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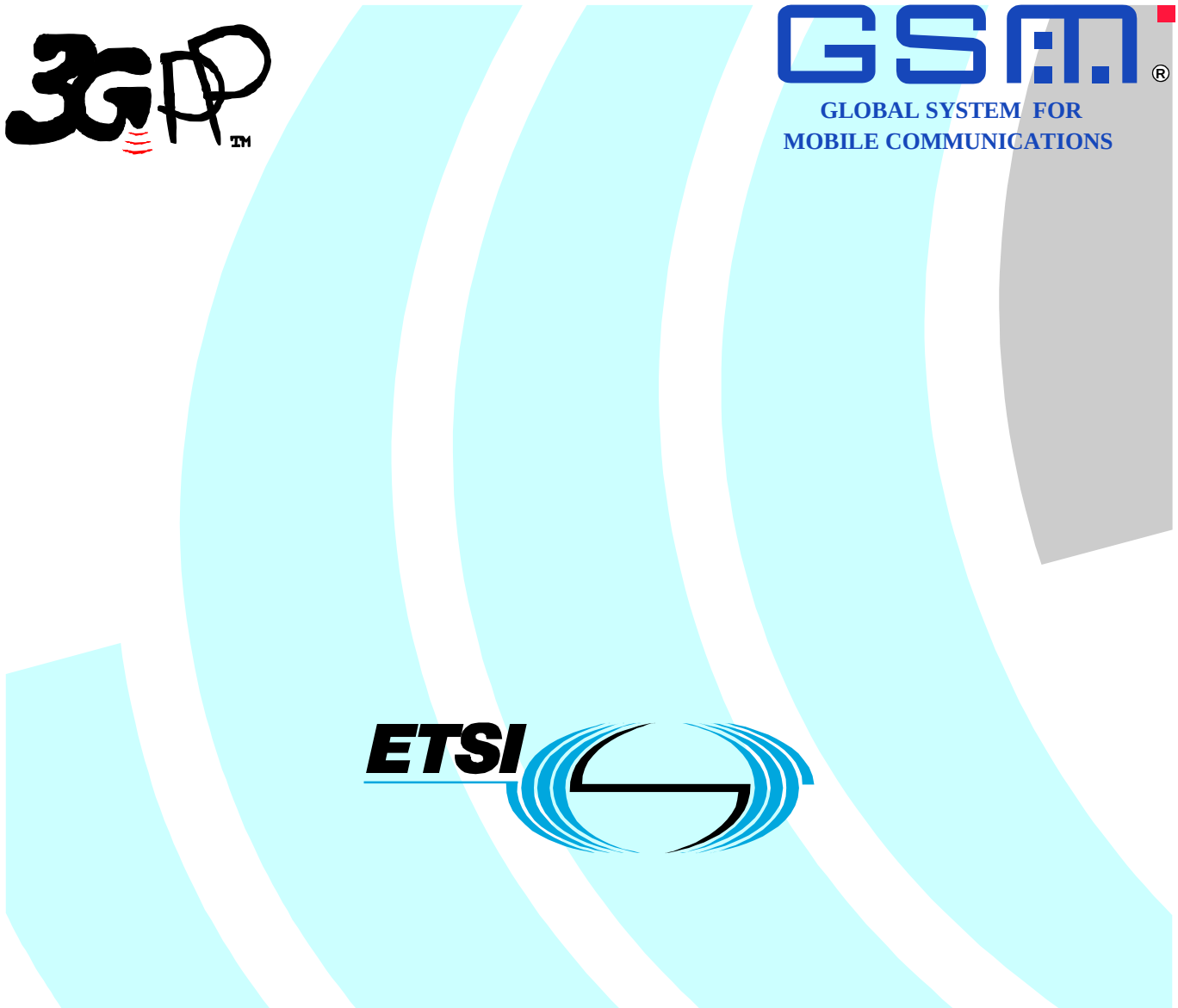
Technical Specification

Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
(U)SIM Application Programming Interface API;
(U)SIM API for Java Card(TM)
(3GPP TS 31.130 version 6.1.0 Release 6)



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Foreword

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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

1 Scope

The present document defines the (U)SIM Application Programming Interface extending the 'UICC API for Java Card™' [2].

This API allows to develop a (U)SAT application running together with a (U)SIM application and using GSM/3G network features.

The present document includes information applicable to network operators, service providers, server -, (U)SIM - and database manufacturers.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] ETSI TS 101 220: "Integrated Circuit Cards (ICC); ETSI numbering system for telecommunication; Application providers (AID)".

