

ETSI TS 122 038 V12.0.0 (2014-10)



**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
LTE;
(U)SIM Application Toolkit (USAT);
Service description;
Stage 1
(3GPP TS 22.038 version 12.0.0 Release 12)**



Reference

RTS/TSGS-0122038vc00

Keywords

GSM, LTE, UMTS

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

Important notice

The present document can be downloaded from:

<http://www.etsi.org>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

http://portal.etsi.org/chaicor/ETSI_support.asp

Copyright Notification

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2014.

All rights reserved.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

GSM® and the GSM logo are Trade Marks registered and owned by the GSM Association.

Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<http://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**may not**", "**need**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

Contents

| | |
|---|----|
| Intellectual Property Rights | 2 |
| Foreword..... | 2 |
| Modal verbs terminology..... | 2 |
| Foreword..... | 5 |
| 1 Scope | 6 |
| 2 References | 6 |
| 2.1 Normative references | 7 |
| 3 Definitions and abbreviations..... | 7 |
| 3.1 Definitions | 7 |
| 3.2 Abbreviations | 8 |
| 4 Description | 8 |
| 5 High level USAT requirements..... | 9 |
| 6 SAT/USAT/ME interface requirements..... | 10 |
| 6.1 (U)SAT APIs..... | 10 |
| 6.2 USAT proactive capability | 10 |
| 6.3 ME Capability for support of bearer independent protocol..... | 11 |
| 6.4 ME equipped with positioning features..... | 12 |
| 7 USAT User Interface requirements | 12 |
| 7.1 Data presentation requirements (e.g. Display) | 12 |
| 7.2 Data acquisition requirements (e.g. Keypad) | 12 |
| 7.3 Access requirements (e.g. Menu) | 12 |
| 7.4 Menu capability..... | 12 |
| 7.4.1 Set up capability | 12 |
| 7.4.2 Selection capability..... | 12 |
| 7.5 Soft-key capability | 13 |
| 7.6 User control of the SAT/USAT execution environment | 13 |
| 7.7 MMS presentation requirements | 13 |
| 8 Network interface requirements | 13 |
| 8.1 USAT/Network interaction | 13 |
| 8.2 Communication control capability | 13 |
| 8.3 Service Interworking requirements | 14 |
| 9 USAT data exchange capabilities requirements..... | 14 |
| 9.1 Data exchange capabilities supported..... | 14 |
| 10 Charging requirements | 14 |
| 11 Security requirements..... | 15 |
| 11.1 Secure Environment requirements..... | 15 |
| 12 Emergency calls | 15 |
| 13 Roaming | 15 |
| 14 Interaction with supplementary services | 16 |
| 14.1 General | 16 |
| 14.2 Line Identification | 16 |
| 14.2.1 Calling Line Identification Presentation (CLIP)..... | 16 |
| 14.2.2 Calling Line Identification Restriction (CLIR)..... | 16 |
| 14.2.3 Connected Line Identification Presentation (COLP)..... | 16 |
| 14.2.4 Connected Line Identification Restriction (COLR)..... | 16 |
| 14.3 Call Forwarding..... | 16 |

| | | |
|-------------------------------|--|-----------|
| 14.3.1 | Call Forwarding Unconditional (CFU)..... | 16 |
| 14.3.2 | Call Forwarding Busy (CFB)..... | 16 |
| 14.3.3 | Call Forwarding on No Reply (CFNRy)..... | 16 |
| 14.3.4 | Call Forwarding on Not Reachable (CFNRc)..... | 16 |
| 14.4 | Call Completion | 16 |
| 14.4.1 | Call Hold (CH) | 16 |
| 14.4.2 | Call Waiting (CW)..... | 17 |
| 14.5 | Multi Party (MPTY)..... | 17 |
| 14.6 | Closed User Group (CUG) | 17 |
| 14.7 | Advice of Charge (AoC) | 17 |
| 14.8 | Call Barring | 17 |
| 14.8.1 | Barring of all outgoing calls | 17 |
| 14.8.2 | Barring of outgoing international calls | 17 |
| 14.8.2.1 | Mobile originated calls..... | 17 |
| 14.8.2.2 | Forwarded Calls | 17 |
| 14.8.3 | Barring of outgoing international calls except those directed to the HPLMN country | 17 |
| 14.8.4 | Barring of all incoming calls..... | 17 |
| 14.8.5 | Barring of incoming calls when roaming..... | 17 |
| 14.9 | Explicit Call Transfer (ECT)..... | 17 |
| 14.10 | Completion of Call to Busy Subscriber (CCBS)..... | 18 |
| 14.11 | Multiple Subscriber Profile (MSP)..... | 18 |
| 15 | Interaction with network features..... | 18 |
| 15.1 | Interactions with Operator Determined Barring (ODB)..... | 18 |
| 15.1.1 | Barring of all outgoing calls | 18 |
| 15.1.2 | Barring of all outgoing international calls | 18 |
| 15.1.3 | Barring of all outgoing international calls except those directed to the home PLMN country | 18 |
| 15.1.4 | Barring of outgoing calls when roaming outside the home PLMN country | 18 |
| 15.1.5 | Barring of outgoing premium rate calls | 18 |
| 15.1.6 | Barring of incoming calls | 18 |
| 15.1.7 | Barring of incoming calls when roaming outside the home PLMN country | 18 |
| 15.1.8 | Operator Specific Barring..... | 18 |
| 15.1.9 | Barring of Supplementary Services Management..... | 19 |
| 15.2 | Interactions with Optimal Routing (OR) | 19 |
| 15.3 | Interactions with MExE..... | 19 |
| 15.4 | Interactions with CAMEL | 19 |
| 16 | Compatibility of USAT ME's and applications..... | 19 |
| 16.1 | USAT Classification..... | 19 |
| 16.2 | ME/USIM operation..... | 20 |
| 16.3 | ME/UICC capability information exchange..... | 20 |
| 16.4 | ME and compatibility..... | 20 |
| 16.5 | Void..... | 20 |
| 17 | Void..... | 20 |
| Annex A (informative): | Change history | 21 |
| History | | 23 |

