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Technical Specification

**Digital cellular telecommunications system (Phase 2+);
Universal Mobile Telecommunications System (UMTS);
Universal Subscriber identity module
Application Toolkit (USAT)
(3GPP TS 31.111 version 4.11.0 Release 4)**



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Foreword

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1 Scope

The present document defines the interface between the Universal ICC (UICC) and the Mobile Equipment (ME), and mandatory ME procedures, specifically for "USIM Application Toolkit".

The present document refers in its majority to the TS 102 223 [32], which describes the generic aspects of application toolkits within the UICC.

USAT is a set of commands and procedures for use during the network operation phase of 3G, in addition to those defined in 3GPP TS 31.101 [13].

Specifying the interface is to ensure interoperability between a UICC and an ME independently of the respective manufacturers and operators.

The present document defines for 3G technology:

- the commands;
- the application protocol;
- the mandatory requirements on the UICC and ME for each procedure.

The present document does not specify any aspects related to the administrative management phase. Any internal technical realization of either the UICC or the ME are only specified where these reflect over the interface. The present document does not specify any of the security algorithms which may be used.

Within the context of the present document, the term "terminal" used in TS 102 223 [32] refers to the Mobile Equipment (ME).

Within the context of the present document, the term "NAA" used in TS 102 223 [32] refers to the USIM.

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] 3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".
- [2] 3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)".
- [3] 3GPP TS 22.042: "Network Identity and Time Zone (NITZ); Service description; Stage 1".
- [4] 3GPP TS 23.038: "Alphabets and language-specific information".
- [5] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".
- [6] 3GPP TS 23.041: "Technical realization of Cell Broadcast Service (CBS)".
- [7] 3GPP TS 23.122: "Non-Access Stratum functions related to Mobile Station (MS) in idle mode".
- [8] 3GPP TS 24.007: "Mobile radio interface signalling layer 3; General aspects".

- [9] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core network protocols; Stage 3".
- [10] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".
- [11] 3GPP TS 24.080: "Mobile radio layer 3 supplementary services specification; Formats and coding".
- [12] 3GPP TS 27.007: "AT command set for 3G User Equipment (UE)".
- [13] 3GPP TS 31.101: "UICC-terminal interface; Physical and logical characteristics".
- [14] 3GPP TS 31.102: "Characteristics of the USIM application".
- [15] 3GPP TS 31.110: "Numbering system for telecommunication IC card applications".
- [16] ISO/IEC 7816-3 (1997): "Information technology - Identification cards - Integrated circuit(s) cards with contacts - Part 3: Electronic signals and transmission protocols".
- [17] ISO/IEC 7816-4 (1995): "Information technology - Identification cards - Integrated circuit(s) cards with contacts - Part 4: Interindustry commands for interchange".
- [18] ISO/IEC 7816-6 (1995): "Identification cards - Integrated circuit(s) cards with contacts - Part 6: Interindustry data elements".
- [19] ISO 639 (1988): "Codes for the representation of names of languages".
- [20] GSM 02.07: "Digital cellular telecommunications system (Phase 2+); Mobile Stations (MS) features".
- [21] 3GPP TS 42.017: "Subscriber Identity Modules (SIM); Functional characteristics".
- [22] 3GPP TS 22.001: "Principles of circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".
- [23] 3GPP TS 23.048: "Security mechanisms for the (U)SIM application toolkit; Stage 2".
- [24] IETF RFC 1738: "Uniform Resource Locators (URL)".
- [25] IETF RFC 768: "User Datagram Protocol".
- [26] IETF RFC 793: "Transmission Control Protocol".
- [27] 3GPP TS 44.018: "Mobile radio interface Layer 3 specification; Radio Resource Control Protocol".
- [28] "Specification of the Bluetooth system; Profiles part"
<http://www.virelex.com/bluetooth/specification.asp>.
- [29] TIA/EIA-136-123 (April 2001): "Third Generation Wireless - Digital Control Channel Layer 3".
- [30] 3GPP TS 23.003: "Numbering, addressing and identification".
- [31] TIA/EIA/IS-820: "Removable User Identity Module (R-UIM) for TIA/EIA Spread Spectrum Systems".
- [32] ETSI TS 102 223: "Smart cards; Card Application Toolkit (CAT)".
- [33] 3GPP TR 21.905: "Vocabulary for 3GPP specifications".
- [34] 3GPP TS 22.101: "Service aspects; Service Principles".
- [35] 3GPP TS 25.401: "UTRAN overall description".
- [36] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

3 Definitions, abbreviations and symbols

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TS 102 223 [32] apply.

3.2 Abbreviations

For the purpose of the present document, the abbreviations given in TS 102 223 [32] and the following apply:

ADN	Abbreviated Dialling Number
CB	Cell Broadcast
CBMID	Cell Broadcast Message IDentifier
EGPRS	EDGE General Packet Radio Service
FDN	Fixed Dialling Number
GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile communications
PDP	Packet Data Protocol (e.g. Ip or X25 or PPP)
RFU	Reserved for Future Use
SS	Supplementary Service
SSC	Supplementary Service Control string
USAT	USIM Application Toolkit
USIM	Universal Subscriber Identity Module
USSD	Unstructured Supplementary Service Data

3.3 Symbols

For the purposes of the present document, the following symbols apply:

'0' to '9' and 'A' to 'F' The sixteen hexadecimal digits

4 Overview of USAT

The USAT provides mechanisms which allow applications, existing in the UICC, to interact and operate with any ME which supports the specific mechanism(s) required by the application.

The following mechanisms have been defined. These mechanisms are dependent upon the commands and protocols relevant to USAT in TS 31.101 [13].

4.1 Profile Download

Profile downloading provides a mechanism for the ME to tell the UICC what it is capable of.

4.2 Proactive UICC

Proactive UICC gives a mechanism whereby the UICC can initiate actions to be taken by the ME. In addition to the actions listed in TS 102 223 [32], the USAT is extended with the following actions:

- sending a SS control or USSD string.

4.3 Data download to UICC

Data downloading to the UICC uses either dedicated commands (the transport mechanisms of SMS point-to-point and Cell Broadcast) or the Bearer independent protocol. Transferral of information over the UICC-ME interface uses the ENVELOPE command.

4.4 Menu selection

See TS 102 223 [32].

4.5 Call control by USIM

When this service is activated by the USIM, all dialled digit strings, supplementary service control strings and USSD strings are first passed to a USIM application before the ME sets up the call, the supplementary service operation or the USSD operation. The ME shall also pass to the USIM application at the same time its current serving cell. The USIM application has the ability to allow, bar or modify the call, the supplementary service operation or the USSD operation. The USIM application also has the ability to replace a call request, a supplementary service operation or a USSD operation by another call request or supplementary service operation or USSD operation.

EXAMPLE: A call request can be replaced by a supplementary service operation or a USSD operation, and vice-versa.

4.6 MO Short Message control by USIM

When this service is activated by the USIM, all MO short messages are first passed to the USIM application before the ME sends the short message. The ME shall also pass to the USIM application at the same time its current serving cell. The USIM application shall have the ability to allow the sending, bar the sending or modify the destination address of the short message before sending it.

4.7 Event download

See TS 102 223 [32].

4.8 Security

See TS 102 223 [32].

4.9 Multiple card

See TS 102 223 [32].

4.10 Timer Expiration

See TS 102 223 [32].

4.11 Bearer Independent Protocol

See TS 102 223 [32].

5 Profile download

5.1 Procedure

The profile download instruction is sent by the ME to the UICC as part of the UICC initialization procedure. This procedure is specified in 3GPP TS 31.101 [13]. The profile sent by the ME shall state the facilities relevant to USAT that are supported by the ME.

See additional details in TS 102 223 [32].

5.2 Structure and coding of TERMINAL PROFILE

Direction: ME to UICC.

The command header is specified in 3GPP TS 31.101 [13].

Command parameters/data:

Description	Clause	M/O/C	Length
Profile	-	M	lgth

- Profile:

Contents:

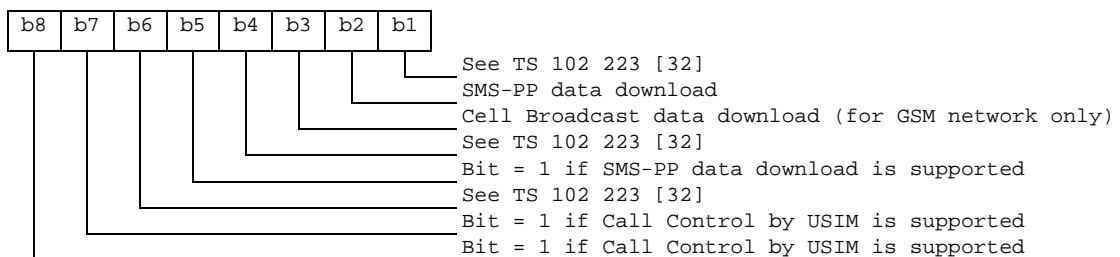
- The list of USAT facilities that are supported by the ME.

Coding:

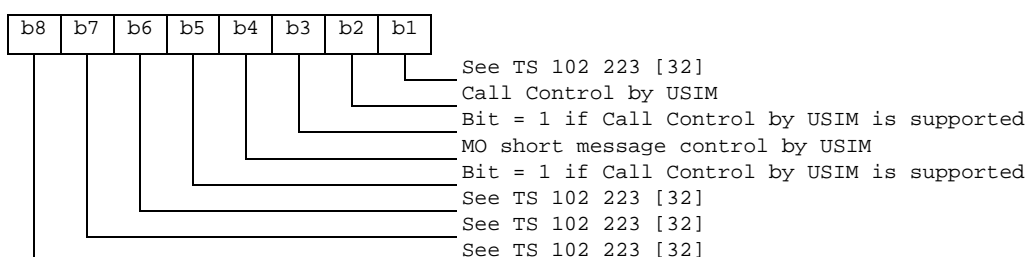
- 1 bit is used to code each facility:
 - bit = 1: facility supported by ME.
 - bit = 0: facility not supported by ME.

NOTE: several bits may need to be set to 1 for the support of the same facility. This is because of backward compatibility with SAT: several options existed in SAT for a given facility, and they are mandatory in USAT when this facility is supported.

First byte (Download):



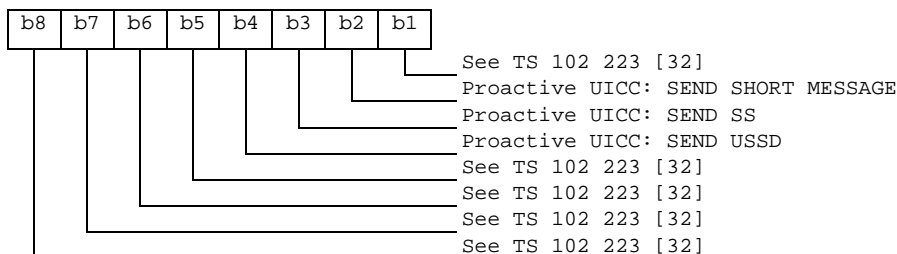
Second byte (Other):



Third byte (Proactive UICC):

- See TS 102 223 [32].

Fourth byte (Proactive UICC):



Fifth byte (Event driven information):

- See TS 102 223 [32].

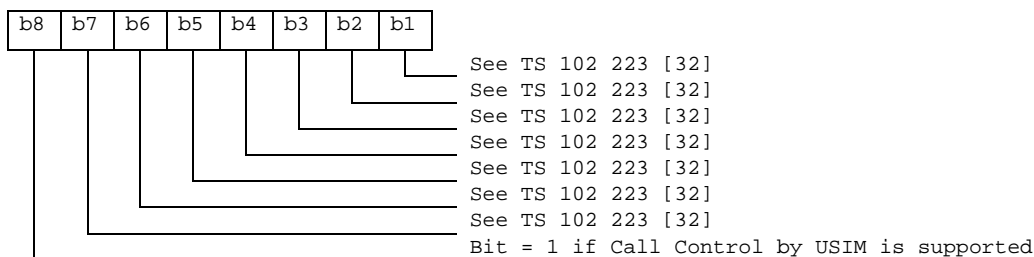
Sixth byte (Event driven information extensions):

- See TS 102 223 [32].