[2] ETSI TS 102 241 Release 6: "UICC API for Java Card™"

[3] 3GPP TS 31.102: "Characteristics of the USIM Application".

[4] 3GPP TS 51.011 Release 4: "Specification of the Subscriber Identity Module- Mobile Equipment (SIM – ME) interface".

[5] 3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".

[6] ETSI TS 102 223 Release 6: "Card Application Toolkit (CAT)".

[7] 3GPP TS 31.111: "USIM Application Toolkit (USAT)".

[8] 3GPP TS 51.014 Release 4: "Specification of the SIM Application Toolkit for the Subscriber Identity Module – Mobile Equipment (SIM – ME) interface".

[9] 3GPP TS 31.115: "Secured packet structure for the (U)SIM Toolkit applications".

[10] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".

[11] Sun Microsystems Java Card™ Specification: "Java Card™ 2.2.1 Application Programming Interface".

[12] Sun Microsystems Java Card™ Specification : "Java Card™ 2.2.1 Runtime Environment (JCRE) Specification".

[13] Sun Microsystems Java Card™ Specification: "Java Card™ 2.2.1 Virtual Machine Specification".

SUN Java Card™ Specifications can be downloaded at http://java.sun.com/products/javacard

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions defined in TS 102 241[2] apply.

(U)SAT Framework : (U)SAT extension of the CAT Runtime Environment.

3.2 Abbreviations

For the purposes of the present document, the abbreviations defined in TS 102 241[2] apply.

4 Description

This API is an extension to the TS 102 241[2] "UICC API for Java Card™" and requires the implementation of this specification.

The classes and interfaces described in this specification inherit functionality from the classes and interfaces specified in the "UICC API for Java Card™".

The (U)SAT Framework described in this specification is an extension of the CAT Runtime Environment defined in TS 102 241 [2].

4.1 (U)SIM Java Card™ Architecture

The overall architecture of the (U)SIM API is based on the "UICC API for Java Card™" defined in TS 102 241[2].

