Giesecke+Devrient

Security Target Lite

SCX Luna1.xM M2M/In-Car SGP.32

R&D

Department: MS Security

Author: G+D Mobile Security Germany GmbH

Version: 1.7

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Status: Released

Classification: PUBLIC

File: GDI_Luna_SGP32_ASE_Lite

History

Version	Date	Author	Description of change
0.1	08/03/2024	G+D MS	Initial version
1.0	27/09/2024	G+D MS	First version shared with the Lab/CB
1.1	01/10/2024	G+D MS	Changes in section7 (SFRs): operations and application notes
1.2	05/12/2024	G+D MS	Changes in section 2 (refinement of the TOE overview), section 3.4.4/3.4.5, section 7 (SFRs: app. notes, SFR iterations and operations), plus editorial changes
1.3	20/01/2025	G+D MS	Editorial changes, SFR updates in section 7 (operations, application notes, FCS_RNG) and completion of section 8
1.4	10/03/2025	G+D MS	Refinements in section 2 and 3, addition of section 6 (extended requirements), changes in section 7 (alignment with [PP-eUICC], addition of FCS_CKM.1/GP-SCP and FCS_COP.1/GP-SCP) and section 8
1.5	25/06/2025	G+D MS	Release version, including final TOE/SW name plus editorial changes
1.6	08/07/2025	G+D MS	Update of AGD documentation in References (Section 11)
1.7	18/07/2025	G+D MS	Update of AGD documentation in References (Section 11)

Table 1. History

Contents

1. Security Target Introduction

1.1 Security Target reference

Name	Security Target Lite SCX Luna1.xM M2M/In-Car SGP.32
Version	1.7
Date	18/7/2025
Author	Giesecke+Devrient Mobile Security Germany GmbH
Reference	GDI_Luna_SGP32_ASE_Lite

Table 2. Security Target reference

1.2 TOE reference

Name	SCX Luna1.xM M2M/In-Car SGP.32
Version	1.0
Reference	SCX Luna1.xM M2M/In-Car SGP.32

Table 3. TOE reference

2. TOE overview

2.1 TOE description

The TOE is a “whole eUICC” as defined in chapter 1.2.1 of **[PP-eUICC]** including:

- The complete TOE of the Base-PP (the Application Layer and the Platform Layer as shown in Figure 1)
- The secure IC platform and OS
- The Runtime Environment (the Java Card System), version 3.0.5
- The GlobalPlatform Card Content Management, version 2.3.1 plus **[GP AM B]** 1.2, **[GP AM D]** 1.2, **[GP AM E]** 1.1, **[GP AM F]** 1.2.1
- The Image Trusted Loader (ITL), which is a module that enables a full Operating System update. This update can be performed both in the factory (Over The Wire) or in the field (Over the Air),when the previous OS is already installed

The TOE implements the GSMA eSIM IoT Architecture and Requirements for IoT Devices **[SGP.31], [SGP.32]** and **[SGP.33-1]**. A detailed TOE overview is given in chapter 1.2 of **[PP-eUICC]**.

This Security Target is following scenario 3 of the Protection Profile Usage, according to [PP-eUICC], chapter 1.2.5. It is written to accomplish a composite evaluation of the system composed of the eUICC software, JCS and OS on top of a certified IC.

The delivery of the TOE happens at the end eUICC lifecycle Phase c according to section 1.2.3 of the **[PP-eUICC]**.

2.2 TOE type and usage

The TOE type is a composite of secure software implemented on secure IC.

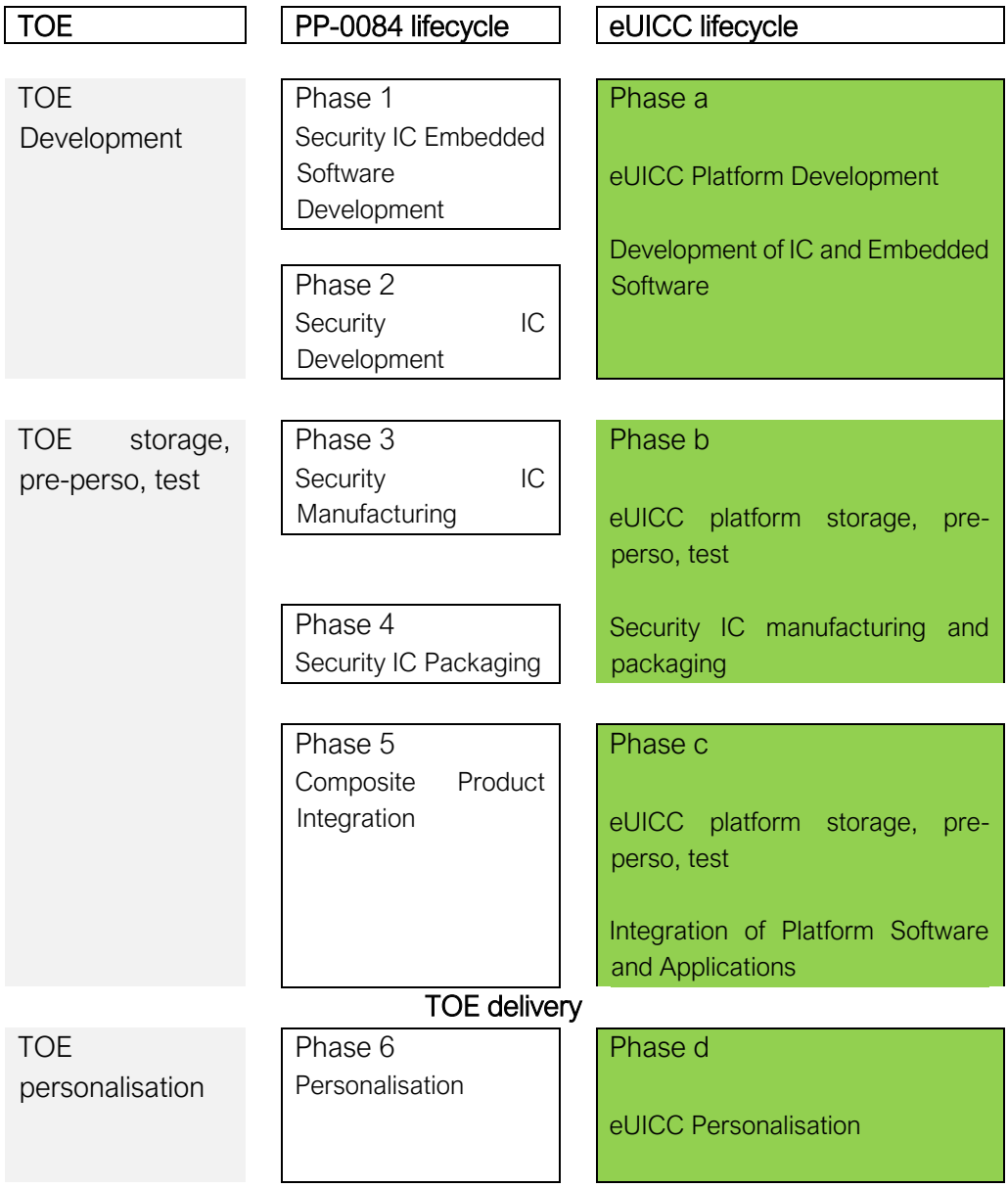
The eUICC is an UICC embedded in an IoT device. The eUICC is connected to a given mobile network, by the means of its currently enabled MNO Profile. The Profiles are not part of the TOE.

The TOE relies on IoT Profile Assistant (IPA), a software running in the device introduced and defined in the [SGP.31], [SGP.32] and [SGP.33-1] specifications. This is implemented as a non-TOE on-device until called IPAd.

2.3 TOE life cycle

The life-cycle of the TOE is composed of 5 phases where the delivery of the self-protected TOE happens at the end eUICC lifecycle Phase c as shown and described in Table 4. **Error! Reference source not found.** shows the actors and the sites involved in the indicated life cycle phases, and provides a brief statement of how the items are delivered.

The delivery of the TOE is performed before phase d.



		Addition of applications (profiles, ISD-P)
TOE Operational Usage	Phase7: TOE Operational Usage	Phase e eUICC integration, delivery of product to end-user eUICC remote provisioning OS updates via ITL functionality of the TOE

Table 4 TOE life-cycle phases and TOE delivery

During phase e of the lifecycle, the eUICC may be provisioned again, post-issuance, using the ITL. During this process, the eUICC lifecycle's phases from a to d, are not applicable.

2.3.1 Non-TOE HW/SW/FW available to the TOE

Non-TOE is same than the ones mentioned in **[PP-eUICC]**, section 1.2.4, except for Integrated Circuit (IC) or chip, Embedded Software (ES) and the Runtime Environment, which are part of the TOE.

2.4 TOE scope

2.4.1 Physical scope

Category	Component	Version	Delivery form
HW	SLM37ECA1M3 & SLI37CCA1M5 CC Certificate: NSCIB-CC-2200060-02	G11 and H11 (design step)	Diced wafer
FW	SLI37/SLM37 firmware	80.203.00.3	Binary in memory
SW	SCX Luna1.xM M2M/In-Car SGP.32	1.0	Binary in memory
DOC	Operative guidance	[AGD_OPE]	Pdf file
DOC	Preparative guidance	[AGD_PRE]	Pdf file
DOC	Security guidance	[AGD_SEC]	Pdf file

Table 5. TOE Physical scope

2.4.2 Logical scope

The TOE is a composite of eUICC OS implemented on a certified IC, as described in the section 2.1 of this ST.

The eUICC OS is composed by: Application Layer and Platform Layer. These layers are described in [PP-eUICC], section 1.2.1.

The logical boundaries of the TOE are delimited with a red line in Figure 1:

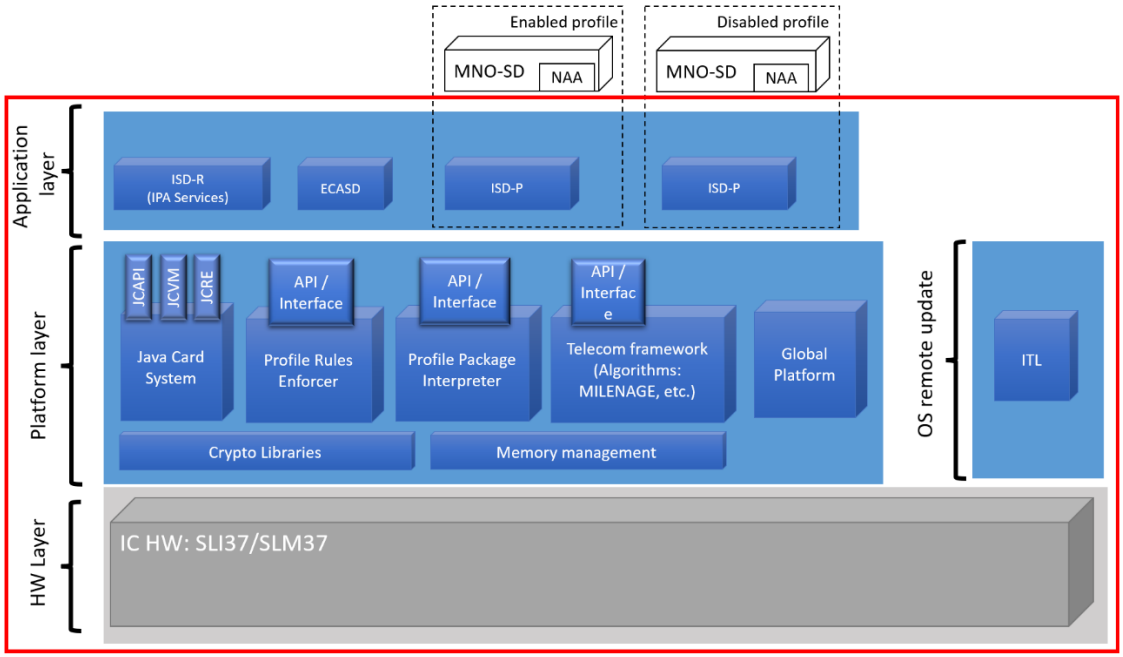


Figure 1 TOE Logical Scope

3. Conformance Claim

3.1 Common Criteria version and conformance with CC part 2 and part 3

The Security Target conforms to Common Criteria 2022 Release 1:

- CC Part 1 [CC1]
- CC Part 2 [CC2] (extended),
- CC Part 3 [CC3] (conformant),

The extended Security Functional Requirements are defined in section 6.

3.2 CC Part 5 [CC5]. Assurance package

This Security target conforms to the assurance package EAL4 augmented with ALC_DVS.2 and AVA_VAN.5.

ADV_ARC is refined to add a particular set of verifications on top of the existing requirement.

3.3 Protection Profile (PP) conformance claim

This Security Target claims demonstrable conformance to the [PP-eUICC] protection profile: Base-PP and Annex A - PP Module Update.

3.4 Conformance claim rationale

Conformance rationale of the ST against [PP-eUICC] is mapped below. The conformance rationale focuses on assets, threats, OSPs, assumptions, security objectives, and SFRs and the notation used is detailed below:

- Equivalent (E): The element in the ST is the same as in [PP-eUICC] .
- Refinement (R): The element in the ST refines the corresponding [PP-eUICC] element. New names are given between brackets and added to the list of elements.
- Addition (A): The element is newly defined in the ST; it is not present in [PP-eUICC] and does not affect it.
- X: The element is present in [PP-eUICC].

3.4.1 Conformity of the TOE Type

The TOE follows the third scenario from the definition in [PP-eUICC] when the embedded eUICC is embedded in a certified IC, but the OS and JCS features have not been certified. The ST additionally fulfils the IC objectives and introduces SFRs in order to meet the objectives for the OS and JCS. This is a composite evaluation of the system composed of the eUICC software, JCS and OS on top of a certified IC.

3.4.2 SPD Consistency

3.4.2.1 Assets consistency

All assets defined in Base-PP [PP-eUICC] are relevant for the TOE of this Security Target. Assets related to post-issuance update of the OS through ITL are described in [PP-eUICC] Annex A – PP Module OS update.

All assets are described in section 4.1.

The table below indicates the assets' consistency and the additions from [PP-JCS].

Assets	PP-eUICC	Security Target
D.MNO_KEYS	X	(E)
D.PROFILE_NAA_PARAMS	X	(E)
D.PROFILE_IDENTITY	X	(E)
D.PROFILE_RULES	X	(E)
D.PROFILE_CODE	X	(E)
D.TSF_CODE	X	(E)
D.PLATFORM_DATA	X	(E)
D.DEVICE_INFO	X	(E)
D.PLATFORM_RAT	X	(E)
D.SK.EUICC.ECDSA	X	(E)
D.CERT.EUICC.ECDSA	X	(E)
D.PK.CI.ECDSA	X	(E)
D.PK.EIM.ECDSA (SGP.32)	X	(E)
D.EID	X	(E)
D.SECRETS	X	(E)
D.CERT.EUM.ECDSA	X	(E)

D.CRLs	X	(E)
D.APP_CODE		(A): Added from [PP-JCS].
D.APP_C_DATA		(A): Added from [PP-JCS].
D.APP_I_DATA		(A): Added from [PP-JCS].
D.APP_KEYs		(A): Added from [PP-JCS].
D.PIN		(A): Added from [PP-JCS].
D.API_DATA		(A): Added from [PP-JCS].
D.CRYPTO		(A): Added from [PP-JCS].
D.JCS_CODE		(A): Added from [PP-JCS].
D.JCS_DATA		(A): Added from [PP-JCS].
D.SEC_DATA		(A): Added from [PP-JCS].
D.UPDATE_IMAGE	X	(E): from OS Update module
D.TOE_IDENTIFIER	X	(E): from OS Update module
D.OS-UPDATE_KEY(S)	X	(E): from OS Update module

Table 6. Assets Consistency table

3.4.2.2 Users and Subjects consistency

All Users defined in Base-PP [PP-eUICC] are relevant for the TOE of this Security Target. All users are described in section 4.2.

The table below indicates the Users' consistency.

User	PP-eUICC	Security Target
U.SM-DP+	X	(E)
U.SM-DS	X	(E)
U.MNO-OTA	X	(E)
U.MNO-SD	X	(E)
U.eIM (SGP.32)	X	(E)

Table 7. User consistency table

All Subjects defined in Base-PP [PP-eUICC] are relevant for the TOE of this Security Target. Subjects related to post-issuance update of the OS through ITL are described in [PP-eUICC] Annex A – PP Module OS update.

All subjects are described in section 4.2.

The table below indicates the Subjects' consistency and the additions from [PP-JCS] .

Subjects	PP-eUICC	Security Target

S.ISD-R	X	(E)
S.ISD-P	X	(E)
S.ECASD	X	(E)
S.PPI	X	(E)
S.PPE	X	(E)
S.TELECOM	X	(E)
S.ADEL		(A): Added from [PP-JCS].
S.APPLET		(A): Added from [PP-JCS].
S.BCV		(A): Added from [PP-JCS].
S.CAD		(A): Added from [PP-JCS].
S.INSTALLER		(A): Added from [PP-JCS].
S.JCRE		(A): Added from [PP-JCS].
S.JCVM		(A): Added from [PP-JCS].
S.LOCAL		(A): Added from [PP-JCS].
S.MEMBER		(A): Added from [PP-JCS].
S.CAP_FILE		(A): Added from [PP-JCS].
S.OSU	X	(E) From PP-module OS update
S.UpdateImageCreator	X	(E) From PP-module OS update

Table 8. Subjects Consistency table

3.4.2.3 Threats consistency

All Threats defined in [PP-eUICC] are relevant for the TOE of this Security Target. Threats related to post-issuance update of the OS through ITL are described in [PP-eUICC] Annex A – PP Module OS update.

All threats are described in section 4.3.

The table below indicates the Threats' consistency.

Threats	PP-eUICC	Security Target
T.UNAUTHORIZED-PROFILE-MNG	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.
T.UNAUTHORIZED-PLATFORM-MNG	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.
T.PROFILE-MNG-INTERCEPTION	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.
T.PROFILE-MNG-ELIGIBILITY	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.

T.UNAUTHORIZED-IDENTITY-MNG	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.
T.IDENTITY-INTERCEPTION	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.
T.UNAUTHORIZED-eUICC	X	(E)
T.LPAd-INTERFACE-EXPLOIT	X	(E)
T.UNAUTHORIZED-MOBILE-ACCESS	X	(E)
T.LOGICAL-ATTACK	X	(R): Assets added from [PP-JCS] are mapped as threatened assets.
T.PHYSICAL-ATTACK	X	(E)
T.CONFID-UPDATE-IMAGE.LOAD	X	(E): From PP-module OS update
T.INTEG-UPDATE-IMAGE.LOAD	X	(E): From PP-module OS update
T.UNAUTH-UPDATE-IMAGE.LOAD	X	(E): From PP-module OS update
T.INTERRUPT_OSU	X	(E): From PP-module OS update

Table 9. Threats Consistency table

3.4.2.4 Organizational Security Policies consistency

All Organizational Security Policies defined in [PP-eUICC] are relevant for the TOE of this Security Target. All OSPs are described in section 4.4.

The table below indicates the Organizational Security Policies' consistency.

OSPs	PP-eUICC	Security Target
OSP.LIFE-CYCLE	X	(E)

Table 10. Organizational Security Policies Consistency table

3.4.2.5 Assumptions consistency

All Assumptions defined in [PP-eUICC] are relevant for the TOE of this Security Target.

The table below indicates the Assumptions consistency.

Assumptions	PP-eUICC	Security Target
A.TRUSTED-PATHS-LPAd-IPAd	X	(E)
A.ACTORS	X	(E)
A.APPLICATIONS	X	(E)
A.CAP_FILE		(A): Added from [PP-JCS]

Table 11. Assumptions Consistency table

3.4.3 Security Objectives Consistency

3.4.3.1 Objective for the TOE consistency

All Security Objectives defined in [PP-eUICC] are relevant for the TOE of this Security Target. Security Objectives related to post-issuance update of the OS through ITL are described in [PP-eUICC] Annex A – PP Module OS update.

All objectives are described in section 5.

The table below indicates the Security Objectives' consistency.

Note that OE.RE* and OE.IC* from [PP-eUICC] become security objectives from the TOE in the present security target. The [PP-eUICC] already provides the conversion of OE.RE* to objectives from the [PP-JCS] protection profile.

O.TOE	PP-eUICC	Security Target
O.PPE-PPI	X	(E)
O.eUICC-DOMAIN-RIGHTS	X	(E)
O.SECURE-CHANNELS	X	(E)
O.INTERNAL-SECURE-CHANNELS	X	(E)
O.PROOF_OF_IDENTITY	X	(E)
O.OPERATE	X	(E)
O.API	X	(E)
O.DATA-CONFIDENTIALITY	X	(E)
O.DATA-INTEGRITY	X	(E)
O.ALGORITHMS	X	(E)
O.SECURE_LOAD_ACODE	X	(E) From PP-module OS update
O.SECURE_AC_ACTIVATION	X	(E) From PP-module OS update
O.TOE_IDENTIFICATION	X	(E) From PP-module OS update
O.CONFID-UPDATE-IMAGE.LOAD	X	(E) From PP-module OS update
O.AUTH-LOAD-UPDATE-IMAGE	X	(E) From PP-module OS update
O.IC.PROOF_OF_IDENTITY		(A) Replaces OE.IC.PROOF_OF_IDENTITY from PP-eUICC
O.IC.SUPPORT		(A) Replaces OE.IC. SUPPORT from PP-eUICC
O.IC.RECOVERY		(A) Replaces OE.IC. RECOVERY from PP-eUICC
O.RE.PRE-PPI		(A) Replaces OE. RE.PRE-PPI from PP-eUICC

O.RE.SECURE-COMM		(A) Replaces OE. RE.SECURE-COMM from PP-eUICC
O.RE.API		(A) Replaces OE. RE.API from PP-eUICC
O.RE.DATA-CONFIDENTIALITY		(A) Replaces OE. RE.DATA-CONFIDENTIALITY from PP-eUICC
O.RE.DATA-INTEGRITY		(A) Replaces OE. RE.DATA-INTEGRITY from PP-eUICC
O.RE.IDENTITY		(A) Replaces OE. RE.IDENTITY from PP-eUICC
O.RE.CODE-EXE		(A) Replaces OE. RE.CODE-EXE from PP-eUICC

Table 12. Security objectives for the TOE consistency table

3.4.4 Objective for Environment consistency

O.ENV	PP-eUICC	Security Target
OE.CI	X	(E)
OE.SM-DP+	X	(E)
OE.SM-DS	X	(E)
OE.MNO	X	(E)
OE.TRUSTED-PATHS-LPAd-IPAd	X	(E)
OE.APPLICATIONS	X	(E)
OE.EIM (SGP.32)	X	(E)
OE.CODE-EVIDENCE		(A): Added from [PP-JCS].
OE.CAP-FILE		(A): Added from [PP-JCS].
OE.MNO-SD	X	(E)
OE.IC.PROOF_OF_IDENTITY	X	Removed and replaced by O.IC.PROOF_OF IDENTITY.
OE.IC.SUPPORT	X	Removed and replaced by O.IC.SUPPORT.
OE.IC.RECOVERY	X	Removed and replaced by O.IC.RECOVERY.
OE.RE.PRE-PPI	X	Removed and replaced by O.RE.PRE-PPI.
OE.RE.SECURE-COMM	X	Removed and replaced by O.RE.SECURE-COMM.
OE.RE.API	X	Removed and replaced by O.RE.API.
OE.RE.DATA-CONFIDENTIALITY	X	Removed and replaced by O.RE.DATA-CONFIDENTIALITY.
OE.RE.DATA-INTEGRITY	X	Removed and replaced by O.RE.DATA-INTEGRITY

OE.RE.IDENTITY	X	Removed and replaced by O.RE.IDENTITY
OE.RE.CODE-EXE	X	Removed and replaced by O.RE.CODE-EXE
OE.CONFID_UPDATE_IMAGE.CREATE	X	(E): From PP-module OS update

Table 13. Security objectives for the Operational Environment consistency table

3.4.5 Conformity of the Requirement (SFR/SAR)

3.4.5.1 SFR consistency

Note 1: The dependency FCS_CKM.3 of FCS_COP.1, FCS_CKM.1 and FCS_CKM.2 are discarded. This dependency is discarded as there is no Interface to access the keys.

Note 2: The dependency FAU_SAA.1 of FAU_ARP.1 is discarded. The dependency of FAU_ARP.1 on FAU_SAA.1 assumes that a "potential security violation" generates an audit event. On the contrary, the events listed in FAU_ARP.1 are self-contained (arithmetic exception, ill-formed bytecodes, access failure) and ask for a straightforward reaction of the TSFs on their occurrence at runtime. The JCVM or other components of the TOE detect these events during their usual working order. Thus, there is no mandatory audit recording in this ST.