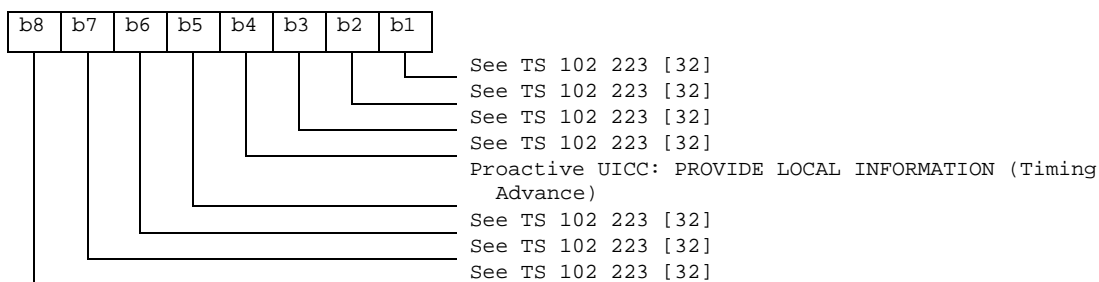
Seventh byte (Multiple card proactive commands) for class "a":

- See TS 102 223 [32].

Eighth byte (Proactive UICC):



Ninth byte:



Tenth byte (Soft keys support) for class "d":

- See TS 102 223 [32].

Eleventh byte: (Soft keys information):

- See TS 102 223 [32].

Twelfth byte:

- See TS 102 223 [32].

Thirteenth byte:

- See TS 102 223 [32].

Fourteenth byte: (Screen height):

- See TS 102 223 [32].

Fifteenth byte: (Screen width):

- See TS 102 223 [32].

Sixteenth byte: (Screen effects):

- See TS 102 223 [32].

Seventeenth byte:

- See TS 102 223 [32].

Eighteenth byte:

- See TS 102 223 [32].

Nineteenth byte: (reserved for TIA/EIA-136 facilities):

- See TS 102 223 [32].

Twentieth byte: (reserved for TIA/EIA/IS-820 facilities):

- See TS 102 223 [32].

Subsequent bytes:

- See TS 102 223 [32].

Response parameters/data:

- None.

5.3 Definition of display parameters in Profile download

See TS 102 223 [32].

6 Proactive UICC

6.1 Introduction

3GPP TS 31.101 [13] defines the communication protocols between the ME and the UICC, and defines a mechanism to transport "proactive" commands using these protocols. In addition to the proactive commands listed in TS 102 223 [32], an UICC supporting USAT can issue the following proactive commands:

- **SEND SS:** which sends an SS request to the network;
- **SEND USSD:** which sends a USSD string to the network;

If the UICC issues an instruction to the ME to initiate a Mobile Originated transaction (e.g. SEND SMS, SEND SS, SEND USSD or SEND DTMF), then unless explicitly stated elsewhere in the present document or in 3GPP TS 31.101 [13], the content supplied by the UICC for onward transmission by the ME shall not be altered by the ME.

6.2 Identification of ME support

See TS 102 223 [32].

6.3 General procedure

See TS 102 223 [32].

6.4 Proactive UICC commands and procedures

6.4.1 DISPLAY TEXT

See TS 102 223 [32].

6.4.2 GET INKEY

See TS 102 223 [32].

6.4.3 GET INPUT

See TS 102 223 [32].

6.4.4 MORE TIME

See TS 102 223 [32].

6.4.5 PLAY TONE

See TS 102 223 [32].

NOTE: Some supervisory tones are optional for mobile equipment (see 3GPP TS 22.001 [22]).

6.4.6 POLL INTERVAL

See TS 102 223 [32].

6.4.7 REFRESH

See TS 102 223 [32].

6.4.7.1 EF_{IMSI} changing procedure

When an EF_{IMSI} is changed via Data Download or a USAT application and a REFRESH command is issued by the UICC the following rules apply to the UICC and ME:

- USIM Initialization. This command shall not be used if an EF_{IMSI} is changed, as the behaviour of the UE is unpredictable;
- File Change Notification. This command shall not be used if an EF_{IMSI} is changed, as the behaviour of the UE is unpredictable;
- USIM Initialization and File Change Notification. This command shall not be used if an EF_{IMSI} is changed, as the behaviour of the UE is unpredictable;
- USIM Initialization and Full File Change Notification. This command shall not be used if an EF_{IMSI} is changed, as the behaviour of the UE is unpredictable;

- UICC Reset. Normal UICC Reset procedure is carried out;
- USIM Application Reset. Normal USIM Application Reset procedure is carried out;
- 3G Session Reset. Normal 3G Session Reset procedure is carried out.

If an EF_{IMSI} is to be updated, neither EF_{IMSI} nor EF_{LOCI} shall be updated in the UICC before the 3G session termination procedure has been completed by the ME.

6.4.8 SET UP MENU

See TS 102 223 [32].

6.4.9 SELECT ITEM

See TS 102 223 [32].

6.4.10 SEND SHORT MESSAGE

This command requests the ME to send a short message.

Two types are defined in TS 102 223 [32] and apply as follows within the context of the present document:

- a short message to be sent to the network in an SMS-SUBMIT message, or an SMS-COMMAND message, where the user data can be passed transparently;
- a short message to be sent to the network in an SMS-SUBMIT message where the text needs to be packed by the ME.

Where the text has been packed, the text string provided by the UICC shall not be longer than 160 characters. It shall use the SMS default 7-bit coded alphabet, packed into 8-bit octets, in accordance with 3GPP TS 23.038 [4]. The data coding indication contained in the Data Coding Scheme byte shall be "default alphabet". The text length (which is part of the SMS TPDU) given by the UICC shall state the number of 7-bit characters in the text string. The command details shall indicate "packing not required".

8-bit data Short Messages may be sent by the UICC. The command shall indicate packing not required. The data coding indication contained in the Data Coding Scheme byte shall be "8 bit". The string shall not be longer than 140 bytes, and the length (in SMS TPDU) shall state the number of bytes in the string.

If UCS2 is supported by the ME, 16-bit data Short Messages may be sent by the UICC. The text string provided by the UICC shall not be longer than 70 characters. It shall use the 16-bit UCS2 alphabet format, in accordance with 3GPP TS 23.038 [4]. The text length (which is part of the SMS TPDU) given by the UICC shall state the number of 16-bit characters in the text string. The command details shall indicate "packing not required".

SMS commands may be sent by the UICC. These shall count as packed text message. The SMS TPDU from the UICC shall indicate SMS-COMMAND. The command details shall indicate "packing not required".

Where packing by the ME is required, the text string provided by the UICC shall not be longer than 160 characters. It shall use the SMS default 7-bit coded alphabet as defined in 3GPP TS 23.038 [4] with bit 8 set to 0. The text length given by the UICC shall state the number of characters in the text string. The ME shall pack the text string and modify the Data Coding Scheme byte to "default alphabet" in accordance with 3GPP TS 23.038 [4] before submitting the message to the network.

Optionally, the UICC may include in this command an alpha identifier. See TS 102 223 [32] for the use of this alpha identifier.

If the ME is capable of SMS-MO, then it shall send the data as a Short Message TPDU to the destination address. The ME shall give the result to the UICC using TERMINAL RESPONSE (indicating successful or unsuccessful transmission of the Short Message) after receiving an SMS RP-ACK or RP-Error from the network. If an alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of SMS RP-ACK or RP-Error.

If the Short Message TPDU is unsuccessfully received by the network (e.g. the reception of a CP-ERROR), the ME shall inform the UICC using TERMINAL RESPONSE (network currently unable to process command). If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the unsuccessful network reception.

6.4.11 SEND SS

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- if the command is rejected because the ME is busy on an SS transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction);
- if the command is rejected because the ME is busy on a USSD transaction, the ME shall inform the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on USSD transaction);
- if the command is rejected because the ME does not support that Supplementary Service, the ME informs the UICC using TERMINAL RESPONSE (Command beyond ME's capabilities).

If the ME is able to send the SS request, the ME shall:

- send the SS request immediately, without need to alert the user first;
- optionally, the UICC may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below:
 - if the alpha identifier is provided by the UICC and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is sending a SS request. If an icon is provided by the UICC, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see clause 6.5.4);
 - if the alpha identifier is provided by the UICC and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is sending an SS request;
 - if the alpha identifier is not provided by the UICC, the ME may give information to the user concerning what is happening.
- once an SS Return Result message not containing an error has been received from the network, the ME shall inform the UICC that the command has been successfully executed, using TERMINAL RESPONSE. This command shall include the contents of SS Return Result as additional data. If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of an SS Return Result message;
- if the command is rejected because the network cannot support or is not allowing the Supplementary Service request, the ME informs the UICC using TERMINAL RESPONSE (SS Return Result error code). If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of a SS Return Result message;
- if the SS request is unsuccessfully received by the network, the ME shall inform the UICC using TERMINAL RESPONSE (network currently unable to process command), and not retry to send the request. If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of a SS Return Result message.

If the ME supports the Last Number Dialed service, the ME shall not store in EF_{LND} the supplementary service control string sent by the UICC in this command.

The supplementary service control string included in the SEND SS proactive command shall not be checked against those of the FDN list, even if the Fixed Dialling Number service is enabled.

6.4.12 SEND USSD

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- if the command is rejected because the ME is busy on a USSD transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on USSD transaction);
- if the command is rejected because the ME is busy on a SS transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction).

If the ME is able to send the USSD request, the ME shall:

- send the USSD immediately, without need to alert the user first;
- optionally, the UICC may include in this command an alpha-identifier. The use of this alpha-identifier by the ME is described below:
 - if the alpha identifier is provided by the UICC and is not a null data object, the ME shall use it to inform the user. This is also an indication that the ME should not give any other information to the user on the fact that the ME is sending a USSD request. If an icon is provided by the UICC, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier (see clause 6.5.4);
 - if the alpha identifier is provided by the UICC and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the fact that the ME is sending a USSD request;
 - if the alpha identifier is not provided by the UICC, the ME may give information to the user concerning what is happening.
- once the USSD transaction is initiated, a dialogue between the network and the user may occur which involves the MMI of the ME. If an alpha identifier was initially provided by the UICC, this alpha identifier may be discarded during this dialogue;
- once a RELEASE COMPLETE message containing the USSD Return Result message not containing an error has been received from the network, the ME shall inform the UICC that the command has been successfully executed, using TERMINAL RESPONSE. This command shall include the text contained in the USSD Return Result in a Text String data object. If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of a USSD Return Result message;
- if the UE clears the transaction by sending a RELEASE COMPLETE upon request of the user, the ME shall inform the UICC using TERMINAL RESPONSE (USSD transaction terminated by user);
- if the USSD operation is rejected because the network cannot support or is not allowing mobile initiated USSD, the ME informs the UICC using TERMINAL RESPONSE (USSD Return Result error code). If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of a USSD Return Result message;
- if the USSD request is unsuccessfully received by the network, the ME shall inform the UICC using TERMINAL RESPONSE (network currently unable to process command), and not retry to send the request. If a null alpha identifier was provided by the UICC, the ME should not give any information to the user at the reception of a USSD Return Result message.

6.4.13 SET UP CALL

This command is issued by the UICC to request a call set up. The procedure is defined in TS 102 223 [32], except when stated otherwise in the present document.

The UICC may request the use of an automatic redial mechanism according to 3GPP TS 22.001 [22].

In addition to the rules given in TS 102 223 [32] the following applies:

- If the UICC supplies a number stored in EF_{ECC}, this shall not result in an emergency call.