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

This 3GPP Technical Specification defines the stage one description of the USIM application Toolkit (USAT). Stage one is an overall service description, primarily from the subscriber's and serving environment's points of view, and does not deal with the details of the human interface itself.

This TS includes information applicable to network operators, serving environments and terminal, switch and database manufacturers.

This TS contains the core requirements for a USIM application Toolkit (USAT) which are sufficient to provide a complete service.

It is highly desirable however, that technical solutions for a USIM application Toolkit (USAT) are sufficiently flexible to allow for possible enhancements. Additional functionalities not documented in this TS may implement requirements which are considered outside the scope of this TS. This additional functionality may be on a network-wide basis, nation-wide basis or particular to a group of users. Such additional functionality shall not compromise conformance to the core requirements of the service.

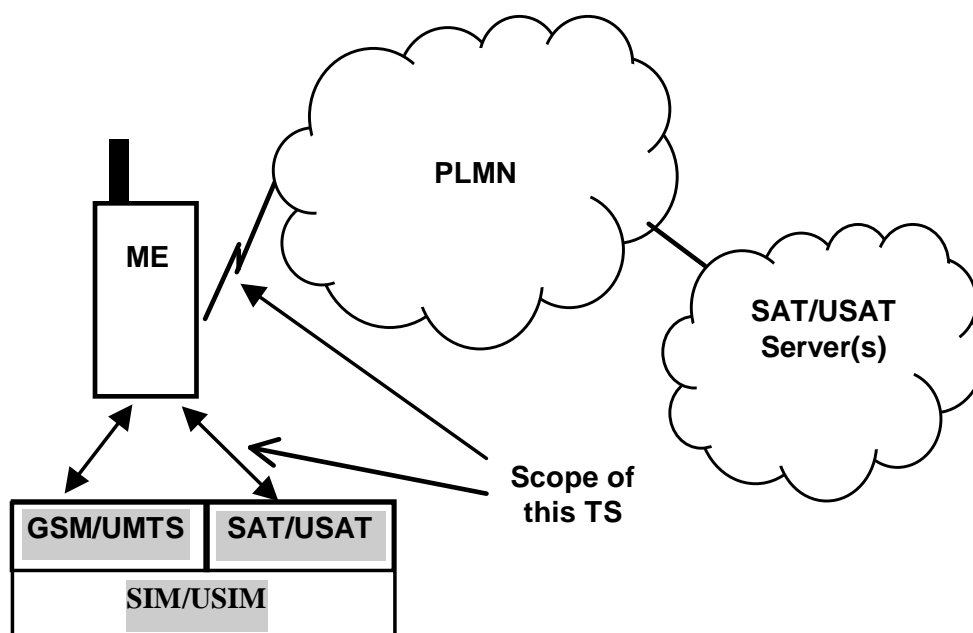


Figure 1: Scope of this TS

As indicated in Figure 1, the scope of this TS encompasses the USAT functionality in the UE (comprising USIM and ME) and the interaction with the PLMN environment. The USAT Server is not necessarily a separate entity as shown in the figure; nodes providing USAT services may also exist within the PLMN. The functionalities of the USAT servers (such as charging aspects, security level classification etc.) are not covered by this specification.

The requirements are considered to be applicable to both GSM and UMTS systems.

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*.

2.1 Normative references

- [1] 3GPP TS 31.101: "UICC-Terminal Interface; Physical and Logical Characteristics".
- [2] Void.
- [3] Void.
- [4] 3GPP TS 51.011: "Specification of the Subscriber Identity Module, Mobile Equipment (SIM - ME) interface" Release 4.
- [5] Void.
- [6] Void.
- [7] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".
- [8] Void.
- [9] Void.
- [10] Void.
- [11] Void.
- [12] Void.
- [13] Void.
- [14] 3GPP TS 31.111: "USIM Application Toolkit (USAT)".
- [15] 3GPP TS 31.102: "Characteristics of the USIM Application".
- [16] 3GPP TS 22.140: "Multimedia Messaging Service (MMS); Stage 1".
- [17] 3GPP TS 51.014: "Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface" Release 4.
- [18] ETSI TS 102 240: "UICC Application Programming Interface and Loader Requirements; Service description" Release 6.
- [19] 3GPP TS 22.071: "Location Services (LCS); Service description; Stage 1"..

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this TS the following definitions apply:

applet: a small program that is intended not to be run on its own, but rather to be embedded inside another application.

application: USAT information in the form of software, applications, associated resources (e.g. libraries) and/or data.

bearer independent protocol: Mechanism at the interface between the USIM and the ME which provide access to the data bearers supported by the ME.

buffer: A dedicated memory used to temporarily store data to be sent and/or retrieved.

content: data and/or information associated with, or independent of, a particular application which may be presented to or collected from a user.

data channel: allow the USIM and the network to exchange data using a selected data exchange capability.

link: radio resource.