SFR	PP-eUICC	Security Target
FIA_UID.1/EXT	X	Assignment performed.
FIA_UAU.1/EXT	X	Assignment performed.
FIA_USB.1/EXT	X	Selection performed.
FIA_UAU.4/EXT	X	Selection performed.
FIA_UID.1/MNO-SD	X	Assignment performed.
FIA_USB.1/MNO-SD	X	(E)
FIA_ATD.1/Base	X	Selection performed.
FIA_API.1	X	(E)
FDP_IFC.1/SCP	X	(E)
FDP_IFF.1/SCP	X	Assignment performed.
FTP_ITC.1/SCP	X	Assignment performed.
FDP_ITC.2/SCP	X	Assignment performed.
FPT_TDC.1/SCP	X	Assignment performed.
FDP_UCT.1/SCP	X	(E)
FDP_UIT.1/SCP	X	(E)
FCS_CKM.1/SCP-SM	X	Assignment performed.

FCS_CKM.2/SCP-MNO	X	Selection and Assignment performed.
FCS_CKM.6/SCP-SM	X	Selection and Assignment performed.
FCS_CKM.6/SCP-MNO	X	Selection and Assignment performed.
FDP_ACC.1/ISDR	X	(E)
FDP_ACF.1/ISDR	X	Selection and Assignment performed.
FDP_ACC.1/ECASD	X	Assignment performed.
FDP_ACF.1/ECASD	X	Assignment performed.
FDP_IFC.1/Platform_services	X	Selection performed.
FDP_IFF.1/Platform_services	X	Selection and Assignment performed.
FPT_FLS.1/Platform_services	X	Selection and Assignment performed.
FCS_RNG.1	X	Selection and assignment performed. Refined.
FPT_EMS.1/Base	X	Assignment performed.
FDP_SDI.1/Base	X	(E)
FDP_RIP.1/Base	X	(E)
FPT_FLS.1/Base	X	(E)
FMT_MSA.1/PLATFORM_DATA	X	(E)
FMT_MSA.1/CERT_KEYS	X	Selection performed.
FMT_SMF.1/Base	X	Assignment performed.
FMT_SMR.1/Base	X	Selection performed.
FMT_MSA.1/RAT	X	(E)
FMT_MSA.3	X	(E)
FCS_COP.1/Mobile_network	X	Selection and Assignment performed.
FCS_CKM.2/Mobile_network	X	Assignment performed.
FCS_CKM.6/Mobile_network	X	Selection and Assignment performed.
FDP_ACC.2/FIREWALL		(A) Added from [PP-JCS].
FDP_ACF.1/FIREWALL		(A) Added from [PP-JCS].
FDP_IFC.1/JCVM		(A) Added from [PP-JCS].

FDP_IFF.1/JCVM		(A) Added from [PP-JCS].
FDP_RIP.1/OBJECTS		(A) Added from [PP-JCS].
FMT_MSA.1/JCRE		(A) Added from [PP-JCS].
FMT_MSA.1/JCVM		(A) Added from [PP-JCS].
FMT_MSA.2/FIREWALL_JCVM		(A) Added from [PP-JCS].
FMT_MSA.3/FIREWALL		(A) Added from [PP-JCS].
FMT_MSA.3/JCVM		(A) Added from [PP-JCS].
FMT_SMF.1/RE		(A) Added from [PP-JCS]. Refined with iteration.
FMT_SMR.1/RE		(A) Added from [PP-JCS]. Refined with iteration.
FCS_CKM.1/ECC		(A) Added from [PP-JCS]. Refined with iteration.
FCS_CKM.6/RE		(A) Added from [CC2]. Refined with iteration. Replaces FCS_CKM.4 from [PP-JCS]
FCS_COP.1 **/SHA** **/SIG_ECC** **/ECDH** **/MAC_TDES** **/MAC_AES** **/HMAC** **/CIPH_TDES** **/CIPH_AES** **/CIPH_AES_GCM** **/ECKA-EG**		(A) Added from [PP-JCS]. Refined with iteration.
FDP_RIP.1/ABORT		(A) Added from [PP-JCS].
FDP_RIP.1/APDU		(A) Added from [PP-JCS].
FDP_RIP.1/bArray		(A) Added from [PP-JCS].
FDP_RIP.1/GlobalArray		(A) Added from [PP-JCS].
FDP_RIP.1/KEYS		(A) Added from [PP-JCS].
FDP_RIP.1/TRANSIENT		(A) Added from [PP-JCS].
FDP_ROL.1/FIREWALL		(A) Added from [PP-JCS].
FCS_CKM.1/GP-SCP		(A): Added from [PP-GP]

FCS_COP.1/GP-SCP		(A): Added from [PP-GP]
FAU_ARP.1		(A) Added from [PP-JCS].
FDP_SDI.2/DATA		(A) Added from [PP-JCS].
FPR_UNO.1		(A) Added from [PP-JCS].
FPT_FLS.1/RE		(A) Added from [PP-JCS]. Refined with iteration.
FPT_TDC.1/RE		(A) Added from [PP-JCS]. Refined with iteration.
FIA_ATD.1/AID		(A) Added from [PP-JCS].
FIA_UID.2/AID		(A) Added from [PP-JCS].
FIA_USB.1/AID		(A) Added from [PP-JCS].
FMT_MTD.1/JCRE		(A) Added from [PP-JCS].
FMT_MTD.3/JCRE		(A) Added from [PP-JCS].
FDP_ACC.2/ADEL		(A) Added from [PP-JCS].
FDP_ACF.1/ADEL		(A) Added from [PP-JCS].
FDP_RIP.1/ADEL		(A) Added from [PP-JCS].
FMT_MSA.1/ADEL		(A) Added from [PP-JCS].
FMT_MSA.3/ADEL		(A) Added from [PP-JCS].
FMT_SMF.1/ADEL		(A) Added from [PP-JCS].
FMT_SMR.1/ADEL		(A) Added from [PP-JCS].
FPT_FLS.1/ADEL		(A) Added from [PP-JCS].
FDP_RIP.1/ODEL		(A) Added from [PP-JCS].
FPT_FLS.1/ODEL		(A) Added from [PP-JCS].
FAU_SAS.1		(A) Added to cover O.IC.PROOF_OF_IDENTITY.
FPT_RCV.3/OS		(A): Added to cover O.IC.RECOVERY.
FPT_RCV.4/OS		(A): Added to cover O.IC.SUPPORT.
FPT_PHP.3		(A): Added to cover O.IC.SUPPORT.
FIA_AFL.1/GP		(A): Added from [PP-GP]
FIA_UAU.1/GP		(A): Added from [PP-GP]
FIA_UAU.4/GP		(A): Added from [PP-GP]
FDP_UIT.1/GP		(A): Added from [PP-GP]

FDP_UCT.1/GP		(A): Added from [PP-GP]
FDP_IFC.2/GP-KL		(A): Added from [PP-GP]
FDP_IFC.2/GP-ELF		(A): Added from [PP-GP]
FMT_MSA.3/GP		(A): Added from [PP-GP]
FMT_MSA.1/GP		(A): Added from [PP-GP]
FMT_SMR.1/GP		(A): Added from [PP-GP]. Refinement of FDP_SMR.1/Installer and FDP_SMR.1/CM.
FPT_FLS.1/GP		(A): Added from [PP-GP]. Refinement of FPT_FLS.1/Installer.
FPT_RCV.3/GP		(A): Added from [PP-GP]. Refinement of FPT_RCV.3/Installer
FDP_ITC.2/GP-ELF		(A): Added from [PP-GP]. Refinement of FDP_ITC.2/Installer.
FDP_ITC.2/GP-KL		(A): Added from [PP-GP]
FTP_ITC.1/GP		(A): Added from [PP-GP]
FDP_IFF.1/GP-ELF		(A): Added from [PP-GP]
FDP_IFF.1/GP-KL		(A): Added from [PP-GP]
FMT_SMF.1/GP		(A): Added from [PP-GP]. Refinement performed.
FIA_UID.1/GP		(A): Added from [PP-GP]
FPT_TDC.1/GP		(A): Added from [PP-GP]
FCO_NRO.2/GP		(A): Added from [PP-GP]
FDP_ROL.1/GP		(A): Added from [PP-GP]
FDP_ACC.1/OS-UPDATE		(A): Added from [PP-GP]
FDP_ACF.1/OS-UPDATE		(A): Added from [PP-GP]
FMT_MSA.3/OS-UPDATE		(A): Added from [PP-GP]
FMT_SMR.1/OS-UPDATE		(A): Added from [PP-GP]
FMT_SMF.1/OS-UPDATE		(A): Added from [PP-GP]
FIA_ATD.1/OS-UPDATE		(A): Added from [PP-GP]
FTP_TRP.1/OS-UPDATE		(A): Added from [PP-GP]
FCS_COP.1/OS-UPDATE-DEC		(A): Added from [PP-GP]

FCS_COP.1/OS-UPDATE-VER		(A): Added from [PP-GP]
FPT_FLS.1/OS-UPDATE		(A): Added from [PP-GP]

Table 14 Security Functional Requirement consistency table

3.4.5.2 SAR consistency

This ST claims the same evaluation assurance level as [PP-eUICC], i.e., EAL4 augmented with ALC_DVS.2 and AVA_VAN.5.

4. Security Problem definition

This chapter introduces the security problem addressed by the TOE and its operational environment. The security problem consists of the threats the TOE may face in the field, the assumptions on its operational environment, and the organizational policies that must be implemented by the TOE or within the operational environment.

4.1 Assets

The definition of the assets from [PP-eUICC] and [PP-JCS] is not repeated here.

See section 3.4.2.1 for complete list is assets.

4.2 Users and Subjects

The definition of users and subjects from [PP-eUICC] and [PP-JCS] is not repeated here.

See section 3.4.2.2 for a complete list of users and subjects.

4.3 Threats

The definition of threats from [PP-eUICC] where no refinements are made is not repeated here.

See section 3.4.2.3 for complete list is threats.

Refined threats description are detailed below:

T.UNAUTHORIZED-PROFILE-MNG

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatens the assets: D.ISDP_KEYS, D.MNO_KEYS, D.TSF_CODE (ISD-P), D.PROFILE_*, D.APP_C_DATA, D.APP_I_DATA, D.PIN, D.APP_KEYs and D.APP_CODE.

T.UNAUTHORIZED-PLATFORM-MNG

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatened assets are D.TSF_CODE, D.PLATFORM_DATA, D.PLATFORM_RAT. By altering the behaviour of ISD-R or PPE, the attacker indirectly threatens the provisioning status of the eUICC, thus also threatens the same assets as T.UNAUTHORIZED-PROFILE-MNG

T.PROFILE-MNG-INTERCEPTION

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatens the assets: D.MNO_KEYS, D.TSF_CODE (ISD-P and ISD-R), D.PROFILE_*., D.APP_C_DATA, D.PIN and D.APP_KEYs.

T.PROFILE-MNG-ELIGIBILITY

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatens the assets: D.TSF_CODE, D.DEVICE_INFO, D.EID, D.APP_C_DATA, D.PIN, D.APP_KEYs, D.APP_CODE and D.APP_I_DATA.

T.UNAUTHORIZED-IDENTITY-MNG

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatens the assets: D.TSF_CODE, D.SK.EUICC.ECDSA, D.SECRETS, D.CERT.EUICC.ECDSA, D.PK.CI.ECDSA, D.EID, D.CERT.EUM.ECDSA, D.CRLs, D.PK.EIM.ECDSA, D.APP_CODE, D.APP_I_DATA, D.PIN, D.APP_KEYs, D.APP_C_DATA and D.SEC_DATA.

T.IDENTITY-INTERCEPTION

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatens the assets: D.SECRETS, D.EID, D.APP_C_DATA, D.PIN and D.APP_KEYs.

T.LOGICAL-ATTACK

The definition of this threat is present in [PP-eUICC]. The mapping against assets has been refined as detailed below.

Directly threatens the assets: D.TSF_CODE, D.PROFILE_NAA_PARAMS, D.PROFILE_RULES, D.PLATFORM_DATA, D.PLATFORM_RAT, D.JCS_CODE, D.API_DATA, D.SEC_DATA, D.JCS_DATA, D.CRYPTO, D.APP_CODE, D.APP_I_DATA, D.PIN, D.APP_KEYs and D.APP_C_DATA..

4.4 Organizational Security Policies

The definition of organizational security policies from [PP-eUICC] and [PP-JCS] is not repeated here.

See section 3.4.2.4 for complete list is organizational security policies.

4.5 Assumptions

The definition of assumptions from [PP-eUICC] and [PP-JCS] is not repeated here.

See section 3.4.2.5 for complete list is organizational security policies.

5. Security Objectives

This section introduces the security objectives for the TOE.

5.1 Security Objectives for the TOE

The list and definitions of the Security Objectives for the TOE from [PP-eUICC] and [PP-JCS] are not repeated here.

See section 3.4.3 for complete list is Security Objectives for the TOE.

Some objectives from the environment have been converted to objectives of the TOE, specifically the ones from [PP-eUICC] related to OE.RE* and OE.IC*. The replaced objectives from 3.4.4 and their description are listed next:

Sec. Objectives for the TOE	Description
O.IC.PROOF_OF_IDENTITY	The underlying IC used by the TOE is uniquely identified.
O.IC.SUPPORT	The IC embedded software shall support the following functionalities: (1) It does not allow the TSFs to be bypassed or altered and does not allow access to low-level functions other than those made available by the packages of the API. That includes the protection of its private data and code (against disclosure or modification). (2) It provides secure low-level cryptographic processing to Profile Policy Enabler, Profile Package Interpreter, and Telecom Framework (S.PPE, S.PPI, and S.TELECOM). (3) It allows the S.PPE, S.PPI, and S.TELECOM to store data in "persistent technology memory" or in volatile memory, depending on its needs (for instance, transient objects must not be stored in non-volatile memory). The memory model is structured and allows for low-level control accesses (segmentation fault detection). (4) It provides a means to perform memory operations atomically for S.PPE, S.PPI, and S.TELECOM.
O.IC.RECOVERY	If there is a loss of power while an operation is in progress, the underlying IC must allow the TOE to eventually complete the interrupted operation successfully, or recover to a consistent and secure state.
O.RE.PRE-PPI	The Runtime Environment shall provide secure means for card management activities, including: load of a package file, installation of a package file, extradition of a package file or an application, personalization of an application or a Security Domain, deletion of a package file or an application, privileges

	update of an application or a Security Domain, access to an application outside of its expected availability.
O.RE.SECURE-COMM	The Runtime Environment shall provide means to protect the confidentiality and integrity of applications communication.
O.RE.API	The Runtime Environment shall ensure that native code can be invoked only via an API.
O.RE.DATA-CONFIDENTIALITY	The Runtime Environment shall provide a means to protect at all times the confidentiality of the TOE sensitive data it processes.
O.RE.DATA-INTEGRITY	The Runtime Environment shall provide a means to protect at all times the integrity of the TOE sensitive data it processes.
O.RE.IDENTITY	The Runtime Environment shall ensure the secure identification of the applications it executes.
O.RE.CODE-EXE	The Runtime Environment shall prevent unauthorized code execution by applications.

Table 15. Security Objectives TOE

5.2 Security Objectives for the Operational Environment

The list and definitions of the Security Objectives for the TOE from [PP-eUICC] and [PP-JCS] are not repeated here.

See section 3.4.4 for complete list is Security Objectives for the Operational Environment.

5.3 Security Objectives Rationale

5.3.1 Threats

5.3.1.1 Unauthorized profile and platform management

T.UNAUTHORIZED-PROFILE-MNG

This threat is covered by requiring authentication and authorization from the legitimate actors:

- O.PRE-PPI and O.eUICC-DOMAIN-RIGHTS ensure that only authorized and authenticated actors (SM-DP+ and MNO OTA Platform) will access the Security Domains functions and content;

- OE.SM-DP+ and OE.MNO protect the corresponding credentials when used offcard. The on-card access control policy relies upon the underlying Runtime Environment, which ensures confidentiality and integrity of application data (O.RE.DATA-CONFIDENTIALITY and O.RE.DATA-INTEGRITY). The authentication is supported by corresponding secure channels:

- O.SECURE-CHANNELS and O.INTERNAL-SECURE-CHANNELS provide a secure channel for communication with SM-DP+ and a secure channel for communication with MNO OTA Platform. These secure channels rely upon the underlying Runtime Environment, which protects the applications communications (O.RE.SECURE-COMM).

Since the MNO-SD Security Domain is not part of the TOE, the operational environment has to guarantee that it will use securely the SCP80/81 secure channel provided by the TOE (OE.MNO-SD).

In order to ensure the secure operation of the Application Firewall, the following objectives for the operational environment are also required:

- compliance to security guidelines for applications (OE.APPLICATIONS).

T.UNAUTHORIZED-PLATFORM-MNG

This threat is covered by requiring authentication and authorization from the legitimate actors:

- O.PRE-PPI and O.eUICC-DOMAIN-RIGHTS ensure that only authorized and authenticated actors will access the Security Domains functions and content.

- OE.SM-DP+ and OE.EIM (SGP.32) protect the corresponding credentials when used off- card.

The on-card access control policy relies upon the underlying Runtime Environment, which ensures confidentiality and integrity of application data (O.RE.DATA-CONFIDENTIALITY and O.RE.DATA-INTEGRITY).

In order to ensure the secure operation of the Application Firewall, the following objectives for the operational environment are also required:

- compliance to security guidelines for applications (OE.APPLICATIONS).

T.PROFILE-MNG-INTERCEPTION

Commands and profiles are transmitted by the SM-DP+ to its on-card representative (ISD-P), while profile data (including meta-data such as PPRs) is also transmitted by the MNO OTA Platform to its on-card representative (MNO-SD) by means of RPM requests from Profile owner to ISD-R (UpdateMetadataRequest), or by means of PSMO commands from eIM to ISD-R (SGP.32

Consequently, the TSF ensures:

- Security of the transmission to the Security Domain (O.SECURE-CHANNELS and O.INTERNAL-SECURE-CHANNELS) by requiring authentication from SM-DP+ and MNO OTA Platforms, and protecting the transmission from unauthorized disclosure, modification and replay. These secure channels rely upon the underlying Runtime Environment, which protects the applications communications (O.RE.SECURE-COMM).

Since the MNO-SD Security Domain is not part of the TOE, the operational environment has to guarantee that it will securely use the SCP80/81 secure channel provided by the TOE (OE.MNO-SD).
OE.SM-DP+, OE.MNO and OE.EIM (SGP.32) ensure that the credentials related to the secure channels will not be disclosed when used by off-card actors.

T.PROFILE-MNG-ELIGIBILITY

Device Info and eUICCInfo2, transmitted by the eUICC to the SM-DP+, are used by the SM-DP+ to perform the Eligibility Check prior to allowing profile download onto the eUICC.

Consequently, the TSF ensures:

- Security of the transmission to the Security Domain (O.SECURE-CHANNELS and O.INTERNAL-SECURE-CHANNELS) by requiring authentication from SM-DP+, and protecting the transmission from unauthorized disclosure, modification and replay. These secure channels rely upon the underlying Runtime Environment, which protects the applications communications (OE.RE.SECURE-COMM).

OE.SM-DP+ ensures that the credentials related to the secure channels will not be disclosed when used by off-card actors.
O.DATA-INTEGRITY and O.RE.DATA-INTEGRITY ensure that the integrity of Device Info and eUICCInfo2 is protected at the eUICC level.

5.3.1.2 Identity Tampering

T.UNAUTHORIZED-IDENTITY-MNG

O.PRE-PPI and O.eUICC-DOMAIN-RIGHTS covers this threat by providing an access control policy for ECASD content and functionality.

The on-card access control policy relies upon the underlying Runtime Environment, which ensures confidentiality and integrity of application data (O.RE.DATA-CONFIDENTIALITY and O.RE.DATA-INTEGRITY).

O.RE.IDENTITY ensures that at the Java Card level, the applications cannot impersonate other actors or modify their privileges.

T.IDENTITY-INTERCEPTION

O.INTERNAL-SECURE-CHANNELS ensures the secure transmission of the shared secrets from the ECASD to ISD-R and ISD-P. These secure channels rely upon the underlying Runtime Environment, which protects the applications communications (O.RE.SECURE-COMM).

OE.CI ensures that the eSIM CA will manage securely its credentials off-card.

5.3.1.3 eUICC cloning

T.UNAUTHORIZED-eUICC

O.PROOF_OF_IDENTITY guarantees that the off-card actor can be provided with a cryptographic proof of identity based on an EID.

O.PROOF_OF_IDENTITY guarantees this EID uniqueness by basing it on the eUICC hardware identification (which is unique due to O.IC.PROOF_OF_IDENTITY).

5.3.1.4 LPAd impersonation

T.LPAd-INTERFACE-EXPLOIT

OE.TRUSTED-PATHS-LPAd-IPAd ensures that the interfaces ES10a and ES10b are trusted paths to the IPA.

5.3.1.5 Unauthorized access to the mobile network

T.UNAUTHORIZED-MOBILE-ACCESS

The objective O.ALGORITHMS ensures that a profile may only access the mobile network using a secure authentication method, which prevents impersonation by an attacker.

5.3.1.6 Second Level Threats

T.LOGICAL-ATTACK

This threat is covered by controlling the information flow between Security Domains and the PPE, PPI, the Telecom Framework or any native/OS part of the TOE. As such it is covered:

- by the APIs provided by the Runtime Environment (O.RE.API);
- by the APIs of the TSF (O.API); the APIs of Telecom Framework, PRE and PPI shall ensure atomic transactions (O.IC.SUPPORT).

Whenever sensitive data of the TOE are processed by applications, confidentiality and integrity must be protected at all times by the Runtime Environment (O.RE.DATACONFIDENTIALITY, O.RE.DATA-INTEGRITY). However these sensitive data are also processed by the PRE, PPI and the Telecom Framework, which are not protected by these mechanisms. Consequently,

- the TOE itself must ensure the correct operation of PRE, PPI and Telecom Framework (O.OPERATE), and

- PRE, PPI and Telecom Framework must protect the confidentiality and integrity of the sensitive data they process, while applications must use the protection mechanisms provided by the Runtime Environment (O.DATA-CONFIDENTIALITY, O.DATA-INTEGRITY).

The following objectives for the operational environment are also required:
- prevention of unauthorized code execution by applications (OE.RE.CODE-EXE),
- compliance to security guidelines for applications (OE.APPLICATIONS).

T.PHYSICAL-ATTACK

This threat is countered mainly by physical protections which rely on the underlying Platform and are therefore an environmental issue.

The security objectives O.IC.SUPPORT and O.IC.RECOVERY protect sensitive assets of the Platform against loss of integrity and confidentiality and especially ensure the TSFs cannot be bypassed or altered.

In particular, the security objective O.IC.SUPPORT provides functionality to ensure atomicity of sensitive operations, secure low level access control and protection against bypassing of the security features of the TOE. In particular, it explicitly ensures the independent protection in integrity of the Platform data.

Since the TOE cannot only rely on the IC protection measures, the TOE shall enforce any necessary mechanism to ensure resistance against side channels (O.DATACONFIDENTIALITY). For the same reason, the Java Card Platform security architecture must cover side channels (O.RE.DATA-CONFIDENTIALITY).

5.3.1.7 OS updates

T.CONFID-UPDATE-IMAGE.LOAD

O.CONFID-UPDATE-IMAGE.LOAD Counters the threat by ensuring the confidentiality of D.UPDATE_IMAGE during installing it on the TOE.

OE.CONFID-UPDATE-IMAGE.CREATE Counters the threat by ensuring that the D.UPDATE_IMAGE is not transferred in plain and that the keys are kept secret.

T.INTEG-UPDATE-IMAGE.LOAD

O.SECURE_LOAD_ACODE Counters the threat directly by ensuring the authenticity and integrity of D.UPDATE_IMAGE.

T.UNAUTH-UPDATE-IMAGE.LOAD

O.SECURE_LOAD_ACODE Counters the threat directly by ensuring that on-ly authorized (allowed version) images can be installed.

O.AUTH-LOAD-UPDATE-IMAGE Counters the threat directly by ensuring that only authorized (allowed version) images can be loaded.

T.INTERRUPT_OSU

O.SECURE_LOAD_ACODE Counters the threat directly by ensuring that the TOE remains in a secure state after interruption of the OS Update procedure (Load Phase).

O.TOE_IDENTIFICATION Counters the threat directly by ensuring that D.TOE_IDENTIFICATION is only updated after successful OS Update procedure.

O.SECURE_AC_ACTIVATION Counters the threat directly by ensuring that the update OS is only activated after successful (atomic) OS Update procedure.

5.3.2 Organizational Security Policies

The OSP defined is OSP.LIFE-CYCLE as in [PP-eUICC].

5.3.3 Assumptions

The assumptions A.TRUSTED-PATHS-LPAd-IPAd, A.ACTORS and A.APPLICATIONS are defined as in [PP-eUICC]. A.CAP_FILE is defined as in [PP-JCS] section 5.4. A.CAP-FILE is defined as in [PP-JCS] section 5.4 .