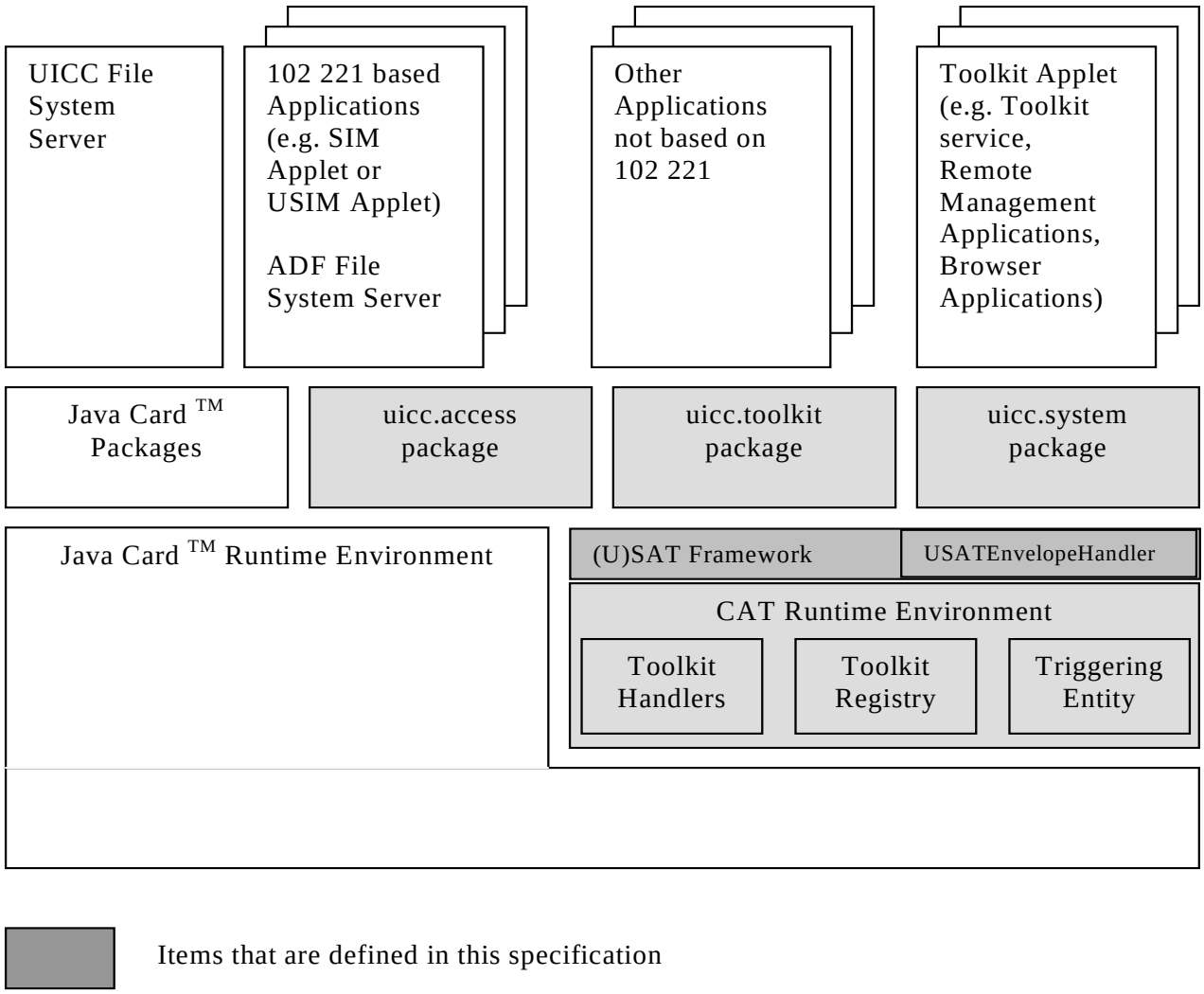

Figure 1: (U)SIM Java Card™ Architecture

5 File Access API

The (U)SIM file access API consists of the package *uicc.usim.access*. This package defines additional constants to those defined in the *uicc.access* package from TS 102 241[2]. The access to the file system, defined in TS 51.011[4] and TS 31.102 [3], is the one specified in TS 102 241[2] via the UICC *FileView* Interface. When selecting a cyclic file the current record number is defined, this applies also to files located under DF_{GSM}.

6 (U)SAT Framework

6.1 Overview

The (U)SIM toolkit API consists of the *uicc.usim.toolkit* package for toolkit features defined in TS 31.111[7] and TS 51.014[8], and is based on the *uicc.toolkit* package defined in TS 102 241[2].

6.2 Definition of Events

The following events can trigger a Toolkit Applet in addition to the events defined in TS 102 241[2], all short values are reserved in TS 102 241[2]:

Table 1: (U)SAT event list

Event Name	Reserved short value
EVENT_FORMATTED_SMS_PP_ENV	2
EVENT_FORMATTED_SMS_PP_UPD	3
EVENT_UNFORMATTED_SMS_PP_ENV	4
EVENT_UNFORMATTED_SMS_PP_UPD	5
EVENT_UNFORMATTED_SMS_CB	6
EVENT_MO_SHORT_MESSAGE_CONTROL_BY_NAA	10
EVENT_FORMATTED_SMS_CB	24

EVENT_FORMATTED_SMS_PP_ENV, EVENT_UNFORMATTED_SMS_PP_ENV, EVENT_FORMATTED_SMS_PP_UPD, EVENT_UNFORMATTED_SMS_PP_UPD

There are two ways for a card to receive a Short Message Point to Point: via an ENVELOPE(SMS-PP DOWNLOAD) APDU as defined in TS 31.111[7] and TS 51.014[8] or an UPDATE RECORD EF_{SMS} APDU as defined in TS 31.102[3] and TS 51.011[4]. The EF_{SMS} can be either located under the $DF_{Telecom}$ or under any ADF as defined in TS 31.102[3] and TS 51.011[4].

The received Short Message may be:

- formatted according to TS 31.115[9] or an other protocol to identify explicitly the toolkit applet for which the message is sent;
- unformatted (e.g. a toolkit applet specific protocol) then the (U)SAT Framework will pass this data to all registered toolkit applets.

When the Short Message is received as Concatenated Short Messages as defined in TS 23.040[10], it is the responsibility of the (U)SAT Framework to link single Short Messages together to re - assemble the original message before any further processing. The original Short Message shall be placed in one SMS TPDU TLV (with TP-UDL field coded on one octet) included in the *USATEnvelopeHandler*. The concatenation control headers used to re-assemble the short messages in the correct order shall not be present in the SMS TPDU. The TP-elements of the SMS TPDU and the Address (TS - Service-Centre-Address) shall correspond to the ones in the last received Short Message (independently of the Sequence number of Information-Element-Data).

The minimum requirement for the (U)SAT Framework is to process a concatenated short message with the following properties:

- the Information Element Identifier is equal to the 8-bit reference number.
- it contains uncompressed 8 bit data or uncompressed UCS2 data.

