eUICC Profile Package: Interoperable Format Technical Specification

Version 1.0

Note: The OID required in order to implement this specification is missing in this version.
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1. **Objective**

The objective of this document is to define the technical specification of a standard format to be used for the loading and installation of an interoperable Profile Package in any compliant eUICC. This specification is based on the following SIMalliance document: eUICC Profile Package: Interoperability Functional Requirements.

2. **Introduction**

The embedded UICC (eUICC), and the subsequent requirement for remote provisioning, has introduced the need for a number of operations, previously carried out in personalisation centres by individual UICC vendors, to be performed remotely in an open ecosystem.

This document specifies the structure and coding required to build, remotely load and install a profile in an eUICC.

The Profile Package, as technically specified in this document, represents the structure of data to be built by the Profile Creator and to be loaded in the eUICC in order for the eUICC to be personalised according to the content of the Profile Package.

This specification is intended primarily for Profile Creator providers, Profile Creator users (i.e. Mobile Network Operators or MNOs) and eUICC vendors in order for them to elaborate and exchange profiles with guaranteed interoperability.

In order to reduce complexity, the definition of the Profile Package does not support 2G SIM applications. This is not a limitation; for a terminal (e.g. a 2G M2M module) to be able to sustain remote provisioning of an eUICC according to this definition of the Profile Package, it shall support features defined in standard releases which also mandate the support of a UICC containing a USIM application to access a 2G network. This is aligned with requirements expressed in the GSMA Remote Provisioning Technical Specification [GS RPT], which require support of Release 9 for a device supporting eUICC.

**eUICC ecosystem**

The following illustration shows an example eUICC system environment. On the server side, interoperability is achieved on different levels (e.g. by the GSMA Remote Provisioning Technical Specifications [GS RPT]). The Subscription Manager (divided into two parts according to this specification) must interact with different entities like other SM, EUM (eUICC Manufacturer) or MNO.
3. Principles

- This specification is based on the requirements defined in the following SIMalliance specification: eUICC Profile Package: Interoperability Functional Requirements V1.1
- This specification also takes into account the requirements defined in section 6.5 of ETSI TS 103 383
- This specification also takes into account these GSMA documents:
  - Remote Provisioning Architecture for Embedded UICC V1.1
  - Remote Provisioning Architecture for Embedded UICC Technical Specification V2.0

4. References

4.1 Normative References

- [SA PP RS]: SIMalliance eUICC Profile Package: Interoperability Functional Requirements V1.1
- [101 220]: ETSI TS 101 220 V12.0.0: Smart Cards; ETSI numbering system for telecommunication application providers (Release 12)
- [102 221]: ETSI TS 102 221 V12.0.0: Smart Cards; UICC-Terminal interface; Physical and logical characteristics (Release 12)
- [102 222]: ETSI TS 102 222 V7.1.0: Integrated Circuit Cards (ICC); Administrative commands for telecommunications applications (Release 7)
- [102 226]: ETSI TS 102 226 V12.0.0: Smart Cards; Remote APDU structure for UICC based applications (Release 12)
- [USIM]: 3GPP TS 31.102 V12.6.0: Characteristics of the Universal Subscriber Identity Module (USIM) application (Release 12)
- [ISIM]: 3GPP TS 31.103 V12.2.0: Characteristics of the IP Multimedia Services Identity Module (ISIM) application (Release 12)
- [CSIM]: 3GPP2 C.S0065-C v1.0: cdma2000 Application on UICC for Spread Spectrum Systems
- [GP CS]: GlobalPlatform Card Specification V2.2.1
- [GP UC]: GlobalPlatform Card Specification UICC Configuration V1.0.1
- [GP AA]: Confidential Card Content Management; GlobalPlatform Card Specification Amendment A V1.0.1
- [GP AB]: GlobalPlatform Card Remote Application Management over HTTP Card Specification v2.2 – Amendment B v1.1.2
- [X690]: ITU-T X.690 (11/2008): ASN.1 Encoding Rules: Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER) including Corrigendum 1 and 2

4.2 Informative References
- [GS RPA]: GSMA Remote Provisioning Architecture for Embedded UICC V1.1
- [GS RPT]: GSMA Remote Provisioning Architecture for Embedded UICC Technical Specification V2.0
- [102 383]: ETSI TS 103 383 V12.7.0: Smart Cards; Embedded UICC; Requirements Specification (Release 12)

5. Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>ADF</td>
<td>Application Dedicated File</td>
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<tr>
<td>AID</td>
<td>Application Identifier</td>
</tr>
<tr>
<td>APDU</td>
<td>Application Protocol Data Unit</td>
</tr>
<tr>
<td>ASN.1</td>
<td>Abstract Syntax Notation One</td>
</tr>
<tr>
<td>CASD</td>
<td>Controlling Authority Security Domain</td>
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<tr>
<td>CDMA</td>
<td>Code Division Multiple Access</td>
</tr>
<tr>
<td>CSIM</td>
<td>cdma2000 Subscriber Identify Identity Module</td>
</tr>
<tr>
<td>DF</td>
<td>Dedicated File</td>
</tr>
<tr>
<td>DGI</td>
<td>Data Grouping Identifier</td>
</tr>
<tr>
<td>DO</td>
<td>Data Object</td>
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<tr>
<td>EAP</td>
<td>Extensible Authentication Protocol</td>
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<tr>
<td>EF</td>
<td>Elementary File</td>
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<tr>
<td>eUICC</td>
<td>embedded UICC</td>
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<tr>
<td>EUM</td>
<td>eUICC Manufacturer</td>
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<tr>
<td>FCP</td>
<td>File Control Parameters</td>
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<tr>
<td>GBA</td>
<td>Generic Bootstrapping Architecture</td>
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</table>
### 6. Definitions

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>embedded UICC</strong></td>
<td>A UICC which is not easily accessible or replaceable, is not intended to be removed or replaced in the terminal, and enables the secure changing of Subscriptions.</td>
</tr>
<tr>
<td>Policy Rules</td>
<td>Defines the atomic action of a Policy and the conditions under which it is executed.</td>
</tr>
<tr>
<td>Profile</td>
<td>Combination of a file structure, data and applications on an eUICC.</td>
</tr>
<tr>
<td>Profile Creator</td>
<td>External entity in charge of creating the Profile Package based on MNO requirements, protecting the Profile Package from modification and/or content access.</td>
</tr>
<tr>
<td>Profile Element</td>
<td>A Profile Element is a part of the Profile Package representing one or several features of the Profile encoded using TLV structures based on ASN.1 description</td>
</tr>
<tr>
<td>Profile Package</td>
<td>A Personalised Profile using an interoperable description format transmitted to an eUICC in order to load and install a Profile.</td>
</tr>
<tr>
<td>Provisioning</td>
<td>The downloading and installation of a Profile into an eUICC.</td>
</tr>
<tr>
<td>Remote Provisioning</td>
<td>Provisioning done by the subscription manager on an eUICC outside of his premises, using a secure data link.</td>
</tr>
</tbody>
</table>
7. Profile Package General Structure

7.1 Introduction
The Profile Package is a collection of Profile Elements (PE) which uses a common description language. This description language is independent from the transport protocol. Each PE is described and can be processed by the eUICC independently from the others. A specific sequence is required for many PEs, however, because they will be processed by the eUICC in the context of previous PEs (i.e. some elements of the profile may be created only after higher level elements, such as a directory, is created; NAA parameters are applied to the NAA file structure created by previous PEs etc). Examples of Profile Elements include: a file; a reference to a file system structure; a set of parameters for a specific NAA; an interoperable application etc.

The description of every PE in this specification is based on ASN.1 specified in [X.680] and encoded in TLV structures using DER (Distinguished Encoding Rule) encoding as specified in [X690]. This provides a flexible description and avoids the limitations of APDU protocol.

An identification number shall be associated to every PE. This identification number is used for error reporting.

A PE starts with a header containing the following information:
- PE identification number
- Optional flag indicating that the support of this PE is mandatory
- PE type
- PE length

7.2 Error management
A PE can be flagged in order to indicate that the support of the feature described by this PE is mandatory. If this feature is not supported by the eUICC, an error is reported to the Profile Creator, the processing of the Profile Package is cancelled and all of the PE already processed shall be discarded.

If a PE is not flagged as mandatory, and if the eUICC does not support the associated feature, the error is reported but the processing of the Profile Package continues. The coding of the error message is defined in section 8.118.10.

In order to avoid errors and warnings during the processing of a Profile Package, the Profile Creator may audit the targeted eUICC before building a Profile Package. In that case, all the features described in the Profile Package will be entirely supported by the eUICC. This is the best way to ensure predictable behaviour of the Profile when installed on a specific eUICC. If this procedure is not followed, a functional Profile in the eUICC may still be possible, but available features may be restricted.

The features that shall be supported by the Profile are also described in the Profile header. In case the eUICC does not support one of the features listed in this Profile header, the eUICC shall immediately return an error code and abort the processing of the Profile. This second mechanism complements the list of mandatory features encoded in the Profile header and is required for some specific features (e.g. proprietary features) that are not in the standardised list of features.

7.3 ASN.1 Module
The PE format is defined in a single, self-contained, ASN.1 definition module called PEDefinitions, with an ISO Object Identifier in the SIMalliance namespace.
Editor’s Note: OID is under request by SIMalliance

Two encoding/decoding attributes are defined:
- AUTOMATIC TAGS means that the tags are defined automatically using the encoding rules unless a tag notation is present in the PE format definition
- EXTENSIBILITY IMPLIED means that types may have elements that are not defined in this specification. This means that decoders should be ready to handle values with unspecified tags, either by processing them if they know their value content, or ignoring them silently (without reporting an error) if they do not know them. This is useful when processing PEs from a newer specification and to handle proprietary tag values.