5.3.4 Rationale Tables

5.3.4.1 Threats Rationale

Threats	Security Objectives	Rationale
T.UNAUTHORIZEDPROFILE-MNG	O.eUICC-DOMAIN-RIGHTS, OE.SM-DP+, OE.MNO, O.PRE-PPI, O.SECURE-CHANNELS, OE.APPLICATIONS, and OE.CODE-EVIDENCE, O.INTERNAL-SECURECHANNELS, .RE.SECURE-COMM, O.RE.DATACONFIDENTIALITY, O.RE.DATA-INTEGRITY, OE.MNO-SD	Section 5.3.1.1

T.UNAUTHORIZEDPLATFORM-MNG	O.eUICC-DOMAIN-RIGHTS, O.PRE-PPI, OE.APPLICATIONS, and OE.CODE-EVIDENCE, O.RE.DATA-CONFIDENTIALITY, O.RE.DATA-INTEGRITY, OE.EIM (SGP.32)	Section 5.3.1.1
T.PROFILE-MNG-INTERCEPTION	OE.SM-DP+, OE.MNO, O.SECURE-CHANNELS, O.INTERNAL-SECURE-CHANNELS, OE.RE.SECURE- COMM, OE.MNO-SD, OE.EIM (SGP.32)	Section 5.3.1.1
T.PROFILE-MNG-ELIGIBILITY	OE.SM-DP+, OE.RE.SECURE-COMM, O.SECURE- CHANNELS, O.INTERNAL-SECURE-CHANNELS, OE.RE.DATA-INTEGRITY, O.DATA-INTEGRITY	Section 5.3.1.1
T.UNAUTHORIZED-IDENTITY-MNG	O.eUICC-DOMAIN-RIGHTS, O.PPE-PPI, O.RE.DATA-CONFIDENTIALITY, O.RE.DATA-INTEGRITY, O.RE.IDENTITY	Section 5.3.1.2
T.IDENTITY-INTERCEPTION	OE.CI, O.INTERNAL-SECURE-CHANNELS, O.RE.SECURE-COMM	Section 5.3.1.2
T.UNAUTHORIZED-eUICC	O.PROOF_OF_IDENTITY, O.IC.PROOF_OF_IDENTITY	Section 5.3.1.3
T.LPAd-INTERFACE-EXPLOIT	OE.TRUSTED-PATHS-LPAd-IPAd	Section 5.3.1.4
T.UNAUTHORIZED-MOBILE-ACCESS	O.ALGORITHMS	Section 5.3.1.5
T.LOGICAL-ATTACK	O.DATA-CONFIDENTIALITY, O.DATA-INTEGRITY, O.API, OE.APPLICATIONS, O.OPERATE, OE.RE.API, OE.RE.CODE-EXE, OE.IC.SUPPORT, OE.RE.DATA-CONFIDENTIALITY, OE.RE.DATA-INTEGRITY	Section 5.3.1.6
T.PHYSICAL-ATTACK	O.IC.SUPPORT, O.IC.RECOVERY, O.DATA-CONFIDENTIALITY, O.RE.DATA-CONFIDENTIALITY	Section 5.3.1.6
T.CONFID-UPDATE-IMAGE.LOAD	O.CONFID-UPDATEIMAGE.LOAD, OE.CONFID-UPDATEIMAGE.CREATE	Section 5.3.1.7
T.UNAUTH-UPDATE-IMAGE.LOAD	O.SECURE_LOAD_ACODE, O.AUTH-LOAD-UPDATE-IMAGE	Section 5.3.1.7
T.INTEG-UPDATE-IMAGE.LOAD	O.SECURE_LOAD_ACODE	Section 5.3.1.7
T.INTERRUPT_OSU	O.SECURE_LOAD_ACODE, O.TOE_IDENTIFICATION, O.SECURE_AC_ACTIVATION	Section 5.3.1.7

Table 16. Threats and Security Objectives-Coverage

Security Objectives	Threats
O.PPE-PPI	T.UNAUTHORIZED-PROFILE-MNG, T.UNAUTHORIZED-PLATFORM-MNG, T.UNAUTHORIZED-IDENTITY-MNG
O.eUICC-DOMAIN-RIGHTS	T.UNAUTHORIZED-PROFILE-MNG, T.UNAUTHORIZED-PLATFORM-MNG, T.UNAUTHORIZED-IDENTITY-MNG
O.SECURE-CHANNELS	T.UNAUTHORIZED-PROFILE-MNG, T.PROFILE-MNG-INTERCEPTION, T.PROFILE-MNG-ELIGIBILITY
O.INTERNAL-SECURE-CHANNELS	T.UNAUTHORIZED-PROFILE-MNG, T.PROFILE-MNG-INTERCEPTION, T.PROFILE-MNG-ELIGIBILITY, T.IDENTITY-INTERCEPTION
O.PROOF_OF_IDENTITY	T.UNAUTHORIZED-eUICC
O.OPERATE	T.LOGICAL-ATTACK
O.API	T.LOGICAL-ATTACK
O.DATA-CONFIDENTIALITY	T.LOGICAL-ATTACK, T.PHYSICAL-ATTACK
O.DATA-INTEGRITY	T.PROFILE-MNG-ELIGIBILITY, T.LOGICAL-ATTACK
O.ALGORITHMS	T.UNAUTHORIZED-MOBILE-ACCESS
OE.CI	T.IDENTITY-INTERCEPTION
OE.SM-DP+	T.UNAUTHORIZED-PROFILE-MNG, T.PROFILE-MNG-INTERCEPTION, T.PROFILE-MNG-ELIGIBILITY
OE.MNO	T.UNAUTHORIZED-PROFILE-MNG, T.PROFILE-MNG-INTERCEPTION
OE.EIM (SGP.32)	T.UNAUTHORIZED-PLATFORM-MNG, T.PROFILE-MNG-INTERCEPTION,
O.IC.PROOF_OF_IDENTITY	T.UNAUTHORIZED-eUICC
O.IC.SUPPORT	T.LOGICAL-ATTACK, T.PHYSICAL-ATTACK
O.IC.RECOVERY	T.PHYSICAL-ATTACK
O.RE.PRE-PPI	
O.RE.SECURE-COMM	T.UNAUTHORIZED-PROFILE-MNG, T.PROFILE-MNG-INTERCEPTION, T.PROFILE-MNG-ELIGIBILITY, T.IDENTITY-INTERCEPTION
O.RE.API	T.LOGICAL-ATTACK
O.RE.DATACONFIDENTIALITY	T.UNAUTHORIZED-PROFILE-MNG, T.UNAUTHORIZED-PLATFORM-MNG, T.UNAUTHORIZED-IDENTITY-MNG, T.LOGICAL-ATTACK, T.PHYSICAL-ATTACK
O.RE.DATA-INTEGRITY	T.UNAUTHORIZED-PROFILE-MNG, T.UNAUTHORIZED-PLATFORM-MNG, T.PROFILE-MNG-ELIGIBILITY, T.UNAUTHORIZED-IDENTITY-MNG, T.LOGICAL-ATTACK
O.RE.IDENTITY	T.UNAUTHORIZED-IDENTITY-MNG

O.RE.CODE-EXE	T.LOGICAL-ATTACK
OE.TRUSTED-PATHS-LPAd-IPAd	T.LPAd-INTERFACE-EXPLOIT
OE.APPLICATIONS	T.UNAUTHORIZED-PROFILE-MNG, T.UNAUTHORIZED-PLATFORM-MNG, T.LOGICAL-ATTACK
OE.CODE-EVIDENCE	T.UNAUTHORIZED-PROFILE-MNG, T.UNAUTHORIZED-PLATFORM-MNG, T.LOGICAL-ATTACK
OE.MNO-SD	T.UNAUTHORIZED-PROFILE-MNG, T.PROFILE-MNG-INTERCEPTION
O.SECURE_LOAD_ACODE	T.INTEG-UPDATE-IMAGE.LOAD, T.UNAUTH-UPDATE-IMAGE.LOAD, T.INTERRUPT_OSU
O.SECURE_AC_ACTIVATION	T.INTERRUPT_OSU
O.TOE_IDENTIFICATION	T.INTERRUPT_OSU
O.CONFID-UPDATE-IMAGE.LOAD	T.CONFID-UPDATE-IMAGE.LOAD
O.AUTH-LOAD-UPDATE-IMAGE	T.UNAUTH-UPDATE-IMAGE.LOAD
OE.CONFID_UPDATE_IMAGE.CREATE	T.CONFID-UPDATE-IMAGE.LOAD

Table 17. Security Objectives and threats

5.3.4.2 Organizational Security Policies Rationale

Organizational Security Policies	Security Objectives	Rationale
OSP.LIFE-CYCLE	O.PPE-PPI, OE.RE.PRE-PPI, O.OPERATE	Section 5.3.2

Table 18. Organizational Security Policies and Security Objectives-Coverage

Security Objectives	Organizational Security Policies
O.PPE-PPI	OSP.LIFE-CYCLE
O.eUICC-DOMAIN-RIGHTS	
O.SECURE-CHANNELS	
O.INTERNAL-SECURE-CHANNELS	
O.PROOF_OF_IDENTITY	
O.OPERATE	OSP.LIFE-CYCLE
O.API	
O.DATA-CONFIDENTIALITY	
O.DATA-INTEGRITY	
O.ALGORITHMS	

OE.CI	
OE.SM-DP+	
OE.MNO	
OE.EIM (SGP.32)	
O.IC.PROOF_OF_IDENTITY	
O.IC.SUPPORT	
O.IC.RECOVERY	
O.RE.PRE-PPI	OSP.LIFE-CYCLE
O.RE.SECURE-COMM	
O.RE.API	
O.RE.DATA-CONFIDENTIALITY	
O.RE.DATA-INTEGRITY	
O.RE.IDENTITY	
O.RE.CODE-EXE	
OE.TRUSTED-PATHS-LPAd-IPAd	
OE.APPLICATIONS	
OE.CODE-EVIDENCE	
OE.MNO-SD	
OE.SM-DS	
O.SECURE_LOAD_ACODE	
O.SECURE_AC_ACTIVATION	
O.TOE_IDENTIFICATION	
O.CONFID-UPDATE-IMAGE.LOAD	
O.AUTH-LOAD-UPDATE-IMAGE	
OE.CONFID_UPDATE_IMAGE.CREATE	

Table 19. Security Objectives and Organizational Security Policies

5.3.4.3 Assumptions Rationale

Assumptions	Security Objectives for the Operational Environment	Rationale
A.TRUSTED-PATHS-LPAd-IPAd	OE.TRUSTED-PATHS-LPAd-IPAd	Section 5.3.3
A.ACTORS	OE.CI, OE.SM-DP+, OE.MNO, OE.EIM (SGP.32), OE.SM-DS	Section 5.3.3

A.APPLICATIONS	OE.APPLICATIONS, OE.CODE-EVIDENCE	Section 5.3.3
A.CAP_FILE	OE.CAP-FILE	Section 5.3.3

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

Security Objectives for the Operational Environment	Assumptions
OE.CI	A.ACTORS
OE.SM-DP+	A.ACTORS
OE.MNO	A.ACTORS
OE.SM-DS	A.ACTORS
OE.EIM (SGP.32)	A.ACTORS
OE.TRUSTED-PATHS-LPAd-IPAd	A.TRUSTED-PATHS-LPAd-IPAd
OE.APPLICATIONS	A.APPLICATIONS
OE.CODE-EVIDENCE	A.APPLICATIONS
OE.MNO-SD	
OE.CAP_FILE	A.CAP-FILE
OE.CONFID_UPDATE_IMAGE.CREATE	

Table 21. Assumptions and Security Objectives for the Operational Environment

6. Extended Requirements

The following components are defined in the current Security Target:

- Extended Family FAU_SAS – Audit Data Storage

FAU_SAS.1 definition has been taken from [PP-0084] section 5.3 with no modification.

7. Security Functional requirements

The following SFRs are relevant for this TOE:

SFR	Included in this ST
[PP-eUICC] SFRs	All SFRs of Base-PP, section 6.1
[PP-JCS] SFRs	All SFRs listed in section 3.4.2 added for secure IC support.
FPT_PHP.3	Added for secure IC support.
[PP-GP] SFRs	Added for Card Content Management and for secure post-issuance updates (ITL) support.

Table 22 SFRs of the TOE of this ST

7.1 eUICC Security Functional Requirements

The introduction and security attributes definition are present in [PP-eUICC] section 6.1 and are not repeated here.

7.1.1 Identification and authentication

FIA_UID.1/EXT Timing of identification

FIA_UID.1.1/EXT The TSF shall allow

- **application selection**
- **requesting data that identifies the eUICC**
- **[assignment: *No additional TSF mediated actions*]**[1]

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

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

FIA_UAU.1/EXT Timing of authentication

FIA_UAU.1.1/EXT The TSF shall allow

- **application selection**
- **requesting data that identifies the eUICC**
- **user identification**

[1] [assignment: list of additional TSF mediated actions]

- **[assignment: *No additional TSF mediated actions*]**[2]

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

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

Application note 1:

This SFR is related to the authentication of the following external (remote) users of the TOE:

- *U.SM-DP+;*
- *U.MNO-OTA;*
- *U.EIM (SGP.32).*

As the cryptographic mechanisms used for the authentication may be provided by the underlying Platform, this ST includes the corresponding FCS_COP.1 SFRs to cover the requirements stated by [SGP.32]:

- *A U.SM-DP+ must be authenticated by verifying its ECDSA signature, using the public key included in its certificates (CERT.DPauth.ECDSA and CERT.DPpb.ECDSA), as well as the public key of the CI (D.PK.CI.ECDSA).*
- *U.MNO-OTA must be authenticated using a SCP80 secure channel according to [TS102 225] and [TS102 226] using the parameters defined in [SGP.02] section 2.4.3, or optionally SCP81 according to [GP AM B] using the parameters defined in [SGP.02] section 2.4.4 (The keyset used for this operation is distributed according to FCS_CKM.2/SCP-MNO).*
- *U.EIM must be authenticated by verifying its ECDSA signature using the public key PK.EIM.ECDSA included in its certificate (CERT.EIM.ECDSA).*

Regarding the use of ECDSA signature verification, the underlying elliptic curve cryptography must be compliant with at least one of the elliptic curves referenced for that purpose in [SGP.22] and/or [SGP.32].

FIA_USB.1/EXT User-subject binding

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

- **SM-DP+ OID is associated to S.ISD-R, acting on behalf of U.SM-DP+;**
- **MNO OID is associated to U.MNO-SD, acting on behalf of U.MNO-OTA;**
- **SM-DS OID is associated to S.ISD-R, acting on behalf of U.SM-DS;**
- **[selection: *eIM ID is associated to S.ISD-R, acting on behalf of U.EIM*]**[3]**.**

[3] [selection: eIM ID is associated to S.ISD-R, acting on behalf of U.EIM, no other associations]

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

- **Initial association of SM-DP+ OID and MNO OID requires U.SM-DP+ to be authenticated via "CERT.DPauth.ECDSA";**
- **Initial association of SM-DS OID requires U.SM-DS to be authenticated via "CERT.DSauth.ECDSA";**
- **[selection: *Initial association of eIM ID requires U.EIM to be authenticated via CERT.EIM.ECDSA (SGP.32)*][4].**

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

- **change of SM-DP+ OID requires U.SM-DP+ to be authenticated via "CERT.DPauth.ECDSA";**
- **change of MNO OID is not allowed;**
- **change of SM-DS OID requires U.SM-DS to be authenticated via "CERT.DSauth.ECDSA";**
- **[selection: *change of eIM ID requires U.EIM to be authenticated via "CERT.EIM.ECDSA (SGP.32*][5].**

Application note 2 :

This SFR is related to the binding of external (remote) users to local subjects or users of the TOE:

- *U.SM-DP+ binds to a subject (S.ISD-R);*
- *U.SM-DS binds to a subject (S.ISD-R)*
- *U.MNO-OTA binds to an on-card user (U.MNO-SD);*
- *U.EIM binds to a subject (S.ISD-R).*

U.MNO-SD is not a subject of the TOE, but an external on-card user acting on behalf of U.MNO-OTA, which is an external off-card user.

This SFR is related to the following commands:

- *Initial association of the D.MNO_KEYS keyset is performed by the ES8+.ConfigureISDP command.*

FIA_UAU.4/EXT Single-use authentication mechanisms

FIA_UAU.4.1/EXT The TSF shall prevent reuse of authentication data related to **the authentication mechanism used to open a secure communication channel between the eUICC and**

- **U.SM-DP+**

[4] [selection: Initial association of eIM ID requires U.EIM to be authenticated via CERT.EIM.ECDSA (SGP.32), no other initial associations]

[5] [selection: change of eIM ID requires U.EIM to be authenticated via "CERT.EIM.ECDSA (SGP.32), no other changes]

- **U.MNO-OTA**
- **[Selection: *U.EIM (SGP.32)*]**[6]

Application note 3:

This SFR is related to the authentication of external (remote) users of the TOE:

- *U.SM-DP+;*
- *U.MNO-OTA;*
- *U.EIM (SGP.32).*

FIA_UID.1/MNO-SD Timing of identification

FIA_UID.1.1/MNO-SD The TSF shall allow **[assignment: *application selection, requesting data that identifies the eUICC]*** [7] on behalf of the user to be performed before the user is identified.

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

Application note 4:

This SFR is related to the identification of the local user U.MNO-SD only. The identification of remote users is addressed by the FIA_UID.1/EXT SFR.

It should be noted that the U.MNO-SD is identified but not authenticated. However, U.MNO- SD is installed on the TOE by the U.SM-DP+ via the subject S.ISD-R (see FDP_ACF.1/ISDR), and the binding between U.SM-DP+ and S.ISD-R requires authentication of U.SM-DP+, as described in FIA_USB.1/EXT.

FIA_USB.1/MNO-SD User-subject binding

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FIA_ATD.1/Base User attribute definition

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

- **CERT.DPauth.ECDSA, CERT.DPpb.ECDSA, and SM-DP+ OID belonging to U.SM-DP+;**

[6] [Selection: none, U.EIM (SGP.32)]

[7] [assignment: list of TSF-mediated actions]

- **MNO OID belonging to U.MNO-OTA;**
- **AID belonging to U.MNO-SD;**
- **CERT.DSauth.ECDSA and SM-DS OID belonging to U.SM-DS;**
- **[selection: *CERT.EIM.ECDSA and eIM ID belonging to U.EIM*]**[8].

FIA_API.1 Authentication Proof of Identity

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

7.1.2 Communication

FDP_IFC.1/SCP Subset information flow control

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FDP_IFF.1/SCP Simple security attributes

FDP_IFF.1.1/SCP The TSF shall enforce the **Secure Channel Protocol information flow control SFP** based on the following types of subject and information security attributes:

- **users/subjects/objects:**
  - **U.SM-DP+, SO.ISD-P and SO.ISD-R, with security attribute D.SECRETS**
  - **U.MNO-OTA and U.MNO-SD, with security attribute D.MNO_KEYS**
- **information: transmission of commands**.

FDP_IFF.1.2/SCP The TSF shall permit an information flow between a controlled subject and controlled information via a controlled operation if the following rules hold:

- **The TOE shall permit communication between U.MNO-OTA and U.MNOSD in a SCP80 or SCP81 secure channel**.

FDP_IFF.1.3/SCP The TSF shall enforce **[assignment: *no additional information flow control SFP rules*]**[9].

[8] [selection: CERT.EIM.ECDSA and eIM ID belonging to U.EIM, no additional attributes]

[9] [assignment: additional information flow control SFP rules]

FDP_IFF.1.4/SCP The TSF shall explicitly authorise an information flow based on the following rules: **[assignment: *none*]**[10].

FDP_IFF.1.5/SCP The TSF shall explicitly deny an information flow based on the following rules:

- **The TOE shall reject communication between U.SM-DP+ and S.ISD-R if it is not performed in a SCP-SGP22 secure channel**.

FTP_ITC.1/SCP Inter-TSF trusted channel

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

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

FTP_ITC.1.3/SCP The TSF shall initiate communication via the trusted channel for: **[assignment:**

- ***the remote OTA platform via SCP80 or SCP81 secure channel to transmit ES6 functions (UpdateMetadata),***
- ***the SM-DP+ via SCP-SGP.22 secure channel to transmit the ES8+ functions (Profile Download and Installation*)]**[11].

Application note 5:

As the cryptographic mechanisms used for the trusted channel may be provided by the underlying Platform, this ST includes the corresponding FCS_COP.1 SFR. The requirements stated by [SGP.32]:

- *The secure channels to SM-DP+ must be SCP-SGP22 secure channels. Identification of endpoints is addressed by the use of AES according to [GP AM F] using the parameters defined in [SGP.32], sections 2.6 and 5.5.*
- *SCP80 must be provided to build secure channels to MNO OTA Platform (section 5.4 of [SGP.32]). The TSF may also permit to use a SCP81 secure channel to perform the same functions than the SCP80 secure channel.*

Related keys are:

- *either generated on-card (D.SECRETS); see FCS_CKM.1/SCP-SM for further details,*

[10] [assignment: rules, based on security attributes, that explicitly authorise information flows]

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

- *or distributed along with the profile (D.MNO_KEYS); see FCS_CKM.2/SCP-MNO for further details.*

In terms of commands, the TSF shall permit remote actors to initiate communication via a trusted channel in the following cases:

- *The TSF shall permit the SM-DP+ to open a SCP-SGP22 secure channel to transmit the following operations:*
  - *ES8+.InitialiseSecureChannel*
  - *ES8+.ConfigureISDP*
  - *ES8+.StoreMetadata*
  - *ES8+.ReplaceSessionKeys*
  - *ES8+.LoadProfileElements.*
  - *The TSF shall permit the IPAd to transmit the following operations:*
    - *ES10a.GetEuiccConfiguredAddresses*
    - *ES10b.SetDefaultDpAddress (SGP.32)*
    - *ES10b.PrepareDownload*
    - *ES10b.LoadBoundProfilePackage*
    - *ES10b.GetEUICCChallenge*
    - *ES10b.GetEUICCInfo*
    - *ES10b.ListNotification*
    - *ES10b.RetrieveNotificationsList*
    - *ES10b.RemoveNotificationFromList*
    - *ES10b.AuthenticateServer*
    - *ES10b.CancelSession*
    - *ES10b.LoadEuiccPackage (SGP.32)*
    - *ES10b.AddInitialEim (SGP.32)*
    - *ES10b.GetCerts (SGP.32)*
    - *ES10b.ImmediateEnable (SGP.32)*
    - *ES10b.ProfileRollback (SGP.32)*
    - *ES10b.ConfigureImmediateProfileEnabling (SGP.32)*
    - *ES10b.GetEimConfigurationData (SGP.32)*
    - *ES10b.GetProfilesInfo (SGP.32)*
    - *ES10b.GetEID (SGP.32)*
    - *ES10b.GetRAT*
  - *The TSF may permit the IPAd to transmit the following operations:*
    - *ES10b.eUICCMemoryReset (SGP.32)*
    - *ES10b.ExecuteFallbackMechanism (SGP.32)*
    - *ES10b.ReturnFromFallback (SGP.32)*
    - *ES10b.EnableEmergencyProfile (SGP.32)*
    - *ES10b.DisableEmergencyProfile (SGP.32)*

- *ES10b.GetConnectivityParameters (SGP.32)*

- *The TSF shall permit the remote OTA Platform to open a SCP80 or SCP81 secure channel to transmit the following operation:*
  - *ES6.UpdateMetadata.*

FDP_ITC.2/SCP Import of user data with security attributes

FDP_ITC.2.1/SCP The TSF shall enforce the **Secure Channel Protocol information flow control SFP** when importing user data, controlled under the SFP, from outside of the TOE.

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

FDP_ITC.2.3/SCP 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/SCP 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/SCP The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE: ***[assignment: none]***[12].

FPT_TDC.1/SCP Inter-TSF basic TSF data consistency

FPT_TDC.1.1/SCP The TSF shall provide the capability to consistently interpret

- **Commands from U.SM-DP+ and U.MNO-OTA**
- **Downloaded objects from U.SM-DP+ and U.MNO-OTA**

when shared between the TSF and another trusted IT product.

FPT_TDC.1.2/SCP The TSF shall use **[assignment: *the following interpretation rules:***

- ***[SGP.32] §5.4 for commands and downloaded objects from U.MNO-OTA***
- ***[SGP.32] §5.5 for commands and downloaded objects from U.SM-DP+***
- ***[SGP.32] §5.8-5.9-5.13 IPAd command]***[13]

when interpreting the TSF data from another trusted IT product.