USAT service: a service enhanced (or made possible) by USAT technology.

USAT execution environment: the USAT execution environment provides the mechanisms to operate single or multiple USAT-applications.

USAT serving environment: an entity which delivers USAT services to the subscriber. This is normally the PLMN operator, but could be an entity with USAT responsibility (which may have been delegated by the PLMN operator).

USAT subscriber: the owner of a PLMN subscription who has entered into an agreement with a USAT serving environment for USAT services. Access to USAT services through other types of networks is out of scope of this specification.

USAT server: a node supporting USAT services in the USAT service environment.

user: the user of a USAT UE, who may or may not be the subscriber.

(U)SIM: SIM and/or USIM.

3.2 Abbreviations

For the purposes of this TS the following abbreviations apply:

| | |
|-------|---|
| API | Application Programming Interface |
| CAMEL | Customized Applications for Mobile network Enhanced Logic |
| CS | Circuit Switched |
| CSE | CAMEL Service Environment |
| IN | Intelligent Network |
| ME | Mobile Equipment |
| MExE | Mobile Execution Environment |
| MMI | Man Machine Interface |
| NO | Network Operator |
| PLMN | Public Land Mobile Network |
| SAT | SIM Application Toolkit |
| SCI | Subscriber Controlled Input |
| SIM | Subscriber Identity Module |
| UE | User Equipment |
| USAT | USIM Application Toolkit |
| USIM | Universal Subscriber Identity Module |

Further abbreviations are given in TS 21.905 [7].

4 Description

USAT provides a standardised execution environment for applications stored on the UICC and the ability to utilize certain functions of the supporting mobile equipment. USAT provides mechanisms which allow applications, existing in the UICC, to interact and operate with any ME which supports the specified mechanism(s) thus ensuring interoperability between a UICC and an ME, independent of the respective manufacturers and operators. A transport mechanism is provided enabling applications to be down-loaded and/or updated.

A significant aspect of USAT is the highly secure environment provided by the UICC. This is further enhanced by the fact that the subscriber and the issuer of the UICC and also the USAT applications have a "trusted relationship" (e.g. the subscriber trusts the issuer of the UICC to charge correctly for the resources used). This allows certain features, such as call control, to be implemented with a degree of freedom which would not be acceptable in a "non-trusted relationship".

The introduction of the USAT execution environment into UEs (i.e. ME+USIM) is a significant step forward in their evolution. The ability of UEs to support USAT represents an extension of the UE's and PLMN capabilities. In order to allow current and future technologies to exploit and benefit from this, a standardized means of exchanging the MEs' and USIMs capability profiles is supported.

This Technical Specification defines an enhancement of the USIM/ME interface.

5 High level USAT requirements

The requirements described in the present document apply independently of the UICC/ME interfaces described in TS 31.101 [1]. However, this may imply different technical implementations of these requirements depending on the used interface (e.g. ISO or HSP), in order to optimize the USAT implementation.

The high level requirements of USAT are as follows:-

- provide the user with additional user interface functionalities to control and invoke services (e.g. menus, icons, etc.) ;
- to provide means for the user to personalize applications by means of parameters, if such parameters are made available by the application;
- provide support of a wide variety of applications;
- provide the means for USAT to interact with the user via the input and output devices of the ME;
- the means to transfer applications automatically or on demand to the USIM from a USAT server, and upgrade existing applications via the PLMN;
- the means to transfer content automatically or on demand to or from the USIM from or to a USAT server;
- the means to transfer content directly from one USAT application to a second UE with a USAT application via the PLMN;
- the need for an inherent security architecture such that it shall be possible for both the USAT and USAT server sides of a connection to be authenticated (possibly implicitly by the use of digital signature or ciphering). The USAT server shall maintain security of subscribers' personal data and PLMN data;
- it shall be possible to charge subscribers for the use of PLMN or third party USAT services;
- the means for USAT applications on the USIM to communicate with other PLMN nodes;
- the means for the ME and USIM to exchange USAT capability information;
- provision of USAT API(s) to facilitate the development and downloading of USAT applications;
- It may be possible for the user to activate and deactivate the USIM/SIM application execution environment; in this case the ME shall initiate a new USIM session.- the means for the network operator to provide and manage the USAT execution environment resources and also to provide and manage (i.e. identify version, activate, deactivate, delete, modify, download etc.) the applications;
- the means for the USAT application to fully control the display of all actions and network-responses related to the operation of the application. Optionally under user control the ME may display the individual actions/responses;
- the means for the USAT application to control the PLMN services/supplementary services and IP multimedia services via the standardized MMI. Only the originator (i.e. either user or USAT application) of the action shall directly receive the results/responses of that action (e.g. network response to an SCI). Optionally under user control the ME may display the individual actions/responses.
- provide the user with additional user interface functionality to control and invoke IP multimedia services

Some of the above requirements are subsequently elaborated.

6 SAT/USAT/ME interface requirements

6.1 (U)SAT APIs

The (U)SIM-API is defined in ETSI TS 102 240 [18]. This API is valid for (U)SAT and is referred to in this TS as (U)SAT API.

The (U)SAT API for the UICC shall allow application programmers easy access to the functions and data described in 3GPP TS 51.011 [4], TS 31.101 [1], TS 31.102 [15], TS 51.014 [17], TS 31.111 [14], such that (U)SIM based services can be developed and loaded onto UICCs (independent of the UICC manufacturer), quickly and, if necessary, remotely, after the card has been issued. The (U)SAT API shall support pro-active functions as described in 3GPP TS 51.014 [17] and TS 31.111 [14], and transport functions as described in 3GPP TS 51.011 [4] and TS 31.102 [15].