8. Profile Package Elements Definition

8.1 Common types

8.1.1 General Purpose types
To avoid ambiguity regarding the maximum allowed size of integers and octets strings, the following types and values, that are referenced in various PE definitions, are defined:

```plaintext
-- Basic integer types, for size constraints
maxUInt8 INTEGER ::= 255
UInt8 ::= INTEGER (0..maxUInt8)
maxUInt15 INTEGER ::= 32767
UInt15 ::= INTEGER (0..maxUInt15)
maxUInt16 INTEGER ::= 65535
UInt16 ::= INTEGER (0..maxUInt16)
maxUInt31 INTEGER ::= 2147483647
UInt31 ::= INTEGER (0..maxUInt31)
```

8.1.2 Profile specific types
The following types are used within several PE definitions:

```plaintext
ApplicationIdentifier ::= OCTET STRING (SIZE(5..16))
```

8.1.3 PE Header
The PE header is present at the beginning of all PEs described in this specification

```plaintext
PEHeader ::= SEQUENCE {
  mandated NULL OPTIONAL,
  -- if set, indicate that the support of this PE is mandatory
  identification UInt15 -- Identification number of this PE
}
```
The *mandated* field is used to indicate that the support of this PE is mandatory for the installation of this profile. If the eUICC does not support the following PE, it shall abort the processing of the profile and return an error to the sender of the profile.

The *identification* field is used to uniquely identify a PE within the profile. It will be used for error reporting to the sender of the profile.

The list of supported PEs is defined below:

```plaintext
ProfileElement ::= CHOICE {
    header ProfileHeader,
    /* PEs */
    genericFileManagement PE-GenericFileManagement,
    pinCodes PE-PINCodes,
    pukCodes PE-PUKCodes,
    akaParameter PE-AKAParameter,
    cdmaParameter PE-CDMAParameter,
    securityDomain PE-SecurityDomain,
    rfm PE-RFM,
    application PE-Application,
    nonStandard PE-NonStandard,
    end PE-End,
    rfu1 PE-Dummy,  -- this avoids renumbering of tag values
    rfu2 PE-Dummy,  -- in case other non-file-system PEs are
    rfu3 PE-Dummy,  -- added here in future versions
    rfu4 PE-Dummy,
    rfu5 PE-Dummy,
}
```

It is important that PEs are sent in an order which do not create unresolved dependencies. The following rules shall be considered:

**ProfileHeader**
Securing the future of mobile services

Shall be the first element and provided once within a profile download only.

**PE-MF**
Shall be the first element of the file system creation.

**PE-CD**
The use of this PE is optional and shall come after the creation of the MF.

**PE-TELECOM**
The use of this PE is optional and shall come after the creation of the MF.

**PE-USIM**
The use of this PE is optional and shall come after the creation of the MF.

**PE-OPT-USIM**
The use of this PE is optional and shall come after PE-USIM.

**PE-ISIM**
The use of this PE is optional and shall come after the creation of the MF.

**PE-OPT-ISIM**
The use of this PE is optional and shall come after PE-ISIM.

**PE-GSM-ACCESS**
The use of this PE is optional and shall come after PE-USIM.

**PE-PHONEBOOK**
The use of this PE is optional and shall come after PE-USIM.

**PE-CSIM**
The use of this PE is optional and shall come after the creation of the MF.

**PE-OPT-CSIM**
The use of this PE is optional and shall come after PE-CSIM.

**PE-GenericFileManagement**
Dependencies within the file system creation need to be considered. E.g. the DF Telecom template may only be used when the MF has been created.

**PE-AKAParameters**
Shall be created in the context of the respective NAA. May only be provided once per NAA. This element is not allowed in the context of MF, SDs and applications.

**PE-PINCodes**
Shall be created in the context where they shall be defined. Global PINs shall be created in the context of the creation of the UICC file system (MF). This element may only be provided once within each DF (ADF).

**PE-PUKCodes**
May only be provided once within the context of the UICC file system (MF). It needs to include all PUK codes for the complete profile.

**PE-SecurityDomain**

*Security, Identity, Mobility*
Should be created after the creation of the file system, NAA parameters and PIN/PUK configuration.

**PE-Application**
Should be provided after the creation of the SDs.

**PE-RFM**
Shall be provided after the creation of the SDs.

**PE-NonStandard**
In general this element may be provided in any position after the profile header. Further restrictions depend on the respective application.

**PE-End**
Shall be provided once at the end of the Profile Package.

### 8.2 Profile header
The following type defines the service list which is used later in the Profile header. This service list is used to indicate the services that shall be supported by the eUICC. When a service is present in this sequence, it indicates that this service is mandatory.

```plaintext
ServicesList ::= SEQUENCE {
/* Contactless */
  contactless NULL OPTIONAL,
/* NAAs */
  usim NULL OPTIONAL,
  isim NULL OPTIONAL,
  csim NULL OPTIONAL,
/* NAA algorithms */
  milenage NULL OPTIONAL,
  tuak NULL OPTIONAL,
  cave NULL OPTIONAL,
/* USIM/ISIM services */
  gba-usim NULL OPTIONAL,
  gba-isim NULL OPTIONAL,
  mbms NULL OPTIONAL,
  eap NULL OPTIONAL,
/* Application Runtime environment */
  javacard NULL OPTIONAL,
  multos NULL OPTIONAL
}
```

The following list gives the features that the eUICC shall support in order to provide the associated service:
- contactless: support the SWP and HCI interfaces as well as the associated APIs
- usim: the USIM application as defined by 3GPP [USIM]
- isim: the ISIM application as defined by 3GPP [ISIM]
- csim: the CSIM application as defined by 3GPP2 [CSIM]
- milenage: the milenage AKA authentication algorithm
• tuak: the TUAk AKA authentication algorithm
• cave: the CAVE authentication algorithm
• gba-usim: support of GBA authentication context in the USIM application
• gba-isim: support of GBA authentication context in the ISIM application
• mbms: support of the MBMS authentication context in the USIM application
• eap: support of the UICC EAP client
• javacard: support of the Java Card™ runtime environment
• multos: support of the Multos™ runtime environment

The Profile header PE is used once at the beginning of the profile in order to give various indications on the content on the profile:

```
ProfileHeader ::= SEQUENCE {
    Major-version UINT8, -- set to 1 for this version of the specification
    Minor-version UINT8, -- set to 0 for this version of the specification
    profileType UTF8String OPTIONAL, -- Profile type
    iccid OCTET STRING (SIZE (10)),-- ICCID of the Profile
    pol OCTET STRING OPTIONAL,
    eUICC-Mandatory-services ServicesList,
    eUICC-Mandatory-GFSTEList SEQUENCE OF OBJECT IDENTIFIER
}
```

When receiving the Profile header, the eUICC shall check the major-version. If the version indicated by the Profile is greater than the version supported by the eUICC, the eUICC shall return an error "unsupported-profile-version" and stop the processing of the Profile. The minor-version is only informative, however, this may indicate that the Profile contains elements that the eUICC will not be able to process if it supports an older version of the specification. In that case, these elements will be ignored by the eUICC unless they are marked as mandatory in the PE header.

The "profileType" is a free optional text indicating for example, the name of the Profile issuer and the type of Profile.

The "pol" contains the policy rules within a Profile (e.g. POL1 value as defined by GSMA in [GS RPT], Table 66). If this variable is not supplied in the Profile Package, its value shall be set to all 0 in the eUICC.

"eUICC-Mandatory-GFSTEList" contains a list of OIDs identifying file system templates used in the Profile Package that shall be supported by the eUICC in order for the Profile to be correctly installed on the eUICC. This list may contain the OIDs associated to the file system template defined in "ANNEX A (Normative): File Structure Templates Definition" of this specification.

Usage rules: This PE shall be used once and shall be the first PE of the Profile Package.

### 8.3 File system

#### 8.3.1 File system templates

Templates are defined in Annex A of this document. These templates are used to accelerate the creation of the file system in the Profile. Their use is optional. An alternate mechanism is defined in order to allow the creation of files without using these templates.

These templates define default values for:

- File size, number of records and record size
- Access conditions
- Content

---

Security, Identity, Mobility
These default values are not defined for all the files. In that case, these values shall be provided in the Profile.

There are 2 types of templates:
- Created by default templates: All the files described in these templates will be created, even if they are not listed in the PE provided in the Profile Package, except if they are tagged with "doNotCreate" in the "File" sequence.
- Not created by default templates: Only the file listed in the PE provided in the Profile Package will be created.

The templates also indicate an access rule reference which can be used to build the Access Rules Reference file content.

When using a template containing a hierarchy of files, Profile Creator shall take care to not instantiate files within a DF without instantiating the DF before.