Upon receiving this command, the ME shall decide if it is able to execute the command. Examples are given below, but the list is not exhaustive:

- if the command is rejected because the ME is busy on another call, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on call);
- if the command is rejected because the ME is busy on a SS transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction);
- if the command is rejected because the ME cannot support Call Hold, or because the ME does not support the capability configuration parameters requested by the UICC, the ME informs the UICC using TERMINAL RESPONSE (Command beyond ME's capabilities);
- if the command is rejected because the network cannot support or is not allowing Call Hold of a multi party call, the ME informs the UICC using TERMINAL RESPONSE (SS Return Result error code);
- if the command is rejected because the network cannot support or is not allowing Call Hold of a single call, the ME informs the UICC using TERMINAL RESPONSE (Network currently unable to process command).

6.4.14 POLLING OFF

See TS 102 223 [32].

6.4.15 PROVIDE LOCAL INFORMATION

This command requests the ME to send current local information to the UICC. At present, this information is restricted to:

- location information: the mobile country code (MCC), mobile network code (MNC), location area code (LAC) and cell ID of the current serving cell;
- the IMEI of the ME;
- the Network Measurement Results and the BCCH channel list, suitable only for GSM access network;
- the current date, time and time zone;
- the current ME language setting;
- the Timing Advance, suitable only for GSM access network;
- the current access technology.

The ME shall return the requested local information within a TERMINAL RESPONSE. Where location information or Network Measurement Results has been requested and no service is currently available, then the ME shall return TERMINAL RESPONSE (ME currently unable to process command - no service). Where location information or Network Measurement Results has been requested and the ME is on limited service (e.g. emergency calls only), the ME shall return the data requested in the TERMINAL RESPONSE with the general result (Limited Service).

NMR are only available if the ME is connected to a GSM access network. If the NMR are requested and a call is in progress, the value of all the returned parameters provided by the ME in the response to the command will be valid. The NMR returned when a call is in progress from MEs supporting multiband operation, shall be according to the value of the multiband reporting parameter as defined in 3GPP TS 44.018 [27]. If a call is not in progress (i.e. ME is in idle mode) some of the returned parameters (e.g. RXQUAL) may be invalid. In idle mode, MEs supporting multiband operation shall ignore the value of the multiband reporting parameter and the NMR returned shall be as defined in 3GPP TS 44.018 [27] when the multiband reporting parameter equals zero.

NOTE 1: When in idle mode, the only information element on which it is possible to rely on is the RXLEV-FULL-SERVING-CELL, which contains the value of the received signal strength on the BCCH of the current serving cell.

NOTE 2: Network Measurement Results are defined in 3GPP TS 44.018 [27] as Measurement Results.

The BCCH channel list is only available if the ME is connected to a GSM access network.

The ME shall return the current date and time as set by the user. If available, the ME shall also return the time zone known from the network with the NITZ feature (see 3GPP TS 22.042 [3]). If the time zone information is not available, the ME shall return 'FF' for this element.

If language setting is requested, the ME shall return the currently used language.

Timing advance is only available if the ME is connected to a GSM access network. If the Timing Advance is requested, the ME shall return the timing advance value that was received from the BTS during the last active dedicated connection (e.g. for call or SMS). Timing advance is defined in 3GPP TS 44.018 [27]. An ME supporting the Timing Advance feature shall be able to store the last value of timing advance. In addition to the timing advance value, the ME shall return its current status (i.e. ME is in idle mode or not) in order for the application to be aware of potential misinterpretation of the timing advance value. Caution should be taken if using the Timing Advance value for distance measurement as reflections from the external environment (buildings etc.) may affect the accuracy.

If the access technology is requested, the ME shall return the current access technology that the ME is using.

6.4.16 SET UP EVENT LIST

See TS 102 223 [32].

6.4.17 PERFORM CARD APDU

See TS 102 223 [32].

6.4.18 POWER OFF CARD

See TS 102 223 [32].

6.4.19 POWER ON CARD

See TS 102 223 [32].

6.4.20 GET READER STATUS

See TS 102 223 [32].

6.4.21 TIMER MANAGEMENT

See TS 102 223 [32].

6.4.22 SET UP IDLE MODE TEXT

See TS 102 223 [32].

6.4.23 RUN AT COMMAND

See TS 102 223 [32].

6.4.24 SEND DTMF

See TS 102 223 [32].

6.4.25 LANGUAGE NOTIFICATION

See TS 102 223 [32].

6.4.26 LAUNCH BROWSER

This command is used to request a browser inside a browser-enabled ME to interpret the content corresponding to a URL. See TS 102 223 [32].

Upon receiving this command, the ME shall decide if it is able to execute the command. In addition to the examples given in TS 102 223 [32] the following example applies:

- if the command is rejected because the ME is busy on a SS transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - ME currently unable to process command).

6.4.27 OPEN CHANNEL

6.4.27.1 OPEN CHANNEL related to CS bearer

This command is issued by the UICC to request a channel opening. The procedure is defined in TS 102 223 [32], except when stated otherwise in the present document.

The UICC may request the use of an automatic reconnection mechanism according to 3GPP TS 22.001 [22].

Upon receiving this command, the ME shall decide if it is able to execute the command. In addition to the examples given in TS 102 223 [32] the following example applies:

- if the command is rejected because the ME is busy on a SS transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction). The operation is aborted.

6.4.27.2 OPEN CHANNEL related to GPRS

The procedures defined in TS 102 223 [32] apply, understanding that:

- "packet data service" means GPRS,
- "activation of packet data service" means activation of a PDP context.

Upon receiving this command, the ME shall decide if it is able to execute the command. In addition to the examples given in TS 102 223 [32] the following example applies:

- if the command is rejected because the ME is busy on a SS transaction and unable to activate a PDP context in parallel with this SS transaction, the ME informs the UICC using TERMINAL RESPONSE (ME unable to process command - currently busy on SS transaction). The operation is aborted.

6.4.27.3 OPEN CHANNEL related to local bearer

See TS 102 223 [32].

6.4.28 CLOSE CHANNEL

See TS 102 223 [32].

6.4.29 RECEIVE DATA

See TS 102 223 [32].

6.4.30 SEND DATA

See TS 102 223 [32].

6.4.31 GET CHANNEL STATUS

See TS 102 223 [32].

6.4.32 SERVICE SEARCH

See TS 102 223 [32].

6.4.33 GET SERVICE INFORMATION

See TS 102 223 [32].

6.4.34 DECLARE SERVICE

See TS 102 223 [32].

6.5 Common elements in proactive UICC commands

See TS 102 223 [32].

6.6 Structure of proactive UICC commands

The general structure of proactive UICC commands using TLV objects is described in Annex C.

6.6.1 DISPLAY TEXT

See TS 102 223 [32].

6.6.2 GET INKEY

See TS 102 223 [32].

6.6.3 GET INPUT

See TS 102 223 [32].

6.6.4 MORE TIME

See TS 102 223 [32].

6.6.5 PLAY TONE

See TS 102 223 [32].

6.6.6 POLL INTERVAL

See TS 102 223 [32].

6.6.7 SET-UP MENU

See TS 102 223 [32].

6.6.8 SELECT ITEM

See TS 102 223 [32].

6.6.9 SEND SHORT MESSAGE

Description	Clause	M/O/C	Min	Length
Proactive UICC command Tag	9.2	M	Y	1
Length (A+B+C+D+E+F)	-	M	Y	1 or 2
Command details	8.6	M	Y	A
Device identities	8.7	M	Y	B
Alpha identifier	8.2	O	N	C
Address	8.1	O	N	D
SMS TPDU (SMS-SUBMIT or SMS-COMMAND)	8.13	M	Y	E
Icon identifier	8.31	O	N	F

The address data object holds the RP_Destination_Address of the Service Centre. If no RP_Destination_Address is transferred, then the ME shall insert the default Service Centre address.

6.6.10 SEND SS

Description	Clause	M/O/C	Min	Length
Proactive UICC command Tag	9.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	8.6	M	Y	A
Device identities	8.7	M	Y	B
Alpha identifier	8.2	O	N	C
SS string	8.14	M	Y	D
Icon identifier	8.31	O	N	E

6.6.11 SEND USSD

Description	Clause	M/O/C	Min	Length
Proactive UICC command Tag	9.2	M	Y	1
Length (A+B+C+D+E)	-	M	Y	1 or 2
Command details	8.6	M	Y	A
Device identities	8.7	M	Y	B
Alpha identifier	8.2	O	N	C
USSD String	8.17	M	Y	D
Icon identifier	8.31	O	N	E

6.6.12 SET UP CALL

See TS 102 223 [32].

6.6.13 REFRESH

See TS 102 223 [32].

6.6.14 POLLING OFF

See TS 102 223 [32].

6.6.15 PROVIDE LOCAL INFORMATION

See TS 102 223 [32].

6.6.16 SET UP EVENT LIST

See TS 102 223 [32].

6.6.17 PERFORM CARD APDU

See TS 102 223 [32].

6.6.18 POWER OFF CARD

See TS 102 223 [32].

6.6.19 POWER ON CARD

See TS 102 223 [32].

6.6.20 GET READER STATUS

See TS 102 223 [32].

6.6.21 TIMER MANAGEMENT

See TS 102 223 [32].

6.6.22 SET UP IDLE MODE TEXT

See TS 102 223 [32].

6.6.23 RUN AT COMMAND

See TS 102 223 [32].

6.6.24 SEND DTMF COMMAND

See TS 102 223 [32].

6.6.25 LANGUAGE NOTIFICATION

See TS 102 223 [32].

6.6.26 LAUNCH BROWSER

See TS 102 223 [32].

6.6.27 OPEN CHANNEL

See TS 102 223 [32].

6.6.28 CLOSE CHANNEL

See TS 102 223 [32].

6.6.29 RECEIVE DATA

See TS 102 223 [32].

6.6.30 SEND DATA

See TS 102 223 [32].

6.6.31 GET CHANNEL STATUS

See TS 102 223 [32].

6.6.32 SERVICE SEARCH

See TS 102 223 [32].

6.6.33 GET SERVICE INFORMATION

See TS 102 223 [32].

6.6.34 DECLARE SERVICE

See TS 102 223 [32].

6.7 Command results

Once the ME has made its attempt to execute a proactive command from the UICC, the ME shall inform the UICC of the success or otherwise of that command, by using **TERMINAL RESPONSE**.

This procedure is defined in TS 102 223 [32], and applies here except for the following statements.

Temporary problems are defined as:

- ME is currently unable to process the command. Specific causes for this are listed in TS 102 223 [32]; in addition to these, the following causes may be returned within the USAT context:
 - ME currently busy on SS transaction;
 - ME currently busy on USSD operation;
 - access control class barred on serving network.
- if none of these can be made to apply, a "no cause can be given" value can be used;
- network is currently unable to process the command. Within the USAT context, specific cause values are the cause values given by the network, as defined in 3GPP TS 24.008 [9];
- in some proactive commands, the ME is required to solicit and receive approval of the user before executing the proactive command. In the case that the user does not give approval for the execution of the proactive command, it shall not be executed by the ME and the terminal response "user did not accept the proactive command" shall be returned by the ME to the UICC;
- the user cleared down the call, before the call connected (CONNECT received from network, as defined in 3GPP TS 24.008 [9]) or before the network released the call;

- action in contradiction with the current timer state. This is where the UICC requests an action for a timer to be taken by the ME and the state of the timer does not allow that action;
- interaction with call control by UICC, temporary problem. This is sent by the ME to indicate that call control modified the type of request indicated in the proactive command, and that the action requested by call control encounters a temporary problem.

Permanent problems are defined as in TS 102 223 [32], with the addition of:

- SS Return Error. This is given to the UICC when the network returns a SS error in response to a previous SS command. Specific cause values are the same as given by the network in the Return Error message;
- USSD Return Error. This is given to the UICC when the network returns a USSD error in response to a previous USSD command. Specific cause values are the same as given by the network in a Return Error message;
- SMS RP-ERROR. This is given to the UICC when the network returns an error in response to the ME trying to send a short message. Specific cause values are the same as the cause value of RP-Cause in an RP-ERROR message;
- interaction with MO short message control by USIM, permanent problem. This is sent by the ME to indicate that:
 - MO short message control by USIM does not allow the action corresponding to the proactive command; or
 - MO short message control by USIM has modified the type of request indicated in the proactive command and that the action requested by call control encounters a permanent problem.