EVENT_FORMATTED_SMS_PP_ENV

Upon reception of a TS 31.115[9] formatted Short Message Point to Point (Single or Concatenated) via an ENVELOPE, the (U)SAT Framework shall:

- verify the security of the Short Message as per TS 31.115[9];
- trigger the toolkit applet registered with the corresponding TAR;
- take the optional Application Data posted by the triggered toolkit applet if present;
- secure and send the response packet using SMS-DELIVER-REPORT or SMS-SUBMIT.

When the toolkit applet is triggered, data shall be provided deciphered.

EVENT_UNFORMATTED_SMS_PP_ENV

Upon reception of an unformatted Short Message Point to Point (Single or Concatenated) via an ENVELOPE, the (U)SAT Framework shall trigger all the Toolkit Applets registered to this event.

Note: As a consequence of the *EnvelopeResponseHandler* availability rules specified in clause 6.6, only the first triggered toolkit applet is guaranteed to be able to send back a response.

EVENT_FORMATTED_SMS_PP_UPD

Upon reception of a TS 31.115[9] formatted Short Message Point to Point (Single or Concatenated) via an UPDATE RECORD EF_{SMS}, the (U)SAT Framework shall:

- update the EF_{SMS} file with the data received, it is then up to the receiving toolkit applet to change the SMS stored in the file (i.e. the toolkit applet need to have access to the EF_{SMS} file)
- verify the security of the Short Message as per TS 31.115[9];
- convert the UPDATE RECORD EF_{SMS} APDU into a COMPREHENSION TLV List;
- trigger the toolkit applet registered with the corresponding TAR;

When the toolkit applet is triggered, data shall be provided deciphered.

The *USATEnvelopeHandler* provided to the applet shall:

- return *BTAG_SMS_PP_DOWNLOAD* to the *getTag()* method call;
- return the Comprehension TLV list length to the *getLength()* method call;

The *USATEnvelopeHandler* provided to the applet shall contain the following COMPREHENSION TLVs :

- Device Identities TLV

The Device Identities Comprehension TLV is used to store the information about the absolute record number in the EF_{SMS} file and the value of the EF_{SMS} record status byte, and is formatted as defined below:

Device identities Comprehension TLV
Device Identities tag
length = 02
Absolute Record Number
Record Status

With the absolute record number the toolkit applet can update EF_{SMS} in absolute mode to change the received SMS (e.g. in a readable text).

For Concatenated Short Message the Absolute Record Number and the Record Status will correspond to the last UPDATE RECORD EF_{SMS} APDU received.

- Address TLV

The value is the TS-Service-Centre-Address (RP-OA) of the last UPDATE RECORD EF_{SMS} APDU.

- SMS TPDU TLV

The value is the SMS TPDU provided deciphered and reassembled, if needed

- AID TLV

The AID comprehension TLV is present only if the EF_{SMS} file updated is under an ADF. The value is the AID of the ADF as defined TS 102 223[6].

The order of the TLVs given in the *USATEnvelopeHandler* is not specified,

Note: To get each COMPREHENSION TLV, it is recommended that the applet uses the *ViewHandler.findTLV()* methods

EVENT_UNFORMATTED_SMS_PP_UPD

Upon reception of an unformatted Short Message Point to Point (Single or Concatenated) via UPDATE RECORD EF_{SMS} APDU, the (U)SAT Framework shall :

- update the EF_{SMS} file with the data received;
- convert the UPDATE RECORD EF_{SMS} APDU data into a COMPREHENSION TLV List (as described for *EVENT_FORMATTED_SMS_PP_UPD*);
- trigger all the Toolkit Applets registered to this event.

The content of EF_{SMS} may have been modified by a previously triggered Toolkit Applet..

EVENT_FORMATTED_SMS_CB, EVENT_UNFORMATTED_SMS_CB

The received Cell Broadcast Message, via an ENVELOPE (CELL BROADCAST DOWNLOAD) APDU as defined in TS 31.111[7] and TS 51.014[8] and, can be either:

- formatted according to TS 31.115 [9] or an other protocol to identify explicitly the toolkit applet for which the message is sent;
- unformatted (e.g. using a toolkit applet specific protocol), then the (U)SAT Framework will pass this data to all registered toolkit applets.