### 8.3.2 File related types

These types are required for file system and file PE definitions.

```plaintext
ProprietaryInfo ::= SEQUENCE {
    specialFileInformation [PRIVATE 0] OCTET STRING (SIZE (1)) DEFAULT '00'H,
    fillPattern [PRIVATE 1] OCTET STRING OPTIONAL,
    repeatPattern [PRIVATE 2] OCTET STRING OPTIONAL
}
Fcp ::= SEQUENCE {
    fileDescriptor [2] OCTET STRING (SIZE(1..5)) OPTIONAL,
    fileID [3] OCTET STRING (SIZE(2)) OPTIONAL,
    dfName [4] ApplicationIdentifier OPTIONAL,
    lcsi [10] OCTET STRING (SIZE (1)) DEFAULT '05'H,
    securityAttributesReferenced
```

Security, Identity, Mobility
Either containing EF ARR ID[2] + record number[1] or record number[1] only and EF ARR ID implicitly known from the context, i.e. '2F06' within the MF and '6F06' otherwise

`securityAttributesReferenced [11] OCTET STRING OPTIONAL,

`/* efFileSize
   Mandatory for EF file types
   Not allowed for DF files
*/

`efFileSize [0] OCTET STRING OPTIONAL,

`/* pinStatusTemplateDO
   Not allowed for EF files
   Mandatory for DF/ADF files
   Encoding is defined in ETSI TS 102 221 [102 221]
*/

`pinStatusTemplateDO [PRIVATE 6] OCTET STRING OPTIONAL,

`/* shortEFID
   Optional for EF file types
   Not allowed for DF files
*/

`shortEFID [8] OCTET STRING (SIZE (1)) OPTIONAL,

`/* proprietaryEFInfo
   Optional for EF file types
   Not allowed for DF files
*/

`proprietaryEFInfo [5] ProprietaryInfo OPTIONAL,

`/* linkPath
   Specifies the path to the file to which shall be linked, also valid for DFs/ADFs. Files within ADFs are addressed by the temporary file ID of the respective ADF. For the coding see filePath.
*/

`linkPath [PRIVATE 7] OCTET STRING OPTIONAL

}

File ::= SEQUENCE OF CHOICE {
   doNotCreate NULL, /* Indicates that this file shall not be created by the eUICC even if present in a PE referencing a "Created by Default" template. This flag has no effect for the creation of files in the MF and shall not be used for all the files listed in a "Not Created by Default" template*/
   fileDescriptor Fcp,
   fillFileOffset UInt16,
   fillFileContent OCTET STRING
}
The "File" type is used during the creation of the file system when using a template. It contains 2 optional elements that are used to modify the content of the template during file creation or to set the content when it is not defined in the template.

The "Fcp" type contains all the file control parameters required for an ADF, DF or EF creation. All the elements contained in the "Fcp" are marked as optional. The parameters to be provided within the "Fcp" are context specific (See 8.3.3 and 8.3.5). Within "File" type, "Fcp" may be repeated to create a sequence of files (like several EF ICON files).

The "fillFileContent" type, preceded optionally by a "fillFileOffset" type, is used to set the content of a file. These types may be used repetitively for each file created.

The eUICC shall process the elements contained in the "File" type according to the diagram below to create no, one or several files and optionally fill them with content.

NOTE: Not all sequences allowed by this diagram are useful (e.g. several sequential "fillFileOffset"). However, the processing defined above simplifies the rules to be followed and the implementation on the eUICC.
8.3.3 Template Modification Rules

For each template, default settings are defined within ANNEX A (Normative): File Structure Templates Definition. If no value is defined for a specific parameter, it has to be provided as a parameter within the template instance parameters (e.g. content of EF IMSI).

To overwrite parameters of the template, the following parameters may be specified within the FCP parameters defined within a PE. Depending on the file type defined in the template, the following parameters may be provided within the FCP of a PE to change the settings of the template for a respective file.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>ADF</th>
<th>ADF Link</th>
<th>DF</th>
<th>DF Link</th>
<th>EF</th>
<th>EF Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>fileDescriptor</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>C</td>
<td>C (See Note 2)</td>
</tr>
<tr>
<td>fileID</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>dName</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>lcsi</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>securityAttributesReferenced</td>
<td>C</td>
<td>C (See Note 4)</td>
<td>C</td>
<td>C (See Note 4)</td>
<td>C</td>
<td>C (See Note 4)</td>
</tr>
<tr>
<td>efFileSize</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>C</td>
<td>F</td>
</tr>
<tr>
<td>pinStatusTemplateDO</td>
<td>C</td>
<td>C (See Note 4)</td>
<td>C</td>
<td>C (See Note 4)</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>shortEFID</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>proprietaryEFInfo</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>C</td>
<td>F</td>
</tr>
<tr>
<td>linkPath</td>
<td>F</td>
<td>C (See Note 3)</td>
<td>F</td>
<td>C (See Note 3)</td>
<td>C (See Note 1)</td>
<td>C (See Note 3)</td>
</tr>
</tbody>
</table>

M: Mandatory
Parameters marked as mandatory have to be provided. Otherwise the file creation will fail.

C: Conditional
Parameters marked with conditional may always be provided if the default value of the template shall be modified (e.g. change of securityAttributesReferenced).
In case no default value is defined within the template the respective conditional parameter is mandatory. Otherwise the creation will fail.

F: Forbidden
These parameters shall not be provided within the FCP since they are invalid within the respective context. In case they are available they will be skipped like unknown tags.

Note 1: For some files it is required to provide content. Instead of providing content it is also allowed to turn the file into a link to an existing file. In this case the settings of the source file for fileDescriptor, efFileSize and proprietaryEFInfo will be applied for creating the file (the respective settings from the template will be ignored).

Note 2: Size within FileDescriptor shall match the size or the file which is referenced by the link. In case a link is turned into an independent file the size may be altered according to the necessary size.

Note 3: In case a link shall be turned in an independent file an empty linkPath needs to be provided. For EFs the FCP needs to include the parameters to define the file size (efFileSize; file Descriptor for record oriented files).

Note 4: Allowed only when a link is changed into an independent file.

All file default contents defined within the template are defined as either repeat or fill patterns. There are two ways to alter the default:

- **Overwrite Repeat/Fill Pattern:**
  A repeat or fill pattern provided within the respective "Fcp" will overwrite the default pattern completely. It does not matter whether the default has been defined as repeat or fill pattern. This means that in case the "Fcp" in the PE includes a fill pattern, but the template is defined as repeat pattern, the fill pattern from the PE will be applied (and vice versa).
  This might be needed for some files where the default template size shall be modified (e.g. EF ICI, EF OCI).
- **Using "fillFileContent"/"fillFileOffset":**
  Providing file content within "fillFileContent" / "fillFileOffset" will have the same effect as creating a file with a fill/repeat pattern and thereafter updating the content via Update.
8.3.4 File system PEs

8.3.4.1 MF PE
This PE is used to create and set the content of the files at the MF level. It is based on the template defined in Annex A, section 9.2. The template referenced by the PE is a "Created by default" type template. The rules associated with this kind of template will be used by the eUICC.

```plaintext
PE-MF ::= SEQUENCE {
    mf-header PEHeader,
    templateID OBJECT IDENTIFIER,
    mf File,
    ef-pl File OPTIONAL, --
    ef-iccid File,
    ef-dir File,
    ef-arr File
}
```

**Usage rules:** This PE shall be used only once at the beginning of the profile Package.

8.3.4.2 DF CD PE
This PE is used to create the DF CD and to create and set the content of the files at the DF CD level. It is based on the template defined in Annex A, section 9.3. The use of this PE is optional. If this PE is not received by the eUICC, it will not create DF CD in the profile. The template referenced by the PE is a "Not created by default" type template.

```plaintext
PE-CD ::= SEQUENCE {
    cd-header PEHeader,
    templateID OBJECT IDENTIFIER,
    df-cd File,
    ef-launchpad File OPTIONAL, --
    ef-icon File OPTIONAL
}
```

**Usage rules:** This PE may be used only once after the creation of the MF.

8.3.4.3 DF TELECOM PE
This PE is used to create the DF TELECOM, to create the DFs under the DF TELECOM and to create and set the content of the EFs at the DF TELECOM and sub DFs level. It is based on the template defined in Annex A, section 9.4. The use of this PE is optional. If this PE is not received by the eUICC, it will not create DF TELECOM in the profile. The template referenced by the PE is a "Not created by default" type template.

```plaintext
PE-TELECOM ::= SEQUENCE {
    telecom-header PEHeader,
    templateID OBJECT IDENTIFIER,
    df-telecom File,
    ef-arr File OPTIONAL,
    ef-rma File OPTIONAL,
    ef-sume File OPTIONAL,
    ef-ice-dn File OPTIONAL,
    ef-ice-dd File OPTIONAL,
    ef-ice-ff File OPTIONAL,
}
```
Usage rules: This PE may be used only once after the creation of the MF. Additional files may be required that are not part of this template. These files shall be created using the GenericFileManagement PE.

8.3.4.4. USIM Related Files and Directories

8.3.4.4.1. USIM “Created by default” Files PE

This PE is used to create a USIM ADF and to create and set the content of the files either mandatory or always used at the DF USIM level. The template referenced by the PE is a “Created by default” type template. This PE is based on the template defined in Annex A, section 9.5.1.

PE-USIM ::= SEQUENCE {
    usim-header PEHeader,
    templateID OBJECT IDENTIFIER,
    adf-usim File,
    ef-imsi File,
    ef-arr File,
    ef-keys File OPTIONAL,
    ef-keysPS File OPTIONAL,
}
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Usage rules: This PE may be used several times after the creation of the MF.