[12] [assignment: additional importation control rules]

13 [assignment: list of interpretation rules to be applied by the TSF]

Application note 6:

The commands related to the SFRs FPT_TDC.1/SCP, FDP_IFC.1/SCP, FDP_IFF.1/SCP and the Downloaded objects related to this SFR FPT_TDC.1/SCP are listed below:

- *SM-DP+ commands*
  - *ES8+.InitialiseSecureChannel*
  - *ES8+.ConfigureISDP*
  - *ES8+.StoreMetadata*
  - *ES8+.ReplaceSessionKeys*
  - *ES8+.LoadProfileElements*
- *IPAd commands*
  - *ES10a.GetEuiccConfiguredAddresses*
  - *ES10b.SetDefaultDpAddress (SGP.32)*
  - *ES10b.PrepareDownload*
  - *ES10b.LoadBoundProfilePackage*
  - *ES10b.GetEUICCChallenge*
  - *ES10b.GetEUICCInfo*
  - *ES10b.ListNotification*
  - *ES10b.RetrieveNotificationsList*
  - *ES10b.RemoveNotificationFromList*
  - *ES10b.AuthenticateServer*
  - *ES10b.CancelSession*
  - *ES10b.LoadEuiccPackage (SGP.32)*
  - *ES10b.AddInitialEim (SGP.32)*
  - *ES10b.GetCerts (SGP.32)*
  - *ES10b.ImmediateEnable (SGP.32)*
  - *ES10b.ProfileRollback (SGP.32)*
  - *ES10b.ConfigureAutomaticProfileEnabling (SGP.32)*
  - *ES10b.GetEimConfigurationData (SGP.32)*
  - *ES10b.GetProfilesInfo (SGP.32)*
  - *ES10b.eUICCMemoryReset (SGP.32)*
  - *ES10b.GetEID (SGP.32)*
  - *ES10b.GetRAT*
  - *ES10b.ExecuteFallbackMechanism (SGP.32)*
  - *ES10b.ReturnFromFallback (SGP.32)*
  - *ES10b.EnableEmergencyProfile (SGP.32)*
  - *ES10b.DisableEmergencyProfile (SGP.32)*
  - *ES10b.GetConnectivityParameters (SGP.32)*
- *Downloaded objects from SM-DP+*
  - *Session keys*

- *Profile Metadata (including PPR data)*

- *MNO commands*
  - *ES6.UpdateMetadata*

FDP_UCT.1/SCP Basic data exchange confidentiality

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FDP_UIT.1/SCP Data exchange integrity

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FCS_CKM.1/SCP-SM Cryptographic key generation

FCS_CKM.1.1/SCP-SM The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **Elliptic Curves Key agreement (ECKA)** and specified cryptographic key sizes **256** that meet the following: **[assignment: *NIST P-256 and brainpoolP256r1*]**[14].

FCS_CKM.2/SCP-MNO Cryptographic key distribution

FCS_CKM.2.1/SCP-MNO The TSF shall distribute cryptographic keys in accordance with a specified cryptographic key distribution method **[assignment: *PUT KEY, STORE DATA]***[15] that meets the following: **[assignment: *[GP] §11.8 §11.11, [SGP.32] §5.9.8*]**[16].

Application note 7:

This SFR is related to the distribution of

- *D.MNO_KEYS during profile download.*

Note: this SFR does not apply to the private keys loaded pre-issuance of the TOE (D.SK.EUICC.ECDSA).

FCS_CKM.6/SCP-SM Cryptographic key destruction

FCS_CKM.6.1/SCP-SM TSF shall destroy **D.SECRETS, CERT.DPauth.ECDSA, CERT.DPpb.ECDSA, CERT.DSauth.ECDSA, D.CERT.EUICC.ECDSA, D.SK.EUICC.ECDSA and D.PK.CI.ECDSA** when **[selection: *no longer needed*]**[17].

14 [assignment: at least one elliptic curve referenced in SGP.22 [24] or SGP.32 [36]]

15 [assignment: cryptographic key distribution method]

16 [assignment: list of standards]

17 [selection: no longer needed, [assignment: other circumstances for key or keying material destruction]]

FCS_CKM.6.2/SCP-SM The TSF shall destroy cryptographic keys and keying material specified by FCS_CKM.6.1/SCP-SM in accordance with a specified cryptographic key destruction method **[assignment: *physically overwriting keys with zero values*]**[18] that meets the following: **[assignment: *none*]**[19]**.**

FCS_CKM.6/SCP-MNO Cryptographic key destruction

FCS_CKM.6.1/SCP-MNO The TSF shall destroy **D.MNO_KEYS** when **[selection: *no longer needed*]**[20].

FCS_CKM.6.2/SCP-MNO The TSF shall destroy cryptographic keys and keying material specified by FCS_CKM.6.1/SCP-MNO in accordance with a specified cryptographic key destruction method **[assignment: *physically overwriting keys with zero values*]**[21] that meets the following: **[assignment: *none*]**[22].

7.1.3 Security Domains

FDP_ACC.1/ISDR Subset access control

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FDP_ACF.1/ISDR Security attribute based access control

FDP_ACF.1.1/ISDR The TSF shall enforce the **ISD-R access control SFP** to objects based on the following:

- **subjects: S.ISD-R**
- **objects:**
  - **SO.ISD-P with security attributes "state" "PPR", and [Selection: *no additional attributes*]**[23]
- **operations:**
  - **Create and configure profile**
  - **Store profile metadata**
  - **Enable profile**
  - **Disable profile**
  - **Delete profile**
  - **Perform a Memory reset**.

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

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[18] [assignment: cryptographic key destruction method]

[19] [assignment: list of standards]

[20] [selection: no longer needed, [assignment: other circumstances for key or keying material destruction]]

[21] [assignment: cryptographic key destruction method]

[22] [assignment: list of standards]

[23] [Selection: "Reference Enterprise Rule" (SGP.22 v3.1 or higher), no additional attributes]

- **Enabling a S.ISD-P is authorized only if**
  - **the corresponding S.ISD-P is in the state "DISABLED" and**
  - **in case a currently enabled S.ISD-P has to be disabled, the PPR data of this S.ISD.P allows its disabling, and**
  - **[Selection: *no additional conditions*]**[24]
- **Disabling a S.ISD-P is authorized only if**
  - **the corresponding S.ISD-P is in the state "ENABLED" and**
  - **the corresponding S.ISD-P's PPR data allows its disabling.**
- **Deleting a S.ISD-P is authorized only if**
  - **the corresponding S.ISD-P is not in the state "ENABLED" and**
  - **the corresponding S.ISD-P's PPR data allows its deletion.**
- **Performing a S.ISD-P Memory reset is authorized regardless of the involved S.ISD-P's state or PPR attribute**.

FDP_ACF.1.3/ISDR The TSF shall explicitly authorise access of subjects to objects based on the following additional rules, **[assignment: *none]*[25].**
FDP_ACF.1.4/ISDR The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **[assignment: *none*]**[26].

Application note 8:

This policy describes the rules to be applied to access Platform Management or eUICC Management operations. It covers the access to the following operations by ISD-R required by sections 5.x of [SGP.32]:

- *ES8+.ConfigureISDP (Create and configure profile)*
- *ES8+.StoreMetadata (Store profile metadata)*
- *ES10b.eUICCMemoryReset (Perform a Memory reset)*
- *ES10b.ImmediateEnable (Enable Profile)*
- *ES10b.ProfileRollback (Enable Rollback profile)*
- *ES10b.ExecuteFallbackMechanism (Enable Fallback profile)*
- *ES10b.EnableEmergencyProfile (Enable eCall Profile)*
- *ES10b.DisableEmergencyProfile (Disable eCall Profile)*
- *ESep.Enable (Enable profile)*
- *ESep.Disable (Disable Profile)*
- *ESep.Delete (Delete Profile)*

FDP_ACC.1/ECASD Subset access control

[24] [Selection: the Reference Enterprise Rule allows enabling S.ISD-P (SGP.22 v3.1 or higher), no additional conditions]

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

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

FDP_ACC.1.1/ECASD The TSF shall enforce the **ECASD access control SFP** on

- **subjects: S.ISD-R, S.ECASD**
- **objects: data and attributes of ECASD,**
- **operations:**
  - **execution of a ECASD function**
  - **access to output data of these functions,**
- **[assignment: *additional operations defined by the interfaces ES8+ (SM-DP+ – eUICC), and ES10x (IPA – eUICC), creation of an eUICC signature on material provided by an ISD-R*]**[27]**.**

FDP_ACF.1/ECASD Security attribute based access control

FDP_ACF.1.1/ECASD The TSF shall enforce the **ECASD access control SFP** to objects based on the following:

- **subjects: S.ISD-R, with security attribute "AID", S.ECASD**
- **objects: data and attributes of S.ECASD**
- **operations:**
  - **execution of a ECASD function**
    - **Verification of the off-card entities Certificates (SM-DP+, SM-DS), provided by an ISD-R, with the eSIM CA public key (PK.CI.ECDSA)**
    - **Creation of an eUICC signature on material provided by an ISD-R.**
  - **access to output data of these functions**.
  - **[assignment: *none*]**[28]**.**

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

- **Authorized users: only S.ISD-R, identified by its AID, shall be authorized to execute the following S.ECASD functions:**
  - **Verification of a certificate CERT.DPauth.ECDSA, CERT.DPpb.ECDSA, CERT.DP.TLS, CERT.DSauth.ECDSA, or CERT.DS.TLS, provided by an ISD-R, with the CI public key (PK.CI.ECDSA)**
  - **Creation of an eUICC signature, using D.SK.EUICC.ECDSA, on material provided by an ISD-R**.
- **[assignment: *rules defined in [SGP.32], Section 2.4*]**[29]**.**

FDP_ACF.1.3/ECASD The TSF shall explicitly authorise access of subjects to objects based on the following additional rules: **[assignment: *none]***[30].

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[27] [assignment: additional list of subjects, objects, and operations between subjects and objects covered by the SFP]

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

[29] [assignment: additional rules governing access among controlled subjects and controlled objects using controlled operations on controlled objects]

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

FDP_ACF.1.4/ECASD The TSF shall explicitly deny access of subjects to objects based on the following additional rules: **[assignment: *none*]**[31].

7.1.4 Platform Services

FDP_IFC.1/Platform_services Subset information flow control

FDP_IFC.1.1/Platform_services The TSF shall enforce the **Platform services information flow control SFP** on

- **Users/subjects:**
  - **S.ISD-R, S.ISD-P, U.MNO-SD**
  - **Platform code (S.PRE, S.PPI, S.TELECOM)**
- **information:**
  - **D.PROFILE_NAA_PARAMS**
  - **D.PROFILE _RULES**
  - **D.PLATFORM_RAT**
- **operations:**
  - **installation of a profile**
  - **PPR and RAT enforcement**
  - **network authentication.**
  - **[selection: *no additional operations*]**[32]

FDP_IFF.1/Platform_services Simple security attributes

FDP_IFF.1.1/Platform_services The TSF shall enforce the **Platform services information flow control SFP** based on the following types of subject and information security attributes:

- **users/subjects:**
  - **S.ISD-R, S.ISD-P, U.MNO-SD, with security attribute "application identifier (AID)"**
- **information:**
  - **D.PROFILE_NAA_PARAMS**
  - **D.PROFILE_RULES**
  - **D.PLATFORM_RAT**
- **operations:**
  - **installation of a profile**
  - **PPR and RAT enforcement**

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

[32] [selection: no additional operations]

- **network authentication.**
- **[selection: *no additional operations*][33]**

FDP_IFF.1.2/Platform_services The TSF shall permit an information flow between a controlled subject and controlled information via a controlled operation if the following rules hold:

- **D.PROFILE_NAA_PARAMS shall be transmitted only:**
  - **by U.MNO-SD to S.TELECOM in order to execute the network authentication function**
  - **by S.ISD-R to S.PPI using the profile installation function**
- **D.PROFILE_RULES shall be transmitted only**
  - **by S.ISD-R to S.PPE in order to execute the PPR enforcement function**
  - **[selection: *no additional information flaws*][34]**
- **D.PLATFORM_RAT shall be transmitted only**
  - **by S.ISD-R to S.PPE in order to execute the RAT enforcement function**.

FDP_IFF.1.3/Platform_services The TSF shall enforce the **[assignment: *following additional information flow control SFP rules: none]*[35].**

FDP_IFF.1.4/Platform_services The TSF shall explicitly authorise an information flow based on the following rules: **[assignment: *none]*[36]**.

FDP_IFF.1.5/Platform_services The TSF shall explicitly deny an information flow based on the following rules: **[assignment: *when none of the conditions listed in the element FDP_IFF.1.4 of this component hold and at least one of those listed in the element FDP_IFF.1.2 does not hold]*[37]**.

FPT_FLS.1/Platform_services Failure with preservation of secure state

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

- **failure that lead to a potential security violation during the processing of a S.PPE, S.PPI or S.TELECOM API specific functions:**
  - **Installation of a profile**
  - **PPR and RAT enforcement**
  - **Network authentication**

[33] [selection: no additional operations]

[34] [selection: by S.ISD-R to S.PRE in order to execute the Reference Enterprise Rule enforcement function (SGP.22 v3.1 or higher), no additional information flows]

[35] [assignment: additional information flow control SFP rules]

[36] [assignment: rules, based on security attributes, that explicitly authorise information flows]

[37] [assignment: rules, based on security attributes, that explicitly deny information flows]

- **[selection: *no additional functions*]**[38]

- **[assignment: *none*][39].**

7.1.5 Security management

FCS_RNG.1 Random number generation

FCS_RNG.1.1 [Refined] The TSF shall provide a **[selection: *deterministic*]**[40] random number generator that implements: **[assignment:**
(DRG.3.1) The internal state of the RNG (= slave CTR_DRBG) uses a DRNG (= master CTR_DRBG) of class DRG.3 as a random source. The master CTR_DRBG uses a PTRNG of class PTG.2 as a random source.
(DRG.3.2) The RNG provides forward secrecy.
(DRG.3.3) The RNG provides backward secrecy even if the current internal state is known
(DRG.3.4) The RNG generates output such that 2^34 + 1 output strings of bit length 128 are mutually different with a probability larger than 1 – 2^(-16).
(DRG.3.5) Statistical test suites cannot practically distinguish the random numbers from output sequences of an ideal RNG. The random numbers must pass test procedure A as defined in AIS20/31][41]

Application note 9:

The TOE implements DRG.3 as defined in AIS20/31.

FPT_EMS.1/Base	TOE Emanation of TSF and User Data

FPT_EMS.1.1/Base The TSF shall ensure that the TOE does not emit emissions over its attack surface in such amount that these emissions enable access to TSF data and user data as specified in

ID	Emission	Attack Surface	TSF data	User data
1	**[assignment: *information about IC power consumption, electromagnetic radiation, radio emission, internal state transition and timing during command execution*]**[42]	Any	-	• D.SECRETS; • D.SK.EUICC.ECDSA and the secret keys which are part of the following keysets: • D.MNO_KEYS, • D.PROFILE_NAA_PARAMS.

[38] [selection: Reference Enterprise Rule enforcement (SGP.22 v3.1 or higher), no additional functions]

[39] [assignment: other type of failure]

[40] [selection: deterministic, hybrid deterministic, physical, hybrid physical]

[41] [assignment: list of security capabilities]

[42] [assignment: list of types of emissions]

Application note 10:

The TOE shall prevent attacks against the secret data of the TOE where the attack is based on external observable physical phenomena of the TOE. Such attacks may be observable at the interfaces of the TOE or may originate from internal operation of the TOE or may originate from an attacker that varies the physical environment under which the TOE operates. The set of measurable physical phenomena is influenced by the technology employed to implement the TOE.

Examples of measurable phenomena are variations in the power consumption, the timing of transitions of internal states, electromagnetic radiation due to internal operation, radio emission. Due to the heterogeneous nature of the technologies that may cause such emanations, evaluation against state-of-the-art attacks applicable to the technologies employed by the TOE is assumed. Examples of such attacks are, but are not limited to, evaluation of TOE's electromagnetic radiation, simple power analysis (SPA), differential power analysis (DPA), timing attacks, and so on.

FDP_SDI.1 Stored data integrity monitoring

FDP_SDI.1.1 The TSF shall monitor user data stored in containers controlled by the TSF for **integrity errors** on all objects, based on the following attributes: **integrity-sensitive data**.

Refinement:

The notion of integrity-sensitive data covers the following assets of the TOE:

- D.MNO_KEYS
- Profile data
  - D.PROFILE_NAA_PARAMS
  - D.PROFILE_IDENTITY
  - D.PROFILE _RULES
- Management data
  - D.PLATFORM_DATA
  - D.DEVICE_INFO
  - D.PLATFORM_RAT
- Identity management data
  - D.SK.EUICC.ECDSA
  - D.CERT.EUICC.ECDSA
  - D.PK.CI.ECDSA
  - D.PK.EIM.ECDSA (SGP.32)
  - D.EID
  - D.SECRETS

- D.CERT.EUM.ECDSA
- D.CRLs if existing

FDP_RIP.1/Base Subset residual information protection

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FPT_FLS.1/Base Failure with preservation of secure state

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FMT_MSA.1/PLATFORM_DATA Management of security attributes

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

FMT_MSA.1/RULES Management of security attributes

FMT_MSA.1.1/RULES The TSF shall enforce the **Security Channel protocol information flow SFP** to restrict the ability to change_default, query, modify and delete the security attributes

- D.PROFILE_RULES

To

- **S.ISD-R for change_default, via function "ES8+.ConfigureISDP"**
- **S.ISD-R for query**
- **S.ISD-P for modify, via function "ES6.UpdateMetadata"**
- **[selection: *S.ISD-R to delete, via function "ESep.Delete" (SGP.32)*]**[43]

FMT_MSA.1/CERT_KEYS Management of security attributes

FMT_MSA.1.1/CERT_KEYS The TSF shall enforce the **Security Channel protocol information flow SFP, ISD-R access control SFP and ECASD access control SFP** to restrict the ability to query and delete the security attributes

- **D.CERT.EUICC.ECDSA**
- **D.PK.CI.ECDSA**
- **D.CERT.EUM.ECDSA**
- **D.MNO_KEYS**

To

- **S.ISD-R for:**

[43] [selection: S.ISD-R to modify, via function "ES10b.LoadRPMPackage (UpdateMetadataRequest)" (SGP.22 v3.1 or higher), S.ISD-R to delete, via function "ES10c.DeleteProfile" (SGP.22), S.ISD-R to delete, via function "ESep.Delete" (SGP.32)]

    - **query D.PK.CI.ECDSA**
    - **delete D.MNO_KEYS, via function [selection: *"ESep.Delete" (SGP.32)*]**[44]
- **no actor for other operations.**

Application note 11:

The modification of D.MNO_KEYS keysets is forbidden. To modify the key-sets, one must delete the profile and load another profile.

FMT_SMF.1/Base	Specification of Management Functions

FMT_SMF.1.1/Base The TSF shall be capable of performing the following management functions: **[assignment: *Profile Management functions specified in [SGP.32]*]** [45].

FMT_SMR.1/Base	Security roles

FMT_SMR.1.1/Base The TSF shall maintain the roles

- **External users:**
    - **U.SM-DP+**
    - **U.MNO-SD**
    - **U.MNO-OTA**
    - **U.SM-DS**
    - **[selection: *U.EIM (SGP.32)*]**[46]
- **Subjects:**
    - **S.ISD-R**
    - **S.ISD-P**
    - **S.ECASD**
    - **S.PPI**
    - **S.PRE**
    - **S.TELECOM**

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

FMT_MSA.1/RAT	Management of security attributes

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

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[44] [selection: ES10c.DeleteProfile (SGP.22), ESep.Delete (SGP.32)]

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

[46] [selection: U.EIM (SGP.32)]

FMT_MSA.3/Base Static attribute initialisation

The definition of this SFR is present in [PP-eUICC] and it is unchanged within this ST.

7.1.6 Mobile Network authentication

FCS_COP.1/Mobile_network Cryptographic operation

FCS_COP.1.1/Mobile_network The TSF shall perform **Network authentication** in accordance with a specified cryptographic algorithm **MILENAGE, Tuak, [selection: [assignment: *Cave*][47]]**[48] and cryptographic key sizes **according to the corresponding standard** that meet the following:

- **MILENAGE according to standard [MILENAGE] with the following restrictions:**
  - **Only use 128-bit AES as the kernel function. Do not support other choices**
  - **Allow any value for the constant OP**
  - **Allow any value for the constants C1-C5 and R1-R5, subject to the rules and recommendations in section 5.3 of the standard [MILENAGE]**
- **Tuak according to [TUAK] with the following restrictions:**
  - **Allow any value of TOP**
  - **Allow multiple iterations of Keccak**
  - **Support 256-bit K as well as 128-bit**
  - **To restrict supported sizes for RES, MAC, CK and IK to those currently supported in 3GPP standards.**
- ***Cave according to standard [CAVE] with the following restrictions*:**
  - ***Supports 0~16 rounds of SSD Generation***

FCS_CKM.2/Mobile_network Cryptographic key distribution

FCS_CKM.2.1/Mobile_network The TSF shall distribute cryptographic keys in accordance with a specified cryptographic key distribution method **[assignment: *Profile download and installation*]**[49] that meets the following: **[assignment: *[SGP.32] §3.2, §5.9.8, [SIMalliance] §8.6.3, [SIMalliance_2] §8.6.3]***[50].

FCS_CKM.6/Mobile_network Cryptographic key destruction

[47] [assignment: cryptographic algorithms]

[48] [selection: [assignment: cryptographic algorithms], no other algorithm]

[49] [assignment: *cryptographic key distribution method*]

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

FCS_CKM.6.1/Mobile_network The TSF shall destroy **MILENAGE keys, TUAK keys and [selection: [assignment: *Cave*][51]]** [52]when **[selection: *no longer needed*]**[53].

FCS_CKM.6.2/Mobile_network The TSF cryptographic keys and keying material specified by FCS_CKM.6.1/Mobile_network in accordance with a specified cryptographic key destruction method **[assignment: *physically overwriting keys with zero values]***[54] that meets the following: **[assignment: *none]***[55].

7.2 Runtime Environment Security Requirements

The Subjects (prefixed with an "S"), the Objects (prefixed with an "O"), Information (prefixed with an "I") are defined and described in [PP-JCS] section 7.1. Security attributes linked to these subjects, objects and information are also defined in [PP-JCS] section 7.1. Finally, Operations (prefixed with "OP") definition and description are present in [PP-JCS] section 7.1.

7.2.1 Core_LG Security Functional requirements

7.2.1.1 Firewall Policy

FDP_ACC.2/FIREWALL Complete access control

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_ACF.1/FIREWALL Security attribute based access control

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_IFC.1/JCVM Subset information flow control

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_IFF.1/JCVM Simple security attributes

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[51] [assignment: *keys of the cryptographic algorithms*]

[52] [selection: [assignment: *keys of the cryptographic algorithms], no other keys of the cryptographic algorithm]*]

[53] [selection: *no longer needed*, [assignment: *other circumstances for key or keying material destruction*]]

[54] [assignment: *cryptographic key destruction method*]

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

FDP_IFF.1.1/JCVM The TSF shall enforce the **JCVM information flow control SFP** based on the following types of subject and information security attributes:

Subjects	Security attributes
S.JCVM	Currently Active Context

Table 23. FDP_IFF.1/JCVM Simple security attributes

FDP_IFF.1.2/JCVM The TSF shall permit an information flow between a controlled subject and controlled information via a controlled operation if the following rules hold:

- **An operation OP.PUT(S1, S.MEMBER, I.DATA) is allowed if and only if the Currently Active Context is "Java Card RE";**
- **other OP.PUT operations are allowed regardless of the Currently Active Context's value**.

FDP_IFF.1.3/JCVM The TSF shall enforce the **[assignment: *none*]**[56].

FDP_IFF.1.4/JCVM The TSF shall explicitly authorise an information flow based on the following rules: ***none***[57].

FDP_IFF.1.5/JCVM The TSF shall explicitly deny an information flow based on the following rules: **[assignment: *none*]**[58].

FDP_RIP.1/OBJECTS Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MSA.1/JCRE Management of security attributes

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MSA.1/JCVM Management of security attributes

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MSA.2/FIREWALL_JCVM Secure security attributes

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

[56] [assignment: additional information flow control SFP rules]
[57] [assignment: rules, based on security attributes, that explicitly authorise information flows]
[58] [assignment: rules, based on security attributes, that explicitly deny information flows]

FMT_MSA.3/FIREWALL Static attribute initialisation

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MSA.3/JCVM Static attribute initialisation

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_SMF.1/RE Specification of Management Functions

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST, except for the iteration /RE.

FMT_SMR.1/RE Security roles

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST, except for the iteration /RE.

7.2.1.2 Application Programming Interface

FCS_CKM.1 Cryptographic key generation

FCS_CKM.1.1 The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **[assignment: *cryptographic key generation algorithm*]**[59] and specified cryptographic key sizes **[assignment: *cryptographic key sizes*]**[60] that meet the following: **[assignment: *list of standards*]**[61]

Iteration	Cryptographic key generation algorithm	Cryptographic key sizes	List of standards
/ECC	**G+D EC key generator**	**NIST P-256, curve25519**	**[RFC5639]** chapter 3

Table 24. List of cryptographic key generation algorithms for assignments 59 60 61

FCS_CKM.6/RE Cryptographic key destruction

FCS_CKM.6.1/RE The TSF shall destroy **[assignment: *ECC keys, Triple DES keys, AES keys*]**[62] when **[selection: *no longer needed*]**[63].