6.2 USAT proactive capability

The USAT proactive capability is a mechanism whereby the UICC can request specific actions to be taken by the ME by issuing "proactive commands" thus establishing and maintaining an interactive dialogue with the user and/or communicating with the network or an external device.

An ME may have a variety of configurations, for example, it may consist of a modem connected to an external display. The USAT proactive capability requirements are applicable to the ME as a whole without regard to any particular configuration.

The ME shall inform the UICC of the success or otherwise of each command issued to it by the UICC, and also indicate the command details and if applicable add more specific information.

The proactive command set allows the USAT to instruct the ME to:

- 1 display text supplied by the USAT on the ME's display, with an indication of priority (normal or high), and a defined action (user activity or timeout) to terminate the text display.
- 2 display a text string and obtain the response in the form of a single user keystroke or a string of keys entered by the user and pass the response to the UICC. If the response is designated as private by the UICC the ME shall not display the users response on the screen.
- 3 set up a voice call to an address with a specific priority as indicated by the UICC with all parameters indicated by the UICC.
- 4 set up a data call to an address with specific bearer capability and priority, all parameters are indicated by the UICC.
- 5 set up and manage a data channel (using CSD, Packet service bearer (e.g.: GPRS, UTRAN packet service, HSDPA, ...), SMS, USSD or I-WLAN) between the UICC and an address using information provided by the UICC. It shall be possible for the USAT application to provide the ME with the network connectivity parameters to be used (e.g. PDP context parameters) to establish IP connectivity between a USAT application and a remote entity.
- 6 send data through a previously set up data channel. The UICC informs the ME if the data is to be sent immediately.
- 7 retrieve data from the ME that has previously been received via a data channel set up using (5) above. The UICC informs the ME as to how much data it expects to retrieve.
- 8 send a short message to the network. The short message text is supplied by the UICC to the ME in either packed or unpacked SMS 7-bit alphabet, or UCS2 alphabet.
- 9 send a SS control, SS MMI string or USSD string, indicating which alphabet is used where applicable.
- 10 play a tone in the appropriate audio device.

- 11 negotiate, within reasonable tolerances, a periodic "polling" of the USIM Toolkit.
 - 12 refresh the image (if applicable) of the USIM data contained in the ME memory, either entirely, or partially, or instruct the ME to re-initialize completely.
 - 13 set up an event list in the ME such that the UICC is informed by the ME when an indicated event has occurred.
 - 14 set up an additional menu in the ME, by issuing the ME with a menu list, and allow indication back to the UICC of the user selected menu item.
 - 15 provide requested information from the ME to the UICC, for example the MCC, MNC and IMEI.
 - 16 communicate bi-directionally with an auxiliary device, e.g. a second card reader.
 - 17 set up, refresh and interrogate several timers, and inform the UICC when these expire, within reasonable tolerances.
 - 18 display additional MMI information such as display information or tones with commands that employ network resources, with an indication to the ME as to the required level of ME generated MMI as a result of the interaction with the network.
 - 19 allow the ME to display help information with the commands, by providing the associated text, related to the user action (e.g. menu selection).
 - 20 Provide indication from the ME to the USAT when a key on the MMI has been pressed in a "menu" (response to prompt) or and event (independent action) methods, with key identification. This indication shall be done in a secure manner.
 - 21 send a MM to the network, using a data channel as (5) above. The MM content is supplied by the ME or the UICC.
 - 22 start an ME-based application that the USAT application knows about. For example USAT applications have the ability to launch a micro-browser if provided by the ME as already described in this document (see Interactions with MExE), or may ask the ME to initiate a data synchronisation process.
- Note: addressing of ME applications and other relevant parameters if needed, shall be properly defined by the corresponding USAT specifications.
- 23 Provide location information from the ME to the UICC (e.g. GPS, A-GPS, Galileo, etc) if the ME is equipped with a positioning feature.
 - 24 Provide a list of the CSG identities available application for selection together with the corresponding HNB Names from the ME to the UICC applications, if available to the ME.
 - 25 Inform the UICC applications when selecting and leaving a CSG cell and to provide the corresponding CSG identity and HNB Name, if HNB Name is available.

Unless otherwise stated the following shall apply:

- The format of text to be displayed is designated by the UICC and is either SMS default alphabet (packed or unpacked) or UCS2 alphabet.
- The format of the response from the ME is designated by the UICC and is either keypad digit (0-9, *, #, +), SMS default alphabet characters or UCS2 alphabet characters.

6.3 ME Capability for support of bearer independent protocol

The ME supporting bearer independent protocol shall provide to the USIM a common interface for any type of data bearer. This interface is in addition to dedicated commands (e.g. SMS, SS and USSD) for USAT application to exchange data with entities outside the UICC.

The communication is initiated by the UICC. The ME negotiates with the UICC and the addressed entity to establish the optimum channel considering the UICC request, the network and ME capabilities.

The ME is responsible for maintaining and restoring the link should there be a link error.

6.4 ME equipped with positioning features

It shall be possible for the UICC to request the current location information from the ME for USAT applications if the ME is equipped with a positioning feature capable of operating in autonomous, MS Assisted or MS Based modes (e.g. GPS, A-GPS, Galileo, etc).