When the Cell Broadcast Message is received as multiple pages as defined in TS 23.041[5], it is the responsibility of the (U)SAT Framework to link single pages together to re-assemble the original message before any further processing. The original Cell Broadcast message shall be placed in one Cell Broadcast page TLV included in the *USATEnvelopeHandler*. The message parameters shall correspond to the ones in the last received Cell Broadcast page (independently of the Page Parameter).

EVENT_FORMATTED_SMS_CB

Upon reception of a TS 31.115[9] formatted Cell Broadcast message, the (U)SAT Framework shall:

- verify the security of the Cell Broadcast message as per TS 31.115[9];
- trigger the toolkit applet registered with the corresponding TAR;

When the toolkit applet is triggered, data shall be provided deciphered.

EVENT_UNFORMATTED_SMS_CB

Upon reception of an unformatted Cell Broadcast message, the (U)SAT Framework shall trigger all the Toolkit Applets registered to this event.

EVENT_MO_SHORT_MESSAGE_CONTROL_BY_NAA

Upon reception of an ENVELOPE (MO SHORT MESSAGE CONTROL defined in TS 51.014[8] and TS 31.111[7]) APDU as defined in TS 102 221[6] and TS 51.011[4] the (U)SAT Framework shall trigger the Toolkit Applet registered to this event. The (U)SAT Framework shall not allow more than one Toolkit Applet to be registered to this event at a time(e.g. if a Toolkit Applet is registered to this event but not in selectable state the (U)SAT Framework shall not allow another Toolkit Applet to register to this event).

The following events defined in TS 102 221[6] shall be raised upon reception of the corresponding APDU defined in either TS 51.011[4] or TS 102 221[6].

EVENT_PROFILE_DOWNLOAD

EVENT_MENU_SELECTION, EVENT_MENU_SELECTION_HELP_REQUEST

EVENT_CALL_CONTROL_BY_NAA

EVENT_TIMER_EXPIRATION

EVENT_EVENT_DOWNLOAD_MT_CALL

EVENT_EVENT_DOWNLOAD_CALL_CONNECTED

EVENT_EVENT_DOWNLOAD_CALL_DISCONNECTED

EVENT_EVENT_DOWNLOAD_LOCATION_STATUS

EVENT_EVENT_DOWNLOAD_USER_ACTIVITY

EVENT_EVENT_DOWNLOAD_IDLE_SCREEN_AVAILABLE

EVENT_EVENT_DOWNLOAD_CARD_READER_STATUS

EVENT_STATUS_COMMAND

EVENT_EVENT_DOWNLOAD_LANGUAGE_SELECTION

EVENT_EVENT_DOWNLOAD_BROWSER_TERMINATION

EVENT_EVENT_DOWNLOAD_DATA_AVAILABLE

EVENT_EVENT_DOWNLOAD_CHANNEL_STATUS

EVENT_EVENT_DOWNLOAD_ACCESS_TECHNOLOGY_CHANGE

EVENT_EVENT_DOWNLOAD_DISPLAY_PARAMETER_CHANGED

EVENT_EVENT_DOWNLOAD_LOCAL_CONNECTION

EVENT_EVENT_DOWNLOAD_NETWORK_SEARCH_MODE_CHANGE

EVENT_EVENT_DOWNLOAD_BROWSING_STATUS

EVENT_PROACTIVE_HANDLER_AVAILABLE

EVENT_EXTERNAL_FILE_UPDATE

EVENT_FIRST_COMMAND_AFTER_ATR

EVENT_UNRECOGNIZED_ENVELOPE

6.3 Registration

A Toolkit Applet shall register to events described in 6.2 as defined in TS 102 241[2].

Constants for these events are available in *uicc.usim.toolkit.ToolkitConstants* interface in Annex A.

The *uicc.toolkit.ToolkitException* TAR_NOT_DEFINED shall be thrown if a Toolkit Applet has no TAR defined and registers to events: EVENT_FORMATTED_SMS_PP_ENV, EVENT_FORMATTED_SMS_PP_UPD, EVENT_FORMATTED_SMS_CB.

The *uicc.toolkit.ToolkitException*.EVENT_ALREADY_REGISTERED shall be thrown if there is another Toolkit Applet already registered to *EVENT_MO_SHORT_MESSAGE_CONTROL_BY_NAA.*

6.4 Proactive command handling

There is no extension of the CAT Runtime Environment by the (U)SAT Framework for proactive command handling.

6.5 Envelope response handling

For futher study.

6.6 System Handler management

For the handler management of the *ProactiveHandler*, the *ProactiveResponseHandler*, the *EnvelopeHandler* and the *EnvelopeResponseHandler*, the rules defined in TS 102 241[2] apply.