[59] [assignment: cryptographic key generation algorithm]

[60] [assignment: cryptographic key sizes]

[61] [assignment: list of standards]

[62] [assignment: list of cryptographic keys (including key material)]

[63] [selection: no longer needed, [assignment: other circumstances for key or keying material destruction]]

FCS_CKM.6.2/RE The TSF shall destroy cryptographic keys and keying material specified by FCS_CKM.6.1/RE in accordance with a specified cryptographic key destruction method **[assignment: *physically overwriting the keys with zero values*]**[64] that meets the following: **[assignment: *none*]** [65].

FCS_COP.1 Cryptographic operation

FCS_COP.1.1 The TSF shall perform cryptographic operations in accordance with a specified cryptographic algorithm and cryptographic key sizes that meet the following:

[64] [assignment: cryptographic key destruction method]

[65] [assignment: list of standards]

Iteration	Operation	Algorithm	Key sizes	List of standards
/SHA	hashing	SHA-1 SHA-224, 256, 384, 512	n.a.	[FIPS180-4]
/SIG_EC	digital signature generation and verification	ECDSA	256	[FIPS186-4] [BSI TR 03111] [RFC5639]
/ECDH	key agreement	ECDH	256 bits	[FIPS46-3], Chapter 'TRIPLE DATA ENCRYPTION ALGORITHM', [ISO 9797-1] Sections 6.6.3, 7.1, 7.3
/MAC_TDES	MAC or HMAC generation and verification	Triple-DES CBC MAC	112, 168 bits	[FIPS197] Section 5 [ISO 9797-1] Section 7.1 [SP800-38b] Section 6
/MAC_AES		AES CBC MAC, AES CMAC	128, 192, 256 bits	[SP800-67] [SP800-38a]
/HMAC		With SHA-1, SHA-256, 384, 512	n.a.	[FIPS197] [SP800-38a]
/CIPH_TDES	encryption and decryption	Triple-DES in CBC	112, 168 bits	[FIPS197] [SP800-38d]
/CIPH_AES	encryption and decryption	AES in CBC and ECB modes	128, 192, 256 bits	[FIPS197] [SP800-38a]
/CIPH_AES_GCM	encryption and decryption	AES in GCM mode	128 bits	[FIPS197] [SP800-38d]

/ECKA-EG	Key agreement	ElGamal elliptic curves key agreement	256 bits	NIST P-256 acc. to [FIPS186-4], [BSI TR-03111]

Table 25. List of cryptographic operations[66][67][68][69]

FDP_RIP.1/ABORT Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_RIP.1/APDU Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_RIP.1/bArray Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_RIP.1/GlobalArray Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_RIP.1/KEYS Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_RIP.1/TRANSIENT Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_ROL.1/FIREWALL Basic rollback

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FCS_CKM.1/GP-SCP Cryptographic key generation

FCS_CKM.1.1/GP-SCP The TSF shall generate cryptographic keys in accordance with a specified cryptographic key generation algorithm **[assignment: *cryptographic key generation algorithm*]** [70] and

[66] [assignment: list of cryptographic operations]
[67] [assignment: cryptographic algorithm]
[68] [assignment: cryptographic key sizes]
[69] [assignment: list of standards]
[70] [assignment: cryptographic key generation algorithm]

specified cryptographic key sizes **[assignment: *cryptographic key sizes*]**[71] that meet the following: **[assignment: *list of standards*]**[72]**.**

SCP Protocol	Cryptographic key generation algorithm	Cryptographic key sizes	List of standards
SCP11	ECC	256, 384, 512, 521 bits	[GP AM F] section 5.2
SCP80	AES, TDES	TDES: 112 bits AES: 128, 192, or 256 bits	[TS 102 225]
SCP81	TLS 1.2 with recommended cipher suites: TLS_PSK_WITH_AES_128_CBC_SHA256 TLS_PSK_WITH_NULL_SHA256 TLS 1.3 with recommended cipher suites: TLS_AES_128_CCM_SHA256 TLS_AES_128_GCM_SHA256		[GP AM B]
SCP02	TDES	112 bits	[GP] section E.4.1
SCP03	AES	128, 192, or 256 bits	[GP AM D] section 6.2.1

FCS_COP.1/GP-SCP	Cryptographic operation

FCS_COP.1.1/GP-SCP The TSF shall perform **[assignment: list of cryptographic operations]**[73] in accordance with a specified cryptographic algorithm **[assignment: cryptographic algorithm]**[74] and cryptographic key sizes **[assignment: cryptographic key sizes]**[75] that meet the following: **[assignment: list of standards]**[76].

SCP protocol	Cryptographic Operations	Cryptographic Algorithm	Cryptographic Key Sizes	List of Standards
SCP02	MAC Generation/ Verification	H-MAC, CMAC using TDES	112 bits	[FIPS 198]
SCP02	Symmetric Encryption/ Decryption	TDES in CBC mode	112 bits	[NIST 800-67], [NIST 800-38A]

[71] [assignment: cryptographic key sizes]
[72] [assignment: list of standards]
[73] [assignment: list of cryptographic operations]
[74] [assignment: cryptographic algorithm]
[75] [assignment: cryptographic key sizes]
[76] [assignment: list of standards]

SCP02	Key Derivation	HMAC-based KDF, CMAC-based KDF using TDES	112 bits	[NIST 800-108], [FIPS 198]
SCP03, SCP11	Symmetric Encryption/ Decryption	AES in CBC mode	128, 192, or 256 bits	[FIPS 197], [NIST 800-38A] and [FIPS 140-2]
SCP03	MAC Generation/ Verification	CMAC AES	128, 192, or 256 bits	[NIST 800-38B] and [FIPS 140-2]
SCP03	Key Derivation	CMAC-based KDF using AES	128, 192, or 256 bits	[NIST 800-108], [NIST 800-38B]
SCP02, SCP03, SCP11	Hash Computing	SHA-256, SHA-384, SHA-512		[ISO-10188-3] and [FIPS-180-4]
SCP80	Secure communication channel with OTA Server	TDES or AES	TDES: 112 bits AES: 128, 192, or 256 bits	[TS 102 225] [TS 102 226]
SCP81	Secure communication channel with the Remote Administration Server	TLS 1.2 with recommended cipher suites: TLS_PSK_WITH_AES_128_CBC_SHA256 TLS_PSK_WITH_NULL_SHA256 TLS 1.3 with recommended cipher suites: TLS_AES_128_CCM_SHA256 TLS_AES_128_GCM_SHA256		[GP Am B] section 3.3.2

7.2.1.3 Card Security Management

FAU_ARP.1 Security alarms

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

- **throw an exception,**
- **lock the card session,**

- **reinitialize the Java Card System and its data,**
- **[assignment: *Card Lock / Application Lock*]**[77] upon detection of a potential security violation.

Refinement:

The "potential security violation" stands for one of the following events:

- CAP file inconsistency,
- typing error in the operands of a bytecode,
- applet life cycle inconsistency,
- card tearing (unexpected removal of the Card out of the CAD) and power failure, abort of a transaction in an unexpected context, (see abortTransaction(), [JCAPI3] and ([JCRE3], §7.6.2)
- violation of the Firewall or JCVM SFPs,
- unavailability of resources,
- array overflow
- **[assignment: *flow control errors,***
- ***other runtime errors related to applet's failure (like uncaught exceptions)]***[78]

Application note 12:

Bytecode verification is performed off-card.

FDP_SDI.2/DATA	Stored data integrity monitoring and action

FDP_SDI.2.1/DATA The TSF shall monitor user data stored in containers controlled by the TSF for **[assignment: *integrity errors*]**[79] on all objects, based on the following attributes: **[assignment: *checksum integrity (complementary value, EDC) of cryptographic keys, PIN values and their associated attributes*]**[80].

FDP_SDI.2.2/DATA Upon detection of a data integrity error, the TSF shall **[assignment: *bring the card into a secure state*]**[81].

FPR_UNO.1 Unobservability

FPR_UNO.1.1 The TSF shall ensure that **[assignment: *unauthorized users or subjects*]**[82] are unable to observe the operation **[assignment: *cryptographic operations and comparison operations*]** [83] on **[assignment: *key values, PIN values*]**[84] by **[assignment: *S.JCRE, S.Applet, S.OSU, S.UpdateImageCreator]***[85].

[77] [assignment: list of other actions]
[78] [assignment: list of other runtime errors]
[79] [assignment: integrity errors]
[80] [assignment: user data attributes]
[81] [assignment: actions to be taken]
[82] [assignment: list of users and/or subjects]
[83] [assignment: list of operations]
[84] [assignment: list of objects]
[85] [assignment: list of protected users and/or subjects]

FPT_FLS.1/RE Failure with preservation of secure state

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST, except for the iteration /RE.

FPT_TDC.1/RE Inter-TSF basic TSF data consistency

FPT_TDC.1.1 The TSF shall provide the capability to consistently interpret **the CAP files, the bytecode and its data arguments** when shared between the TSF and another trusted IT product.

FPT_TDC.1.2 The TSF shall use

- **the rules defined in [JCVM] specification,**
- **the API tokens defined in the export files of reference implementation,**
- **[assignment: *no other rules*]**[86]

when interpreting the TSF data from another trusted IT product.

7.2.1.4 AID Management

FIA_ATD.1/AID User attribute definition

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FIA_UID.2/AID User identification before any action

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FIA_USB.1/AID User-subject binding

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

FIA_USB.1.2/AID The TSF shall enforce the following rules on the initial association of user security attributes with subjects acting on the behalf of users: **[assignment: *rules defined in FMT_MSA.2/FIREWALL_JCVM and FMT_MSA.3/FIREWALL*]**[87].

[86] [assignment: list of interpretation rules to be applied by the TSF]

[87] [assignment: list of rules for the initial association of attributes]

FIA_USB.1.3/AID The TSF shall enforce the following rules governing changes to the user security attributes associated with subjects acting on the behalf of users: **[assignment: *rules defined in FMT_MSA.3/FIREWALL]***[88].

FMT_MTD.1/JCRE Management of TSF data

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MTD.3/JCRE Secure TSF data

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

7.2.2 INSTG Security Functional requirements

The InstG SFRs are not included. They are replaced by the following SFRs from [PP GP] as defined in section 7.2.7:

FDP_ITC.2/GP-ELF replaces FDP_ITC.2/Installer of [PP-JCS].
FMT_SMR.1/GP replaces FMT_SMR.1/Installer of [PP-JCS].
FPT_FLS.1/GP replaces FPT_FLS.1/Installer of [PP-JCS].
FPT_RCV.3/GP replaces FPT_RCV.3/Installer of [PP-JCS].

7.2.3 ADELG Security Functional Requirements

This group consists of the SFRs related to the deletion of applets and/or packages, enforcing the applet deletion manager (ADEL) policy on security aspects outside the runtime. Deletion is a critical operation and therefore requires specific treatment. This policy is better thought as a frame to be filled by ST implementers.

FDP_ACC.2/ADEL Complete access control

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FDP_ACF.1/ADEL Security attribute based access control

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

[88] [assignment: list of rules for the changing of attributes]

FDP_RIP.1/ADEL Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MSA.1/ADEL Management of security attributes

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_MSA.3/ADEL Static attribute initialisation

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_SMF.1/ADEL Specification of Management Functions

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FMT_SMR.1/ADEL Security roles

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FPT_FLS.1/ADEL Failure with preservation of secure state

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

7.2.4 RMIG Security Functional Requirements

The product does not support RMI features.

7.2.5 ODELG Security Functional Requirements

The following requirements concern the object deletion mechanism. This mechanism is triggered by the applet that owns the deleted objects by invoking a specific API method.

FDP_RIP.1/ODEL Subset residual information protection

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

FPT_FLS.1/ODEL Failure with preservation of secure state

The definition of this SFR is present in [PP-JCS] and it is unchanged within this ST.

7.2.6 CARG Security Functional Requirements

The CarG SFRs are not included. They are replaced by the following SFRs from [PP GP] as defined in section 7.2.7:

FCO_NRO.2/GP replaces FCO_NRO.2/CM of [PP-JCS].
FDP_IFC.2/GP-ELF replaces FDP_IFC.2/CM of [PP-JCS].
FDP_IFF.1/GP-ELF replaces FDP_IFF.1/CM of [PP-JCS].
FDP_UIT.1/GP replaces FDP_UIT.1/CM of [PP-JCS].
FIA_UID.1/GP replaces FIA_UID.1/CM of [PP-JCS].
FMT_MSA.1/GP replaces FMT_MSA.1/CM of [PP-JCS].
FMT_MSA.3/GP replaces FMT_MSA.3/CM of [PP-JCS].
FMT_SMF.1/GP replaces FMT_SMF.1/CM of [PP-JCS].
FTP_ITC.1/GP replaces FTP_ITC.1/CM of [PP-JCS].

7.2.7 Card Content Management Security Functional requirements

The Runtime Environment shall provide secure means for card management activities ([PP-eUICC], section 4.2.2, OE.RE.PRE-PPI). Since the Runtime Environment is to part of the TOE of this ST, the corresponding objectives were transformed into objectives for the TOE (O.RE.PRE-PPI) and subsequently have to be covered by SFRs. Therefore the following SFRs are introduced.

These SFRs replace the SFRs from the [PP-JCS] as stated in sections 7.2.2 and 7.2.5.

FIA_AFL.1/GP Authentication failure handling

FIA_AFL.1.1/GP The TSF shall detect when **[selection: [assignment: *1*][89]]** [90] unsuccessful authentication attempts occur related to **the authentication of the origin of a card management operation command.**

FIA_AFL.1.2/GP When the defined number of unsuccessful authentication attempts has been **met or surpassed**, the TSF shall **close the Secure Channel**.

FIA_UAU.1/GP Timing of authentication

[89] [assignment: positive integer number]

[90] [selection: [assignment: positive integer number], an administrator con-figurable positive integer within [assignment: range of acceptable values]]

The definition of this SFR is present in [PP-GP] and it is unchanged within this ST.

FIA_UAU.4/GP Single-use authentication mechanisms

The definition of this SFR is present in [PP-GP] and it is unchanged within this ST.

FDP_UIT.1/GP Basic data exchange integrity

FDP_UIT.1.1/GP The TSF shall enforce the **ELF Loading information flow control SFP and Data & Key Loading information flow control SFP** to **[selection: *receive*]**[91] user data in a manner protected from **modification, deletion, insertion, replay** errors.

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

Application note 13 :

This SFR extends FDP_UIT.1/CM of [PP-JC] to cover the integrity protection of SD/Application data and keys.

This SFR applies where APDU command and response integrity protection is required. For instance: INSTALL, LOAD, STORE DATA and PUT KEY commands.

FDP_ROL.1/GP Basic rollback

FDP_ROL.1.1/GP The TSF shall enforce **ELF Loading information flow control SFP and Data & Key Loading information flow control SFP** to permit the rollback of the **installation, loading, or removal operation** on the **executable files, application instances, SD/Application data and keys**.

FDP_ROL.1.2/GP The TSF shall permit operations to be rolled back within the **boundary limit:**

- **Until the Executable File or application instance has been added to or removed from the applet's registry.**
- **Until SD/Application data or keys have been added to or removed from SD or Application**.

FDP_UCT.1/GP Basic data exchange confidentiality

[91] [selection: transmit, receive]

FDP_UCT.1.1/GP The TSF shall enforce the **ELF Loading information flow control SFP and Data & Key Loading information flow control SFP** to **[selection: *receive*]**[92] user data in a manner protected from unauthorised disclosure.

Application note 14:

This SFR applies where APDU command and response confidentiality protection is required. For example, the sensitive data (e.g. secret keys) shall always be transmitted as confidential data.

FDP_IFC.2/GP-ELF Complete information flow control

FDP_IFC.2.1/GP-ELF The TSF shall enforce the ELF Loading information flow control SFP on

- **Subjects: S.SD, S.CAD, S.OPEN**
- **Information: APDU commands INSTALL and LOAD, GlobalPlatform APIs for loading and installing ELF**

and all operations that cause that information to flow to and from subjects covered by the SFP.

FDP_IFC.2.2/GP-ELF The TSF shall ensure that all operations that cause any information in the TOE to flow to and from any subject in the TOE are covered by an information flow control SFP.

Application note 15:

This SFR corresponds to FDP_IFC.2/CM of [PP-JC].
The subject S.SD can be the ISD, an APSD, or the CASD.
GlobalPlatform's card content management APDU commands and API methods are described in [GP] Chapter 11 and Appendix A.1, respectively.

FDP_IFC.2/GP-KL Complete information flow control

FDP_IFC.2.1/GP-KL The TSF shall enforce the **Data & Key Loading information flow control SFP** on

- **Subjects: S.SD, S.CAD, S.OPEN, Application**
- **Information: GlobalPlatform APDU commands STORE DATA and PUT KEY, GlobalPlatform APIs for loading and storing data and keys** and all operations that cause that information to flow to and from subjects covered by the SFP.

FDP_IFC.2.2/GP-KL The TSF shall ensure that all operations that cause any information in the TOE to flow to and from any subject in the TOE are covered by an information flow control SFP.

[92] [selection: transmit, receive]

Application note 16:

GlobalPlatform's card content management APDU commands and API methods are described in [GP] Chapter 11 and Appendix A.1, respectively.

The subject S.SD can be the ISD, an APSD, or the CASD.

FMT_MSA.3/GP Security attribute initialization

FMT_MSA.3.1/GP The TSF shall enforce the **ELF Loading information flow control SFP and Data & Key Loading information flow control SFP** to provide **restrictive** default values for security attributes that are used to enforce the SFP.

FMT_MSA.3.2/GP The TSF shall allow the **[assignment: *authorized identified roles from FMT_MSA.1/GP SFR*]**[93] to specify alternative initial values to override the default values when an object or information is created.

Application note 17:

This SFR refines FMT_MSA.3/CM of [PP-JC]. It is extended to cover the Data and Key loading Policy.

The authorized identified roles could be off-card or on-card entities as defined in FMT_SMR.1/GP.

FMT_MSA.1/GP Management of security attributes

FMT_MSA.1.1/GP The TSF shall enforce the **ELF Loading information flow control SFP and Data & Key Loading information flow control SFP** to restrict the ability to **[selection: [assignment: *perform the operations listed below*]**[94]**]**[95] the security attributes **[assignment: *listed in the tables below*]**[96] to **[assignment: *the authorized identified roles listed in the tables below*]**[97].

Operations (APDUs or APIs)	Security Attributes: Card Life Cycle State	Authorised Identified Roles with Privileges
DELETE Executable Load File	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD

[93] [assignment: authorised identified roles]

[94] [assignment: other operations]

[95] [selection: change_default, query, modify, delete, [assignment: other operations]]

[96] [assignment: list of security attributes]

[97] [assignment: the authorised identified roles]

DELETE Executable Load File and related Application(s)	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD
DELETE Application	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD
DELETE Key	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD, SD
INSTALL	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD
INSTALL [for personalisation]	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD, SD
LOAD	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD
PUT KEY	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD
SELECT	OP_READY, INITIALIZED, SECURED, or CARD_LOCKED (If an SD does have the Final Application privilege)	ISD, AM SD, DM SD, SD with Final Application privilege
SET STATUS	OP_READY, INITIALIZED, SECURED, or CARD_LOCKED	ISD, AM SD, DM SD, SD
STORE DATA	OP_READY, INITIALIZED, or SECURED	ISD, AM SD, DM SD, SD
GET DATA	OP_READY, INITIALIZED, SECURED, CARD_LOCKED, or TERMINATED	ISD, AM SD, DM SD, SD
GET STATUS	OP_READY, INITIALIZED, SECURED, or CARD_LOCKED	ISD, AM SD, DM SD, SD

Table 26 GlobalPlatform Common Operations, Security Attributes, and Roles

Operations: SCP02 Commands	**Security Attributes: Card Life Cycle State**	**Security Attributes: Minimum Security Level**	**Authorised Identified Roles with Privileges**
INITIALIZE UPDATE	OP_READY, INITIALIZED, SECURED, or CARD_LOCKED	None	ISD, AM SD, DM SD, SD
EXTERNAL AUTHENTICATE		C-MAC	

Table 27 SCP02 Operations, Security Attributes, and Roles

Operations: SCP11 Commands	Used by	Security Attributes: Card Life Cycle State	Security Attributes: Minimum Security Level	Authorised Identified Roles with Privileges
GET DATA (ECKA Certificate)	SCP11a, b and c	OP_READY, INITIALIZED, SECURED, or CARD_LOCKED	None	ISD, AM SD, DM SD, SD
PERFORM SECURITY OPERATION	SCP11a, b and c		None	
MUTUAL AUTHENTICATE	SCP11a, b and c		AUTHENTICATED or ANY_AUTHENTICATED	
STORE DATA (ECKA Certificate)	SCP11a, b and c		None	
STORE DATA (Whitelist)	SCP11a, b and c		None	

Table SCP11 Operations, Security Attributes, and Roles

Operations: SCP80 Command	Security Attributes: Card Life Cycle State	Security Attributes: Minimum Security Level	Authorised Identified Roles with Privileges
Remote File Management Commands **SELECT** **UPDATE BINARY** **UPDATE RECORD** **SEARCH RECORD** **INCREASE** **VERIFY PIN** **CHANGE PIN** **DISABLE PIN** **ENABLE PIN** **UNBLOCK PIN** **DEACTIVATE FILE** **ACTIVATE FILE**	See [TS 102 225] and [TS 102 226]	See [TS 102 225] and [TS 102 226]	See [TS 102 225] and [TS 102 226]

READ BINARY **READ RECORD** **CREATE FILE** **DELETE FILE** **RESIZE FILE** **SET DATA** **RETRIEVE DATA**			
Remote Applet Management Commands **DELETE** **SET STATUS** **INSTALL LOAD** **PUT KEY** **GET STATUS** **GET DATA** **STORE DATA**	See [TS 102 225] and [TS 102 226]	See [TS 102 225] and [TS 102 226]	See [TS 102 225] and [TS 102 226]

Table 28 SCP80 Operations, Security Attributes, and Roles

Operations: SCP81 Command	Security Attributes: Card Life Cycle State	Security Attributes: Minimum Security Level	Authorised Identified Roles with Privileges
PUT KEY	OP_READY, INITIALIZED, SECURED	None	ISD, AM SD, DM SD, SD
STORE DATA	OP_READY, INITIALIZED, SECURED	None	ISD, AM SD, DM SD, SD
GET DATA	OP_READY, INITIALIZED, SECURED, CARD_LOCKED, or TERMINATED ISD, AM SD, DM SD, SD	None	ISD, AM SD, DM SD, SD

Table 29 SCP81 Operations, Security Attributes, and Roles

Legend:

ISD: Issuer Security Domain
AM SD: Security Domain with Authorised Management privilege
DM SD: Security Domain with Delegated Management privilege
SD: Other Security Domain

Application note 18:

This SFR refines FMT_MSA.1/CM of [PP-JC]. It is extended to cover Data and Key loading Policy.

The authorised identified roles could be off-card or on-card entities as defined in FMT_SMR.1/GP.

FMT_SMR.1/GP Security roles

FMT_SMR.1.1/GP The TSF shall maintain the roles:

- **On-card: S.OPEN, S.SD (e.g. ISD, APSD, CASD), Application**
- **Off-card: Issuer, Users (e.g. VA, AP, CA) owning SDs.**

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

Application note 19:

This SFR corresponds to FMT_SMR.1/Installer and FMT_SMR.1/CM of [PP-JCS], applied to roles involved in card content management operations (this is why it has been renamed).

FDP_ITC.2/GP-KL Import of user data with security attributes

FDP_ITC.2.1/GP-KL The TSF shall enforce the **Data & Key Loading information flow control SFP** when importing user data, controlled under the SFP, from outside of the TOE.

FDP_ITC.2.2/GP-KL The TSF shall use the security attributes associated with the imported user data.

FDP_ITC.2.3/GP-KL 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/GP-KL 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/GP-KL The TSF shall enforce the following rules when importing user data controlled under the SFP from outside the TOE:

- **The algorithms and key sizes of the imported keys shall be supported by the SE**
- **[assignment: *none*][98].**

[98] [assignment: additional importation control rules]

FTP_ITC.1/GP Inter-TSF trusted channel

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

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

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

- **APDU commands sent to the card within a Secure Channel Session**
- **When loading/installing a new ELF on the card**
- **When transmitting and loading sensitive data to the card using STORE DATA or PUT KEY commands**
- **When deleting ELFs, Applications, or Keys**
- **[assignment:**
  - ***When retrieving status information via GET STATUS Command***
  - ***When modifying the Application Life Cycle State via SET STATUS command*]**[99]**.**

Application note 20:

This SFR corresponds to FTP_ITC.1/CM of [PP-JC], applied where APDU command and response integrity and/or confidentiality protection through a Secure Channel are required.