It shall be possible for the UICC to detect the presence of a positioning feature in the Terminal Profile if the ME is equipped with a positioning feature.

The ME shall inform the UICC if the location feature is disabled when the UICC requests the ME to send the location information.

The ME shall inform the UICC if the location information retrieval is not possible (e.g. due to lack of GPS coverage) when the UICC requests the ME to send the location information.

The UICC request for location information shall be treated in accordance with the principles defined in TS 22.071 [19].

7 USAT User Interface requirements

7.1 Data presentation requirements (e.g. Display)

In order to be able to create and operate applications with a homogeneous display(s) USAT shall fully control the display of all actions and all network-responses concerned with the operation of the application. USAT shall, upon completion/closure of the application, return full control to the ME.

The display of information shall be either in the form of text (i.e. alphanumeric characters) or in graphical form or both.

Optionally under user control the ME may display the individual actions/network responses.

7.2 Data acquisition requirements (e.g. Keypad)

In order to be able to create and operate applications with a homogeneous user interface USAT shall fully control the function associated with the user input for example via the keypad of the ME. Exceptions to this are keys which are "dedicated ME keys" such as the ON/OFF key. USAT shall, upon completion/closure of the application, return full control to the ME.

7.3 Access requirements (e.g. Menu)

A simple, powerful method for the user to access and interact with certain USAT applications shall be provided.

It shall be possible for the USAT-Application to set up a user interface (e.g. menu, icons) via the capabilities provided by the ME to allow the user to interact with a USAT application using, for example, the display and keypad.

7.4 Menu capability

7.4.1 Set up capability

The menu set up capability is a mechanism whereby the menu items (menu entries/structure etc.) required by the USAT is indicated to the ME by means of a proactive command. The menu set up capability is not directly available to the user. As an option this may include "help information" items.

7.4.2 Selection capability

The menu selection capability is a mechanism whereby the menu item selected by the user is indicated to the USAT by the ME via the UICC-ME interface. As an option this may include "help information" items.

7.5 Soft-key capability

The soft-key allocation capability is a mechanism whereby the UICC indicates to the ME the text to be displayed and the USAT function which is to be assigned to a ME soft-key.

7.6 User control of the SAT/USAT execution environment

The user may be able to control the USAT execution environment via the ME in accordance with the following cases:

- i) the USAT execution environment is enabled/disabled
- ii) the USAT execution environment is not allowed to make automatic calls
- iii) the USAT execution environment is allowed to make automatic calls but only with user confirmation
- iv) the USAT execution environment is allowed to make automatic calls without user confirmation.

In addition it shall be possible for the user to independently enable/disable the AT command feature.

Note that for ease of reading the term "automatic call" is used but this shall be taken to mean any network interaction initiated by USAT including SMS, USSD etc. but excluding user initiated interactions modified by USAT.

The user shall be notified by the ME if service access is prevented as the result of partially disabling the USAT execution environment. It shall be possible to enable the USAT execution environment if service access has been prevented.

7.7 MMS presentation requirements

The USAT shall be able to request the ME to present to the user a Multimedia Message (i.e. via the MMS user agent in the ME) stored in the UICC (see TS 22.140 [16]).

8 Network interface requirements

8.1 USAT/Network interaction

USAT/Network interaction is required such that the USAT and the network can bi-directionally exchange data through the ME, employing any of the transport mechanisms defined in the section "USAT data exchange capabilities requirements".

8.2 Communication control capability

The communication control capability is a mechanism whereby the use of communication resources is either initiated by the USAT application or modified by the USAT application subsequent to a user action. If supported by the ME, the ME shall, at the time of the user initiated communication request, inform the UICC of the current cell location identity. The UICC shall indicate to the ME if the presentation of information (display, tones etc.) shall be restricted to the explicit presentation of USAT supplied information or if it is required to present standard PLMN information (e.g. network responses) in addition to the USAT supplied information.

It shall be possible for the UICC:

- to initiate and terminate a (UICC initiated) communication request with or without explicit confirmation by the user
- to allow, bar or modify a communication request initiated by the user
- to replace a user initiated communication request by another communication request (e.g. replace call request by an SS action etc.).

It shall be possible for the SAT/USAT serving environment to enable/disable the communication control capability. As an option, dependant on the subscribers subscription and the application, the user may enable/disable the communication control capability via a SAT/USAT serving environment and/or under the control of the Network Operator. The user shall be notified by the ME in case network service is lost as the result of disabling the communication control capability.

The communication control capability applies to all mobile originated requests independent of the applicable data exchange capability. Explicitly it applies to voice calls, IMS based communications and to all services listed in the section "USAT data exchange capabilities requirements" (e.g. SMS, supplementary service, circuit switched connection, packet switched connection, etc.).

8.3 Service Interworking requirements

The USAT application shall be able to use all PLMN services and supplementary services (SS) including those functions available to the user via the standardized MMI (e.g. 2 SEND for Call Hold). Only the originator (i.e. either user or USAT application) of the action shall directly receive the results/responses of that action (e.g. network response to an SCI). Optionally under user control the ME may display the individual actions/responses.

9 USAT data exchange capabilities requirements

9.1 Data exchange capabilities supported

USAT shall support the transmission (mobile originated) and the reception (mobile terminated) of data by means of one of the following data exchange capabilities, either using dedicated commands or managed by the ME (using the Bearer Independent Protocol) ;

| Data exchange capability |
|--|
| SMS |
| CSD |
| Packet service bearer |
| SS (MO only) |
| USSD (MO only) |
| Cell Broadcast (MT only) |
| SMS via GPRS |
| I-WLAN |
| Local Bearer (Bluetooth, IrDA, RS232, USB) |

10 Charging requirements

It shall be possible to charge the subscriber for the use of USAT applications.