6.8 Structure of TERMINAL RESPONSE

Direction: ME to UICC.

The command header is specified in 3GPP TS 31.101 [13]. Length (A+B+ ... +Y) is indicated by P3 of the header.

Command parameters/data.

Description	Clause	M/O/C	Min	Length
Command details	8.6	M	Y	A
Device identities	8.7	M	N	B
Result	8.12	M	Y	C
Duration (only required in response to a POLL INTERVAL proactive command)	8.8	C	N	D
Text string (only required in response to a GET INKEY or GET INPUT or SEND USSD proactive command)	8.15	C	N	E
Item identifier (only required in response to SELECT ITEM proactive command)	8.10	C	N	F
Local information (only required in response to PROVIDE LOCAL INFORMATION proactive command)	8.19, 8.20, 8.22, 8.29, 8.39, 8.45, 8.46, 8.62	C	N	G
Call control requested action (only required if call control by USIM has modified a proactive command SET UP CALL, SEND SS or SEND USSD in another type of request).	8.30	C	N	H
Result data object 2 (only required if call control by USIM has modified a proactive command SET UP CALL, SEND SS or SEND USSD in another type of request).	8.12	C	N	I
Card reader status (only required in response to GET READER STATUS command). According to the requested information, one Card reader status object for each card interface reported, or one Card reader identifier object is required..	8.33, 8.57	C	N	J ₀ + ... + J _n or J
Card ATR (only required in response to	8.34	C	N	K

Description	Clause	M/O/C	Min	Length
POWER ON CARD).				
R-APDU (only required in response to PERFORM CARD APDU).	8.36	C	N	L
Timer identifier (only required in response to a TIMER MANAGEMENT proactive command)	8.37	C	N	M
Timer value (only required in response to a TIMER MANAGEMENT proactive command)	8.38	C	N	N
AT Response (only required in response to RUN AT COMMAND proactive command)	8.41	C	N	P
Text string2 (only required if call control by USIM has modified the proactive command SET UP CALL or SEND SS into a USSD request)	8.15	C	N	Q
Channel data (only required in response to RECEIVE DATA)	8.54	C	N	R
Channel status (only required in response to GET CHANNEL STATUS or OPEN CHANNEL proactive command)	8.56	C	N	S ₀ + ... + S _n
Channel data length (only required in response to RECEIVE DATA or SEND DATA proactive command)	8.54	C	N	T
Bearer description (only required in response to OPEN CHANNEL proactive command)	8.52	C	N	U
Buffer size (only required in response to OPEN CHANNEL proactive command)	8.55	C	N	V
Total display duration (only required in response to a GET INKEY proactive command)	8.8	C	N	W
Service availability (only required in response to SERVICE SEARCH proactive command)	8.68	C	N	X
Service record (only required in response to GET SERVICE INFORMATION proactive command)	8.64	C	N	Y

Specific rules apply for the coding of the TERMINAL RESPONSE, see TS 102 223 [32].

Response parameters/data: None.

6.8.1 Command details

See TS 102 223 [32].

6.8.2 Device identities

See TS 102 223 [32].

6.8.3 Result

See TS 102 223 [32].

6.8.4 Duration

See TS 102 223 [32].

6.8.5 Text string

TS 102 223 [32] applies, with the addition of the following procedure.

When the ME issues a successful TERMINAL RESPONSE for a SEND USSD command, it shall supply the text returned within the Return Result message from the network, no matter what type of string was returned.

6.8.6 Item identifier

See TS 102 223 [32].

6.8.7 Local information

See TS 102 223 [32].

NOTE: The ESN does not apply for a mobile supporting only access technologies defined by 3GPP. The support of ESN is indicated in the TERMINAL PROFILE.

6.8.8 Call control requested action

When the ME issues a TERMINAL RESPONSE for a proactive command SET UP CALL, SEND SS or SEND USSD which has been modified by call control by UICC in another type of request, it shall supply the response data given in response to the ENVELOPE (CALL CONTROL).

6.8.9 Result data object 2

When the ME issues a TERMINAL RESPONSE for a proactive command SET UP CALL, SEND SS or SEND USSD which has been modified by call control by UICC in another type of request, it shall supply the Result data object it would have supplied for the proactive command equivalent to the action requested by call control, and given in the Call control request data element.

6.8.10 Card reader status

See TS 102 223 [32].

6.8.11 Card ATR

See TS 102 223 [32].

6.8.12 R-APDU

See TS 102 223 [32].

6.8.13 Timer identifier

See TS 102 223 [32].

6.8.14 Timer value

See TS 102 223 [32].

6.8.15 AT Response

See TS 102 223 [32].

6.8.16 Text string 2

When the ME issues a successful TERMINAL RESPONSE for a proactive command SET UP CALL or SEND SS which has been modified by "call control" by USIM into a USSD request ('05' result value), it shall supply the Text string 2. The Text string 2 shall contain the text returned within the Return Result message from the network for the USSD response. Text string 2 is equivalent to the Text string in the Terminal Response to a SEND USSD command.

6.8.17 Channel data

See TS 102 223 [32].

6.8.18 Channel status

See TS 102 223 [32].

6.8.19 Channel data length

See TS 102 223 [32].

6.8.20 Bearer description

See TS 102 223 [32].

6.8.21 Buffer size

See TS 102 223 [32].

6.8.22 Total Display Duration

See TS 102 223 [32].

6.8.23 Service Availability

See TS 102 223 [32].

6.8.24 Service Record

See TS 102 223 [32].

6.9 Proactive UICC session and ME display interaction

See TS 102 223 [32].

6.10 Handling of unknown, unforeseen and erroneous messages

See TS 102 223 [32].

6.11 Proactive commands versus possible Terminal response

Table 6.1 shows for each proactive command the possible terminal response returned (marked by a "•" character), in addition to those defined in TS 102 223 [32].

Table 6.1: Proactive commands versus possible Terminal response (continued overleaf...)

		PROACTIVE COMMAND																			
		RE-FRESH	MORE TIME	POLL INTERVAL	POLLING OFF	SETUP EVENT LIST	SET UP CALL	SEND SS	SEND USSD	SEND SMS	SEND DTMF	LAUNCH BROWSER	PLAY TONE	DISPLAY TEXT	GET INKEY	GET INPUT	SELECT ITEM	SET UP MENU	PROVIDE LOCAL INFO	TIMER MANAGEMENT	SETUP IDLE MODE TEXT
TERMINAL RESPONSE		'01'	'02'	'03'	'04'	'05'	'10'	'11'	'12'	'13'	'14'	'15'	'20'	'21'	'22'	'23'	'24'	'25'	'26'	'27'	'28'
14	USSD or SS Transaction terminated by user						•	•	•												
34	SS Return Error						•	•													
35	SMS RPERROR									•											
37	USSD return error								•												
39	Interaction with call/SM control by USIM, permanent problem						•	•	•	•											

Table 6.1: Proactive commands versus possible Terminal response

		PROACTIVE COMMAND														
		CARD APDU	POWER ON CARD	POWER OFF CARD	GET READER STATUS	RUN AT COMMAND	LANG NOTIFICATION	OPEN CHANNEL	CLOSE CHANNEL	RECEIVE DATA	SEND DATA	GET CHANNEL STATUS	SERVICE SEARCH	GET SERVICE INFORMATION	DECLARE SERVICE	
TERMINAL RESPONSE		'30'	'31'	'32'	'33'	'34'	'35'	'40'	'41'	'42'	'43'	'44'	'45'	'46'	'47'	
14	USSD or SS Transaction terminated by user															
34	SS Return Error															
35	SMS RPERROR															
37	USSD return error															
39	Interaction with call/SM control by USIM, permanent problem															

7 ENVELOPE Commands

7.1 Data download to UICC

7.1.1 SMS-PP data download

7.1.1.1 Procedure

If the service "data download via SMS Point-to-point" is allocated and activated in the UICC Service Table (see 3GPP TS 31.101 [13]), then the ME shall follow the procedure below:

- when the ME receives a Short Message with:
 - protocol identifier = SIM data download; and
 - data coding scheme = class 2 message; or
- when the ME receives a Short Message with:
 - protocol identifier=ANSI-136 R-DATA (see 3GPP TS 23.040 [7]); and
 - data coding scheme = class 2 message, and the ME chooses not to handle the message (e.g. MEs not supporting EGPRS over TIA/EIA-136 do not need to handle the message).
- then the ME shall pass the message transparently to the UICC using the ENVELOPE (SMS-PP DOWNLOAD) command as defined below;
- the ME shall not display the message, or alert the user of a short message waiting;
- the ME shall wait for an acknowledgement from the UICC;
- if the UICC responds with '90 00', the ME shall acknowledge the receipt of the short message to the network using an RP-ACK message. The response data from the UICC will be supplied by the ME in the TP-User-Data element of the RP-ACK message it will send back to the network (see 3GPP TS 23.040 [5] and 3GPP TS 24.011 [10]). The values of protocol identifier and data coding scheme in RP-ACK shall be as in the original message;
- if the UICC responds with '93 00', the ME shall either retry the command or send back an RP-ERROR message to the network with the TP-FCS value indicating 'SIM Application Toolkit Busy' (see 3GPP TS 23.040 [5]).
- If the UICC responds with '6F XX', the ME shall send back an RP-ERROR message to the network with the TP-FCS value indicating "UICC data download error". The values of protocol identifier and data coding scheme in RP-ERROR shall be as in the original message;

NOTE: The preferred way for a USAT application to indicate a Data Download error is by using the specific code '62 XX' or '63 XX' as described in the following bullet point.

- if the UICC responds with '62 XX' or '63 XX', the ME shall acknowledge the receipt of the short message to the network using an RP-ERROR message. The response data from the UICC will be supplied by the ME in the TP-User-Data element of the RP-ERROR message it will send back to the network (see 3GPP TS 23.040 [5] and 3GPP TS 24.011 [10]). The values of protocol identifier and data coding scheme in RP-ERROR shall be as in the original message. The value of the TP-FCS element of the RP-ERROR shall be "SIM data download error".

If the service "data download via SMS-PP" is not available in the UICC Service Table, and the ME receives a Short Message with the protocol identifier = SIM data download and data coding scheme = class 2 message, then the ME shall store the message in EF_{SMS} in accordance with 3GPP TS 31.102 [14].

7.1.1.2 Structure of ENVELOPE (SMS-PP DOWNLOAD)

Direction: ME to UICC.

The command header is specified in 3GPP TS 31.101 [13].

Command parameters/data.

Description	Clause	M/O/C	Min	Length
SMS-PP download tag	9.1	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Device identities	8.7	M	Y	A
Address	8.1	O	N	B
SMS TPDU (SMS-DELIVER)	8.13	M	Y	C

- Device identities: the ME shall set the device identities to:
 - source: Network;
 - destination: UICC.
- Address: The address data object holds the RP_Originating_Address of the Service Centre (TS-Service-Centre-Address), as defined in 3GPP TS 24.011 [10].

Response parameters/data.

It is permissible for the UICC not to provide response data. If the UICC provides response data, the following data is returned.

Byte(s)	Description	Length
1-X (X≤128)	UICC Acknowledgement	X

7.1.2 Cell Broadcast data download

This functionality is only available when the ME is connected to a GSM access network.

7.1.2.1 Procedure

If the service "data download via SMS-CB" is available in the UICC Service Table or USIM Service Table (see 3GPP TS 31.102 [14]), then the ME shall follow the procedure below:

- when the ME receives a new Cell Broadcast message, the ME shall compare the message identifier of the Cell Broadcast message with the message identifiers contained in EF_{CBMID};
- if the message identifier is found in EF_{CBMID}, the cell broadcast page is passed to the UICC using the ENVELOPE (CELL BROADCAST DOWNLOAD) command, defined below. The ME shall not display the message;
- if the message identifier of the incoming cell broadcast message is not found in EF_{CBMID}, then the ME shall determine if the message should be displayed, by following the procedures in 3GPP TS 23.041 [6] and 3GPP TS 31.102 [14].
- if the UICC responds with '93 00', the ME shall consider that the Cell Broadcast page has not been delivered successfully. The ME may retry to deliver the same Cell Broadcast page.