FCO_NRO.2/GP Enforced proof of origin

FCO_NRO.2.1/GP The TSF shall enforce the generation of evidence of origin for transmitted **[assignment: *Executable Load Files, SD/Application data and keys*]**[100] at all times.

Refinement

The TSF shall be able to generate an evidence of origin at all times for 'Executable Load Files, SD/Application data and keys' received from the off-card entity (originator of transmitted data) that communicates with the card.

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

[100] [assignment: *list of information types*]

FCO_NRO.2.2/GP The TSF shall be able to relate the **[assignment: *identity*]**[101] of the originator of the information, and the **[assignment: *Executable Load Files, SD/Application data and keys*]**[102] of the information to which the evidence applies.

Refinement

The TSF shall be able to load 'Executable Load Files, SD/Application data and keys' to the card with associated security attributes (the identity of the originator, the destination) such that the evidence of origin can be verified.

FCO_NRO.2.3/GP The TSF shall provide a capability to verify the evidence of origin of information to **the off-card entity (recipient of the evidence of origin) who requested that verification given [assignment: *that the data origin authentication provided within the context of secure messaging was successful*]**[103].

Application note 21:

This SFR extends FCO_NRO.2/CM of [PP-JC] to cover the SD/Application data and keys transmitted and loaded to the card via STORE DATA and PUT KEY commands.

FDP_IFF.1/GP-ELF Complete information flow control

FDP_IFF.1.1/GP-ELF The TSF shall enforce the **ELF Loading information flow control SFP** based on the following types of subject and information security attributes: **[assignment:**

- ***Subjects: S.SD, S.OPEN***
- ***Information: INSTALL and LOAD commands***
- ***Security Attributes: card Life Cycle State, SD Life Cycle states, Secure Channel Security Level, SD privileges*]**[104].

FDP_IFF.1.2/GP-ELF The TSF shall permit an information flow between a controlled subject and controlled information via a controlled operation if the following rules hold:

- **S. SD implements one or more Secure Channel Protocols, namely [selection: *SCP02, SCP03, SCP11, SCP80, SCP81*]**[105]**, each with a complete Secure Channel Key Set.**
- **S.SD has all of the cryptographic keys required by its privileges (e.g. CLFDB, DAP, DM).**

---

[101] [assignment: *list of attributes*]

[102] [assignment: *list of information fields*]

[103] [assignment: *limitations on the evidence of origin*]

[104] [assignment: *list of subjects and information controlled under the indicated SFP, and for each, the security attributes*]

[105] [selection: SCP02, SCP03, SCP10, SCP11, SCP21, SCP22, SCP80, SCP81]

- **On receipt of INSTALL or LOAD commands, S.OPEN checks that the card Life Cycle State is not CARD_LOCKED or TERMINATED.**
- **S.OPEN accepts an ELF only if its integrity and authenticity has been verified.**
- **[assignment: *S.OPEN accepts an ELF only if its AID is not already registered by the TSF*][106].**

FDP_IFF.1.3/GP-ELF The TSF shall enforce the **[assignment: *none*]**[107].

FDP_IFF.1.4/GP-ELF The TSF shall explicitly authorise an information flow based on the following rules**: [assignment: *none*]**[108].

FDP_IFF.1.5/GP-ELF The TSF shall explicitly deny an information flow based on the following rules:

- **S.OPEN fails to verify the integrity and request verification of the authenticity for ELFs**
- **S.OPEN fails to verify the Card Life Cycle state**
- **S.OPEN fails to verify the SD privileges.**
- **S.SD fails to verify the security level applied to protect INSTALL or LOAD commands.**
- **S.SD fails to set the security level (integrity and/or confidentiality), to apply to the next incoming command and/or next outgoing response.**
- **S.SD fails to unwrap INSTALL or LOAD commands.**
- **[assignment: *none*][109].**

Application note 22:

This SFR refines and replaces FDP_IFF.1/CM of [PP-JC].

APDUs belonging to the policy ELF Loading information flow control SFP are described in the following references:

- *For INSTALL, see [GP] section 11.5.*
- *For LOAD, see [GP] section 11.6.*

The INSTALL and LOAD commands must only be issued within a Secure Channel Session; the levels of security for these commands depend on the security level defined in the EXTERNAL AUTHENTICATE command.

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[106] [assignment: for each operation, the security attribute-based re-lationship that must hold between subject and information secu-rity attributes]

[107] [assignment: additional information flow control SFP rules]

[108] [assignment: rules, based on security attributes, that explicitly author-ise information flows]

[109] [assignment: rules, based on security attributes, that explicitly deny information flows]

The minimum security level of INSTALL and LOAD is 'AUTHENTICATED' as defined in [GP] section 10.6.

For instance, Security attributes that can be used in FDP_IFF.1.1/GP-ELF are the authorisation status per Card Life Cycle State information, Privileges data, and the protection security levels of messages as defined in [GP] section 10.6: Entity authentication, Integrity and Data Origin authentication, Confidentiality.

For more details about the rules to be applied to each role of INSTALL command, refer to [GP] sections 9.3 and 3.4.

FDP_ITC.2/GP-ELF Import of user data with security attributes

FDP_ITC.2.1/GP-ELF The TSF shall enforce the **ELF Loading information flow control SFP** when importing user data, controlled under the SFP, from outside of the TOE.

FDP_ITC.2.2/GP-ELF The TSF shall use the security attributes associated with the imported user data.

FDP_ITC.2.3/GP-ELF 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/GP-ELF 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/GP-ELF The TSF shall enforce the following rules when import-ing user data controlled under the SFP from outside the TOE:

- **Referring to Java Card rules defined in [JCVM] and [JCRE]: ELF loading is allowed only if, for each dependent ELF, its AID attrib-ute is equal to a resident ELF AID attribute, and the major (minor) Version attribute associated with the dependent ELF is less than or equal to the major (minor) Version attribute associated with the resident ELF**
- **[assignment: *none*][110].**

Application note 23:

This SFR corresponds to FDP_ITC.2/Installer of [PP-JC].
Java Card rules are defined in [JCVM] sections 4.4 and 4.5 and [JCRE] sec-tion 11.
The TSF shall use the INSTALL data format and the LOAD data format when interpreting the user data from outside the TOE.

[110] [assignment: additional importation control rules]

FDP_IFF.1/GP-KL Complete information flow control

FDP_IFF.1.1/GP-KL The TSF shall enforce the **Data & Key Loading information flow control SFP** based on the following types of subject and information security attributes: **[assignment:**

- ***Subjects: S.SD, S.OPEN***
- ***Information: STORE DATA and PUT KEY commands***
- ***Security Attributes: card Life Cycle State, SD Life Cycle states, Secure Channel Security Level*]**[111].

FDP_IFF.1.2/GP-KL The TSF shall permit an information flow between a controlled subject and controlled information via a controlled operation if the following rules hold:

- **S.SD implements one or more Secure Channel Protocols, namely [selection: *SCP02, SCP03, SCP11, SCP80, SCP81*][112], each equipped with a complete Secure Channel Key Set.**
- **S.SD has all of the cryptographic keys required by its privileges (e.g. CLFDB, DAP, DM).**
- **An Application accepts a message only if it comes from the S.SD it belongs to.**
- **On receipt of a request to forward STORE DATA or PUT KEY commands to an Application,**
- **S.OPEN checks that the card Life Cycle State is not CARD_LOCKED or TERMINATED.**
- **On receipt of a request to forward STORE DATA or PUT KEY commands to an Application, the**
- **S.OPEN checks that the requesting S.SD has no restrictions for personalisation.**
- **S.SD unwraps STORE DATA or PUT KEY according to the Current Security Level of the current Secure Channel Session and prior to the command forwarding to the targeted Application or SD.**
- **[assignment: *none*][113].**

FDP_IFF.1.3/GP-KL The TSF shall enforce the **[assignment: *none*][114].**

FDP_IFF.1.4/GP-KL The TSF shall explicitly authorise an information flow based on the following rules**: [assignment: *none*][115].**

FDP_IFF.1.5/GP-KL The TSF shall explicitly deny an information flow based on the following rules:

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111 [assignment: list of subjects and information controlled under the indi-cated SFP, and for each, the security attributes]

112 [selection: SCP02, SCP03, SCP10, SCP11, SCP21, SCP22, SCP80, SCP81]

113 [assignment: for each operation, the security attribute-based re-lationship that must hold between subject and information secu-rity attributes]

114 [assignment: additional information flow control SFP rules]

115 [assignment: rules, based on security attributes, that explicitly author-ise information flows]

- **S.OPEN fails to verify the Card Life Cycle, Application and SD Life Cycle states.**
- **S.OPEN fails to verify the privileges belonging to an SD or an Application.**
- **S.SD fails to unwrap STORE DATA or PUT KEY.**
- **S.SD fails to verify the security level applied to protect APDU commands.**
- **S.SD fails to set the security level (integrity and/or confidentiality), to apply to the next incoming command and/or next outgoing response.**
- **[assignment: *none*][116].**

Application note 24:

APDUs belonging to the Data & Key Loading information flow control SFP are described in the following references:

- For PUT KEY, see [GP] section 11.8.
- For STORE DATA, see [GP] section 11.11.
The PUT KEY and STORE DATA commands must only be issued within a Secure Channel Session; the levels of security for these commands depend on the security level defined in the EXTERNAL AUTHENTICATE command.

The minimum security level of PUT KEY and STORE DATA is 'AUTHENTI-CATED' as defined in [GP] section 10.6.

For instance, Security attributes that can be used in FDP_IFF.1.1/GP-KL are the authorisation status per Card Life Cycle State information, Privileges data, and the protection security levels of messages as defined in [GP] section 10.6: Entity authentication, Integrity and Data Origin authentication, Confidentiality.

For more details about Key Access Conditions, Data and Key Management, refer to [GP] sections 7.5.2 and 7.6.

FMT_SMF.1/GP [Refined]	**Specification of Management Functions**

FMT_SMF.1.1/GP The TSF shall be capable of performing the following management functions **specified in [GP]:**

- **Card and Application Security Management as defined in [GP]: Life Cycle, Privileges, Application/SD Locking and Unlocking, Card Locking and Unlocking, ~~Card Termination,~~**

[116] [assignment: rules, based on security attributes, that explicitly deny information flows]

Application Status interrogation, Card Status Interrogation, command dispatch, Operational Velocity Checking, and Tracing and Event Logging.

- **Management functions (Secure Channel Initiation/Operation/Termination) related to SCPs as defined in [GP].**

Application note 25:

This SFR corresponds to FMT_SMF.1/CM of [PP-JCS], applied to card content management operations (this is why it has been renamed).

Management functions related to SCPs are defined in [GP] Chapter 10.

Card Termination is not supported by the TOE.

FPT_RCV.3/GP	Automated recovery without undue loss

FPT_RCV.3.1/GP When automated recovery from **[assignment: *power loss*]**[117] is not possible, the TSF shall enter a maintenance mode where the ability to return to a secure state is provided.

FPT_RCV.3.2/GP For **[assignment: *a failure during load/installation of a package/applet and deletion of a package/applet/object*]**[118] the TSF shall ensure the re-turn of the TOE to a secure state using automated procedures.

FPT_RCV.3.3/GP The functions provided by the TSF to recover from failure or service discontinuity shall ensure that the secure initial state is restored without exceeding **[assignment: *0%*]**[119] for loss of TSF data or objects under the control of the TSF.

FPT_RCV.3.4/GP The TSF shall provide the capability to determine the objects that were or were not capable of being recovered.

Application note 26:

This SFR corresponds to FPT_RCV.3/Installer of [PP-JC], applied to card content management operations (this is why it has been renamed).

FPT_RCV.3.1 and FPT_RCV.3.2 are complementary requirements. The first allows to specify a maintenance mode through FMT_SMF.1 and the second allows to state which types of failure or service discontinuity require automatic recovery procedures.

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[117] [assignment: list of failures/service discontinuities during card content management operations]

[118] [assignment: list of failures/service discontinuities during card content management operations]

[119] [assignment: quantification]

Note: If there are no failures defined, there is no requirement to define a maintenance mode.

Examples of failures include interruption of the installation of an Executable Load File, interruption of a package/application deletion, loss of the integrity of Executable Load File, and error during linking of an executable Load File with the Files already present in the card. The behaviour of the TSF is implementation-dependent.

For FPT_RCV.3.3, the acceptable loss may refer to a transaction mechanism used in card content operations. For instance, loss of the Executable Load File upon installation failure, or loss of newly created Java Card objects upon Application instance failure.

FPT_FLS.1/GP Failure with preservation of secure state

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

- **S.OPEN fails to load/install an Executable Load File / Applica-tion instance.**
- **S.SD fails to load SD/Application data and keys.**
- **S.OPEN fails to verify/change the Card Life Cycle, Application and SD Life Cycle states.**
- **S.OPEN fails to verify the privileges belonging to an SD or an Application.**
- **S.SD fails to verify the security level applied to protect APDU commands.**
- **[assignment: *none*][120].**

Application note 18:

This SFR extends FPT_FLS.1/Installer of [PP-JCS] to include the failures that may occur during the loading of SD/Application keys and data.

Refer to [JCRE] *section 11.1.5 and [GP] sections 11.5, 11.6, 11.8, and 11.11 for additional details.*

FIA_UID.1/GP Timing of identification

FIA_UID.1.1/GP The TSF shall allow **[assignment: *SD selection, application selection, Initializing a Secure Channel with the card, requesting data that identifies the card or off-card entities*]**[121] on behalf of the user to be performed before the user is identified.

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

[120] [assignment: list of additional types of failures]

[121] [assignment: list of TSF-mediated actions]

Application note 27:

This SFR corresponds to FIA_UID.1/CM of [PP-JC].

The list of TSF-mediated actions is implementation-dependent, but ELF instal-lation, SD/Application data and keys loading require user identification.

FPT_TDC.1/GP Inter-TSF basic TSF data consistency

FPT_TDC.1.1/GP The TSF shall provide the capability to consistently interpret ELFs, SD/Application data and keys, data used to implement a Secure Channel, **[assignment: *none*]**[122] when shared between the TSF and another trusted IT product.

FPT_TDC.1.2/GP The TSF shall use the list of interpretation rules to be applied by the TSF when processing the INSTALL, LOAD, PUT KEY, and STORE DATA commands sent to the card, **[assignment: *none*]**[123] when interpreting the TSF data from another trusted IT product.

7.2.8 Underlying platform IC Security Functional Requirements

The IC embedded software does not allow the TSFs to be bypassed or altered and does not allow access to low-level functions other than those made available by the packages of the API. That includes the protection of its private data and code against disclosure or modification ([PP-eUICC], section 4.2.2, OE.IC.SUPPORT (1)). Since the IC platform is part of the TOE of this ST, the related objectives for the environment were redefined as objectives for the TOE (O.IC.SUPPORT); they subsequently have to be covered by SFRs.

FPT_PHP.3 Resistance to physical attack

FPT_PHP.3.1 The TSF shall resist **[assignment: *physical manipulation and physical probing*]**[124] to the **[assignment: *TSF*]**[125] by responding automatically such that the SFRs are always enforced.

FAU_SAS.1 Audit Storage

[122] [assignment: list of TSF data types]

[123] [assignment: list of interpretation rules to be applied by the TSF]

[124] [assignment: physical manipulation and physical probing]

[125] [assignment: TSF]

FAU_SAS.1.1 The TSF shall provide the test process before TOE Delivery with the capability to store **[selection: *Initialisation Data]*[126]** in the **[assignment: *NVM]*[127].**

FPT_RCV.3/OS Automated recovery without undue loss

FPT_RCV.3.1/OS When automated recovery from **[assignment: *none*]**[128]**,** is not possible, the TSF shall enter a maintenance mode where the ability to return to a secure state is provided.

FPT_RCV.3.2/OS For **[assignment: *execution access to a memory zone reserved for TSF data, writing access to a memory zone reserved for TSF's code, and any segmentation fault performed by a Java Card applet*]**[129] the TSF shall ensure the return of the TOE to a secure state using automated procedures.

FPT_RCV.3.3/OS The functions provided by the TSF to recover from failure or service discontinuity shall ensure that the secure initial state is restored without exceeding [assignment:

- ***the contents of Java Card static fields, instance fields, and array positions that fall under the scope of an open transaction;***
- ***the Java Card objects that were allocated into the scope of an open transaction;***
- ***the contents of Java Card transient objects;***
- ***any possible Executable Load File being loaded when the failure occurred*]**[130]

for loss of TSF data or objects under the control of the TSF.

FPT_RCV.3.4/OS The TSF shall provide the capability to determine the objects that were or were not capable of being recovered.

Application note 28:

There is no maintenance mode implemented within the TOE. Recovery is always enforced automatically as stated in FPT_RCV.3.2/OS.

FPT_RCV.4/OS Function recovery

FPT_RCV.4.1/OS The TSF shall ensure that **[assignment: *reading from and writing to static and objects' fields interrupted by power loss*]**[131] have the property that the function either completes successfully, or for the indicated failure scenarios, recovers to a consistent and secure state.

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[126] [selection: the Initialisation Data, Pre-personalisation Data, [assignment: other data]]

[127] [assignment: type of persistent memory]

[128] [assignment: list of failures/service discontinuities

[129] [assignment: list of failures/service discontinuities]]

[130] [assignment: quantification]

[131] [assignment: list of functions and failures scenarios]

7.3 OS Update (ITL) SFRs

The following SFR provide secure OS update proprietary features related SFRs.

7.3.1 Class FIA: Identification and Authentication

FIA_ATD.1/OS-UPDATE	User attribute definition

FIA_ATD.1.1/OS-UPDATE The TSF shall maintain the following list of security attributes belonging to individual users: **additional code ID for each activated additional code..**

Refinement: "Individual users" stands for additional code.

7.3.2 Class FDP: User Data Protection

FDP_ACC.1/OS-UPDATE	Subset access control

FDP_ACC.1.1/OS-UPDATE The TSF shall enforce the **OS Update Access Control Policy** on **the following list of subjects, objects, and operations**:

- **Subjects: S.OS-DEVELOPER is the representative of the OS Developer within the TOE, being responsible for signature verification and decryption of the additional code, before:**
  - **Loading**
  - **Installation**
  - **Activation**
  - **[assignment: *Eligibility*][132]**

  Is authorized.
- **Objects: additional code and associated cryptographic signature**
- **Operation: loading, installation, and activation of additional code.**

Refinement:

S.OS-DEVELOPER corresponds to S.OSU

[132] [Assignment: list of other subjects covered by the SFP]

Application note 29:

Eligibility is a validation that the additional OS will be compatible before accepting its download. This is the initial operation and it ensures the compatibility of the additional OS, and performs authentication verification, decryption and integrity assurance.

FDP_ACF.1/OS-UPDATE	Security attribute based access control

FDP_ACF.1.1/OS-UPDATE The TSF shall enforce the **OS Update Access Control Policy** to objects based on the following **Security Attributes:**

- **The additional code cryptographic signature verification status**
- **The Identification Data verification status (between the Initial TOE and the additional code).**

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

- **The verification of the additional code cryptographic signature (using D.OS-UPDATE_SGNVER-KEY) by S.OS-DEVELOPER is successful.**
- **The decryption of the additional code prior installation (using D.OS-UPDATE_DEC-KEY) by S.OS-DEVELOPER is successful.**
- **The comparison between the identification data of both the Initial TOE and the additional code demonstrates that the OS Update operation can be performed.**
- **[assignment: *The integrity check of the manifest, received package, and writ-ten memory ensures that the OS Update operation is successful*][133].**

FDP_ACF.1.3/OS-UPDATE The TSF shall explicitly authorize access of subjects to objects based on the following additional rules: ***none***[134].

FDP_ACF.1.4/OS-UPDATE The TSF shall explicitly deny access of subjects to objects based on the following additional rules: ***none.***[135]

Application note 30:

- *Identification data verification is necessary to ensure that the received additional code is actually targeting the TOE and that its version is compatible with the TOE version.*
- *Confidentiality protection must be enforced when the additional code is transmitted to the TOE for loading (See OE.OS-UPDATE-ENCRYPTION). Confidentiality protection is achieved through direct encryption of the additional code.*

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

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

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

Refinement: correspondence in [PP-GP] and [PP-eUICC].

- S.OS-DEVELOPER corresponds to S.OSU
- D.OS-UPDATE_SGNVER-KEY corresponds to
- D.OS-UPDATE_DEC-KEY corresponds to
- OE.OS-UPDATE-ENCRYPTION corresponds to

7.3.3 Class FMT: Security Management

FMT_MSA.3/OS-UPDATE	Static attribute initialization

FMT_MSA.3.1/OS-UPDATE The TSF shall enforce the **OS Update Access Control Policy** to provide **restrictive** default values for security attributes that are used to enforce the SFP.

FMT_MSA.3.2/OS-UPDATE The TSF shall allow the **OS Developer** to specify alternative initial values to override the default values when an object or information is created.

Application note 31:

The additional code signature verification status must be set to "Fail" by default. This prevents installation of any additional code until the additional code signature is successfully verified by the TOE.

FMT_SMR.1/OS-UPDATE	Security roles

FMT_SMR.1.1/OS-UPDATE The TSF shall maintain the roles **OS Developer, Issuer**.

FMT_SMR.1.2/OS-UPDATE The TSF shall be able to associate users with roles.

FMT_SMF.1/OS-UPDATE	Specification of Management Functions including Updates

FMT_SMF.1.1/OS-UPDATE The TSF shall be capable of performing the following management functions: **activation of additional code.**

Application note 32:

Once verified and installed, additional code needs to be activated to become effective.

7.3.4 Class FCS: Protection of the TSF

FCS_COP.1/OS-UPDATE-DEC	Cryptographic operation

FPT_FLS.1.1/ OS-UPDATE-DEC The TSF shall perform **Decryption of the additional code prior installation** in accordance with a specified cryptographic algorithm **[assignment: *AES in GCM mode*]** [136] and cryptographic key sizes **[assignment: *128 bits*]**[137] that meet the following: **[assignment: *[FIPS197], [SP800-38d]*]**[138].

FCS_COP.1/OS-UPDATE-VER	Cryptographic operation

FCS_COP.1.1/OS-UPDATE-VER The TSF shall perform digital signature verification of the additional code to be loaded in accordance with a specified cryptographic algorithm **[assignment: *AES CMAC*]** [139] and cryptographic key sizes **[assignment: *128 bits*]**[140] that meet the following: **[assignment: *[FIPS197], [SP800-38b]*]**[141] .

7.3.5 Class FPT: Protection of the TSF

FPT_FLS.1/OS-UPDATE	Failure with Preservation of Secure State (Failed Update)

FPT_FLS.1.1/OS-UPDATE The TSF shall preserve a secure state when the following types of failures occur: **interruption or incident which prevents the forming of the Updated TOE.**

Application note 33:

The OS Update operation must either be successful or fail securely.
There are 5 steps in an OS Update operation:

- *Step 1: eligibility check*
- *Step 2: loading*
- *Step 3: activation*
- *Step 4: update of TOE identification data*

136 [assignment: cryptographic algorithm]
137 [assignment: cryptographic key sizes]
138 [assignment: list of standards]
139 [assignment: cryptographic algorithm]
140 [assignment: cryptographic key sizes]
141 [assignment: list of standards]

Step 1 is a blocker, so that if the new OS is not compatible with the current TOE, the update will not proceed and no changes will be applied on the TOE.
Steps 2 to 4 are performed subsequently, being step 4 only accepted in case all the previous steps have been fulfilled.

- *If a failure (interruption or incident) occurs during step 1 (eligibility), then the TOE remains in its initial state (no update, neither of code nor of the TOE identification data).*
- *If a failure (interruption or incident) occurs during step 2, the TOE will remain in a safe state, being the ITL in charge of the TOE, and waiting for the failed update to be started from scratch. Only the same OS that was interrupted is eligible, other OS update attempts will be rejected.*
- *Steps 3 and 4 are performed in an atomic way. If a failure (interruption or incident) occurs in these steps, the activation will be restarted, followed by the update of TOE identification data, after performing a RESET of the card.*

7.3.6 Class FTP: Trusted Path/Channels

FTP_TRP.1/OS-UPDATE Trusted Path

FTP_TRP.1.1/ OS-UPDATE The TSF shall provide a communication channel between itself and **remote** that is logically distinct from other communication paths and provides assured identification of its end points and protection of the channel data from **[selection: *none*]**[142].

FTP_TRP.1.2/ OS-UPDATE The TSF shall permit **remote users** to initiate communication via the trusted path.

FTP_TRP.1.3/ OS-UPDATE The TSF shall require the use of the trusted path for **the transfer of the additional code to the TOE**.

Application note 34:

During the transmission of the additional code to the TOE for loading, the confidentiality is ensured through direct encryption of the additional code. Consequently, it is selected 'none' in FTP_TRP.1.1/OS-UPDATE.