It shall be possible to charge for the following activities:-

- subscription:
the subscriber"s registration to use USAT services
- application transfer (download):
the transfer of applications and/or information to a subscriber"s USAT UE
- application upgrading (download):

the upgrading of previously transferred applications to a subscriber's USAT UE

- application use:

the use of applications by a subscriber's USAT UE

- content:

the provision of content within a USAT application

- roaming:

the use of USAT applications by a subscriber when roaming

- transport:

the use of a transport/bearer service (e.g. SMS)

11 Security requirements

The integrity of the USIM and existing security mechanisms shall not be compromised with the introduction of USAT services.

The security of the PLMN, the USIM and the USAT applications shall not be able to be compromised by an external execution environment.

Applications running within an external execution environment are considered "non-trusted" until a secure authentication and identification procedure has been successfully performed. MExE is considered to be an external execution environment. MExE is not covered by this specification.

Applications designed using the features in this specification may require additional methods to provide additional data confidentiality, data integrity, and data sender validation, or any subset thereof.

11.1 Secure Environment requirements

A major aspect of the UICC is the security provided by the chip technology combined with the encryption and challenge/response procedures. The enhancement of the UICC by USAT shall not reduce nor endanger the current security. In addition, the USAT environment shall maintain (or improve) the same high levels of security. Adequate (future) measures shall be taken to ensure the fulfilment of this requirement also with future advances in technologies/services (either network-centric and/or UE-centric).

12 Emergency calls

The SAT/USAT shall be able to instruct the ME to set up an emergency call to the default emergency call centre. All other call set up requests shall proceed as a normal call set up, and the dialled digits offered by the SAT/USAT shall not be altered.

13 Roaming

Provided a roaming agreement for the necessary transport/bearer service(s) (e.g. SMS, GPRS) is currently valid, the USAT execution environment shall be supported when roaming.

14 Interaction with supplementary services

14.1 General

This subclause defines the interaction between PLMN supplementary services and the USAT feature. PLMN supplementary services shall not have any knowledge of USAT based services.

14.2 Line Identification

14.2.1 Calling Line Identification Presentation (CLIP)

No interaction.

14.2.2 Calling Line Identification Restriction (CLIR)

No interaction.

14.2.3 Connected Line Identification Presentation (COLP)

14.2.4 Connected Line Identification Restriction (COLR)

No interaction.

14.3 Call Forwarding

14.3.1 Call Forwarding Unconditional (CFU)

USAT shall be able to modify the forwarded to number entered by the user and displayed, upon interrogation, to the user.

14.3.2 Call Forwarding Busy (CFB)

USAT shall be able to modify the forwarded to number entered by the user and displayed, upon interrogation, to the user.

14.3.3 Call Forwarding on No Reply (CFNRy)

USAT shall be able to modify the forwarded to number entered by the user and displayed, upon interrogation, to the user.

14.3.4 Call Forwarding on Not Reachable (CFNRc)

USAT shall be able to modify the forwarded to number entered by the user and displayed, upon interrogation, to the user.

14.4 Call Completion

14.4.1 Call Hold (CH)

No interaction.

14.4.2 Call Waiting (CW)

No interaction.

14.5 Multi Party (MPTY)

USAT shall be able to modify the called number entered by the user.

14.6 Closed User Group (CUG)

No interaction.

14.7 Advice of Charge (AoC)

No interaction.

14.8 Call Barring

14.8.1 Barring of all outgoing calls

No interaction.

14.8.2 Barring of outgoing international calls

14.8.2.1 Mobile originated calls

No interaction.

14.8.2.2 Forwarded Calls

No interaction.

14.8.3 Barring of outgoing international calls except those directed to the HPLMN country

No interaction.

14.8.4 Barring of all incoming calls

No interaction.

14.8.5 Barring of incoming calls when roaming

No interaction.

14.9 Explicit Call Transfer (ECT)

USAT shall be able to modify the transfer number entered by the user.

14.10 Completion of Call to Busy Subscriber (CCBS)

USAT shall be able to modify the number displayed to the user.

14.11 Multiple Subscriber Profile (MSP)

No interaction.

15 Interaction with network features

All services available in the network shall continue to be offered and remain applicable in addition to USAT. This includes the basic services, supplementary services and network features.

15.1 Interactions with Operator Determined Barring (ODB)

15.1.1 Barring of all outgoing calls

No interaction.

15.1.2 Barring of all outgoing international calls

No interaction.

15.1.3 Barring of all outgoing international calls except those directed to the home PLMN country

No interaction.

15.1.4 Barring of outgoing calls when roaming outside the home PLMN country

No interaction.

15.1.5 Barring of outgoing premium rate calls

No interaction.

15.1.6 Barring of incoming calls

No interaction.

15.1.7 Barring of incoming calls when roaming outside the home PLMN country

No interaction.

15.1.8 Operator Specific Barring

No interaction.

15.1.9 Barring of Supplementary Services Management

No interaction.

15.2 Interactions with Optimal Routing (OR)

No interaction.

15.3 Interactions with MExE

The SAT/USAT applications have the the ability to launch a micro-browser (on a given URL and a given bearer) if provided by the ME.

15.4 Interactions with CAMEL

No interaction.