8.3.4.4.2. USIM "Not Created by default" Files PE

This PE is used to create the files less often used under the USIM DF previously created. The template referenced by the PE is a "Not created by default" type template. This PE is based on the template defined in Annex A, section 9.5.2.

```plaintext
PE-OPT-USIM ::= SEQUENCE {
  optusim-header PEHeader,
  templateID OBJECT IDENTIFIER,
  ef-li File OPTIONAL,
  ef-acmax File OPTIONAL,
  ef-acm File OPTIONAL,
  ef-gid1 File OPTIONAL,
  ef-gid2 File OPTIONAL,
  ef-msisdn File OPTIONAL,
  ef-puct File OPTIONAL,
  ef-cbmi File OPTIONAL,
  ef-cbmid File OPTIONAL,
  ef-sdn File OPTIONAL,
  ef-ext2 File OPTIONAL,
  ef-ext3 File OPTIONAL,
  ef-cbmir File OPTIONAL,
  ef-plmnwact File OPTIONAL,
  ef-oplmnwact File OPTIONAL,
  ef-hplmnwact File OPTIONAL,
  ef-dck File OPTIONAL,
}
```
ef-cnl File OPTIONAL,
ef-smsr File OPTIONAL,
ef-bdn File OPTIONAL,
ef-ext5 File OPTIONAL,
ef-ccp2 File OPTIONAL,
ef-ext4 File OPTIONAL,
ef-acl File OPTIONAL,
ef-cmi File OPTIONAL,
ef-ici File OPTIONAL,
ef-oci File OPTIONAL,
ef-ict File OPTIONAL,
ef-oct File OPTIONAL,
ef-vgcs File OPTIONAL,
ef-vgcss File OPTIONAL,
ef-vbs File OPTIONAL,
ef-vbss File OPTIONAL,
ef-emlpp File OPTIONAL,
ef-aeem File OPTIONAL,
ef-hiddenkey File OPTIONAL,
ef-pnn File OPTIONAL,
ef-op1 File OPTIONAL,
ef-mbdn File OPTIONAL,
ef-ext6 File OPTIONAL,
ef-mbi File OPTIONAL,
ef-mwis File OPTIONAL,
ef-cfis File OPTIONAL,
ef-ext7 File OPTIONAL,
ef-sdpi File OPTIONAL,
ef-mmsn File OPTIONAL,
ef-ext8 File OPTIONAL,
ef-mmsicp File OPTIONAL,
ef-mmsup File OPTIONAL,
ef-mmsucp File OPTIONAL,
ef-nia File OPTIONAL,
ef-vgcsca File OPTIONAL,
ef-gbabp File OPTIONAL,
ef-msk File OPTIONAL,
ef-muk File OPTIONAL,
ef-ehplmn File OPTIONAL,
ef-gban1 File OPTIONAL,
ef-ehplmnpi File OPTIONAL,
ef-lrplmmsi File OPTIONAL,
ef-nafkca File OPTIONAL,
ef-spni File OPTIONAL,
ef-ppni File OPTIONAL,
ef-ncp-ip File OPTIONAL,
ef-ufc File OPTIONAL,
ef-nasconfig File OPTIONAL,
ef-uicciari File OPTIONAL,
ef-pws File OPTIONAL,
ef-fdnuri File OPTIONAL,
ef-bdnuri File OPTIONAL,
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Usage rules: This PE can be used once for each USIM application after the creation of the USIM Mandatory files.

8.3.4.4.3. DF PHONEBOOK PE
This PE is used to create the DF PHONEBOOK inside the ADF USIM and the EFs contained in DF PHONEBOOK. It is based on part of the template defined in Annex A, section 9.4. The use of this PE is optional. If this PE is not received by the eUICC, it will not create DF TELECOM in the profile. The template referenced by the PE is a "Not created by default" type template.

Usage rules: This PE may be used only once after the creation of the USIM ADF.

8.3.4.4.4. DF GSM ACCESS PE
This PE is used to create the DF GSM ACCESS and to create and set the content of the files at the DF GSM ACCESS level. The use of this PE is optional. If this PE is not received by the eUICC, it will not create DF GSM ACCESS in the profile. The template referenced by the PE is a "Not created by default" type template. This PE is based on the template defined in Annex A, section 9.5.4.
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Section 8.3.4.5. ISIM Related Files and Directories

8.3.4.5.1. ISIM "Created by default" Files PE

This PE is used to create an ISIM ADF and to create and set the content of the mandatory files at the DF ISIM level. The template referenced by the PE is a "Created by default" type template. This PE is based on the template defined in Annex A, section 9.6.1.

Usage rules: This PE may be used only once after the creation of the USIM ADF.

8.3.4.5.2. ISIM "Not Created by default" Files PE

This PE is used to create the optional files under the ISIM ADF previously created. The template referenced by the PE is a "Not created by default" type template. This PE is based on the template defined in Annex A, section 9.6.2.

Usage rules: This PE can be used several times after the creation of the MF.

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8.3.4.6. CSIM Related Files and Directories

8.3.4.6.1. CSIM "Created by default" Files PE

This PE is used to create a CSIM ADF and to create and set the content of the mandatory files at the DF CSIM level. The template referenced by the PE is a "Created by default" type template. This PE is based on the template defined in Annex A, section 9.7.1.

```plaintext
PE-CSIM ::= SEQUENCE {
    csim-header PEHeader,
    templateID OBJECT IDENTIFIER,
    adf-csim File,
    ef-arr File,
    ef-call-count File,
    ef-imsi-m File,
    ef-imsi-t File,
    ef-tmsi File,
    ef-ah File,
    ef-aop File,
    ef-aloc File,
    ef-cdmahome File,
    ef-znregi File,
    ef-snregi File,
    ef-distregi File,
    ef-accolc File,
    ef-term File,
    ef-acp File,
    ef-prl File,
    ef-ruimid File,
    ef-csim-st File,
    ef-spdc File,
    ef-otapaspc File,
    ef-namlock File,
    ef-ota File,
    ef-sp File,
    ef-esn-meld-me File,
    ef-li File,
    ef-usgind File,
    ef-ad File,
    ef-max-prl File,
    ef-spdc File,
    ef-mecrp File,
    ef-home-tag File,
    ef-group-tag File,
    ef-specific-tag File,
    ef-call-prompt File
}
```

**Usage rules:** This PE may be used several times after the creation of the MF.

8.3.4.6.2. CSIM "Not Created by default" Files PE
The PE is used to create the optional files under the CSIM DF previously created. The template referenced by the PE is a "Not created by default" type template. This PE is based on the template defined in Annex A, section 9.7.2.

```
PE-OPT-CSIM ::= SEQUENCE {
  optcsim-header PEHeader,
  templateID OBJECT IDENTIFIER,
  ef-ssci File OPTIONAL,
  ef-fdn File OPTIONAL,
  ef-sms File OPTIONAL,
  ef-smsp File OPTIONAL,
  ef-smss File OPTIONAL,
  ef-ssfc File OPTIONAL,
  ef-spn File OPTIONAL,
  ef-mdn File OPTIONAL,
  ef-ecc File OPTIONAL,
  ef-me3gpdopc File OPTIONAL,
  ef-3gpdopm File OPTIONAL,
  ef-sipcap File OPTIONAL,
  ef-mipcap File OPTIONAL,
  ef-sipupp File OPTIONAL,
  ef-mipupp File OPTIONAL,
  ef-sipsp File OPTIONAL,
  ef-mipsp File OPTIONAL,
  ef-sippapss File OPTIONAL,
  ef-puzl File OPTIONAL,
  ef-maxpuzl File OPTIONAL,
  ef-hrpdcap File OPTIONAL,
  ef-hrpdupp File OPTIONAL,
  ef-csspr File OPTIONAL,
  ef-atc File OPTIONAL,
  ef-eprl File OPTIONAL,
  ef-bcsmscfg File OPTIONAL,
  ef-bcsmspref File OPTIONAL,
  ef-bcsmsstable File OPTIONAL,
  ef-bcsms File OPTIONAL,
  ef-bakparam File OPTIONAL,
  ef-upbakpara File OPTIONAL,
  ef-mmsn File OPTIONAL,
  ef-ext8 File OPTIONAL,
  ef-mmsicp File OPTIONAL,
  ef-mmsup File OPTIONAL,
  ef-mmsucp File OPTIONAL,
  ef-auth-capability File OPTIONAL,
  ef-3gcik File OPTIONAL,
  ef-dck File OPTIONAL,
  ef-gid1 File OPTIONAL,
  ef-gid2 File OPTIONAL,
  ef-cdmacnl File OPTIONAL,
  ef-sf-eumid File OPTIONAL,
  ef-est File OPTIONAL,
  ef-hidden-key File OPTIONAL,
}
```
8.3.5 Generic File management PEs

This PE is used in order to create a file in a generic way. This will typically be used in case files are not defined in a file system template (e.g. application specific files, future standard files not covered by the templates).

The Generic File Management PE consists of a list of file system operations and follows the same approach as the one described within the existing standards to establish files within a Profile.

Any file system operation is always executed within the current context. Files are always created within the current DF. File updates are always applied to the currently selected EF.

The default selection at the beginning of this PE is as follows:

- Current DF: MF
- Current EF: no selection

The following operations are available:

filePath:
Selects a DF or EF according to the rules in ETSI TS 102 221 [102 221] for "select by path from MF". It is a concatenation of file identifiers and has even length or length zero for selecting the MF. To select an ADF or a file in an ADF, the file identifier '7FFF' shall be replaced by the temporary File ID of the ADF.

createFCP:
The createFCP structure is used to create files. Coding of the parameters is based on ETSI 102 222 [102 222] and tailored to profile download to minimise the profile download size and to support linked files.

