by the SF.AUTHENTICATION_DURING_PHASE7 functionality and thus the FIA_UID.2 SFR cannot be bypassed.

FIA_USB.1 The FIA_USB.1 SFR is enforced by the SF.ACCESS_CONTROL_IN_READING and SF.ACCESS_CONTROL_IN_WRITING functionalities.

The user - Package AID association can only be performed by the SF.ACCESS_CONTROL_IN_READING and SF.ACCESS_CONTROL_IN_WRITING functionalities and thus the FIA_USB.1 SFR cannot be bypassed.

FPR_UNO.1 The FPR_UNO.1 SFR is enforced by SF.CRYPTOGRAPHIC_OPERATIONS, SF.AUTHENTICATION_DURING_PHASE7 and SF.PHYSICAL_PROTECTION functionalities.

The sensitive operations listed in the FPR_UNO.1 SFR can only be performed by SF.CRYPTOGRAPHIC_OPERATIONS, SF.AUTHENTICATION_DURING_PHASE7 and SF.PHYSICAL_PROTECTION functionalities listed above and thus the SFR cannot be bypassed.

FPT_FLS.1 The FPT_FLS.1 SFR is enforced by the SF.SAFE_STATE_MANAGEMENT functionality.

SF.SAFE_STATE_MANAGEMENT helps ensure that in case of any errors mentioned in the functional requirement the TOE preserves a safe state.

FPT_PHP.3 The FPT_PHP.3 SFR is enforced by the SF.PHYSICAL_PROTECTION functionality.

The physical manipulation and physical probing detection and management can only be performed by the SF.PHYSICAL_PROTECTION functionality.

FPT_TST.1 The FPT_TST.1 SFR is enforced by the SF.SELF_TESTS functionality.

SF.SELF_TESTS is responsible for running self tests on the TOE thus implementing the FPT_TST.1 Fucntional Requirement.

FPT_EMS.1 The FPR_EMS.1 SFR is enforced by the SF.PHYSICAL_PROTECTION functionality.

SF.PHYSICAL_PROTECTION is responsible for maintaining physical security and ensuring there are no emanations during secret operations in the TOE.

FCS_RNG.1 The FCS_RNG.1 SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality. SF.CRYPTOGRAPHIC_OPERATIONS ensures that a random number compliant with the requirement is generated when needed.

Security functional requirements for external communications (2nd Generation)

FCS_CKM.1(1) The FCS_CKM.1(1) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

The cryptographic key generation operation is performed by the SF.CRYPTOGRAPHIC_OPERATIONS functionality that ensures that cryptographic keys that meet the requirement are generated thus making sure the sfr is implemented.

FCS_CKM.2(1) The FCS_CKM.2(1) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

THe security function generates session keys based on key agreement thus enforcing the SFR

FCO_NRO.1 The FCO_NRO.1 SFR is enforced by the SF.SIGNATURE functionality.

SF.SGINATURE ensures functionality for signature generation and verification thus making sure the SFR is implemented.

FCS_CKM.4(1) The FCS_CKM.4(1) SFR is enforced by the SF.CLEARING_OF_SENSITIVE_INFORMATION functionality.

SF.CLEARING_OF_SENSITIVE_INFORMATION ensure that all the session keys are destroyed on power of or when a new authentication is attempted or upon expiry of the keys.

FCS_COP.1(1:AES) The FCS_COP.1(1:AES) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

SF.CRYPTOGRAPHIC_OPERATIONS is capable of performing the cyrptographic operations defined in the SFR.

FCS_COP.1(2:SHA-2) The FCS_COP.1(2:SHA-2) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

SF.CRYPTOGRAPHIC_OPERATIONS is capable of performing the cyrptographic operations defined in the SFR.

FCS_COP.1(3:ECC) The FCS_COP.1(3:ECC) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS and SF.AUTHENTICATION_DURING_PHASE7 functionalities.

SF.CRYPTOGRAPHIC_OPERATIONS is capable of performing the cyrptographic operations defined in the SFR for the authentication defined in SF.AUTHENTICATION_DURING_PHASE7.

FIA_UAU.1(1) The FIA_UAU.1(1) SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7 and SF.ACCESS_CONTROL_IN_READING functionality.

SF.AUTHENTICATION_DURING_PHASE7 and SF.ACCESS_CONTROL_IN_READING together are responsible for ensuring proper access conditions are met before exporting data and users are authenticated for export of data as defined in [EU – 2016/799] Annex 1C, Appendix 2

FPT_TDC.1(1) The FPT_TDC.1(1) SFR is enforced by the SF.SECURE_MESSAGING functionality.

The security function is responsible for maintaining the secure communication channel between the TOE and any connected entity.

FTP_ITC.1(1) The FTP_ITC.1(1) SFR is enforced by the SF.SECURE_MESSAGING and SF.CRYPTOGRAPHIC_OPERATIONS functionality.

SF.SECURE_MESSAGING and SF.CRYPTOGRAPHIC_OPERATIONS together ensure that all commands and responses are sent using Secure Messaging(using AES) to ensure confidentiality.