7.4 Security Functional Requirements Rationale

[142] [selection: disclosure, none]

7.4.1 SFRs for eUICC rationale

The security functional requirements rationale is the same than the ones present in section 6.3 from [PP-eUICC].

7.4.2 SFRs for Runtime Environment rationale

The next table shows the objectives related to [PP-eUICC] runtime environment and its translation according to [PP-eUICC] application notes for OE.RE* objectives. The security functional requirements rationale of O.RE* will be the same than the rationale for the objectives translated from JavaCard PP [PP-JCS] and are not repeated here.

In case of O.CARD-MANAGEMENT, the Security Functional Requirements rationale should be extracted from [PP-GP].

In case of Objectives for the OS Update, the SFRs rationale is extracted from [PP-GP].

RE objectives	Translation from JavaCard PP
O.RE.PRE-PPI	O.INSTALL, O.DELETION, O.LOAD, O.CARD-MANAGEMENT
O.RE.SECURE-COMM	OE.SCP.RECOVERY, OE.SCP.SUPPORT, O.CARD-MANAGEMENT, O.SID, O.OPERATE, O.FIREWALL, O.GLOBAL_ARRAYS_CONFID, O.GLOBAL_ARRAYS_INTEG, O.ALARM, O.TRANSACTION, O.CIPHER, O.RNG, O.PIN-MNGT, O.KEY-MNGT, O.REALLOCATION, OE.VERIFICATION
O.RE.API	O.CARD-MANAGEMENT, O.NATIVE, OE.SCP.RECOVERY, OE.SCP.SUPPORT, O.SID, O.OPERATE, O.FIREWALL, O.ALARM, OE.VERIFICATION
O.RE.DATA-CONFIDENTIALITY	OE.SCP.RECOVERY, OE.SCP.SUPPORT, O.CARD-MANAGEMENT, O.SID, O.OPERATE, O.FIREWALL, O.GLOBAL_ARRAYS_CONFID, O.ALARM, O.TRANSACTION, O.CIPHER, O.RNG, O.PIN-MNGT, O.KEY-MNGT, O.REALLOCATION, OE.VERIFICATION
O.RE.DATA-INTEGRITY	OE.SCP.RECOVERY, OE.SCP.SUPPORT, O.CARD-MANAGEMENT, O.SID, O.OPERATE, O.FIREWALL, O.GLOBAL_ARRAYS_INTEG, O.ALARM, O.TRANSACTION, O.CIPHER, O.RNG, O.PIN-MNGT, O.KEY-MNGT, O.REALLOCATION, O.LOAD, O.NATIVE, OE.VERIFICATION
O.RE.IDENTITY	OE.SCP.RECOVERY and OE.SCP.SUPPORT, O.FIREWALL, O.SID, O.INSTALL, O.OPERATE, O.GLOBAL_ARRAYS_CONFID, O.GLOBAL_ARRAYS_INTEG, O.CARD-MANAGEMENT
O.RE.CODE-EXE	O.FIREWALL, O.REMOTE, O.NATIVE, OE.VERIFICATION

Table 30. Runtime environment objectives conversion for SFR rationale.

Note that OE.SCP.RECOVERY and OE.SCP.SUPPORT from [PP-JCS] are equivalent to OE.IC.RECOVERY and OE.IC.SUPPORT from [PP-eUICC] converted to O.IC.RECOVERY and O.IC.SUPPORT in current Security Target. See next section for the rationale.

7.4.3 SFRs for Underlying platform IC rationale

Objective	SFRs	Rationale / statement on contribution to the objective coverage
O.IC.SUPPORT	FCS_CKM.1/*, FCS_CKM.6/*, FAU_ARP.1, FPR_UNO.1, FPT_EMS.1/Base, FPT_PHP.3, FDP_SDI.2/DATA, FDP_ROL.1/FIREWALL FPT_RCV.4/OS	Contribute by resetting the card session or terminating the card in case of physical tampering; by ensuring leakage resistant implementations of the unobservable operations; by preventing bypassing, deactivation or changing of other security features. Contribute to resistance against physical attacks, to non-bypassability by securing data against modification, and to low-level-cryptographic support and low-level transaction mechanism.
O.IC.RECOVERY	FAU_ARP.1, FPT_FLS.1/RE FPT_RCV.3/OS	Contribute by ensuring reinitialization of the Java Card System and its data after card tearing and power failure, and by preserving a secure state after failure.
O.IC.PROOF_OF_IDENTITY	FAU_SAS.1	Contributes to providing the off-card actor with a cryptographic proof of identity based on an EID, which is derived from eUICC hardware identification.

Table 31 IC Security Objectives and SFRs – Coverage

7.4.4 SFRs for Card Content Management rationale

Objective	SFR and Rationale / statement on contribution to the objective coverage (extracted from [PP-GP] section 7.3.1.2)
O.CARD-MANAGEMENT	FDP_UIT.1/GP ensures the integrity of card management operations. FDP_UCT.1/GP ensures the confidentiality of card management operations. FDP_ROL.1/GP ensures the rollback of the installation or removal operation on the executable files and application instances. FDP_ITC.2/GP-ELF enforces the ELF loading information flow policy when importing ELFs.

	FDP_ITC.2/GP-KL enforces the Data & Key information flow policy when importing keys and data. FPT_FLS.1/GP requires the card to preserve a secure state when failures occur during loading/installing/deleting an Executable File / application instance. FDP_IFC.2/GP-ELF, FDP_IFF.1/GP-ELF, FDP_IFC.2/GP-KL, FDP_IFF.1/GP-KL enforce the information flow control policy for managing, authenticating, and protecting the Card management commands and responses between off-card and on-card entities. FIA_UID.1/GP, FIA_UAU.1/GP and FIA_UAU.4/GP ensure appropriate identification and authentication mechanisms. In addition, these SFRs specify the actions being performed before the authentication of the origin of the received APDU commands takes place. FCO_NRO.2/GP enforces the evidence of the origin during the loading of Executable Load Files, SD/Application data and keys. FPT_TDC.1/GP specifies requirements preventing any possible misinterpretation of the Security Domain keys used to implement a Secure Channel when those are loaded from the off-card entity. FTP_ITC.1/GP requires a trusted channel for authenticating the card management commands and for securely protecting (authenticity, integrity, and/or confidentiality) the loading of ELF/data. FMT_MSA.1/GP and FMT_MSA.3/GP specify security attributes enabling to: o ensure the authenticity, integrity, and/or confidentiality of card management commands; o enforce the TOE Life cycle management and transitions. FMT_SMF.1/GP enforces the card management operations (Loading, Installation, etc.), the privileges, the life cycle states and transition by defining the protective actions for the belonging commands. FMT_SMR.1/GP maintains the roles S.OPEN, ISD, SSD, Application, and their associated Life Cycle states. In addition, it maintains the Application Provider, Controlling Authority roles and specifies the authorised roles enabled for sending and authenticating card management commands. These commands have to be protected with regard to integrity, authenticity, and confidentiality. FPT_RCV.3/GP ensures safe recovery from failure.

	FIA_AFL.1/GP supports the objective by bounding the number of signatures that the attacker may try to attach to a message to authenticate its origin.

Table 32 CCM Objectives and SFRs - Coverage

7.4.5 SFRs for OS Update (ITL) rationale

Objective	Rationale/Statement on contribution to the objective coverage (extracted from [PP-GP], section 18.5)
O.SECURE_LOAD_ACODE	FDP_ACC.1/OS-UPDATE and FDP_ACF.1/OS-UPDATE enforce the OS Update Access Control Policy on the eligibility, loading, installation, and activation of additional code. FMT_MSA.3/OS-UPDATE specifies security attributes that support management of the loading, installation, and activation of additional code. FMT_SMR.1/OS-UPDATE maintains the role of OS Developer, which is responsible for signature verification and decryption of additional code before Loading, Installation, and Activation. FMT_SMF.1/OS-UPDATE manages the activation of additional code. FCS_COP.1/OS-UPDATE-VER specifies the cryptographic algorithms used to perform digital signature verification of the additional code to be loaded.
O.SECURE_AC_ACTIVATION	FDP_ACC.1/OS-UPDATE and FDP_ACF.1/OS-UPDATE enforce the OS Update Access Control Policy on the eligibility, loading, installation, and activation of additional code. FIA_ATD.1/OS-UPDATE maintains the additional code ID for each activated additional code. FMT_MSA.3/OS-UPDATE specifies security attributes that support management of the loading, installation, and activation of additional code. FMT_SMR.1/OS-UPDATE maintains the role of OS Developer, which is responsible for signature verification and decryption of additional code before Loading, Installation, and Activation. FMT_SMF.1/OS-UPDATE manages the activation of additional code. FPT_FLS.1/OS-UPDATE preserves a secure state when upon interruption or incident, which prevents the forming of the Updated TOE.
O.TOE_IDENTIFICATION	FDP_ACC.1/OS-UPDATE and FDP_ACF.1/OS-UPDATE enforce the OS Update Access Control Policy on the eligibility, loading, installation, and activation of additional code. FIA_ATD.1/OS-UPDATE maintains the additional code ID for each activated additional code. FMT_MSA.3/OS-UPDATE specifies security attributes that support management of the loading, installation, and activation of additional code.

	FMT_SMR.1/OS-UPDATE maintains the role of OS Developer, which is responsible for signature verification and decryption of additional code before Loading, Installation, and Activation. FMT_SMF.1/OS-UPDATE manages the activation of additional code.
O.CONFID-UPDATE-IMAGE.LOAD	FDP_ACC.1/OS-UPDATE and FDP_ACF.1/OS-UPDATE enforce the OS Update Access Control Policy on the eligibility, loading, installation, and activation of additional code. FMT_MSA.3/OS-UPDATE specifies security attributes that support management of the loading, installation, and activation of additional code. FMT_SMR.1/OS-UPDATE maintains the role of OS Developer, which is responsible for signature verification and decryption of additional code before Loading, Installation, and Activation. FMT_SMF.1/OS-UPDATE manages the activation of additional code. FTP_TRP.1/OS-UPDATE provides a trusted path during the transmission of the additional code to the TOE for loading. FCS_COP.1/OS-UPDATE-DEC specifies the cryptographic algorithms used to decrypt the additional code prior to installation.
O.AUTH-LOAD-UPDATE-IMAGE	FDP_ACC.1.1/OS-UPDATE enforces the OS Update Access Control Policy on the eligibility, loading, installation, and activation of additional code.

Table 33 OS Update (ITL) Security Objectives and SFRs - Coverage

8. TOE Summary Specification

The TOE implements the SFRs in accordance to the GSMA specifications, sufficiently hardened to counter attackers at AVA_VAN.5 level.

The TOE is equipped with following Security Features to meet the security functional requirements.

8.1 eUICC security functions

8.1.1 SF.TRANSACTION

This security function provides atomic transactions according to the Java Card Transaction and Atomicity mechanism with commit and rollback capability for updating persistent objects in flash memory. The update operation either successfully completes or the data is restored to its original pre-transaction state if the transaction does not complete normally. The transaction exception is thrown if the commit capacity is exceeded during a transaction. The rollback operation restores the original values of the persistent objects and clears the dedicated transaction area.

8.1.2 SF.ACCESS_CONTROL

This TSF is responsible for enforcing the following security policies:

- ISD-R access control SFP
- ISD-P content access control SFP
- ECASD access control SFP
- FIREWALL access control SFP
- ADEL access control SFP
- JCVM information flow policy
- ELF Loading information flow control SFP (covers INSTALL and LOAD commands)
- Data & Key Loading information flow control SFP (covers STORE DATA and PUT KEY commands)
- Platform services information flow control SFP
- OS Update Access Control Policy

to control the flow of information between subjects and to control the access to objects by subjects.
The TOE provides security management measures:

- Management of security attributes such as Platform data (FMT_MSA.1/PLATFORM_DATA), PPR (FMT_MSA.1/PPR), (FMT_MSA.1/RAT) and keys (FMT_MSA.1/CERT_KEYS) with re-strictive default values (FMT_MSA.3);

- Management of roles and security functions (FMT_SMR.1 and FMT_SMF.1).

The TOE enforces access control to objects based on security attributes and throws a security exception when access is denied.

Besides the roles defined in [PP-eUICC] and [PP-JCS], the TOE maintains the roles S.OSU (Content Management) and S.UpdateImageCreator (OS updates) and S.SD and S.OPEN (for Content Management) and associates users with these roles.

The TOE requires each user to identify itself before allowing TSF-mediated actions on behalf of that user. The TSF associates user security attributes with subjects acting on behalf of that user. The TSF accepts only secure values for security attributes. The TSF provides means to identify remote and on-card users of the TOE.

The TOE requires each user to be successfully authenticated before allowing TSF-mediated actions on behalf of that user. Cryptographic mechanisms used for the authentication are covered by SF.CRYPTO. The TSF prevents prevent reuse of authentication data.

Application selection, secure channel initiation, request data with the GET DATA command on behalf of the user can be performed before the user is identified and authenticated.
The TSF enforces the rules under which

- the S.ISD-R can perform its functions (ISD-R access control SFP in FDP_ACC.1/ISDR and FDP_ACF.1/ISDR),
- the S.ISD-R can perform ECASD functions and obtain output data from these functions (ECASD access control SFP in FDP_ACC.1/ECASD and FDP_ACF.1/ECASD).

The TSF ensures that unauthorized actors shall not get access to or change cryptographic keys. Modification of Security Domain keyset is restricted to its corresponding owner.
In the same manner, the TSF ensures that only the legitimate users can access or change its confidential or integrity-sensitive data.

This domain separation capability relies upon the Runtime Environment protection of applications implemented by the FIREWALL access control SFP and the JCVM information flow policy.
The TOE Runtime Environment capabilities prevent unauthorized code execution by applications and to ensure that native code can be invoked via an API only.

The TOE provides Inter-TSF data consistency and implements rules stated in FPT_TDC.1.2/RE, FPT_TDC.1/GP and FPT_TDC.1.2/SCP when interpreting the TSF data from another trusted IT product.

8.1.3 SF.INTEGRITY

This TSF provides protection from integrity errors.

The TSF initializes the checksum of cryptographic keys, PIN values and their associated security attributes and monitors cryptographic keys, PIN values and their associated security attributes stored within the TSF for integrity errors by secure verification of the checksum.

Upon detection of a data integrity error the TOE will throw an exception and/or switch to an endless loop and therefore prevent the usage of this key or PIN. This is a secure state.

8.1.4 SF.SECURITY

This security function provides User data and TSF self-protection measures:

- TOE emanation
- Residual data protection
- Preservation of secure state
- resistance to side channel attacks
- detection of physical tampering

This TSF provides resistance to side channel attacks. The TSF enforces protection of secret data of the TOE during cryptographic operations, comparison operations and key generation against state-of-the-art attacks that are based on external observable physical phenomena of the TOE. The TOE hides information about IC power consumptions and command execution time such that no confidential information can be derived from this data.

The TOE ensures that any previous information content of a resource is made unavailable upon the deallocation of the resource

- deletion of applet instances and/or CAP files,
- in case of failures of PPE, PPI or Telecom Framework,
- from any reference to an object instance created during an aborted transaction,
- sensitive temporary buffers (transient object, bArray object, APDU buffer, Cryptographic buffer) are securely cleared after their usage with respect to their life-cycle and interface as defined in **[JCRE]**,
- transient objects and persistent objects are made inaccessible upon deallocation of the object
- objects owned by the context of an applet instance which triggered the method javacard.framework.JCSystem.requestObjectDeletion().

The card is muted upon detection of a potential security violation such that the TOE preserves a secure state.

The TOE preserves a secure state

- when platform or content management operations fail, e.g.

- failure of creation of a new ISD-P by ISD-R,
- failure of installation of a profile by ISD-R,
- the installer fails to load/install a CAP file/applet,
- the applet deletion manager fails to delete a CAP file/applet,
- the object deletion functions fail to delete all the unreferenced objects owned by the applet that requested the execution of the method.

- upon failures that lead to a potential security violation during the processing of a S.PPE, S.PPI or S.TELECOM API specific functions,
- upon failures detected during post-issuance update process (ITL),
- upon detection of a potential security violation described in FAU_ARP.1.

The TOE detects physical tampering of the TSF with sensors for operating voltage, clock frequency, temperature and electromagnetic radiation. It is resistant to physical tampering of the TSF. If the TOE detects with the above mentioned sensors that it is not supplied within the specified limits, a security reset is initiated and the TOE is not operable until the supply is back in the specified limits. The design of the hardware protects it against analyzing and physical tampering.

8.1.5 SF.PLATFORM_MANAGEMENT

This TSF is responsible for enforcing the Platform services information flow control SFP applicable to the Profile Policy Enabler, Profile Package Interpreter and the Telecom Framework. In particular it defines the measures taken to control the flow of information between the Security Domains and PPE, PPI or Telecom Framework (FDP_IFC.1/Platform_services and FDP_IFF.1/Platform_services).

The TOE provides functionalities of platform management (loading, installation, enabling, disabling, and deletion of applications) in charge of the life-cycle of the whole eUICC and installed applications, as well as the corresponding authorization control, provided by the Profile Policy Enabler (PPE) and the Profile Package Interpreter (PPI).

This functionality relies on the Runtime Environment secure card content management services for loading and installation of a package file, extradition of a package file or an application, personalization of an application or a Security Domain, deletion of a package file or an application, privileges up-date of an application or a Security Domain.

Content changes are permitted according to the privileges that have been as-signed to the acting Security Domain that holds cryptographic keys used to support the Secure Channel Protocol operations and/or to authorize platform management functions. Before performing platform or content management operations, the TOE checks if the off-card entity has been successfully authenticated and a Secure Channel Session has been successfully initiated. Secure communication is provided by SF.SECURE_CHANNEL.

This TSF relies on the Runtime Environment to ensure the secure identification of the applications it executes.

8.1.6 SF.SECURE_CHANNEL

This TSF is related to the protection of:

- Profiles downloaded from SM-DP+,
- Commands received from SM-DP+, eIM (SGP.32) and MNO OTA Platform,
- PPR received from the MNO OTA Platform,
- ELF Loading and Data & Key Loading,
- Post-issuance OS Update image loading

by enforcing the following security policies:

- Secure Channel Protocol information flow control SFP,
- ELF Loading information flow control SFP and Data & Key Loading information flow control SFP
- OS Update Access Control Policy

that permit an off-card entity to initiate communication with the TOE via the trusted channel.

Trusted channels provide protection from unauthorized disclosure, modification and replay. Thus the TSF ensures that incoming messages are transmitted are properly provided unaltered to the corresponding Security Domain and that response messages are properly returned to the off-card entity.

The off-card entity may initiate secure communication with the TOE by the following means: SCP02, SCP03, SCP11, SCP-SGP22, SCP80, SCP81.

Secure channel protocol	Algorithms involved
SCP02 (deprecated)	Triple-DES CBC and Triple-DES CBC MAC acc. to **[GP]** B.1.2.2 (Single DES plus final Triple-DES MAC). Deprecated.
SCP03	AES CBC MAC, AES CMAC **[GP AM D]**
SCP11	ECDSA 256 bits, AES-128
SCP-SGP22	ECDSA 256 bits, AES-128
SCP80	Triple-DES and AES CBC MAC
SCP81	TLS 1.2 with recommended cipher suites ([GP AM B]): TLS_PSK_WITH_AES_128_CBC_SHA256 TLS_PSK_WITH_NULL_SHA256 TLS 1.3 with recommended cipher suites ([GP AM B]): TLS_AES_128_CCM_SHA256

	TLS_AES_128_GCM_SHA256

The TSF enforces the SCP-SGP22 secure channel for communication between U.SM-DP+ and S.ISD-R (ISD-R and SM-DP+). Identification of endpoints is addressed by the use of AES according to **[GP AM F]** using the parameters defined in **[SGP.32]**, chapters 2.6 and 5.5.

The TSF enforces SCP80 or SCP81 for communication between U.MNO-OTA and U.MNO-SD (MNO-SD and MNO OTA Platform). SCP80 must be provided to build secure channels to MNO OTA Platform (chapter 5.4 of [SGP.32]). The TSF may also permit to use a SCP81 secure channel to perform the same functions than the SCP80 secure channel.

Applications may use the Secure Channel Protocol(s) supported by their associated Security Domain for securing information exchanged with the off-card entity (e.g. SCP02, SCP03).

Secure Channel Protocol 02 (SCP02) **[GP AM D]** provides the three followings levels of security: entity authentication, integrity and data origin authentication and confidentiality. A further level of security applies to sensitive data (e.g. secret keys) that shall always be transmitted as confidential data. SCP02 is realised by the TOE based on the Triple-DES cryptographic algorithm.

Secure Channel Protocol 03 (SCP03) **[GP AM D]** provides the three followings level of security: mutual authentication, integrity and data origin authentication and confidentiality. It is based on SCP02 and is a secure channel protocol supporting AES-based cryptography. SCP03 is realized by the TOE based on the AES cryptographic algorithm.

Secure Channel Protocol 11 (SCP11) **[GP AM F]** provides the three following levels of Security: mutual authentication, integrity and data origin authentication and confidentiality. It is based on Elliptic Curve Cryptography (ECC) for mutual authentication and secure channel initiation and on AES for secure messaging. SCP03 is realized by the TOE based on the AES cryptographic algorithm.

The OS Update (ITL) component uses the AES GCM encryption scheme.

The cryptographic mechanisms used by the Secure Channel Protocols to enforce this protection and securely manage the associated keysets are provided by SF.CRYPTO.

This TSF is supported by SF.ACCESS_CONTROL that prevents reuse of authentication data related to the authentication mechanism used to open a secure communication channel.

8.1.7 SF.CRYPTO

This TSF controls all the operations related to the cryptographic key management (generation, distribution, destruction) and cryptographic operations (FCS_CKM.1/*, FCS_CKM.2/*, FCS_CKM.6/*, FCS_COP.1/*).

Key destruction by physically overwriting keys with zero values is provided by the following means:

- Applications may use the Java Card API method Key.clearKey() for key destruction.
- The TOE zeroizes the session keys when closing the corresponding Secure Channel Session or upon card reset.

Key distribution is provided by the following means:

- PUT KEY, LoadBoundProfilePackage according to **[GP]** §11.8, **[SGP.32]** §5.9.8.
- Profile download and installation according to **[SGP.32]** §3.2, §5.9.8, **[SIMalliance]** §8.6.3, **[SIMalliance_2]** §8.6.3.
- Java Card API set methods of javacard.security classes AESKey, DESKey, ECKey, ECPrivateKey, ECPublicKey.

The TOE provides mechanisms for the authentication to the mobile networks via the algorithms MILENAGE, Tuak and Cave.

The TOE provides the following algorithms for hashing:

- SHA-256 as required by **[SGP.22]** §2.6.5: Hashing for digital signatures and hash-only applications, for HMAC, KDF and RNG, for the verification of the hash over the update image (after load phase completed) during the OS Update (ITL) procedure.
- Java Card API class javacard.security.MessageDigest with algorithm SHA (ALG_SHA, ALG_SHA_224/256/384/ 512).

The TOE provides the following algorithms for digital signature generation and verification:

- ECDSA is provided to applications via the Java Card API methods defined in the javacard.security.Signature class.
    - Java Card API ECDSA based signatures (ALG_ECDSA_SHA*) are provided with SHA-1, SHA-224/256/384/512.
- ECDSA is provided as required by the SFRs FDP_ACF.1/ECASD FIA_UAU.1/EXT (for U.SM-DP+ authentication), FIA_API.1.1, and **[SGP.22]** §2.6.7.2 signature computed as defined in **[GP AM E]** with one of the domain parameters in §2.6.7.1.

The TOE provides key agreement:

- ECKA-EG as required by the SFR FCS_CKM.1/SCP-SM and **[SGP.22]** §2.6.7.3; Annex G references **[GP AM F]** §3.1.1.
- ECDH as required by the Java Card API class javacard.security.KeyAgreement ALG_EC_* (all EC DH excluding PACE) and ALG_XDH (using Montgomery Curves).

The TOE provides MAC generation and verification:

- Triple-DES CBC MAC as required by the SCP02 acc. to **[GP]** B.1.2.2 (Single DES plus final Triple-DES MAC) and the Java Card API class javacard.security.Signature (ALG_DES_MAC*)
- AES CBC MAC as required by the SRFs FIA_UAU.1/EXT (for U.MNO-OTA Authentication using SCP80 secure channel), FDP_IFF.1/SCP (SCP80/81, SCP-SGP.22), FDP_UIT.1/SCP, and by the Secure Channel Protocols SCP03 **[GP AM D]** and SCP80 **[TS102 225]**, section 5.1.3.