Usage rules: This PE can be used once for each USIM application after the creation of the USIM Mandatory files.
The following file types can be created using this structure: Linear Fixed, Binary, Cyclic, BER-TLV, linked EFs, linked ADFs/DFs.

The file with the exception of ADFs will always be created within the currently selected DF/ADF. In case a DF/ADF is created it will be automatically selected. No EF will be selected in this case. When an EF has been created it will be automatically selected as the current EF.

**fillFileOffset & fillFileContent:**
These commands are used to provide content for EFs. There is always a current fillFileOffset pointer. After EF selection the current fillFileOffset pointer is set to the beginning of the file (e.g. after creation or after filePath).

fillFileOffset is a binary pointer. Record based files and binary files are handled in the same way. For record based files the current fillFileOffset may reference to any byte within a record.

**e.g. LF file with 100 records and 20 bytes per record:**
Default fillFilePointer = 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Create ADF</th>
<th>Create DF</th>
<th>Create DF Link</th>
<th>Create EF</th>
<th>Create EF Link</th>
</tr>
</thead>
<tbody>
<tr>
<td>fileDescriptor</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>fileID</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>dfName</td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>lcsi</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>securityAttributesReferenced</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>efFileSize</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>pinStatusTemplateDO</td>
<td>M</td>
<td>M</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>shortEFID</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>O</td>
<td>O</td>
</tr>
<tr>
<td>proprietaryEFInfo</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>O</td>
<td>F</td>
</tr>
<tr>
<td>linkPath</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td>M</td>
<td>M</td>
</tr>
</tbody>
</table>

M: Mandatory
This parameter has to be set within the FCP when the respective type is created. Otherwise creation will fail.

O: Optional
Parameters which are optional do not need to be provided since they either address optional features (ShortEFID) or a default will be applied (LCSI, proprietaryInfo, pinStatus_TemplateDO: copy of file addressed in linkPath).
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F Forbidden
This parameter shall not be provided within the respective context.

/* Create GenericFileManagement */

PE-GenericFileManagement ::= SEQUENCE {
  gfm-header PEHeader,
  fileManagementCMD SEQUENCE of FileManagement
}

FileManagement ::= SEQUENCE OF CHOICE {
  filePath [0] OCTET STRING, -- Use Temporary File ID for ADF
  createFCP [APPLICATION 2] Fcp,
  fillFileOffset UInt16,
  fillFileContent [1] OCTET STRING
}

Usage rules: This PE may be used at any time after the creation of the MF.

8.4 NAA(s)

8.4.1 NAA Parameters
An NAA is implicitly installed in the context of the creation of the NAA file structure and includes the following PE provided subsequent to the PEs describing its file system:

- PE-AKAParameters
- PE-CDMAParameter (if <NAA> = CSIM)

8.4.2 AKA Parameters PE
This PE is used to set the parameters for AKA authentication algorithms like Milenage and TUAK.

MappingParameter ::= SEQUENCE {
  mappingOptions OCTET STRING (SIZE(1)),
  mappingSource ApplicationIdentifier
}

AlgoParameter ::= SEQUENCE {
  key OCTET STRING,
  opc OCTET STRING, -- For TUAK, this parameter sets TOPc
  rotationConstants OCTET STRING (SIZE (5)) DEFAULT '4000204060'H,
  xoringConstants OCTET STRING (SIZE (40)) DEFAULT '00000000000000000000000000000001000000000000000200000000000000040000000000000008'H,
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PE-AKAParameter ::= SEQUENCE {
    aka-header PEHeader,
    algorithmID INTEGER {
        milenage(1),
        tuak(2)
    },
    algorithmOptions OCTET STRING (SIZE(1)),
    algoConfiguration CHOICE {
        mappingParameter MappingParameter,
        algoParameter AlgoParameter
    },
    sqnOptions OCTET STRING (SIZE(1)) DEFAULT '02'H,
    sqnDelta OCTET STRING (SIZE(6)) DEFAULT '000010000000'H,
    sqnAgeLimit OCTET STRING (SIZE(6)) DEFAULT '000010000000'H,
    authCounterMax OCTET STRING (SIZE(3)) OPTIONAL
}

The \textit{algorithm-Options} is encoded as follows:

<table>
<thead>
<tr>
<th>Bit 8</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>RES size (0: 32 bits, 1: 64 bits, 2: 128 bits, 3: 256 bits)</td>
</tr>
<tr>
<td>-</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>MAC-A and MAC-S size (0: 64 bits, 1: 128 bits, 2: 256 bits)</td>
</tr>
<tr>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>CK and IK size (0: 128 bits, 1: 256 bits)</td>
</tr>
<tr>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>RFU</td>
</tr>
</tbody>
</table>

RES size allowed values depend on the algorithm. Certain lengths may not be allowed for some algorithms.

The \textit{sqnOptions} is encoded as follows:

<table>
<thead>
<tr>
<th>Bit 8</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>Anonymity Key (AK) (1: not used, 0: used)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SQN wrap around (1: not allowed, 0: allowed)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SQN Delta (1: not used, 0: used)</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>SQN Age Limit (1: not used, 0: used)</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>RFU</td>
</tr>
</tbody>
</table>

The "\textit{mappingOptions}" data element, if present, indicates the AKA parameters the current NAA uses from the application referenced by "\textit{mappingSource}" and is encoded as follows:

<table>
<thead>
<tr>
<th>Bit 8</th>
<th>Bit 7</th>
<th>Bit 6</th>
<th>Bit 5</th>
<th>Bit 4</th>
<th>Bit 3</th>
<th>Bit 2</th>
<th>Bit 1</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>Key K, (T)OPc and all but SQN parameters</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>All SQN parameters including SQN</td>
</tr>
<tr>
<td>-</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>All SQN parameters except SQN</td>
</tr>
<tr>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>RFU</td>
</tr>
</tbody>
</table>
When the NAA maintains its own SQN array the eUICC implicitly creates an array for 32 SQNs and initialises them to zero or to the value given in the optional "sqnInit" array.

Key size: The "key" OBJECT STRING shall have a length of 16 bytes in case of the Milenage and 16 or 32 bytes in case of the TUAK algorithm.

OPc size: The "opc" OBJECT STRING shall have a size of 16 bytes in case of the Milenage and 32 bytes in case of the TUAK algorithm.

**Usage rules:** This PE shall be used once after the creation of a NAA using Milenage or TUAK authentication algorithm (e.g. USIM, ISIM or CSIM using Milenage). Only one Algorithm's parameter set should be provided in a given NAA. If more than one set of parameters is provided in the Profile, the indication of which set of parameters has to be used if FFS.

### 8.4.3 CSIM Parameters PE

This PE is used to set the parameters for the CSIM authentication algorithms CAVE. It may be provided within the context of an ADF_CSIM.

| PE-CDDAMParameter ::= SEQUENCE { |
|     cddma-header PEHeader, |
|     /* A-Key for CAVE Authentication */ |
|     authenticationKey OCTET STRING (SIZE(8)), |
|     /* Optional value for ssd */ |
|     Bytes 1..8: value if shared secret data A |
|     Bytes 9..16: value if shared secret data B |
|     ssd OCTET STRING (SIZE (16)) OPTIONAL, |
|     /* Shared Secrets for HRPD access authentication */ |
|     Includes the shared secret data. Length is variable |
|     hrdpAccessAuthenticationData OCTET STRING (SIZE (8..255)) OPTIONAL, |
|     /* Parameters for simple IP authentication */ |
|     The shared secrets will be provided as a list of TLVs |
|     For each NAI-entry-index which will be provided within CHAP command the shared secret will be coded as follows: |
|     Tag: NAI-entry-index, length, Shared secret |
|     up to 16 shared secret values may be provided |
|     simpleIPAuthenticationData OCTET STRING (SIZE (10..4112)) OPTIONAL, |
|     /* Parameters mobile IP authentication */ |
|     The shared secrets will be provided as a list of Tag Value pairs |
|     For each NAI-entry-index which will be provided within MN-HA command the necessary values will be coded as follows: |
|     Tag: NAI-entry-index, length of MN-AAA-SS, MN-AAA-SS value, length of |
Usage rules: This PE shall be used once after the creation of a NAA using Cave authentication algorithm (e.g. CSIM). Only one Algorithm’s parameters set should be provided in a given NAA. If more than one set of parameters is provided in the Profile Package, the indication of which set of parameters has to be used is FFS.

8.5 PIN and PUK codes

8.5.1 Pin Code PE
This PE is used to set the PIN codes related to the MF for the global ones or related to a DF.

NOTE: Universal PIN is not supported.
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If the RetryNumLeft if greater than MaxNumberOfAttempts then the behaviour of the eUICC is undefined.

The coding of the PINAttributes is as follow:

<table>
<thead>
<tr>
<th>b8</th>
<th>b7</th>
<th>b6</th>
<th>b5</th>
<th>b4</th>
<th>b3</th>
<th>b2</th>
<th>b1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Set to 1: PIN is enabled</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Set to 1: PIN can be changed</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Set to 1: PIN can be disabled</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RFU, bit = 0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RFU, bit = 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>RFU, bit = 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>RFU, bit = 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RFU, bit = 0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Usage rules:** This PE shall be used during the file system creation right after the creation of the MF for global PINs or right after the creation of an ADF or a DF for local PINs. The use of this PE shall be unique in all these contexts.