16 Compatibility of USAT ME"s and applications

16.1 USAT Classification

Given the wide ranging hardware capabilities of UICCs and MEs, together with the development of USAT applications and applets, a USAT classification shall be supported to determine their respective capability and compatibility. The USAT classification shall apply both to UICCs, MEs and applications and applets.

The objective is to:-

- classify the requirements of a USAT UICC/applications and
- identify the commands and features supported by the ME

The development and maintenance of the USAT specification is done in accordance to the ETSI/3GPP release procedures. . I.e. annual releases of the specifications are done providing support for new commands and enhancements of existing commands. The annual Release may both contain commands that are mandatory for that Release and commands that are optional.

The classification of the optional commands and features in a given Release may be done with the concept of 'Letter Classes'. A Letter Class identifies a subset of functionality of the Release, which will provide the user, USAT serving environment and application writer with a consistent set of commands and features.

The concept of a USAT Letter Classes is introduced to help identify the ME, and the UICC /USAT application compatibility within a given Release. The USAT Letter Class is distinct and unrelated to the existing PLMN UE Classmark. The USAT Letter Classes are not used during capability negotiations, but are intended to assist in designing applications by provision of a means for an application designer to identify which combinations of USAT features are supported by the MEs. Capability negotiations between the UICC and the ME are performed at the feature level, independent of the USAT Letter Class.

In addition to classifying the ME as conforming to a specific Release and if applicable one or several Letter Classes within the release, an ME manufacturers declaration shall be provided. This shall indicate in detail the commands and features supported by the ME. Any conformance testing shall be performed in accordance to this declaration.

The support of a given Letter Class doesn"t require the support of another Letter Class.

USAT applications will be developed to execute on USAT UE´s in one or more classifications. In order for USAT applications to be properly supported by a USAT UE, the application shall be designated by the same classification of USAT UE"s on which they are intended to be executed.

16.2 ME/USIM operation

In the case of an ME not supporting SAT/USAT or not supporting a certain SAT/USAT feature the following shall apply:

- the USIM shall control (i.e. allow or prevent) the access to the network.
This allows the USIM to prevent the use of a subscription (which may rely on the support of USAT features for correct operation) in an uncontrolled manner.
- if access to a PLMN is not prevented the ME shall support the non-USAT PLMN features without restriction.

16.3 ME/UICC capability information exchange

If supported, the UICC and the ME shall exchange USAT capabilities when the card session is initiated.

This exchange of information is important since the UICC then knows what the ME is capable of, and the UICC can thus adapt the service made available to the user accordingly. If the UICC does not receive any ME capability information it shall assume that the ME does not support USAT.

A UICC that supports USAT shall not attempt to invoke USAT functions in the ME if the ME has not indicated USAT support.

An ME that supports USAT shall not attempt to invoke USAT functions in the UICC if the UICC has not indicated that USAT is supported and is active.

16.4 ME and compatibility

For compatibility testing the ME manufacturers shall provide a declaration of the Release and if applicable the Letter Class(es) supported by the ME including the detail of all commands and features supported by the ME. It can be envisaged that ME implementations will exist that are compliant to a given release and which support commands and features from later releases.

16.5 Void

17 Void

Annex A (informative): Change history

| Document history | | |
|------------------|---------|--|
| Date | Version | Comment |
| June 98 | 0.0.0 | Initial draft based on MExE stage 1. |
| June 98 | 0.1.0 | Output of SMG1/SMG9 joint ad hoc |
| August 98 | 0.2.0 | Updated by editor reflecting discussion at joint ad hoc in June. |
| August 98 | 0.3.0 | Output of SMG1/SMG9 joint ad hoc meeting |
| November 98 | 0.4.0 | Output of SMG1/SMG9 joint ad hoc meeting |
| January 99 | 0.5.0 | Output of SMG1/SMG9 joint ad hoc meeting |
| January 99 | 0.5.1 | Improved output of SMG1/SMG9 joint ad hoc meeting, submitted to SMG1 for information, with recommendation to raise to Version 1.0.0. |
| March 99 | 1.0.0 | Raised to Version 1.0.0 by SMG1 Plenary |
| May 99 | 1.0.1 | Draft changes, interim output of SMG1/SMG9 ad hoc meeting. |
| May 99 | 1.1.0 | Output of SMG1/SMG9 joint ad hoc meeting |
| May 99 | 1.1.1 | Minor editorial changes only. Output of SMG1/SMG9 joint ad hoc meeting |
| June 99 | 1.1.2 | Spelling and editorial corrections, changes agreed to by email after the 5 th ad hoc |
| September 99 | 1.3.0 | New version after S1 meeting |
| September 99 | 1.3.1 | Final version for approval at TSG-SA Korea |
| October 99 | 2.0.0 | Editorial clean-up for version 2.0.0 |