The ME shall identify new cell broadcast pages by their message identifier, serial number and page values.

7.1.2.2 Structure of ENVELOPE (CELL BROADCAST DOWNLOAD)

Direction: ME to UICC.

The command header is specified in 3GPP TS 31.101 [13].

Command parameters/data.

Description	Clause	M/O/C	Min	Length
Cell Broadcast Download tag	9.1	M	Y	1
Length (A+B)	-	M	Y	1 or 2
Device identities	8.7	M	Y	A
Cell Broadcast page	8.5	M	Y	B

- Device identities: the ME shall set the device identities to:
 - source: Network;
 - Destination: UICC.

Response parameters/data: None for this type of ENVELOPE command.

7.2 Menu Selection

See TS 102 223 [32].

If the UICC responds with '93 00', the ME shall not re-issue this particular envelope.

7.3 Call Control and MO SMS control by USIM

7.3.1 Call Control by USIM

7.3.1.1 Procedure for mobile originated calls

If the service "call control" is available in the USIM Service Table (see 3GPP TS 31.102 [14]), then the ME shall follow the procedure described in TS 102 223 [32] with the additional rules listed here:

- when the user is dialling "112" or an emergency call code stored in EF_{ECC}, the ME shall set up an emergency call instead of passing the call set-up details to the UICC;
- if the UICC provides response data, then in addition to the response data listed by TS 102 223 [32], the response data from the UICC may indicate to the ME to send instead a supplementary service or USSD operation using the data supplied by the UICC. It is then mandatory for the ME to perform the supplementary service or USSD operation in accordance with the data from the UICC, if it is within the ME's capabilities to do so. If the UICC requires a supplementary service or USSD operation that is beyond the ME's capabilities, then the ME shall not perform the supplementary service or USSD operation at all.
- If, as a result of the procedure, the UICC supplies a number stored in EF_{ECC}, this shall not result in an emergency call.

In the case where the initial call set-up request results from a proactive command SET UP CALL:

- if the call control result is "not allowed", the ME shall inform the UICC using TERMINAL RESPONSE "interaction with call control by UICC or MO short message control by UICC, action not allowed";

- if the call set-up request is changed by call control in a supplementary service or USSD operation, and if the supplementary service or USSD operation is within the ME's capabilities, then the ME shall send this request to the network. The ME shall then send back a TERMINAL RESPONSE to the SET UP CALL command at the same time it would have done for the proactive command equivalent to the action requested by call control (i.e. SEND SS or SEND USSD). However, in that case, the TERMINAL RESPONSE shall contain the response data given in the response to ENVELOPE (CALL CONTROL) and a second Result TLV identical to the one given in response to the proactive command equivalent to the action requested by call control (i.e. SEND SS or SEND USSD). The mapping between the general result in the first Result TLV and the general result in the second Result TLV is given below:
 - the general result "command performed, but modified by call control by USIM" shall be given in the first Result TLV if the general result of the second Result TLV is '0X' or '1X';
 - the general result "interaction with call control by USIM, temporary problem" shall be given in the first Result TLV if the general result of the second Result TLV is '2X';
 - the general result "interaction with call control by USIM or MO short message control by USIM, permanent problem" shall be given in the first Result TLV if the general result of the second Result TLV is '3X';
- if the call set-up request is changed by call control into a supplementary service or USSD operation, and if the supplementary service or USSD operation is beyond the ME's capabilities, then the ME shall send back a TERMINAL RESPONSE to the SET UP CALL command, without performing the supplementary service or USSD operation at all. In that case, the TERMINAL RESPONSE shall contain the response data given in the response to ENVELOPE (CALL CONTROL) and a second Result TLV identical to the one given in response to the proactive command equivalent to the action requested by call control (i.e. SEND SS or SEND USSD). The mapping between the general result in the first Result TLV and the general result in the second Result TLV is given below:
 - the general result "interaction with call control by USIM or MO short message control by USIM, permanent problem" shall be given in the first Result TLV, and the general result "command beyond ME's capabilities" shall be given in the second Result TLV.

The ME shall then follow the call set-up procedure defined in 3GPP TS 24.008 [9] or the supplementary service or USSD operation procedure defined in 3GPP TS 24.080 [11].

7.3.1.2 Procedure for Supplementary Services and USSD

If the service "call control" is available in the USIM Service Table (see 3GPP TS 31.102 [14]), then for all supplementary service and USSD operations (including those resulting from a SEND SS or SEND USSD proactive UICC command), the ME shall first pass the supplementary service or USSD control string (corresponding to the supplementary service or USSD operation and coded as defined in 3GPP TS 22.030 [2], even if this SS or USSD operation has been performed via a specific menu of the ME) to the UICC, using the ENVELOPE (CALL CONTROL) command defined below. The ME shall also pass to the UICC in the ENVELOPE (CALL CONTROL) command the current serving cell.

The UICC shall respond in the same way as for mobile originated calls. The ME shall interpret the response as follows:

- if the UICC responds with '90 00', the ME shall send the supplementary service or USSD operation with the information as sent to the UICC;
- if the UICC responds with '93 00', the ME shall not send the supplementary service or USSD operation and may retry the command;
- if the UICC provides response data, then the response data from the UICC shall indicate to the ME whether to send the supplementary service or USSD operation as proposed, not send the SS or USSD operation, send the SS or USSD operation using the data supplied by the UICC, or instead set up a call using the data supplied by the UICC. It is mandatory for the ME to perform the supplementary service or USSD operation or the call set-up request in accordance with the data from the UICC, if it is within the ME's capabilities to do so. If the UICC requires a call set-up or supplementary service or USSD operation that is beyond the ME's capabilities (e.g. the UICC maps a USSD operation to a data call, and the ME does not support data calls), then the ME shall not perform the call set-up request or supplementary service or USSD operation at all.

In the case where the initial SS or USSD request results from a proactive command SEND SS or SEND USSD:

- if the call control result is "not allowed", the ME shall inform the UICC using TERMINAL RESPONSE ("interaction with call control by UICC or MO short message control by UICC, action not allowed");
- if the SS or USSD request is changed by call control in a call set-up request, then the ME shall set up the call using the data given by the UICC, if it is within the ME's capabilities to do so. If the UICC requires a call set-up that is beyond the ME's capabilities (e.g. the UICC maps a USSD operation to a data call, and the ME does not support data calls), then the ME shall not set up the call at all. The ME shall send back a TERMINAL RESPONSE to the initial proactive command at the same time it would have done for the proactive command equivalent to the action requested by call control (i.e. SET UP CALL). However, in that case, the TERMINAL RESPONSE shall contain the response data given in the response to ENVELOPE (CALL CONTROL) and a second Result TLV identical to the one given in response to the proactive command equivalent to the action requested by call control (i.e. SET UP CALL). The mapping between the general result in the first Result TLV and the general result in the second Result TLV is the same as the one described in clause 7.3.1.1.

If the ME supports the Last Number Dialed service, the ME shall update EF_{LND} with the supplementary service or USSD control string corresponding to the initial user request.

The ME shall then follow the supplementary service or USSD operation procedure defined in 3GPP TS 24.080 [11] or the call set-up procedure defined in 3GPP TS 24.008 [9].

7.3.1.3 Indication to be given to the user

The UICC may optionally include an alpha-identifier in the response data to the ENVELOPE (CALL CONTROL) message, in order to inform the user at the time the response is received by the ME. The use of this alpha identifier by the ME is described in TS 102 223 [32] with the additional rules listed here:

- if the UICC responds with "allowed, with modifications", and the data supplied by the UICC is an SS String, and the modified request is within the ME's capabilities, then:
 - if the alpha identifier is provided by the UICC and is not a null data object, the ME shall use it to inform the user. The ME shall then not display the SS string given by the UICC. This is also an indication that the ME should not give any other information to the user on the changes made by the UICC to the initial user request;
 - if the alpha identifier is provided by the UICC and is a null data object (i.e. length = '00' and no value part), this is an indication that the ME should not give any information to the user on the changes made by the UICC to the initial user request. The ME shall not display the SS string given by the UICC. The ME should not modify the display corresponding to the initial user request;
 - if the alpha identifier is not provided by the UICC, the ME may indicate to the user that the initial user request has been changed.
- if the UICC responds with "allowed, with modifications" to a request by a proactive command SEND SS or SEND USSD, and the modified request is beyond the ME's capabilities, then the ME shall not give any information to the user on the fact that the modified request is beyond the ME's capabilities, and shall give a TERMINAL RESPONSE to the proactive command (i.e. SEND SS or SEND USSD) as detailed in clauses 7.3.1.1 and 7.3.1.2. The responsibility to inform the user in this case lies with the UICC application which sent the proactive command.

7.3.1.4 Interaction with Fixed Dialling Number

The procedure defined in TS 102 223 [32] for calls applies. In addition, it shall apply in the same way for supplementary service operations, the supplementary service control string being checked as if it was a called number.

The ME shall check the number (or the supplementary service control string) in accordance with 3GPP TS 22.101 [34].

7.3.1.5 Support of Barred Dialling Number (BDN) service

The procedure defined in TS 102 223 [32] for calls applies. In addition, it shall apply in the same way for supplementary service operations, the supplementary service control string being checked as if it was a called number.

The ME shall check the number (or the supplementary service control string) in accordance with 3GPP TS 22.101 [34].

7.3.1.6 Structure of ENVELOPE (CALL CONTROL)

Direction: ME to UICC.

The command header is specified in 3GPP TS 31.101 [13].

Command parameters/data.

Description	Clause	M/O/C	Min	Length
Call control tag	9.1	M	Y	1
Length (A+B+C+D+E+F)	-	M	Y	1 or 2
Device identities	8.7	M	Y	A
Address or SS string or USSD string	8.1, 8.14 or 8.17	M	Y	B
Capability configuration parameters 1	8.4	O	N	C
Subaddress	8.3	O	N	D
Location information	8.19	M	N	E
Capability configuration parameters 2	8.4	O	N	F

- Device identities: the ME shall set the device identities to:
 - source: ME;
 - destination: UICC.
- Address or SS string or USSD string: only one data object shall be sent to the UICC:
 - for a call set-up, the address data object is used and holds the Called Party Number, as defined in 3GPP TS 24.008 [9], to which the ME is proposing setting up the call;
 - for a supplementary service, the SS string data object is used and holds the corresponding supplementary service;
 - for a USSD operation, the USSD string data object is used and holds the corresponding USSD control string;
 - USIM Applications and MEs should take into account that early implementations of USAT use the SS string data object for coding of USSD control strings (instead of the USSD string data object). This behaviour is only possible for USSD control strings consisting of digits (0-9,*,#). The UICC can identify MEs having this early implementation by evaluating the indication "USSD string data object supported in Call Control" in the TERMINAL PROFILE. The ME can identify SIMs having this early implementation by evaluating the indication "USSD string data object supported in Call Control" in the UICC Service Table.
- Capability configuration parameters: Only used for a call set-up, this contains the Bearer capabilities that the ME is proposing to send to the network. The first capability configuration parameters corresponds to the bearer capability 1 information element of a mobile originating SETUP message, as defined in 3GPP TS 24.008 [9]. The second capability configuration parameters correspond to the bearer capability 2 information element of a mobile originating SETUP message, as defined in 3GPP TS 24.008 [9]. If no capability configuration parameters are present, this shall indicate a speech call.
- Subaddress: Only used for a call set-up, this contains the called party subaddress that the ME is proposing to send to the network. If one is not present, this shall indicate that the ME is proposing not to send this information element to the network.
- Location information: This data object contains the identification (MCC, MNC, LAC, Cell Identity) of the current serving cell of the UE. The comprehension required flag of this data object in this command shall be set to '0'.

Response parameters/data.

It is permissible for the UICC to provide no response data, by responding with SW1/SW2 = '90 00'. If the UICC does not provide any response data, then this shall have the same meaning as "allowed, no modification".