### 8.5.2 PUK Code PE

This PE is used to set the PUK codes at the MF level. This PE shall be used during the file system creation right after the creation of the MF. The use of this PE shall be unique.

PUKKeyReferenceValue ::= INTEGER {
pukAppl1(1),  -- PUK global of App 1
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pukApp12(2), -- PUK global of App 2
pukApp13(3), -- PUK global of App 3
pukApp14(4), -- PUK global of App 4
pukApp15(5), -- PUK global of App 5
pukApp16(6), -- PUK global of App 6
pukApp17(7), -- PUK global of App 7
pukApp18(8), -- PUK global of App 8
secondPUKApp11(129), -- PUK local of App 1
secondPUKApp12(130), -- PUK local of App 2
secondPUKApp13(131), -- PUK local of App 3
secondPUKApp14(132), -- PUK local of App 4
secondPUKApp15(133), -- PUK local of App 5
secondPUKApp16(134), -- PUK local of App 6
secondPUKApp17(135), -- PUK local of App 7
secondPUKApp18(136) -- PUK local of App 8

PUKConfiguration ::= SEQUENCE {
  keyReference PUKKeyReferenceValue,
  pukValue OCTET STRING (SIZE (8)),
  maxNumOfAttemps-retryNumLeft UInt8 DEFAULT 170
/* maxNumOfAttemps-retryNumLeft is encoded as follows: max Number of Attempts is encoded in the high nibble of this value (Bit 8 to 4) and the Number of retry left is encoded in the low nibble of this value (Bit 3 to 0)*/
}

PE-PUKCodes ::= SEQUENCE {
  puk-Header PEHeader,
  pukCodes SEQUENCE (SIZE (1..16))OF PUKConfiguration
}

If the RetryNumLeft if greater than MaxNumOfAttemps then the behavior of the eUICC is undefined.

Usage rules: The PE shall be used only once in the profile Package, right after the creation of the MF.

8.6 Security domains

8.6.1 Security Domain PE
SDs are installed using the ApplicationInstance type (As defined in section 8.7.3) which is also used for application installation. The values standardised for Supplementary SDs shall be used.

For the installation of SDs the following PE is defined:

PE-SecurityDomain ::= SEQUENCE {
  sd-Header PEHeader,
  instance ApplicationInstance, -- see section 8.7.3
  keyList SEQUENCE OF KeyObject OPTIONAL, -- see section 8.6.3
  sdPersoData SEQUENCE OF OCTET STRING OPTIONAL -- see section 8.6.4
}
**Usage rules:** The PE shall be used for every SD creation, starting from MNO-SD.

### 8.6.2 SD and MNO SD Creation

The first SD to be created is the equivalent of the ISD (Issuer Security Domain) of a UICC and is the root of all the other SDs included in a Profile, it is called the MNO-SD. It needs to be installed explicitly using "PE-SecurityDomain" within the Profile Package. The MNO-SD shall be installed before any other SD, before any RFM Parameters are set or before any applets are created.

Since no package AID nor classAID is standardised for the MNO-SD, it shall use the values defined for supplementary SD creation. The first SD within the sequence of the Profile Package will thus be categorized as the MNO-SD by definition and will be installed with the special MNO-SD rights defined by the GSMA. Following instances of SDs will be installed like regular supplementary SDs as known from GlobalPlatform Card Specification [GP CS].

### 8.6.3 Key Personalisation

After creation of an SD, the keys which shall be installed can be described with the respective SD PE. The parameters are based on the DGIs for personalisation of SDs as specified within the GlobalPlatform Card Specification Amd A [GP AA], section 4.10. The structure has been optimised to avoid redundancy within the data structure.

```plaintext
KeyObject ::= SEQUENCE {
  keyUsageQualifier [21] OCTET STRING (SIZE (1)),
  keyAccess [22] OCTET STRING (SIZE (1)),
  keyIdentifier [2] OCTET STRING (SIZE (1)),
  keyVersionNumber [3] OCTET STRING (SIZE (1)),
  keyCheckValue [4] OCTET STRING OPTIONAL,
  keyCounterValue [5] OCTET STRING OPTIONAL, --not checked if not present
  scp80SeqCounter OCTET STRING OPTIONAL,
  keyComponentSequence SEQUENCE OF SEQUENCE {
    keyType [0] OCTET STRING,
    keyData [6] OCTET STRING
  }
}
```

The coding of the following parameters shall follow the GlobalPlatform Card Specification Amd A [GP AA]:

- keyUsageQualifier
- keyAccess
- keyIdentifier
- keyVersionNumber
- keyCheckValue OPTIONAL
- scp80keyCounter OPTIONAL

Each key to be personalised must be listed only once. This means there shall be no keys with same keyIdentifier and keyVersionNumber listed twice. The optional keyCheckValue shall be checked in case available (if it fails the PE-SecurityDomain installation fails). The keyCheckValue may only be provided for key types supporting it.

scp80SeqCounter shall be defined only once for a complete key set.
To simplify the installation of PKI keys, which consist of multiple key components of different types, the following structure has been defined. This is so that redundant information can be avoided. Only keyTypes defined in GlobalPlatform Card Specification [GP CS], Table 11-16, may be part of the list. Each key component shall be specified only once per key (e.g. including two times the same keyType within one KeyObject will lead to an error).

keyComponents SEQUENCE OF SEQUENCE {
    keyType [0] OCTET STRING,
    keyData [6] OCTET STRING,
}

### 8.6.4 SD Personalisation

Optionally a list of commands may be provided to personalise the SD (e.g. set IIN, change AID, ...). Any commands which can be sent via STORE DATA commands addressing the SD personalisation defined by GlobalPlatform Card Specification [GP CS] may be sent to an SD via this means. Only the content of the STORE DATA commands will be provided (leaving CLA, INS, P1, P2, L).

The content shall not be encrypted and shall use DGI format. Since there is no limitation in terms of content length for within the sdPersoData parameter, the complete DGI structure for the SD personalisation shall be sent in one complete byte array. Each DGI shall be provided in its own sdPersoData record. Only standardised DGIs, according to GlobalPlatform Card Specification [GP CS], shall be sent when addressing a SD.

Installation of the CASD, if required inside a Profile, uses the same procedure.

### 8.6.5 RAM / OTA HTTPs Configuration

Within each SD, the settings for RAM and OTA HTTPs can be configured according to GlobalPlatform Card Specification [GP CS] and ETSI specifications. The TAR values for RAM can be configured as follows:

- Bytes 13-15 of the SD instance AID
- TAR List within SD install parameters

Settings for OTA HTTPs may be provided within the processData in tag ‘85’ according to GlobalPlatform Amd B [GP AB] (Section 3.7.1 TLV: Security Domain Administration Session Parameters) in the ApplicationInstance structure.

The security level for RAM is defined by the MSL parameter of the SD installation parameters. It is highly recommended to assign “00 00 00” as the TAR value for RAM within the MNO-SD installation.

The configuration of the PoR (Proof of Receipt) handling is not part of the Profile definition. The eUICC shall follow the latest ETSI and 3GPP release to provide the necessary level of security.

### 8.7 Application loading and installation

#### 8.7.1 Application PE

For loading and installing applications, the following PE is defined.

```
PE-Application ::= SEQUENCE {
    app-Header PEHeader,
    loadBlock ApplicationLoadPackage OPTIONAL,
    instanceList SEQUENCE OF ApplicationInstance OPTIONAL
}
```
Within the Application PE, application code can be loaded and instances can be installed and personalised. An example of application is a Java Card™ Applet. The elements are described in more detail in the following. All parameters are optional to cover the following use cases:

- A library shall be loaded: In this case only the library can be provided by specifying the ApplicationLoadPackage structure only (no install, no perso)
- A preloaded application shall be installed which only requires an ApplicationInstance: Multiple instances of the same ApplicationLoadPackage can be installed within one Application PE.
- An application shall be loaded providing an ApplicationLoadPackage object and installed via an ApplicationInstance (optionally multiple ApplicationInstance objects)

In case the mandatory parameter of the PEHeader object is set to mandatory, profile installation will fail if one of the subsequent elements cannot be executed (e.g. load fails because of API incompatibility, install fails because of duplicate TAR values ...). If mandatory is not set, profile installation will continue with the next PE.

The loading procedure may fail for various reasons, including:

- The eUICC does not support the required runtime environment (e.g. Java Card™)
- The required version of the runtime environment is not available
- A library required by the application is not available
- An algorithm required by the application is not available

Within the subsequent sections, the elements for the PE are described in more detail.

### 8.7.2 ApplicationLoadPackage

The ApplicationLoadPackage parameter includes the applet code. It is based on the GP2.2 LOAD command according to GlobalPlatform Card Specification [GP CS], Section 11.6. The only difference to the GP Load Command is that the complete load block is provided within the loadBlockObject parameter.

```
ApplicationLoadPackage ::= SEQUENCE {
    loadPackageAID [APPLICATION 15] ApplicationIdentifier,
    securityDomainAID [APPLICATION 15] ApplicationIdentifier OPTIONAL,
    nonVolatileCodeLimitC6 [PRIVATE 6] OCTET STRING OPTIONAL,
    volatileDataLimitC7 [PRIVATE 7] OCTET STRING OPTIONAL,
    nonVolatileDataLimitC8 [PRIVATE 8] OCTET STRING OPTIONAL,
    hashValue [PRIVATE 1] OCTET STRING OPTIONAL,
    loadBlockObject [PRIVATE 4] OCTET STRING
}
```

The following parameters may be ignored by the eUICC in case they are not supported.