Security functional requirements for external communications (1st generation)

FCS_CKM.1(2) The FCS_CKM.1(2) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

The cryptographic key generation operation is performed by the SF.CRYPTOGRAPHIC_OPERATIONS functionality that ensures that cryptographic keys that

meet the requirement are generated thus making sure the sfr is implemented.

FCS_CKM.2(2) The FCS_CKM.2(2) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

THe security function generates session keys based on key agreement thus enforcing the SFR

FCS_CKM.4(2) The FCS_CKM.4(2) SFR is enforced by the SF.CLEARING_OF_SENSITIVE_INFORMATION functionality.

SF.CLEARING_OF_SENSITIVE_INFORMATION ensure that all the session keys are destroyed on power of or when a new authentication is attempted or upon expiry of the keys.

FCS_COP.1(4:TDES) The FCS_COP.1(4:TDES) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

SF.CRYPTOGRAPHIC_OPERATIONS is capable of performing the cyrptographic operations defined in the SFR.

FCS_COP.1(5:RSA) The FCS_COP.1(5:RSA) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS and SF.AUTHENTICATION_DURING_PHASE7 functionalities.

SF.CRYPTOGRAPHIC_OPERATIONS is capable of performing the cyrptographic operations defined in the SFR.

FCS_COP.1(6:SHA-1) The FCS_COP.1(6:SHA-1) SFR is enforced by the SF.CRYPTOGRAPHIC_OPERATIONS functionality.

SF.CRYPTOGRAPHIC_OPERATIONS is capable of performing the cyrptographic operations defined in the SFR.

FIA_UAU.1(2) The FIA_UAU.1(2) SFR is enforced by the SF.AUTHENTICATION_DURING_PHASE7 and SF.ACCESS_CONTROL_IN_READING functionality.

SF.AUTHENTICATION_DURING_PHASE7 and SF.ACCESS_CONTROL_IN_READING together are responsible for ensuring proper access conditions are met before exporting data and users are authenticated for export of data as defined in [EU – 2016/799] Annex 1C, Appendix 2

FPT_TDC.1(2) The FPT_TDC.1(2) SFR is enforced by the SF.SECURE_MESSAGING functionality.

The security function is responsible for maintaining the secure communication channel between the TOE and any connected entity.

FTP_ITC.1(2) The FTP_ITC.1(2) SFR is enforced by the SF.SECURE_MESSAGING and SF.CRYPTOGRAPHIC_OPERATIONS functionality.

SF.SECURE_MESSAGING and SF.CRYPTOGRAPHIC_OPERATIONS together ensure that all commands and responses are sent using Secure Messaging(using TDES) to ensure confidentiality.

10.2.2 Association tables of SFRs and TSS

Security Functional Requirements	TOE Summary Specification

FAU_ARP.1	SF.ERROR_MESSAGES_AND_EXCEPTIONS
FAU_SAA.1	SF.ERROR_MESSAGES_AND_EXCEPTIONS
FDP_ACC.2	SF.ACCESS_CONTROL_IN_READING, SF.ACCESS_CONTROL_IN_WRITING, SF.AUTHENTICATION_DURING_PHASE7
FDP_ACF.1	SF.ACCESS_CONTROL_IN_READING, SF.ACCESS_CONTROL_IN_WRITING, SF.AUTHENTICATION_DURING_PHASE7
FDP_DAU.1	SF.SIGNATURE
FDP_ETC.1	SF.ACCESS_CONTROL_IN_READING, SF.ERROR_MESSAGES_AND_EXCEPTIONS
FDP_ETC.2	SF.ACCESS_CONTROL_IN_READING, SF.ERROR_MESSAGES_AND_EXCEPTIONS
FDP_ITC.1	SF.ACCESS_CONTROL_IN_WRITING, SF.ERROR_MESSAGES_AND_EXCEPTIONS
FDP_ITC.2	SF.ACCESS_CONTROL_IN_WRITING, SF.ERROR_MESSAGES_AND_EXCEPTIONS
FDP_RIP.1	SF.CLEARING_OF_SENSITIVE_INFORMATION
FDP_SDI.2	SF.SELF_TESTS, SF.ERROR_MESSAGES_AND_EXCEPTIONS
FIA_AFL.1(1:C)	SF.AUTHENTICATION_DURING_PHASE7, SF.ERROR_MESSAGES_AND_EXCEPTIONS
FIA_AFL.1(2:WC)	SF.AUTHENTICATION_DURING_PHASE7, SF.ERROR_MESSAGES_AND_EXCEPTIONS, SF.RAD_MANAGEMENT
FIA_ATD.1	SF.AUTHENTICATION_DURING_PHASE7
FIA_UAU.3	SF.AUTHENTICATION_DURING_PHASE7
FIA_UAU.4	SF.CLEARING_OF_SENSITIVE_INFORMATION, SF.AUTHENTICATION_DURING_PHASE7
FIA_UID.2	SF.AUTHENTICATION_DURING_PHASE7
FIA_USB.1	SF.ACCESS_CONTROL_IN_READING, SF.ACCESS_CONTROL_IN_WRITING
FPR_UNO.1	SF.PHYSICAL_PROTECTION, SF.AUTHENTICATION_DURING_PHASE7, SF.CRYPTOGRAPHIC_OPERATIONS
FPT_FLS.1	SF.SAFE_STATE_MANAGEMENT
FPT_PHP.3	SF.PHYSICAL_PROTECTION
FPT_TST.1	SF.SELF_TESTS
FPT_EMS.1	SF.PHYSICAL_PROTECTION
FCS_RNG.1	SF.CRYPTOGRAPHIC_OPERATIONS