Description	Clause	M/O/C	Min	Length
Call control result	-	M	Y	1
Length (A+B+C+D+E+F)	-	M	Y	1 or 2
Address or SS string or USSD string	8.1, 8.14 or 8.17	O	N	A
Capability configuration parameters 1	8.4	O	N	B
Subaddress	8.3	O	N	C
Alpha identifier	8.2	O	N	D
BC repeat indicator	8.42	C	N	E
Capability configuration parameters 2	8.4	O	N	F

- Call control result:

Contents:

- The command that the UICC gives to the ME concerning whether to allow, bar or modify the proposed call (or supplementary service operation);

Coding:

- '00' = Allowed, no modification;
 - '01' = Not allowed;
 - '02' = Allowed with modifications.
- Address or SS string or USSD string: Only one data object may be included if the UICC requests the call (or supplementary service or USSD operation) details to be modified:
 - for a call set-up, if the address data object is not present, then the ME shall assume the Dialling number is not to be modified;
 - if the SS string data object or address data object is present and the ME receives wild values according to 3GPP TS 31.102 [14], then the ME shall not process the command.
 - for a supplementary service, if the SS string data object is not present, then the ME shall assume that SS is not to be modified;
 - for a USSD operation, if the USSD string data object is not present, then the ME shall assume that the USSD operation is not to be modified.
 - Capability configuration parameters: Only used for a call set-up, this data object is only required if the USIM application requests the call details to be modified. The first capability configuration parameters corresponds to the bearer capability 1 information element of a mobile originating SETUP message, as defined in 3GPP TS 24.008 [9]. The second capability configuration parameters corresponds to the bearer capability 2 information element of a mobile originating SETUP message, as defined in 3GPP TS 24.008 [9]. If the capability configuration parameters are not present, then the ME shall assume the parameters are not to be modified.
 - Subaddress: Only used for a call set-up, this data object is only required if the USIM application requests the call details to be modified. If the subaddress is not present, then the ME shall assume the called party subaddress is not to be modified. If the subaddress supplied by the USIM application is a null data object, then the ME shall not provide a called party subaddress to the network. A null data object shall have length = '00' and no value part.
 - Alpha identifier: this data object is only required if the UICC requests a particular indication to be given to the user. The handling of this data object by the ME is described in clause 7.3.1.3. The comprehension required flag of this data object shall be set to '0'.
 - BC repeat indicator: indicates how the 2 associated bearers shall be interpreted. The two modes to manage the bearers are the "alternate way" or "sequential way". The change of bearer occurs on a network event. This BC repeat indicator is conditioned to the presence of the second capability configuration parameters and is coded as defined in 3GPP TS 24.008 [9].

It is mandatory for the UICC to provide at least one of the optional data objects if it has set the Call control result to "allowed with modifications".

7.3.2 MO Short Message Control by USIM

7.3.2.1 Description

If the service "MO Short Message Control" is available in the USIM Service Table (see 3GPP TS 31.102 [14]), then the ME shall follow the procedure below:

- for all MO short message attempts (even those resulting from a SEND SM proactive UICC command), the ME shall first pass the RP_destination_address of the service centre and the TP_Destination_Address to the UICC, using the ENVELOPE (MO SHORT MESSAGE CONTROL) command defined below. The ME shall also pass to the UICC in the ENVELOPE (MO SHORT MESSAGE CONTROL) command the current serving cell;
- if the UICC responds with '90 00', the ME shall send the short message with the addresses unchanged;
- if the UICC responds with '93 00', the ME shall not send the short message and may retry the command;
- if the UICC provides response data, then the response data from the UICC shall indicate to the ME whether to send the short message as proposed, not send the short message or send a short message using the data supplied by the UICC. It is mandatory for the ME to perform the MO short message request in accordance with the data from the UICC.

The ME shall then follow the MO Short Message procedure defined in 3GPP TS 24.011 [10].

In the case where the initial MO short message request results from a proactive command SEND SHORT MESSAGE, if the MO short message control result is "not allowed", the ME shall inform the UICC using TERMINAL RESPONSE, "interaction with call control by UICC or MO short message control by UICC, action not allowed".

7.3.2.2 Structure of ENVELOPE (MO SHORT MESSAGE CONTROL)

Direction: ME to UICC.

The command header is specified in 3GPP TS 31.101 [13].

Command parameters/data.

Description	Clause	M/O/C	Min	Length
MO Short Message control tag	9.1	M	Y	1
Length (A+B+C+D)	-	M	Y	1 or 2
Device identities	8.7	M	Y	A
Address data object 1	8.1	M	Y	B
Address data object 2	8.1	M	Y	C
Location information	8.19	M	Y	D

- Device identities: the ME shall set the device identities to:
 - source: ME;
 - destination: UICC.
- Address data object 1: this address data object 1 contains the RP_Destination_Address of the Service Centre to which the ME is proposing to send the short message.
- Address data object 2: this address data object 2 contains the TP_Destination_Address to which the ME is proposing to send the short message.
- Location information: this data object contains the identification (MCC, MNC, LAC, Cell Identity) of the current serving cell of the UE.

Response parameters/data.

It is permissible for the UICC to provide no response data, by responding with SW1/SW2 = '90 00'. If the UICC does not provide any response data, then this shall have the same meaning as "allowed, no modification".

Description	Clause	M/O/C	Min	Length
MO short message control result	-	M	Y	1
Length (A+B+C)	-	M	Y	1 or 2
Address data object 1	8.1	O	N	A
Address data object 2	8.1	O	N	B
Alpha identifier	8.2	O	N	C

- MO Short Message control result:

Contents:

- The command that the UICC gives to the ME concerning whether to allow, bar or modify the proposed short message;

Coding:

- '00' = Allowed, no modification;
- '01' = Not allowed;
- '02' = Allowed with modifications.
- Address data object 1: if the address data object 1 is not present, then the ME shall assume the RP_Destination_Address of the Service Centre is not to be modified.
- if the address data object 1 or address data object 2 is present and the ME receives wild values according to 3GPP TS 31.102 [14], then the ME shall not process the command.
- Address data object 2: if the address data object 2 is not present, then the ME shall assume the TP_Destination_Address is not to be modified.
- Alpha identifier: this data object is only required if the UICC requests a particular indication to be given to the user. The handling of this data object by the ME is described in clause 7.3.2.3.

The UICC shall provide the two optional address data objects if it has set the MO Short Message control result to "allowed with modifications".

7.3.2.3 Indication to be given to the user

The UICC may optionally include an alpha-identifier in the response data to the ENVELOPE (MO SHORT MESSAGE CONTROL) message, in order to inform the user at the time the response is received by the ME. The use of this alpha identifier by the ME is identical to the one described in clause 7.3.1.3 relative to call control by UICC.

7.3.2.4 Interaction with Fixed Dialling Number

It is permissible for the Fixed Dialling Number service to be enabled (see 3GPP TS 31.102 [14]) at the same time as MO Short Message Control is available (in the USIM Service Table). If FDN is enabled, the ME shall follow the procedure for Call Control (see clause 7.3.1.4), where the number in the procedure refers to both the SMS destination address and the SMSC address.

7.4 Timer Expiration

See TS 102 223 [32].

7.5 Event download

See TS 102 223 [32].

Regarding all the call events, the following equivalences shall apply:

- the "call setup message" is the SETUP message as defined in 3GPP TS 24.008 [09];
- the "call connect message" is the CONNECT message as defined in 3GPP TS 24.008 [09];
- the "disconnect messages" are the DISCONNECT, RELEASE, RELEASE COMPLETE messages as defined in 3GPP TS 24.008 [09];
- the "NULL state" is the CC-U0 state as defined in 3GPP TS 24.008 [09].

Regarding the location status event, the following equivalence shall apply:

- the "idle" state is the MM-IDLE state as defined in 3GPP TS 24.008 [09].

Where events occur and the UICC responds with '93 00', the ME shall retry to deliver the event download messages to the UICC.

8 SIMPLE-TLV data objects

The coding of the TLV objects is as described in TS 102 223 [32], except when stated otherwise in the present document.

8.1 Address

See TS 102 223 [32].

8.2 Alpha identifier

See TS 102 223 [32].

8.3 Subaddress

See TS 102 223 [32].

8.4 Capability configuration parameters

Byte(s)	Description	Length
1	Capability configuration parameters tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3 to (Y-1)+X+2	Capability configuration parameters	X

Capability configuration parameters are coded as for EF_{CCP}. If it is being provided by the UICC, the UICC shall supply all information required to complete the Bearer Capability Information Element in the Call Set-up message (see 3GPP TS 24.008 [9]). Any unused bytes at the end of the value part shall be coded 'FF'.

See 3GPP TS 31.102 [14] for the coding of all EFs.

NOTE: The second byte of this TLV contains the Length of the TLV and the third byte contains the Length of the bearer capability contents, followed by the actual contents.

8.5 Cell Broadcast Page

These data are only available when the ME is connected to a GSM access network.

Byte(s)	Description	Length
1	Cell Broadcast page tag	1
2	Length = '58' (88 decimal)	1
3 - 90	Cell Broadcast page	88

The Cell Broadcast page is formatted in the same way as described in 3GPP TS 23.041 [6].

8.6 Command details

The content and the coding of the Command Details TLV object is defined in TS 102 223 [32], except for the following.

The coding of the Command Qualifier is defined for the following commands:

- SEND SS:
 - this byte is RFU.
- SEND USSD:
 - this byte is RFU.
- PROVIDE LOCAL INFORMATION. The following additional values are defined:
 - '00' = Location Information (MCC, MNC, LAC, Cell Identity and Extended Cell Identity)
 - '02' = Network Measurement results.
 - '05' = Timing Advance.

8.7 Device identities

See TS 102 223 [32].

8.8 Duration

See TS 102 223 [32].

8.9 Item

See TS 102 223 [32].

8.10 Item identifier

See TS 102 223 [32].

8.11 Response length

See TS 102 223 [32].

8.12 Result

For the general result byte coding the following values are defined in addition to or replacement of those in TS 102 223 [32]:

- '14' = USSD or SS transaction terminated by the user.
- '34' = SS Return Error;
- '35' = SMS RP-ERROR;
- '37' = USSD Return Error;
- '39' = Interaction with call control by USIM or MO short message control by USIM, permanent problem;
- Additional information:

Contents:

- For the general result "Command performed successfully", some proactive commands require additional information in the command result. This is defined in the clauses below. For the general result values '20', '21', '34', '35', '37', and '39', it is mandatory for the ME to provide a specific cause value as additional information, as defined in the clauses below. For other values, see TS 102 223 [32].

8.12.1 Additional information for SEND SS

When the ME issues a successful general result for a SEND SS proactive command, it shall also include the Operation Code and Parameters included in the Return Result component from the network, as additional information.

The first byte of the additional information shall be the SS Return Result Operation code, as defined in 3GPP TS 24.080 [11].

The rest of the additional information shall be the SS Return Result Parameters, as defined in 3GPP TS 24.080 [11].

8.12.2 Additional information for ME problem

For the general result "ME currently unable to process command", it is mandatory for the ME to provide additional information, the first byte of which to be as defined in TS 102 223 [32], with the addition of the following value:

- '03' = ME currently busy on SS transaction;
- '08' = ME currently busy on USSD transaction.

8.12.3 Additional information for network problem

For the general result "network currently unable to process command", it is mandatory for the ME to provide additional information. The first byte shall be the cause value of the Cause information element returned by the network (as defined in 3GPP TS 24.008 [9]). Bit 8 shall be set to '1'. One further value is defined:

- '00' = No specific cause can be given.

All other values shall be interpreted by the UICC as '00'. The coding '00' shall only be used by the ME if no others apply.

8.12.4 Additional information for SS problem

For the general result "SS Return Error", it is mandatory for the ME to provide additional information. The first byte shall be the error value given in the Facility (Return result) information element returned by the network (as defined in TS 24.080 [11]). One further value is defined:

- '00' = No specific cause can be given.

All other values shall be interpreted by the UICC as '00'. The coding '00' shall only be used by the ME if no others apply.