- nonVolatileCodeLimitC6
- volatileDataLimitC7
- nonVolatileDataLimitC8
- hashValue

All the other parameters are mandatory and need to follow the same rules as defined for the Load command as defined in GlobalPlatform Card Specification [GP CS].
### ApplicationInstance

The ApplicationLoadPackage is used to instantiate and personalise applications. It is based on the GlobalPlatform Card Specification [GP CS] Install for Install command. To simplify and optimise the process of personalisation, additional parameters have been added which will be described in this section.

```plaintext
ApplicationInstance ::= SEQUENCE {
  applicationLoadPackageAID [APPLICATION 15] ApplicationIdentifier,
  classAID [APPLICATION 15] ApplicationIdentifier,
  instanceAID [APPLICATION 15] ApplicationIdentifier,
  extraditeSecurityDomainAID [APPLICATION 15] ApplicationIdentifier OPTIONAL,
  applicationPrivileges [2] OCTET STRING,
  lifeCycleState [3] OCTET STRING (SIZE(1)) DEFAULT '03'\H,
  /* Coding according to GP Life Cycle State */
  applicationSpecificParametersC9 [PRIVATE 9] OCTET STRING,
  systemSpecificParameters [PRIVATE 15] ApplicationSystemParameters OPTIONAL,
  applicationParameters [PRIVATE 10] UICCApplicationParameters OPTIONAL,
  processData SEQUENCE OF OCTET STRING OPTIONAL }

ApplicationSystemParameters ::= SEQUENCE{
  volatileMemoryQuotaC7 [PRIVATE 7] OCTET STRING OPTIONAL,
  nonVolatileMemoryQuotaC8 [PRIVATE 8] OCTET STRING OPTIONAL,
  globalServiceParameters [PRIVATE 11] OCTET STRING OPTIONAL,
  implicitSelectionParameter [PRIVATE 15] OCTET STRING OPTIONAL,
  volatileReservedMemory [PRIVATE 23] OCTET STRING OPTIONAL,
  nonVolatileReservedMemory [PRIVATE 24] OCTET STRING OPTIONAL,
  ts102226SIMFileAccessToolkitParameter [PRIVATE 10] OCTET STRING OPTIONAL,
  ts102226AdditionalContactlessParameters [0] OPTIONAL}

UICCApplicationParameters ::= SEQUENCE {
  uiccToolkitApplicationSpecificParametersField [0] OCTET STRING OPTIONAL,
  uiccAccessApplicationSpecificParametersField [3] OCTET STRING OPTIONAL,
  uiccAccessParams [1] OCTET STRING OPTIONAL,
  uiccAdministrativeAccessApplicationSpecificParametersField [2] OCTET STRING OPTIONAL }

TS102226AdditionalContactlessParameters ::= SEQUENCE{
  protocolParameterData OCTET STRING
}
```

The coding of the following parameters for the ApplicationInstance shall follow the coding defined for Install for Install defined by GlobalPlatform Card Specification [GP CS]:

- `applicationLoadPackageAID`
- `classAID`
- `instanceAID`
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applicationPrivileges
applicationSpecificParameters
systemSpecificParameters

Two parameters have been introduced to enable the direct association of an applet instance to a specific SD and to define the Life Cycle State of the instance. Providing a SD AID within extraditeSecurityDomainAID has the same effect like the Install for Extradition command (GlobalPlatform Card Specification [GP CS]). In case no value for the optional parameter extraditeSecurityDomainAID is provided, the instance will be associated to the MNO-SD by default. The lifeCycleState parameter has the same encoding as the Life Cycle State defined within GlobalPlatform Card Specification [GP CS] (section 11.1.1 Life Cycle Coding). For application instances, coding is according to “Table 11-4 Application Life Cycle Coding”; for SDs according to “Table 11-5 Security Domain Life Cycle Coding”. If no value is provided the default is installed & selectable.

With applicationParameters the ETSI TS 102 226 [102 226] install parameters can be provided to define the access domain for an applet or an RFM instance. Coding follows the same rules as specified within the referenced documents.

8.8 RFM Parameters
This PE is used to set the parameters related to RFM.

```plaintext
PE-RFM ::= SEQUENCE {
  rfm-header PEHeader,
  securityDomainAID [APPLICATION 15] ApplicationIdentifier,

  tarList [0] SEQUENCE OF OCTET STRING (SIZE(3)),

  minimumSecurityLevel [1] OCTET STRING (SIZE (1)),

  uiccAccessDomain OCTET STRING,
  uiccAdminAccessDomain OCTET STRING,

  ...}
```

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Security, Identity, Mobility
If the following parameter is available the respective ADF will be the directory selected by default within an RFM script. In case it is not available the MF will be the default selection.

```plaintext
adfRFMAccess ADFRFMAccess OPTIONAL
```

ADFRFMAccess ::= SEQUENCE {
  adfAID ApplicationIdentifier,
  adfAccessDomain OCTET STRING,
  adfAdminAccessDomain OCTET STRING
}

**Usage rules**: This PE can be used several times in the Profile Package after the PE containing the SD and the PE containing the ADF.

The following parameters for RFM can be configured:

**securityDomainAID**
Referenced the SD in which the keys for RFM are located. If not provided, it will automatically reference the MNO-SD.

**tarList**
Within the list the TAR values can be defined which shall be used to address the RFM instance.

**minimumSecurityLevel**
Define the Minimum Security Level (MSL) for the RFM instance. Interpretation of MSL shall follow the rules defined within ETSI TS 102 226 [102 226].

**uiccAccessDomain**
Access domain of the RFM instance within the MF.

**uiccAdminAccessDomain**
Administrative access domain of the RFM instance within the MF.

**adfRFMAccess**
To address ADFs via RFM, each RFM instance can be associated with one ADF. This optional parameter links the RFM instance to the given ADF. When processing an RFM script, the defined ADF will be selected by default and can be addressed by the file path '7FFF' as it is defined within ETSI standards. In case this optional parameter is not provided, the RFM instance will be linked only to the MF which will be the default selection in the context of an RFM script.

**adfAID**
AID of the ADF to link to the RFM instance.

**adfAccessDomain**
Access domain of the RFM instance within the referenced ADF.

**adfAdminAccessDomain**
Administrative access domain of the RFM instance within the referenced ADF.
8.9 Non standardised content
This PE is used to send content that can only be processed by specific eUICCs. This content can be either a proprietary element or content standardised in a specification after eUICC creation. The Profile Package can use as many PEs of this type as required.

```
PE-NonStandard ::= SEQUENCE {
    nonStandard-header PEHeader,
    issuerID OBJECT IDENTIFIER,
    content OCTET STRING
}
```

Usage rules: The PE can be used at any place in the Profile Package.

8.10 Profile Package end
This PE is used to indicate the end of the Profile Package to the eUICC.

```
PE-End ::= SEQUENCE {
    end-header PEHeader
}
```

Usage rules: The PE shall be used as the last element of the Profile Package.

8.11 eUICC Response type
The eUICC response type is defined in the following ASN.1 type definition:

```
PEStatus ::= SEQUENCE {
    status INTEGER {
        ok(0), pe-not-supported(1), memory-failure(2), bad-values(3),
        not-enough-memory(4), invalid-request-format(5), invalid-parameter(6),
        runtime-not-supported (7), lib-not-supported (8), template-not-supported (9),
        feature-not-supported (10), unsupported-profile-version(31)
    -- proprietary values shall use the [16384...65535] range
    },
    identification UINT15 OPTIONAL,
    -- Identification number of the PE triggering the error
    additional-information UINT8 OPTIONAL
    -- Additional information related to the status code
}

EUICCRresponse ::= SEQUENCE {
    peStatus SEQUENCE OF PEStatus,
    profileInstallationAborted NULL OPTIONAL,
    statusMessage UTF8String OPTIONAL
}
```

The eUICC response may contain several status corresponding to several PEs generating different status messages. The eUICC may group the status messages into one "eUICCResponse" sent after receiving the "PE-End", or right after the processing of a PE leading to the abortion of the Profile Package installation. In case there is nothing to report, one "eUICCResponse" containing the "ok" status code shall be sent by the eUICC at the end of the Profile Package installation.
The status can take the following values:

- **ok**: used at the end of the Profile download and installation in order to indicate that the Profile has been successfully processed by the eUICC. This status shall not be sent for all the PEs but only at the end of the Profile installation. When using this status code, the eUICC shall not indicate any identification of a PE.
- **PE-not-supported**: indicates that a specific PE identified by its identification number is not supported by the eUICC. If this PE was indicated as "mandated" in the PE header, this status is an error status and the processing of the Profile was aborted. Otherwise this is just a warning and the installation of the Profile continues.
- **memory-failure**: indicates a failure during the installation of the Profile due to internal memory issue.
- **bad-values**: indicates that a least one value in the PE identified by its identification number is out of acceptable value range.
- **not-enough-memory**: indicates that the eUICC does not have enough free memory to install the Profile. This status is an error status and the processing of the Profile was aborted.
- **invalid-request-format**: indicates that a structure in a PE is unknown or badly formatted.
- **invalid-parameter**: indicates that a parameter in a PE description is not supported.
- **runtime-not-supported**: indicates that the runtime environment required by the application present in a PE-Application is not supported by the eUICC.
- **lib-not-supported**: indicates that a library required by the application present in a PE-Application is not available in the eUICC.
- **template-not-supported**: indicates that the template indicated by the OBJECT IDENTIFIER in the Generic File System Template PE is not available in the eUICC.
- **feature-not-supported**: indicates that a feature included in the PE is not supported by the eUICC.
- **unsupported-profile-version**: indicates that the major version indicated in the Profile header is not supported by this eUICC. This status is an error status and the processing of the Profile was aborted.