USATEnvelopeHandler:

The single system instance of the *USATEnvelopeHandler* and the single system instance of the *EnvelopeHandler* are two distinct objects instances.

- When available the *USATEnvelopeHandler* shall remain available and its content shall remain unchanged from the invocation to the termination of the *processToolkit()* method.
- The TLV List provided in the *USATEnvelopeHandler* are the same as in the *EnvelopeHandler*.
- The handler availability of the *USATEnvelopeHandler* is the same handler availability as the *EnvelopeHandler* including all the events defined in TS 102 241[2].

The following table describes the minimum availability of the handlers for all the events at the invocation of the *processToolkit()* method of the Toolkit Applet. The rules described in this table apply in addition to the rules described in 'UICC API for Java Card™'

Table 2: Handler availability for each event

EVENT_	Reply busy allowed	EnvelopeHandler / USATEnvelopeHandler	EnvelopeResponse Handler	Nb of triggered / registrered Applet
_FORMATTED_SMS_PP_ENV	Y (see Note 1)	Y	Y	1 / n (per TAR)
_FORMATTED_SMS_PP_UPD	N	Y	N	1 / n (per TAR)
_UNFORMATTED_SMS_PP_ENV	Y	Y	Y	n / n
_UNFORMATTED_SMS_PP_UPD	N	Y	N	n / n
_FORMATTED_SMS_CB	Y	Y	N	1/n (per TAR)
_UNFORMATTED_SMS_CB	Y	Y	N	n / n
_MO_SHORT_MESSAGE_CONTROL_BY_NAA	N	Y	Y	1 / 1

Note 1: The framework may reply busy and not trigger the toolkit applet if e.g. a PoR using SMS SUBMIT is required in the incoming message and a proactive session is ongoing.

6.7 (U)SAT Framework behaviour

The (U)SAT Framework is a (U)SAT extension of the CAT Runtime Environment as defined in TS 102 241[2].

7 UICC toolkit applet

See TS 102 241[2].

Annex A (normative): Java Card™ (U)SIM API

The attached files "31130_Annex_A_Java.zip", and "31130_Annex_A_HTML.zip" contains source files and html documentation for the Java Card™ (U)SIM API.

Annex B (normative): Java Card™ (U)SIM API identifiers

The attached file "31130_Annex_B_Export_files.zip" contains the export files for the uicc.usim.* package.

Annex C (normative): (U)SIM API package version management

The following table describes the relationship between each TS 31.130 specification version and its packages AID and Major, Minor versions defined in the export files.

TS 31.130	**uicc.usim.access package**		**uicc.usim.toolkit package**	
	AID	**Major, Minor**	**AID**	**Major, Minor**
	A0 00 00 00 87 10 05 FF FF FF FF 89 13 10 00 00	1.0	A0 00 00 00 87 10 05 FF FF FF FF 89 13 20 00 00	1.0

The package AID coding is defined in TS 101 220 [1]. The (U)SIM API packages' AID are not modified by changes to Major or Minor Version.

The Major Version shall be incremented if a change to the specification introduces byte code incompatibility with the previous version.

The Minor Version shall be incremented if a change to the specification does not introduce byte code incompatibility with the previous version.

The package *uicc.usim.access* contains only constants, therefore it may not be loaded on the UICC.

Annex D (normative): USIM API jar files

The attached files "31130_Annex_D.jar", contains class files for the Java Card™ (U)SIM API.

Annex E (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2004-03	T#23	TP-040030			Approval of TS 31.130 v2.0.0 at TSG T#23	2.0.0	6.0.0
2004-07					Addition of the missing 31130_Annex_A_Java.zip	6.0.0	6.0.1
2004-12	T#26	TP-040265	001		Editorial cleaning	6.0.1	6.1.0
2004-12	T#26	TP-040265	002		Alignement with 102 241 regarding EnvelopeHandler methods	6.0.1	6.1.0
2004-12	T#26	TP-040265	003		Alignment with changes in 102 241	6.0.1	6.1.0
2004-12	T#26	TP-040265	004		Correction of non specific references	6.0.1	6.1.0
2004-12	T#26	TP-040265	005		Alignment with 31.102 for FID (change to attached file USIMConstants.java)	6.0.1	6.1.0
2004-12	T#26	TP-040265	006		Alignment with 31.111 and 51.014 Terminal Profile constants (change to attached file USATTerminalProfile.java)	6.0.1	6.1.0

History

Document history		
V6.1.0	December 2004	Publication