FCS_CKM.1(1)	SF.CRYPTOGRAPHIC_OPERATIONS
FCS_CKM.2(1)	SF.CRYPTOGRAPHIC_OPERATIONS
FCO_NRO.1	SF.SIGNATURE
FCS_CKM.4(1)	SF.CLEARING_OF_SENSITIVE_INFORMATION
FCS_COP.1(1:AES)	SF.CRYPTOGRAPHIC_OPERATIONS
FCS_COP.1(2:SHA-2)	SF.CRYPTOGRAPHIC_OPERATIONS
FCS_COP.1(3:ECC)	SF.CRYPTOGRAPHIC_OPERATIONS, SF.AUTHENTICATION_DURING_PHASE7
FIA_UAU.1(1)	SF.AUTHENTICATION_DURING_PHASE7, SF.ACCESS_CONTROL_IN_READING
FPT_TDC.1(1)	SF.SECURE_MESSAGING
FTP_ITC.1(1)	SF.SECURE_MESSAGING, SF.CRYPTOGRAPHIC_OPERATIONS
FCS_CKM.1(2)	SF.CRYPTOGRAPHIC_OPERATIONS
FCS_CKM.2(2)	SF.CRYPTOGRAPHIC_OPERATIONS
FCS_CKM.4(2)	SF.CLEARING_OF_SENSITIVE_INFORMATION
FCS_COP.1(4:TDES)	SF.CRYPTOGRAPHIC_OPERATIONS
FCS_COP.1(5:RSA)	SF.CRYPTOGRAPHIC_OPERATIONS, SF.AUTHENTICATION_DURING_PHASE7
FCS_COP.1(6:SHA-1)	SF.CRYPTOGRAPHIC_OPERATIONS
FIA_UAU.1(2)	SF.AUTHENTICATION_DURING_PHASE7, SF.ACCESS_CONTROL_IN_READING
FPT_TDC.1(2)	SF.SECURE_MESSAGING
FTP_ITC.1(2)	SF.SECURE_MESSAGING, SF.CRYPTOGRAPHIC_OPERATIONS

Table 21 SFRs and TSS - Coverage

TOE Summary Specification	Security Functional Requirements
SF.ACCESS_CONTROL_IN_READING	FDP_ACC.2, FDP_ACF.1, FDP_ETC.1, FDP_ETC.2, FIA_USB.1, FIA_UAU.1(1), FIA_UAU.1(2)
SF.ACCESS_CONTROL_IN_WRITING	FDP_ACC.2, FDP_ACF.1, FDP_ITC.1, FDP_ITC.2, FIA_USB.1
SF.AUTHENTICATION_DURING_PHASE7	FDP_ACC.2, FDP_ACF.1, FIA_AFL.1(1:C), FIA_AFL.1(2:WC), FIA_ATD.1, FIA_UAU.3, FIA_UAU.4, FIA_UID.2, FPR_UNO.1, FCS_COP.1(3:ECC), FIA_UAU.1(1), FCS_COP.1(5:RSA), FIA_UAU.1(2)
SF.CLEARING_OF_SENSITIVE_INFORMATION	FDP_RIP.1, FIA_UAU.4, FCS_CKM.4(1), FCS_CKM.4(2)

SF.CRYPTOGRAPHIC_OPERATIONS	FPR_UNO.1, FCS_RNG.1, FCS_CKM.1(1), FCS_CKM.2(1), FCS_COP.1(1:AES), FCS_COP.1(2:SHA-2), FCS_COP.1(3:ECC), FTP_ITC.1(1), FCS_CKM.1(2), FCS_CKM.2(2), FCS_COP.1(4:TDES), FCS_COP.1(5:RSA), FCS_COP.1(6:SHA-1), FTP_ITC.1(2)
SF.ERROR_MESSAGES_AND_EXCEPTIONS	FAU_ARP.1, FAU_SAA.1, FDP_ETC.1, FDP_ETC.2, FDP_ITC.1, FDP_ITC.2, FDP_SDI.2, FIA_AFL.1(1:C), FIA_AFL.1(2:WC)
SF.PHYSICAL_PROTECTION	FPR_UNO.1, FPT_PHP.3, FPT_EMS.1
SF.RAD_MANAGEMENT	FIA_AFL.1(2:WC)
SF.SAFE_STATE_MANAGEMENT	FPT_FLS.1
SF.SECURE_MESSAGING	FPT_TDC.1(1), FTP_ITC.1(1), FPT_TDC.1(2), FTP_ITC.1(2)
SF.SELF_TESTS	FDP_SDI.2, FPT_TST.1
SF.SIGNATURE	FDP_DAU.1, FCO_NRO.1

Table 22 TSS and SFRs - Coverage