The optional tag **profileInstallationAborted** indicates that the installation of the Profile is aborted due to an error specified in the **status** field.

The optional **statusMessage** can be used in order to give additional information.
9. ANNEX A (Normative): File Structure Templates Definition

9.1 Templates rules and usage
The goal of the templates defined below is to reduce the size of the Profile Package by providing a data compression mechanism. Only the differences between the content and parameters of the files required for a specific Profile, and the content and parameters provided by these templates, need to be included in the Profile Package. Additional templates, along with their management instructions, may be defined later.

Table column information:
- FID: File Identifier.
- File Type: TR= Transparent, LF= Linear Fixed, CY= Cyclic, BER-TLV= BER-TLV coded files, MF= Master File, DF= Dedicated File.
- NB Rec: Number of records in the files for LF or CY files.
- File/Rec Size: File size for TR and BER-TLV files, Record size for LF and CY files.
- Access Conditions: the Access Conditions in the tables are related to the Access Rules numbers, but are a recommendation only, as no EF-ARR content is pre-defined.
- Access Rules: reference to the access rules combination that may be defined in the EF-ARR.
- Content Required: Content not defined as a default value and which shall be provided during personalisation.
- Parameters: Characteristics of the files that may be changed during personalisation.

9.2 Files at MF level
This Template is a "Created by default" type template. 

<table>
<thead>
<tr>
<th>FID</th>
<th>EF Name</th>
<th>File Type</th>
<th>NB Rec.</th>
<th>Access Conditions</th>
<th>Access Rules</th>
<th>Default Value</th>
<th>Content Required</th>
<th>Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>3F00</td>
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Securing the future of mobile services

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This Template is a "Not created by default" type template.

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**Security, Identity, Mobility**
9.5 USIM

9.5.1 Mandatory USIM EFs

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Securing the future of mobile services

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9.5.2 Optional USIM EFs

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### 9.5.3 DF Phonebook

The template for DF Phonebook at the USIM level is the same as the template for DF Phonebook at the DF Telecom level. This Template is a “Not created by default” type template.

**Template OID:** `{joint-iso-itu-t(2) international-organizations(23) simalliance(XXX) euicc-profile(1) template(2) phonebook(6)}`

### 9.5.4 DF GSM-ACCESS

This Template is a “Not created by default” type template.
Securing the future of mobile services

Template OID: (joint-iso-itu-t(2) international-organizations(23) simalliance(XXX) euicc-profile(1) template(2) gsm-access(7))

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9.5.10 DF ProSe
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9.6 ISIM

9.6.1 Mandatory ISIM EFs
This Template is a "Created by default" type template.

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Template OID: `{joint-iso-itu-t(2) international-organizations(23) simalliance(XXX) euicc-profile(1) template(2) isim(8)}`

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Securing the future of mobile services

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Files EF GBABP, EF GBANL and EF NAFKCA are associated with services which require support at the eUICC operating system level. So, even if indicated in the profile, the creation of these files shall be skipped by the eUICC if these functionalities are not supported by the eUICC framework. In that case, the eUICC shall answer to the Profile Creator with a status code set to "feature-not-supported" with "additional-information" set to ‘1’ if GBA is not supported, to ‘2’ if MBMS is not supported and ‘3’ if both are not supported.

**9.7 CSIM**

**9.7.1 Mandatory CSIM EFs**

This Template is a "Created by default" type template.

**Template OID:** (joint-iso-itu-t(2) international-organizations(23) simalliance(XXX) euicc-profile(1) template(2) csim(10))

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Security, Identity, Mobility
### 9.7.2 Optional CSIM EFs

This Template is a "Not created by default" type template.

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**Security, Identity, Mobility**
### Security, Identity, Mobility

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Securing the future of mobile services

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Security, Identity, Mobility
### Securing the future of mobile services

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**Security, Identity, Mobility**
### 9.9 Access Rules Definition

The following table summarises the access rules used by the different templates defined above.

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</table>

These access rules may be used by the Profile Creator in order to set the content of EF ARR files.
10. ANNEX B (Normative): List of OIDs

All the OIDs used in this specification are located under the SIMAlliance branch dedicated for this specification:

\{(joint-iso-itu-t(2) international-organizations(23) simalliance(XXX) euicc-profile(1))\}

The table below lists the OIDs currently assigned:

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<th>Dot Notation</th>
<th>Comments</th>
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<td>Specification version</td>
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<td>DF CD file system template</td>
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11. ANNEX C (Informative): Example of Profile Package

11.1 Example of Profile Package structure

The following example shows a typical structure of a Profile Package containing a USIM application and a supplementary SD containing an application.

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<td>PE-PINCodes</td>
<td>Creates the Global PIN codes</td>
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<tr>
<td>PE-TELECOM</td>
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<tr>
<td>PE-GenericFileManagement</td>
<td>To be repeated in order to create the files required in the DF Phonebook</td>
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<tr>
<td>PE-USIM</td>
<td>Creates a USIM ADF and the associated files</td>
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<td>PE-OPT-USIM</td>
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<tr>
<td>PE-PHONEBOOK</td>
<td>Creates DF PHONEBOOK under USIM ADF</td>
</tr>
<tr>
<td>PE-AKAParameter</td>
<td>Sets the AKA parameters related to the previously created USIM</td>
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<tr>
<td>PE-PINCodes</td>
<td>Creates the local PIN code structure at the USIM ADF level</td>
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<tr>
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<td>To be repeated in order to create additional files required in the ADF</td>
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<td>Creates a SSD</td>
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</tr>
<tr>
<td>PE-Application</td>
<td>Loads an application in the SSD</td>
</tr>
<tr>
<td>PE-RFM</td>
<td>Sets the RFM parameters for the Profile</td>
</tr>
<tr>
<td>PE-End</td>
<td>End of the Profile Package</td>
</tr>
</tbody>
</table>

11.2 Example of Profile Package content

The following example contains a limited profile content.

```
value1 ProfileElement ::= header : {
    major-version 1,
    minor-version 0,
    profileType "SIM Alliance Sample Profile",
    iccid '0000000000000000000'H,
    eUICC-Mandatory-services {
        usim NULL,
        milenage NULL
    }
}

value2 ProfileElement ::= mf : {
    mf-header {
        mandated NULL,
        identification 3
    },
    mf-property {
        lcsi '05'H
    },
```
ef-iccid {
},
ef-dir {
},
ef-arr {
}
}

Value3 ProfileElement ::= pukCodes : {
  puk-Header {
    mandated NULL,
    identification 2
  },
pukCodes {
    {
      keyReference pukApp11,
      pukValue '0000000000000000'H,
      maxNumOfAttemps 10,
      retryNumLeft 10
    },
    {
      keyReference pukApp12,
      pukValue '0000000000000000'H,
      maxNumOfAttemps 10,
      retryNumLeft 10
    },
    {
      keyReference secondPUKApp11,
      pukValue '0000000000000000'H,
      maxNumOfAttemps 10,
      retryNumLeft 10
    }
  }
}

value4 ProfileElement ::= cd : {
  cd-header {
    identification 4
  },
  cd-df-property {
    lcsi '05'H
  }
}

value5 ProfileElement ::= telecom : {
  telecom-header {
    identification 5
  },
  telecom-df-property {
    lcsi '05'H
  }
}

value6 ProfileElement ::= usim : {
  usim-header {
    mandated NULL,
  }
}
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Security, Identity, Mobility

Module: Security

Identification 6

usim-df-property {
  lcsi '05'H
},
ef-imsi {
},
ef-ust {
},
ef-spn {
},
ef-est {
},
ef-acc {
},
ef-ecc {
}
}

value7 ProfileElement ::= opt-usim : {
  optusim-header {
    identification 7
  },
  ef-arr {
    fileContent '00'H
  },
  ef-msisdn {
    fileContent '00'H
  }
}

value8 ProfileElement ::= pinCodes : {
  pin-Header {
    identification 8
  },
  pinCodes pinconfig : {
  }
}

value9 ProfileElement ::= akaParameter : {
  aka-header {
    identification 9
  },
  algorithmID milenage,
  algorithmOptions '00'H,
  algoConfiguration algoParameter : {
    key '00'H,
    opc '00'H,
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rotationConstants '4000204060'H,
 xorRingConstants
'0000000000000000000000000000000100000000000000200000000000000040000000000000008'H
),
sqnOptions '02'H,
sqnDelta '000010000000'H,
sqnAgeLimit '000010000000'H
}
value10 ProfileElement ::= securityDomain : {
 sd-Header {
 mandated NULL,
 identification 10
 },
 instance {
 applicationLoadPackageAID '0000000000'H,
 classAID '0000000000'H,
 instanceAID '0000000000'H,
 applicationPrivileges '00'H,
 lifeCycleState '03'H,
 applicationSpecificParametersC9 '00'H
 },
 keyList {
 { 
 keyUsageQualifier '00'H,
 keyAccess '00'H,
 keyIdentifier '00'H,
 keyVersionNumber '00'H,
 keyComponents {
 { 
 keyType '00'H,
 keyData '00'H
 }
}
}
},
 sdPersoData {
 '00'H
 }