8.12.5 Additional information for SMS problem

For the general result "SMS RP-ERROR", it is mandatory for the ME to provide additional information. The first byte shall be the cause value given in the RP-Cause element of the RP-ERROR message returned by the network (as defined in 3GPP TS 24.011 [10]), with bit 8 = 0. One further value is defined:

- '00' = No specific cause can be given.

All other values shall be interpreted by the UICC as '00'. Specific cause '00' shall only be used by the ME if no others apply.

8.12.6 Not used

8.12.7 Additional information for USSD problem

For the general result "USSD Return Error", the ME shall provide additional information. The first byte shall be the error value given in the Facility (Return result) information element returned by the network (as defined in 3GPP TS 24.080 [11]). One further value is defined:

- '00' = No specific cause can be given.

All other values shall be interpreted by the UICC as '00'.

The coding '00' shall only be used by the ME if no others apply.

8.12.8 Additional information for interaction with call control or MO SM control

For the general result "interaction with call control by USIM or MO short message control by USIM, permanent problem", it is mandatory for the ME to provide additional information, the first byte of which to be as defined below:

- '00' = No specific cause can be given;
- '01' = Action not allowed;
- '02' = The type of request has changed.

All other values shall be interpreted by the UICC as '00'. The coding '00' shall only be used by the ME if no others apply.

8.13 SMS TPDU

Byte(s)	Description	Length
1	SMS TPDU tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3 to (Y-1)+X+2	SMS TPDU	X

The TPDU is formatted as described in 3GPP TS 23.040 [5].

Where the TPDU is being sent from the UICC to the ME (to be forwarded to the network), and where it includes a TP-Message-Reference which is to be incremented by the ME for every outgoing message, the TP-Message-Reference as provided by the UICC need not be the valid value. TP-Message-Reference shall be checked and corrected by the ME to the value described in 3GPP TS 23.040 [5].

8.14 SS string

Byte(s)	Description	Length
1	SS string tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3	TON and NPI	1
(Y-1)+4 to (Y-1)+X+2	SS or USSD string	X - 1

TON/NPI and SS or USSD control string are coded as for EF_{ADN} , where the ADN record relates to a Supplementary Service Control string. See 3GPP TS 31.102 [14] for the coding of EF_{ADN} .

8.15 Text string

Content and coding is defined TS 102 223 [32], with the following requirement:

Data coding scheme is coded as for SMS Data coding scheme defined in 3GPP TS 23.038 [4]. Parts of the data coding scheme other than the character set indication shall be ignored.

8.16 Tone

See TS 102 223 [32].

NOTE: Standard supervisory tones for 3G are specified in 3GPP TS 22.001 [22].

8.17 USSD string

Byte(s)	Description	Length
1	USSD string tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3	Data coding scheme	1
(Y-1)+4 to (Y-1)+X+2	USSD string	X-1

The Data coding scheme is coded as for Cell Broadcast defined in 3GPP TS 23.038 [4]. The coding of the USSD string is defined in 3GPP TS 22.030 [2].

8.18 File List

See TS 102 223 [32].

8.19 Location Information

Byte(s)	Description	Length
1	Location Information tag	1
2	Length = '09' or '07' (see Note)	1
3 - 5	Mobile Country & Network Codes (MCC & MNC)	3
6 - 7	Location Area Code (LAC)	2
8 - 9	Cell Identity Value (Cell ID)	2
10 - 11	Extended Cell Identity Value (see Note)	2
NOTE: The Extended Cell Identity Value is not available in GERAN. When in GERAN, this field shall not be present and the length field shall be set to '07'.		

The mobile country code (MCC), the mobile network code (MNC) and the location area code (LAC) are coded as in 3GPP TS 24.008 [9].

For GERAN, the Cell Identity Value is coded as in 3GPP TS 24.008 [9].

For UTRAN, only the C-id part of the UC-id is returned in the Cell Identity Value (i.e. the 16 least significant bits of the UC-id), as defined in 3GPP TS 25.401 [35] and 3GPP TS 25.413 [36].

The Extended Cell identity Value is coded as the RNC-id part of the UC-id, as defined in 3GPP TS 25.401 [35] and 3GPP TS 25.413 [36]. It is left padded with zeros (this means that byte 10 contains the 4 most significant bits of the RNC-id value, and byte 11 contains the 8 least significant bits of the RNC-id value).

8.20 IMEI

See TS 102 223 [32].

8.21 Help Request

See TS 102 223 [32].

8.22 Network Measurement Results

This information is only available when the ME is connected to a GSM access network.

Byte(s)	Description	Length
1	Network Measurement Results tag	1
2	Length = '10'	1
3 - 18	Network Measurement Results	16

The Network Measurement Results are coded as for the Measurement Results information element in 3GPP TS 44.018 [27], starting at octet 2 (the IEI is removed, as this information is duplicated by the data object tag).

8.23 Default Text

See TS 102 223 [32].

8.24 Items Next Action Indicator

See TS 102 223 [32].

8.25 Event list

See TS 102 223 [32].

8.26 Cause

Byte(s)	Description	Length
1	Cause tag	1
2	Length (X) of bytes following. X=0, or $2 \leq X \leq 30$.	1
3 to X+2	Cause	X

The Cause data object is coded as for the Cause call control information element in 3GPP TS 24.008 [9], starting at octet 3 (the IEI and Length information are removed, as this information is duplicated by the data object tag and length).

Radio Link Timeout is indicated by the Cause data object having a value part of zero length (only the Tag and Length components are sent).

8.27 Location status

See TS 102 223 [32].

8.28 Transaction identifier

Byte(s)	Description	Length
1	Transaction identifier tag	1
2	Length (X) of bytes following	1
3 to X+2	Transaction identifier list	X

- Transaction identifier list:

Contents:

- A list of transaction identifiers, of variable length. Each byte in the list defines a transaction identifier. Each transaction identifier shall not appear more than once within the list;

Coding:

- Each byte in the transaction identifier list shall be coded as defined below:
 - bits 1 to 4 = RFU;
 - bits 5 to 7 = TI value;
 - bit 8 = TI flag.

TI value and TI flag are coded as defined in 3GPP TS 24.007 [8].

8.29 BCCH channel list

This information is only available when the ME is connected to a GSM access network.

Byte(s)	Description	Length
1	BCCH channel list tag	1
2	Length (X) of bytes following	1
3 to X+2	BCCH channel list	X

- BCCH channel list:

Contents:

- The list of absolute RF channels for BCCH carriers, as known by the ME from the SYSTEM INFORMATION messages. The BCCH channel list is composed of one to three BCCH channel sub lists, each sub list is derived from the set of frequencies defined by reference neighbour cells description information element or elements. In the latter case the set is the union of the different subsets defined by the neighbour cells description information elements (see 3GPP TS 44.018 [27]). The length of the BCCH channel list field depends on the length of the received BCCH channel list derived from the different SYSTEM INFORMATION messages to be considered.

Coding:

- Each ARFCN is represented by 10 bits. Spare bit(s) are to be filled with 0.

	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
Byte 1	ARFCN#1 (high part)							
Byte 2	ARFCN#1 (low part)			ARFCN#2 (high part)				
Byte 3	ARFCN#2 (low part)				ARFCN#3 (high part)			
...	...							
Byte X-1	ARFCN#m-1 (low part)				ARFCN#m (high part)			
Byte X	ARFCN#m (low part)						Spare bit (0)	Spare bit (0)

8.30 Call control requested action

Byte(s)	Description	Length
1	Call control requested action tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3 to (Y-1)+X+2	Call control requested action	X

- Call control requested action:

Contents:

- The action given in response to the ENVELOPE (CALL CONTROL). It may contain, in the same order as given by the UICC, the address or SS string, the capability configuration parameters, the called party sub-address and the alpha identifier.

Coding:

- As described in clause 7.3.1.6, starting with the first optional element given in the response data to the ENVELOPE (CALL CONTROL).

8.31 Icon Identifier

Byte(s)	Description	Length
1	Icon identifier tag	1
2	Length = '02'	1
3	Icon qualifier	1
4	Icon identifier	1

- Icon qualifier:

Contents:

- The icon qualifier indicates to the ME how the icon is to be used;

Coding:

- bit 1: 0 = icon is self-explanatory, i.e. if displayed, it replaces the alpha identifier or text string;
1 = icon is not self-explanatory, i.e. if displayed, it shall be displayed together with the alpha identifier or text string.
- bits 2-8 = 0 RFU.

- Icon identifier:

Contents:

- The icon identifier addresses a record in EF_{IMG} as defined in 3GPP TS 31.102 [14].

Coding:

- Binary.

8.32 Item Icon Identifier list

See TS 102 223 [32].

8.33 Card reader status

See TS 102 223 [32].

8.34 Card ATR

See TS 102 223 [32].

8.35 C-APDU

See TS 102 223 [32].

8.36 R-APDU

See TS 102 223 [32].

8.37 Timer identifier

See TS 102 223 [32].

8.38 Timer value

See TS 102 223 [32].

8.39 Date-Time and Time zone

See TS 102 223 [32].

NOTE: Coding is as for the Time Zone and Time information element in 3GPP TS 24.008 [9], starting at octet 2.

8.40 AT Command

Byte(s)	Description	Length
1	AT Command tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3 to (Y-1)+3+X-1	AT Command string	X

Contents:

- The AT Command string is structured exactly as the AT Command line as defined in 3GPP TS 27.007 [12], which may contain single or concatenated AT commands.

8.41 AT Response

Byte(s)	Description	Length
1	AT Response tag	1
2 to (Y-1)+2	Length (X)	Y
(Y-1)+3 to (Y-1)+3+X-1	AT Response string	X

Contents:

- The AT Response string is structured exactly as the response to a command line as defined in 3GPP TS 27.007 [12], which may contain single or concatenated responses appropriate to the issued AT command.
- If the AT Response string is longer than the maximum length capable of being transmitted to the UICC then the AT Response string shall be truncated to this length by the ME.

8.42 BC Repeat indicator

Byte(s)	Description	Length
1	BC repeat indicator tag	1
2	Length	1
3	BC repeat indicator values	1

Contents:

- The BC repeat indicator is structured exactly as defined in TS 24.008 [08], which may be alternate mode or sequential mode.

Coding:

- '01' = Alternate mode;
- '03' = Sequential mode.

8.43 Immediate response

See TS 102 223 [32].

8.44 DTMF string

See TS 102 223 [32].

8.45 Language

See TS 102 223 [32].

8.46 Timing Advance

This information is only available when the ME is connected to a GSM access network.

Byte(s)	Description	Length
1	Timing Advance tag	1
2	Length = '02'	1
3	ME Status	1
4	Timing Advance	1

Coding of ME status:

- '00' = ME is in the idle state;
- '01' = ME is not in idle state;
- '02' to 'FF' = reserved values.

The Timing Advance is coded as for the Timing Advance information element in 3GPP TS 44.018 [27], starting at octet 2 (the IEI is removed, as this information is duplicated by the data object tag).

8.47 Browser Identity

See TS 102 223 [32].

8.48 URL

See TS 102 223 [32].

8.49 Bearer

Byte(s)	Description	Length
1	Bearer tag	1
2 to (Y + 1)	Length (X)	Y
(Y+2) to (Y + X + 1)	List of bearers in order of priority requested	X

The ME shall use this list to choose which bearers are allowed in order of priority.

Coding of the bearers:

- '00' = SMS;
- '01' = CSD;
- '02' = USSD;
- '03' = GPRS;
- '04' to 'FF' = RFU.

8.50 Provisioning File Reference

See TS 102 223 [32].

8.51 Browser Termination Cause

See TS 102 223 [32].

8.52 Bearer description

Byte(s)	Description	Length
1	Bearer description tag	1
2	Length (X+1)	1
3	Bearer type	1
4 to (3+X)	Bearer parameters	X

- Bearer Type coding: in addition to the values defined in TS 102 223 [32], the following are defined:
 - '01' = CSD;
 - '02' = GPRS / 3G packet service;
- Bearer parameters coding: see the following clauses for 3G specific technologies.

8.52.1 Bearer parameters for CSD

Contents: parameters specific to the bearer.