| Change history | | | | | | | | | | | |
|----------------|-----------|-----------|--------|-----|-----|-------|-----|--|-------|-------|------------------|
| TSG SA# | SA Doc. | SA1 Doc | Spec | CR | Rev | Rel | Cat | Subject/Comment | Old | New | WI |
| SA#05 | SP99-434 | | | | | | | Version 3.0.0 Approved | | 3.0.0 | |
| SMG#30 | SP99-434 | | | | | | | Version 3.0.0 Approved | | 3.0.0 | |
| SP-07 | SP-000058 | S1-000120 | 22.038 | 001 | | R99 | D | USIM/SIM Application Toolkit, Service Description, Stage 1 | 3.0.0 | 3.1.0 | |
| SP-07 | SP-000152 | | 22.038 | 002 | 1 | R99 | B | Addition requirements for bearer independent data transfer feature | 3.0.0 | 3.1.0 | |
| SP-08 | SP-000196 | S1-000432 | 22.038 | 003 | | R99 | F | Deletion of note to non-existent TS | 3.1.0 | 3.2.0 | |
| SP-09 | SP-000381 | S1-000637 | 22.038 | 005 | | R4 | D | Change of MExE name | 3.2.0 | 4.0.0 | |
| SP-09 | SP-000382 | S1-000629 | 22.038 | 004 | | R5 | B | Release 2000 features | 3.2.0 | 5.0.0 | |
| SP-10 | SP-000541 | S1-000862 | 22.038 | 007 | | Rel-5 | B | LS on USAT local link mechanism and impact on TS 22.038 | 5.0.0 | 5.1.0 | USAT1- LocLnk |
| SP-12 | SP-010261 | S1-010419 | 22.038 | 008 | | Rel-5 | B | Indication of Key identification | 5.1.0 | 5.2.0 | USAT1 |
| SP-20 | SP-030238 | S1-030466 | 22.038 | 011 | | Rel-5 | A | Clean up of USAT requirements | 5.2.0 | 5.3.0 | TEI |

| | | | | | | | | | | | |
|---------|-----------|---------------|--------|------|---|--------|---|---|--------|--------|---------|
| SP-20 | SP-030355 | | 22.038 | 013 | 2 | Rel-6 | B | MMS support on the card | 5.2.0 | 6.0.0 | MMS-R6 |
| SP-21 | SP-030461 | S1-030887 | 22.038 | 014 | | Rel-6 | B | MMS support by the USIM Application Toolkit | 6.0.0 | 6.1.0 | MMS-R6 |
| SP-22 | SP-030772 | - | 22.038 | 016 | 1 | Rel-6 | F | Change of the term "bearer" to "data exchange capability" and removal of implementation dependent statements in TS 22.038 | 6.1.0 | 6.2.0 | TEI |
| SP-22 | SP-030688 | S1-031336 | 22.038 | 018 | - | Rel-6 | A | Enable Cell Broadcast Bearer for USAT application while connected to UTRAN networks | 6.1.0 | 6.2.0 | TEI5 |
| SP-22 | SP-030685 | S1-031322 | 22.038 | 022 | - | Rel-6 | A | CR to align TS 22.038 with the T3 specifications TS 11.14 and TS 31.111 | 6.1.0 | 6.2.0 | EMC1-CS |
| SP-22 | SP-030696 | S1-031220 | 22.038 | 015 | - | Rel-7 | B | Interaction between ME and USAT applications | 6.1.0 | 7.0.0 | USAT1 |
| SP-25 | SP-040679 | - | 22.038 | 023 | 1 | Rel-7 | A | Enhance the USAT MMS presentation | 7.0.0 | 7.1.0 | UEMMS |
| SP-26 | SP-040734 | S1-040985 | 22.038 | 025 | - | Rel-7 | B | Extention of the USAT bearers | 7.1.0 | 7.2.0 | WLAN |
| SP-27 | SP-050057 | S1-050247 | 22.038 | 027 | - | Rel-7 | A | References corrections | 7.2.0 | 7.3.0 | TEI-7 |
| SP-28 | SP-050220 | S1-050479 | 22.038 | 028 | - | Rel-7 | F | Correction of WLAN into I-WLAN | 7.3.0 | 7.4.0 | WLAN |
| SP-29 | SP-050606 | | 22.038 | 0030 | 1 | Rel-7 | A | Addition of UTRAN packet service as a data bearer for the UICC | 7.4.0 | 7.5.0 | TEI-7 |
| SP-39 | SP-080043 | S1-080277 | 22.038 | 0032 | 3 | Rel-8 | C | Extension of Toolkit communication control to IMS | 7.5.0 | 8.0.0 | TEI8 |
| SP-39 | SP-080043 | S1-080311 | 22.038 | 0033 | 4 | Rel-8 | B | Availability of Location information in the UICC | 7.5.0 | 8.0.0 | TEI8 |
| SP-39 | SP-080043 | S1-080305 | 22.038 | 0035 | 4 | Rel-8 | B | Toolkit over HSP | 7.5.0 | 8.0.0 | TEI8 |
| - | - | - | - | | | | | Some revision marks appearing in v.8.0.0 have been accepted | 8.0.0 | 8.0.1 | |
| SP-43 | SP-090215 | S1-090288 rev | 22.038 | 0036 | 5 | Rel-9 | B | Discovery of surrounding home (e)NodeB by UICC | 8.0.1 | 9.0.0 | EHNB |
| SP-50 | SP-100805 | S1-103325 | 22.038 | 0037 | 1 | Rel-10 | F | Correction of USAT requirements | 9.0.0 | 10.0.0 | TEI10 |
| 2011-03 | | | | | | | | Update to Rel-10 version (MCC) | 10.0.0 | 10.0.1 | |
| 2012-09 | - | - | - | - | - | - | - | Update to Rel-11 version (MCC) | 10.0.1 | 11.0.0 | |
| 2014-10 | - | - | - | - | - | - | - | Update to Rel-12 version (MCC) | 11.0.0 | 12.0.0 | |

History

| Document history | | |
|-------------------------|--------------|-------------|
| V12.0.0 | October 2014 | Publication |
| | | |
| | | |
| | | |
| | | |