- AES CMAC for SCP03 message authentication (FCS_COP.1/MAC_AES)
- AES CMAC as required by the Java Card API class javacard.security.Signature (ALG_AES_CMAC_128), and by the ITL procedure for verification of the MAC over the update image.
- HMAC as required by the Java Card API class javacard.security.Signature (ALG_HMAC_SHA*) with SHA-1, SHA-256/384/512.
- AES CCM as required by TLS v1.3

The TOE provides encryption and decryption:

- Triple-DES in CBC mode as required by SCP02 and Java Card API javacardx.crypto.Cipher
- AES in CBC and ECB modes as required by FDP_IFF.1/SCP (SCP80/81, SCP-SGP.22), FDP_UCT.1/SCP, SCP03, SCP11 and the Java Card API class javacardx.crypto.Cipher.
- AES in GCM mode as required by TLS v1.3.
- AES in GCM mode used by OS Update (ITL) procedure.

The TOE provides a cryptographic authentication mechanism based on the EID of the eUICC.

8.1.8 SF.RNG

This security function is composed of random number generation that meets DRG.3 according [AIS 20] (FCS_RNG.1). The random number generator provided by the TOE is a deterministic random bit generator based on the AES block cipher according to [ISO 18031][ISO 18031].

Besides its use in key generation, applications may use the methods of the Java Card API javacard.security.RandomData class for generation of random numbers.

8.1.9 SF.IDENTITY

The TOE ensures that the eUICC is identified by a unique EID, based on the hardware identification of the eUICC (FIA_API.1).
The underlying IC used by the TOE is uniquely identified (FAU_SAS.1).

8.2 TSS Rationale

The justification and overview of the mapping between security functional requirements (SFR) and the TOE's security functionality (SF) is given in section above.

8.2.1 eUICC SFRs coverage

Security Functional Requirement	Coverage by TSS Security Function(s)
FIA_UID.1/EXT	SF.ACCESS_CONTROL

FIA_UAU.1/EXT	SF.ACCESS_CONTROL
FIA_USB.1/EXT	SF.ACCESS_CONTROL
FIA_UAU.4/EXT	SF.ACCESS_CONTROL
FIA_UID.1/MNO-SD	SF.ACCESS_CONTROL
FIA_USB.1/MNO-SD	SF.ACCESS_CONTROL
FIA_ATD.1/Base	SF.ACCESS_CONTROL
FIA_API.1.1	SF.IDENTITY, SF.CRYPTO
FDP_IFC.1/SCP	SF.SECURE_CHANNEL
FDP_IFF.1/SCP	SF.SECURE_CHANNEL
FTP_ITC.1/SCP	SF.SECURE_CHANNEL
FDP_ITC.2/SCP	SF.SECURE_CHANNEL
FPT_TDC.1/SCP	SF.ACCESS_CONTROL
FDP_UCT.1/SCP	SF.SECURE_CHANNEL
FDP_UIT.1/SCP	SF.SECURE_CHANNEL
FCS_CKM.1/SCP-SM	SF.CRYPTO
FCS_CKM.2/SCP-MNO	SF.CRYPTO
FCS_CKM.6/SCP-SM	SF.CRYPTO
FCS_CKM.6/SCP-MNO	SF.CRYPTO
FDP_ACC.1/ISDR	SF.ACCESS_CONTROL
FDP_ACF.1/ISDR	SF.ACCESS_CONTROL
FDP_ACC.1/ECASD	SF.ACCESS_CONTROL
FDP_ACF.1/ECASD	SF.ACCESS_CONTROL
FDP_IFC.1/Platform_services	SF.PLATFORM_MANAGEMENT
FDP_IFF.1/Platform_services	SF.PLATFORM_MANAGEMENT
FPT_FLS.1/Platform_services	SF.SECURITY
FCS_RNG.1	SF.RNG
FPT_EMS.1/Base	SF.SECURITY
FDP_SDI.1/Base	SF.INTEGRITY
FDP_RIP.1/Base	SF.SECURITY
FPT_FLS.1/Base	SF.SECURITY
FMT_MSA.1/PLATFORM_DATA	SF.ACCESS_CONTROL
FMT_MSA.1/RULES	SF.ACCESS_CONTROL
FMT_MSA.1/CERT_KEYS	SF.ACCESS_CONTROL

FMT_SMF.1	SF.ACCESS_CONTROL
FMT_SMR.1/Base	SF.ACCESS_CONTROL
FMT_MSA.1/RAT	SF.ACCESS_CONTROL
FMT_MSA.3	SF.ACCESS_CONTROL
FCS_COP.1/Mobile_network	SF.CRYPTO
FCS_CKM.2/Mobile_network	SF.CRYPTO
FCS_CKM.6/Mobile_network	SF.CRYPTO

Table 34. eUICC SFRs coverage

8.2.2 Runtime Environment SFRs coverage

Security Functional Requirement	Coverage by TSS Security Function(s)
FDP_ACC.2/FIREWALL	SF.ACCESS_CONTROL
FDP_ACF.1/FIREWALL	SF.ACCESS_CONTROL
FDP_IFC.1/JCVM	SF.ACCESS_CONTROL
FDP_IFF.1/JCVM	SF.ACCESS_CONTROL
FDP_RIP.1/OBJECTS	SF.SECURITY
FMT_MSA.1/JCRE	SF.ACCESS_CONTROL
FMT_MSA.1/JCVM	SF.ACCESS_CONTROL
FMT_MSA.2/FIREWALL_JCVM	SF.ACCESS_CONTROL
FMT_MSA.3/FIREWALL	SF.ACCESS_CONTROL
FMT_MSA.3/JCVM	SF.ACCESS_CONTROL
FMT_SMF.1/RE	SF.ACCESS_CONTROL
FMT_SMR.1/RE	SF.ACCESS_CONTROL
FCS_CKM.1	SF.CRYPTO
FCS_CKM.6/RE	SF.CRYPTO
FCS_COP.1	SF.CRYPTO
FDP_RIP.1/ABORT	SF.TRANSACTION
FDP_RIP.1/APDU	SF.SECURITY
FDP_RIP.1/bArray	SF.SECURITY
FDP_RIP.1/GlobalArray	SF.SECURITY
FDP_RIP.1/KEYS	SF.SECURITY
FDP_RIP.1/TRANSIENT	SF.SECURITY

FDP_ROL.1/FIREWALL	SF.TRANSACTION
FCS_CKM.1/GP-SCP	SF.SECURE_CHANNEL
FCS_COP.1/GP-SCP	SF.SECURE_CHANNEL
FAU_ARP.1	SF.SECURITY
FDP_SDI.2/DATA	SF.INTEGRITY
FPR_UNO.1	SF.SECURITY
FPT_FLS.1/RE	SF.SECURITY
FPT_TDC.1/RE	SF.ACCESS_CONTROL
FIA_ATD.1/AID	SF.ACCESS_CONTROL
FIA_UID.2/AID	SF.ACCESS_CONTROL
FIA_USB.1/AID	SF.ACCESS_CONTROL
FMT_MTD.1/JCRE	SF.ACCESS_CONTROL
FMT_MTD.3/JCRE	SF.ACCESS_CONTROL
FDP_ACC.2/ADEL	SF.ACCESS_CONTROL
FDP_ACF.1/ADEL	SF.ACCESS_CONTROL
FDP_RIP.1/ADEL	SF.SECURITY
FMT_MSA.1/ADEL	SF.ACCESS_CONTROL
FMT_MSA.3/ADEL	SF.ACCESS_CONTROL
FMT_SMF.1/ADEL	SF.ACCESS_CONTROL
FMT_SMR.1/ADEL	SF.ACCESS_CONTROL
FPT_FLS.1/ADEL	SF.SECURITY
FDP_RIP.1/ODEL	SF.SECURITY
FPT_FLS.1/ODEL	SF.SECURITY
FCO_NRO.2/GP	SF.SECURE_CHANNEL
FIA_AFL.1/GP	SF.SECURE_CHANNEL
FIA_UAU.1/GP	SF.ACCESS_CONTROL
FIA_UAU.4/GP	SF.ACCESS_CONTROL
FDP_UIT.1/GP	SF.SECURE_CHANNEL
FDP_UCT.1/GP	SF.SECURE_CHANNEL
FDP_IFC.2/GP-KL	SF.SECURE_CHANNEL
FDP_IFC.2/GP-ELF	SF.SECURE_CHANNEL
FMT_MSA.3/GP	SF.ACCESS_CONTROL
FMT_MSA.1/GP	SF.ACCESS_CONTROL

FMT_SMR.1/GP	SF.ACCESS_CONTROL
FDP_ITC.2/GP-KL	SF.ACCESS_CONTROL
FDP_ITC.2/GP-ELF	SF.ACCESS_CONTROL
FPT_FLS.1/GP	SF.SECURITY
FPT_RCV.3/GP	SF.TRANSACTION
FTP_ITC.1/GP	SF.SECURE_CHANNEL
FDP_IFF.1/GP-ELF	SF.SECURE_CHANNEL
FDP_IFF.1/GP-KL	SF.SECURE_CHANNEL
FMT_SMF.1/GP	SF.ACCESS_CONTROL
FIA_UID.1/GP	SF.SECURE_CHANNEL
FPT_TDC.1/GP	SF.ACCESS_CONTROL
FDP_ROL.1/GP	SF.TRANSACTION

Table 35 Runtime Environment SFRs coverage

8.2.3 Secure IC SFRs Coverage

Security Functional Requirement	Coverage by TSS Security Function(s)
FAU_SAS.1	SF.IDENTITY
FPT_PHP.3	SF.SECURITY
FPT_RCV.3/OS	SF.SECURITY
FPT_RCV.4.1/OS	SF.SECURITY

Table 36 Secure IC SFRs Coverage

8.2.4 OS Update (ITL) SFRs coverage

Security Functional Requirement	Coverage by TSS Security Function(s)
FDP_ACC.1/OS-UPDATE	SF.ACCESS_CONTROL
FDP_ACF.1/OS-UPDATE	SF.ACCESS_CONTROL
FMT_MSA.3/OS-UPDATE	SF.ACCESS_CONTROL
FMT_SMF.1/OS-UPDATE	SF.ACCESS_CONTROL
FMT_SMR.1/OS-UPDATE	SF.ACCESS_CONTROL
FCS_COP.1/OS-UPDATE-DEC	SF.CRYPTO
FCS_COP.1/OS-UPDATE-VER	SF.CRYPTO
FIA_ATD.1/OS-UPDATE	SF.ACCESS_CONTROL

FTP_TRP.1/OS-UPDATE	SF.SECURE_CHANNEL
FPT_FLS.1/ OS-UPDATE	SF.SECURITY

Table 37. ITL Security Functions

8.2.5 Association table of SFRs and TSS

TSF	SFR
SF.TRANSACTION	FDP_ROL.1/FIREWALL FPT_RCV.3/GP FDP_RIP.1/ABORT FDP_ROL.1/GP FPT_RCV.3/GP
SF.ACCESS_CONTROL	FIA_UID.1/EXT FIA_UAU.1/EXT FIA_USB.1/EXT FIA_UAU.4/EXT FIA_UID.1/MNO-SD FIA_USB.1/MNO-SD FIA_ATD.1/Base FPT_TDC.1/SCP FDP_ACC.1/ISDR FDP_ACF.1/ISDR FDP_ACC.1/ECASD FDP_ACF.1/ECASD FMT_MSA.1/PLATFORM_DATA FMT_MSA.1/RULES FMT_MSA.1/CERT_KEYS FMT_SMF.1/Base FMT_SMR.1/Base FMT_MSA.1/RAT FMT_MSA.3 FDP_ACC.2/FIREWALL FDP_ACF.1/FIREWALL FDP_IFC.1/JCVM FDP_IFF.1/JCVM

	FMT_MSA.1/JCRE FMT_MSA.1/JCVM FMT_MSA.2/FIREWALL_JCVM FMT_MSA.3/FIREWALL FMT_MSA.3/JCVM FDP_ITC.2/GP-ELF FMT_SMR.1/GP FDP_ACC.2/ADEL FDP_ACF.1/ADEL FMT_MSA.1/ADEL FMT_MSA.3/ADEL FMT_SMF.1/ADEL FMT_SMR.1/ADEL FMT_SMF.1/GP FMT_SMR.1/GP FMT_MSA.1/GP FMT_MSA.3/GP FIA_UAU.1/GP FIA_UAU.4/GP FDP_ITC.2/GP-KL FDP_ITC.2/GP-ELF FPT_TDC.1/GP FMT_SMR.1/RE FMT_SMF.1/RE FPT_TDC.1/RE FIA_ATD.1/AID FIA_UID.2/AID FIA_USB.1/AID FMT_MTD.1/JCRE FMT_MTD.3/JCRE FMT_MSA.3/OS-UPDATE FMT_SMF.1/OS-UPDATE FMT_SMR.1/OS-UPDATE FDP_ACC.1/OS-UPDATE

	FDP_ACF.1/OS-UPDATE FIA_ATD.1/OS-UPDATE
SF.INTEGRITY	FDP_SDI.1/Base FDP_SDI.2/DATA
SF.SECURITY	FPT_FLS.1/Platform_services FPT_EMS.1/Base FDP_RIP.1/Base FPT_FLS.1/Base FDP_RIP.1/OBJECTS FDP_RIP.1/APDU FDP_RIP.1/bArray FDP_RIP.1/GlobalArray FDP_RIP.1/KEYS FDP_RIP.1/TRANSIENT FAU_ARP.1 FPR_UNO.1 FPT_FLS.1/RE FPT_FLS.1/GP FPT_FLS.1/ADEL FPT_FLS.1/ODEL FDP_RIP.1/ADEL FDP_RIP.1/ODEL FPT_PHP.3 FPT_FLS.1/GP FPT_FLS.1/OS-UPDATE
SF.PLATFORM_MANAGEMENT	FDP_IFC.1/Platform_services FDP_IFF.1/Platform_services
SF.SECURE_CHANNEL	FDP_IFC.1/SCP FDP_IFF.1/SCP FTP_ITC.1/SCP FDP_ITC.2/SCP FDP_UCT.1/SCP FDP_UIT.1/SCP FCO_NRO.2/GP

	FCS_CKM.1/GP-SCP FCS_COP.1/GP-SCP FIA_AFL.1/GP FDP_IFC.2/GP-KL FDP_IFC.2/GP-ELF FDP_IFF.1/GP-KL FDP_IFF.1/GP-ELF FDP_UIT.1/GP FDP_UCT.1/GP FIA_UID.1/GP FTP_ITC.1/GP FCO_NRO.2/GP FTP_TRP.1/OS-UPDATE
SF.CRYPTO	FCS_CKM.1/SCP-SM FCS_CKM.2/SCP-MNO FCS_CKM.6/SCP-SM FCS_CKM.6/SCP-MNO FCS_COP.1/Mobile_network FCS_CKM.2/Mobile_network FCS_CKM.6/Mobile_network FCS_CKM.1/ECC FCS_CKM.6/RE FCS_COP.1/SHA FCS_COP.1/SIG_ECC FCS_COP.1/ECDH FCS_COP.1/MAC_TDES FCS_COP.1/MAC_AES FCS_COP.1/HMAC FCS_COP.1/CIPH_TDES FCS_COP.1/CIPH_AES FCS_COP.1/CIPH_AES_GCM FCS_COP.1/ECKA-EG FIA_API.1 FCS_COP.1/OS-UPDATE-DEC

	FCS_COP.1/OS-UPDATE-VER
SF.RNG	FCS_RNG.1
SF.IDENTITY	FIA_API.1 FAU_SAS.1

Table 38 Association table of SFRs and TSS

9. Statement of Compatibility

This is a statement of compatibility between this Composite Security Target (Composite-ST) and the Platform Security Target (Platform-ST). This statement is compliant to the requirements of **[SUPP]**.

9.1 Classification of the Platform TSFs

A classification of TSFs of the Platform-ST has been made. Each TSF has been classified as 'relevant' or 'not relevant' for the Composite-ST.

A classification of TSFs of the Platform-ST has been made. Each TSF has been classified as 'relevant' or 'not relevant' for the Composite-ST.

Chapter in IC_ST**Error! Reference source not found.**	TOE Security Functionality	Relevant	Not relevant
7.1	SF_DPM: Device Phase Management	x	
7.2	SF_PS: Protection against Snooping	x	
7.3	SF_PMA: Protection against Modifying Attacks	x	
7.4	SF_PLA: Protection against Logical Attacks	x	
7.5	SF_CS : Cryptographic Support	x	

Table 39 Classification of Platform-TSFs

The TSFs related to the Loader are not relevant, because the Loader functionality is permanently disabled before TOE delivery.

9.2 Matching statement

The TOE relies on fulfilment of the following implicit assumptions on the IC:

- Certified microcontroller SLM37ECA1M3 & SLI37CCA1M5.
- True Random Number Generation with PTG.2 classification according to **[AIS31]**.
- Cryptographic support based on symmetric key algorithms AES with 128, 192, 256 bits key length and Triple DES with 112, 168 bits key length.

- Cryptographic support based on asymmetric key algorithms (ECDSA) with up to 521 bits (elliptic curve) key length, including key generation.

The rationale of the Platform-ST has been used to identify the relevant SFRs, TOE objectives, threats and OSPs. All SFRs, objectives for the TOEs, but also all objectives for the TOE-environment, all threats and OSPs of the Platform-ST have been used for the following analysis.

9.3 Security Functional Requirements

9.3.1 Security Functional Requirements

Platform SFR	**Correspondence in Composite ST**
FAU_SAS.1	FAU_SAS.1
FMT_LIM.1	Not Relevant
FMT_LIM.2	Not Relevant
FDP_ACC.1	FDP_ACC.1/ISDR
FDP_ACF.1	FDP_ACF.1/FIREWALL, FDP_ACF.1/ADEL, FDP_ACF.1/ECASD, FDP_ACF.1/ISDR
FTP_ITC.1	Not Relevant
FDP_UCT.1	Not Relevant
FIA_API.1	Not Relevant
FMT_LIM.1/Loader	Not Relevant
FMT_LIM.2/Loader	Not Relevant
FDP_UIT.1	Not Relevant
FDP_ACC.1/Loader	Not Relevant
FDP_ACF.1/Loader	Not Relevant
FPT_PHP.3	FPT_PHP.3, FPT_EMS.1/Base
FDP_ITT.1	FDP_IFC.1/JCVM
FPT_ITT.1	FDP_ACF.1/FIREWALL, FPT_EMS.1/*
FDP_SDC.1	FPT_PHP.3, FPT_EMS.1/*
FDP_SDI.2	FDP_SDI.2/DATA.
FDP_IFC.1	FDP_IFC.1/JCVM, FDP_IFC.2/GP, FDP_IFC.1/Platform_services, FPT_EMS.1/*
FMT_MSA.1	FMT_MSA.1/JCRE, FMT_MSA.1/JCVM, FMT_MSA.1/ADEL, FMT_MSA.1/GP, FMT_MSA.1/RAT, FMT_MSA.1/CERT_KEYS, FMT_MSA.1/PPR, FMT_MSA.1/PLATFORM_DATA
FMT_MSA.3	FMT_MSA.3/FIREWALL, FMT_MSA.3/JCVM, FMT_MSA.3/ADEL, FMT_MSA.3/GP, FMT_MSA.3, FMT_MSA.3/OS-UPDATE
FMT_SMF.1	FMT_SMF.1, FMT_SMF.1/ADEL, FMT_SMF.1/GP
FRU_FLT.2	FPT_RCV.3
FPT_TST.2	Not Relevant

FPT_FLS.1	FPT_FLS.1/*, FPT_RCV.3
FCS_RNG.1/TRNG	FCS_RNG.1
FCS_RNG.1/HPRG	Not Relevant
FCS_RNG.1/DRNG	Not Relevant
FCS_RNG.1/KSG	Not Relevant
FCS_RNG.1/DRBG	Not Relevant
FCS_COP.1/TDES	TDES accelerator is used for Triple DES operations of FCS_COP.1/*
FCS_COP.1/TDSCL	Not relevant
FCS_COP.1/AES	AES accelerator is used for AES operations of FCS_COP.1/*
FCS_COP.1/AESCL	Not relevant
FCS_COP.1/RSA-1	Not Relevant
FCS_COP.1/RSA-2	Not Relevant
FCS_COP.1/ECDSA-1	Not Relevant
FCS_COP.1/ECDSA-2	Not Relevant
FCS_COP.1/ECDH-1	Not Relevant
FCS_COP.1/ECDH-2	Not Relevant
FCS_COP.1/HCL	Not Relevant
FCS_CKM.1/RSA-1	Not Relevant
FCS_CKM.1/RSA-2	Not Relevant
FCS_CKM.1/EC-1	Not Relevant
FCS_CKM.1/EC-2	Not Relevant
FCS_CKM.4/TDES	Not Relevant
FCS_CKM.4/AES	Not Relevant

Table 40 Platform SFR classification

9.3.2 Security Assurance Requirements

The Composite-ST requires EAL 4 according to Common Criteria 2022 augmented by ALC_DVS.2 and AVA_VAN.5

The Platform-ST has been certified to EAL 6 according to Common Criteria V3.1 R5 augmented by: ALC_FLR.1.

The assurance requirements of the Composite-ST represent a subset of the assurance requirements of the Platform-ST.

9.4 Security objectives

This Composite-ST has security objectives which are related to the Platform-ST. These are:

- O.IC.SUPPORT
- O.IC.RECOVERY
- O.IC.PROOF-OF-IDENTITY

The following platform objectives could be mapped to composite objectives:

- O.Leak-Inherent
- O.Phys-Probing
- O.Malfunction
- O.Phys-Manipulation
- O.Leak-Forced
- O.Abuse-Func
- O.Identification
- O.RND
- O.Mem-Access
- O.Data_integrityService

These Platform-ST objectives can be mapped to the Composite-ST objectives as shown in the following table.

Platform ST Objective	**Correspondence in Composite ST**		
	O.IC.SUPPORT	O.IC.RECOVERY	O.IC.PROOF-OF-IDENTITY
O.Leak-Inherent	X		
O.Phys-Probing	X		
O.Malfunction	X	X	
O.Phys-Manipulation	X		
O.Leak-Forced	X		
O.Abuse-Func	X		
O.Identification	X		X
O.RND	X		
O.Mem-Access	X		
O.Data_integrityService	X		

Table 41 Correspondence of Objectives in Composite ST

O.IC.RECOVERY matches to O.Malfunction because this allows the TOE to eventually complete the interrupted operation successfully, or recover to a consistent and secure state.

O.IC.SUPPORT matches the listed objectives of the Platform-ST because they provide functionality that supports (1) safeguarding the access to low-level functions (incl. protection against disclosure or modification of private data and code), the well-functioning of the TSFs of the TOE (avoiding they are bypassed or altered), (2) secure low-level cryptographic processing and random number generation, (3,4) the TOEs memory model and operations (allowing to store data in “persistent technology memory” or in volatile memory and performing memory operations atomically).

O.IC.PROOF-OF-IDENTITY meets O.Identification from the Platform-ST because it provides capability of the TOE to store Initialisation Data and/or Prepersonalisation Data according to FAU_SAS.1. The Initialisation Data (or parts of them) are used for TOE identification.

The following Platform-ST objectives are not relevant for or cannot be mapped to the Composite-TOE:

- O.Cap_Avail_Loader, O.Ctrl_Auth_Loader: these objectives are not relevant because the Composite-TOE is delivered only with disabled Loading capability.
- O.Authentication: it is not relevant, since it is not available after TOE delivery.
- O.Prot_TSF_Confidentiality: it is not relevant because the Composite-TOE is delivered only with disabled Loading capability (irreversible operation) and not delivered as an open sample.
- O.Add-Functions, O.AES and O.TDES: these objectives are not relevant because IC’s crypto is not used by the composite-TOE

There is no conflict between security objectives of this Composite-ST and the Platform-ST **Error! R eference source not found.**.

9.5 Security objectives for environment

Platform ST Sec. Obj. Env.	**Correspondence in Composite ST**	
	Relevant	TOE ST Sec. Objective
OE.Resp-Appl	Yes	O.RE.SECURE-COMM, O.RE.PRE-PPI, O.RE.IDENTITY, O.API, O.RE.DATA-CONFIDENTIALITY, O.DATA-INTEGRITY, O.SECURE_LOAD_ACODE, O.CONFID-UPDATE-IMAGE.LOAD
OE.Process-Sec-IC	No	N/A
OE.Lim-Block-Loader	No	N/A

OE.Loader-Usage	No	N/A
OE.TOE-Auth	Yes	O.PPE-PPI, O.RE.DATA-INTEGRITY, O.RE.IDENTITY

Table 42 Correspondence of Objectives for Environment in Composite ST

OE.Lim-Block-Loader Loader and OE.Loader-Usage Loader, are not relevant because the Composite-TOE is delivered only with disabled Loading capability.

OE.Process-Sec-IC Protection during composite product manufacturing is assured by the aspects of the assurance class ALC.

10. Definitions

10.1 Abbreviations

Term	Description
CC	Common Criteria
O.ENV	Objective for the environment
O.TOE	Objective for the TOE
ITL	Image Trusted Loader
ST	Security Target

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12. List of figures

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