In this case X=3.

NOTE: The default values of the subparameters are manufacturer specific since they depend on the purpose of the device and data services provided by it. Not all combinations and values of these subparameters are supported by GSM (see 3GPP TS 22.002 [1]).

Coding:

- The following values are as defined in the 3GPP TS 27.007 [12] for the select service bearer type "+CBST" extended command. They are coded in hexadecimal.

Coding of Byte 4:

- Data rate: same as the "speed" subparameter defined in 3GPP TS 27.007 [12].

Coding of byte 5:

- Bearer service: same as the "name" subparameter defined in 3GPP TS 27.007 [12].

Coding of Byte 6:

- Connection element: same as the "ce" subparameter defined in 3GPP TS 27.007 [12].

8.52.2 Bearer parameters for GPRS/Packet Service

Contents: parameters describing the Quality of Service (QoS) and the type of PDP. This is an element of the PDP context.

In this case X=6.

Coding: The following values are as defined in the 3GPP TS 27.007 [12], for the "+CGQREQ" extended command. They are coded in hexadecimal.

Coding of Byte 4:

- Precedence class: same as the "precedence" subparameter, defined in 3GPP TS 27.007 [12].

Coding of Byte 5:

- Delay class: same as the "delay" subparameter, defined in 3GPP TS 27.007 [12].

Coding of Byte 6:

- Reliability class: same as the "reliability" subparameter, defined in 3GPP TS 27.007 [12].

Coding of Byte 7:

- Peak throughput class: same as the "peak" subparameter, defined in 3GPP TS 27.007 [12].

Coding of Byte 8:

- Mean throughput class: same as the "mean" subparameter, defined in 3GPP TS 27.007 [12].

Coding of Byte 9 - Packet data protocol type:

- '02' = IP (Internet Protocol, IETF STD 5);
- all other values are reserved.

8.53 Channel data

See TS 102 223 [32].

8.54 Channel data length

See TS 102 223 [32].

8.55 Buffer size

See TS 102 223 [32].

8.56 Channel status

See TS 102 223 [32].

8.57 Card reader identifier

See TS 102 223 [32].

8.58 Other Address

See TS 102 223 [32].

8.59 UICC/ME interface transport level

See TS 102 223 [32].

8.60 AID

See TS 102 223 [32].

8.61 Network Access Name

Byte(s)	Description	Length
1	Network Access Name tag	1
2	Length (X)	1
3 to 3+X-1	Network Access Name	X

Content:

- The Network Access Name is used to identify the Gateway entity (GGSN), which provides interworking with an external packet data network. For GPRS, the Network Access Name is an APN.

Coding:

- As defined in 3GPP TS 23.003 [30].

8.62 Access Technology

See TS 102 223 [32].

8.63 Display parameters

See TS 102 223 [32].

8.64 Service Record

See TS 102 223 [32].

8.65 Device Filter

See TS 102 223 [32].

8.66 Service Search

See TS 102 223 [32].

8.67 Attribute Information

See TS 102 223 [32].

8.68 Service Availability

See TS 102 223 [32].

8.69 Remote Entity Address

See TS 102 223 [32].

9 Tag values

This clause specifies the tag values used to identify the BER-TLV and SIMPLE-TLV data objects used in the present document, in addition to those defined in TS 102 223 [32].

9.1 BER-TLV tags in ME to UICC direction

Description	Length of tag	Value
SMS-PP download tag	1	'D1'
Cell Broadcast download tag	1	'D2'
MO Short message control tag	1	'D5'

9.2 BER-TLV tags in UICC TO ME direction

No additional tag is defined for 3G.

9.3 SIMPLE-TLV tags in both directions

Description	Length of tag	Tag value, bits 1-7 (Range: '01' - '7E')	Tag (CR and Tag value)
SS string tag	1	'09'	'09' or '89'
USSD string tag	1	'0A'	'0A' or '8A'
SMS TPDU tag	1	'0B'	'0B' or '8B'
Cell Broadcast page tag	1	'0C'	'0C' or '8C'
Cause tag	1	'1A'	'1A' or '9A'
Transaction identifier tag	1	'1C'	'1C' or '9C'
BCCH channel list tag	1	'1D'	'1D' or '9D'
BC Repeat Indicator tag	1	'2A'	'2A' or 'AA'
Timing Advance tag	1	'2E'	'2E' or 'AE'

9.4 Type of Command and Next Action Indicator

The table below shows the values which shall be used for Type of Command coding (see clause 8.6) and Next Action Indicator coding (see clause 8.24) in addition to those defined in TS 102 223 [32].

Value	Name	used for Type of Command coding	used for Next Action Indicator coding
'11'	SEND SS	X	X
'12'	SEND USSD	X	X

10 Allowed Type of command and Device identity combinations

Only certain types of commands can be issued with certain device identities. These combinations are defined below, in addition to TS 102 223 [32].

Command description	Source	Destination
CELL BROADCAST DOWNLOAD	GSM network only	UICC
MO SHORT MESSAGE CONTROL	ME	UICC
SEND SS	UICC	Network
SEND USSD	UICC	Network

11 Security requirements

3GPP TS 23.048 [23] specifies standardized methods of securing the content of application messages. If it is necessary to secure application messaging to Toolkit applications, then 3GPP TS 23.048 [23] may be used.

Annex A (normative): Support of USAT by Mobile Equipment

Support of USAT is optional for Mobile Equipment. However, if an ME states conformance with a specific 3G release, it is mandatory for the ME to support all functions of that release.

The support of USAT implies the support of CAT (TS 102 223 [32]).

The support of letter classes, which specify mainly ME hardware dependent features, is optional for the ME and may supplement the USAT functionality described in the present document. If an ME states conformance to a letter class, it is mandatory to support all functions within the respective letter class.

The table below indicates the commands and functions of the optional letter classes.

Letter classes	Command/function description
a	Proactive command: GET READER STATUS Proactive command: PERFORM CARD APDU Proactive command: POWER ON CARD Proactive command: POWER OFF CARD Event download: Card reader status
b	Proactive command: RUN AT COMMAND
c	Proactive command: LAUNCH BROWSER Event download: Browser termination
d	Soft key support
e	Proactive command: OPEN CHANNEL Proactive command: CLOSE CHANNEL Proactive command: RECEIVE DATA Proactive command: SEND DATA Proactive command: GET CHANNEL STATUS Event download: Data available Event download: Channel status
f	Proactive command: SERVICE SEARCH Proactive command: GET SERVICE INFORMATION Proactive command: DECLARE SERVICE Event download: Local connection

Annex B (informative): Example of DISPLAY TEXT Proactive UICC Command

See TS 102 223 [32].

Annex C (normative): Structure of USAT communications

See TS 102 223 [32].

Annex D (informative): ME display in proactive UICC session

See TS 102 223 [32].

Annex E (informative): Help information feature processing

See TS 102 223 [32].

Annex F (informative): Monitoring of events

See TS 102 223 [32].

Annex G (normative): Support of Multiple Card Operation

See TS 102 223 [32].

Annex H (informative): Multiple Card proactive command examples

See TS 102 223 [32].

Annex I (informative): Bearer independent protocol proactive command examples

See TS 102 223 [32].

Annex J (informative): WAP References

See TS 102 223 [32].

Annex K (informative): Use of USAT Bearer independent protocol for local links Bluetooth case

See TS 102 223 [32].

Annex L (informative): Bluetooth Service Discovery protocol

See TS 102 223 [32].

Annex M (informative): Use of USAT Bearer independent protocol for local links, server case

See TS 102 223 [32].

Annex N (informative): Change history

The table below indicates all change requests that have been incorporated into the present document since it was initially approved by 3GPP TSG-T.

Change history								
Date	TSG #	TSG Doc	CR	Rev	Cat	Subject/Comment	Old	New
2000-04	TP-07	TP-000055				Version 2.1.0 was approved at TSG-T #07	2.1.0	3.0.0
2000-07	TP-08	TP-000096	001		F	Release 99 alignment of 31.111 with GSM 11.14	3.0.0	3.1.0
			003		F	Correction of SAT commands for using GPRS in bearer independent protocol feature		
			004		F	Clarification of ME/SIM interface for bearer independent protocol feature		
2000-10	TP-09	TP-000154	005		F	Correction of Profile Download regarding USAT service table	3.1.0	4.0.0
			006		C	Modification of GET INKEY		
			007		C	DTMF issues		
			008		F	Correction to GET INPUT regarding number of response string variables		
			009		F	Clarification for Alpha Identifier in PLAY TONE		
			010		F	EVENT DOWNLOAD-MT call: correction of the sub-address description		
			011		B	Addition of a Technology Indicator Tag in a Terminal Response message		
2000-12	TP-10	TP-000202	013		A	Get Reader Status - correction to card identifier tag	4.0.0	4.1.0
			014		B	New event for display parameters		
			016		A	General Clarification and Correction		
			018		A	Clarification of command qualifier related to LAUNCH BROWSER		
			020		A	Modification of general result for proactive command with user confirmation		
			022		A	Clarification of bearer independent related to GPRS		
			024		A	Correction to device identity coding		
2001-03	TP-11	TP-010039	026		A	Correction of TERMINAL PROFILE	4.1.0	4.2.0
			027		F	Addition of UTRAN to the technology indicator		
			028		C	Introduction of additional Access Technology Indicator values"		
			032		A	Correction of reference from GSM 02.40 to TS 22.001		
			033		B	Addition of variable timeout to the Display Text command		
			034		F	Correction to display parameters tag		
			035		B	Use of USAT Bearer independent protocol for local links. Client use case.		
			036		B	Use of USAT Bearer independent protocol for local links. server use case.		
			037		A	Correction of Annex A: Support of USAT by Mobile Equipment		
			038		F	Alignment with GSM 11.14 for reserved TIA/EIA-136 tags"		
			039		B	Addition of variable timeout to GetInkey command		
			040		C	Precisions on the PlayTone command		
2001-06	TP-12	TP-010151	042		A	Correction to NMR functionality (and BCCH list & TA)	4.2.1	4.3.0
			044		A	General corrections		
			046		A	Clarification of min and max length for GET INPUT		
			048		A	Limitation of data field in the C-APDU and R-APDU data object		
			050		A	Correction of Bearer independent protocol examples)		
2001-09	TP-13	TP-010202	052		B	Reservation of TIA/EIA 136 byte to terminal profile	4.3.0	4.4.0
			054		A	Corrections to OPEN CHANNEL commands		
			056		A	TLV object for the APN in the OPEN CHANNEL command		
			058		A	Corrections to SEND DATA commands and Channel Status Event		
2001-12	TP-14	TP-010243	059		F	Reservation for TIA/EIA/IS-820 facilities	4.4.0	4.5.0
			061		A	Miscellaneous corrections (related to the bearer independent protocol)		
2002-03	TP-15	TP-020064	062		F	Usage of Simple TLV Tag Values	4.5.0	4.6.0
2002-06	TP-16	TP-020113	065		F	Miscellaneous corrections	4.6.0	4.7.0
			068		F	Correction to OPEN CHANNEL for GPRS		
2002-09	TP-17	TP-020212	072		D	Correction of Run AT command description	4.7.0	4.8.0

Change history								
Date	TSG #	TSG Doc	CR	Rev	Cat	Subject/Comment	Old	New
2002-12	TP-18	TP-020282	082		F	Restructuring of TS 31.111 to be based on ETSI TS 102 223	4.8.0	4.9.0
			075		A	Clarification of the usage of busy status response for Cell Broadcast, Event download and Menu Selection Envelope.		
			079		A	Correction on the Cell-ID in the Location Information TLV object		
2003-03	TP-19	TP-030021	089		F	Wild values in response to Call Control and MO Short Message Control envelopes	4.9.0	4.10.0
			091		F	Extended location information		
			094		F	Cell Broadcast data download in 3G		
2003-09	TP-21	TP-030180	096		F	Update of the PROVIDE LOCAL INFORMATION functionality.	4.10.0	4.11.0
			098		F	Correction of Provide Local Information in case of roaming onto a GSM access network		

History

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