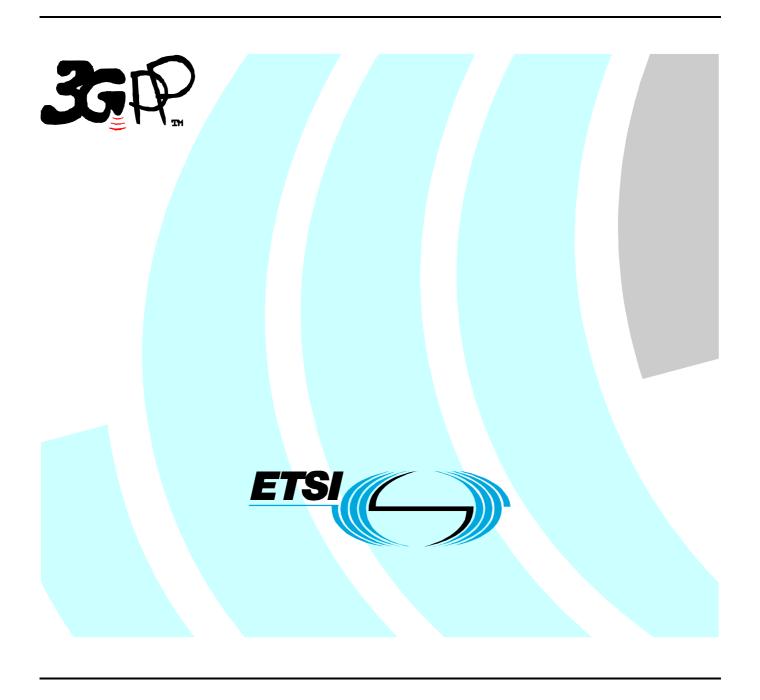# ETSI TS 131 101 V6.4.1 (2004-12)

Technical Specification

Universal Mobile Telecommunications System (UMTS);
UICC-terminal interface;
Physical and logical characteristics
(3GPP TS 31.101 version 6.4.1 Release 6)

Reference

RTS/TSGT-0331101v641

Keywords

UMTS

ETSI

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Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° 7803/88

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Contents

Foreword

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

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

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x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

The present document defines a generic Terminal/Integrated Circuit Card (ICC) interface for 3GPP applications. The present document is based on ETSI TS 102 221 [1], which defines a generic platform for any IC card application. Requirements that are common to all 3GPP smart card based applications are also listed in this specification.

The aim of the present document is to ensure interoperability between an ICC and a terminal independently of the respective manufacturer, card issuer or operator. The present document does not define any aspects related to the administrative management phase of the ICC. Any internal technical realisation of either the ICC or the terminal is only specified where these are reflected over the interface.

Application specific details for applications residing on an ICC are specified in the respective application specific documents.

References to this document from 3GPP application specifications related to functionalities that are not described in the present document are to be considered as direct references to ETSI TS 102 221 [1].

1   Scope

The present document specifies the interface between the UICC and the Terminal for 3G telecom network operation.

The present document specifies:

-    the requirements for the physical characteristics of the UICC;

-    the electrical interface between the UICC and the Terminal;

-    the initial communication establishment and the transport protocols;

-    the model which serves as a basis for the logical structure of the UICC;

-    the communication commands and the procedures;

-    the application independent files and protocols.

The administrative procedures and initial card management are not part of the present document.

2   References

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

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1]   ETSI TS 102 221 Release 6 "Smart Cards; UICC-Terminal interface; Physical and logical characteristics ".

[2]   3GPP TS 31.102: "Characteristics of the USIM Application".

[3]   ETSI TS 101 220: "Smart cards; ETSI numbering system for telecommunication application providers".

[4]   ISO/IEC 7816-6 (1996): "Identification cards - Integrated circuit(s) cards with contacts - Part 6: Interindustry data elements".

[5]   ITU-T Recommendation T.50: "International Reference Alphabet (IRA) (Formerly International Alphabet No. 5 or IA5) - Information technology - 7-bit coded character set for information interchange".

[6]   3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

3   Definitions, symbols, abbreviations and coding

All definitions, symbols, abbreviations applicable to the terminal are specified in TS 102 221 [1].

The coding of Data Objects in the present document is according to ISO/IEC 7816-6 [4].

'XX':   Single quotes indicate hexadecimal values. Valid elements for hexadecimal values are the numbers '0' to '9' and 'A' to 'F'.

4 General 3GPP platform requirements

The UICC/terminal interface shall comply with all requirements stated in ETSI TS 102 221 [1]. Where options are indicated in ETSI TS 102 221 [1], the present document specifies which options are to be used for a UICC/terminal interface where the UICC supports a 3GPP application.

4.1 GSM/USIM application interaction and restrictions

Activation of a USIM session excludes the activation of a GSM session. In particular, this implies that once a USIM application session has been activated, commands sent to the UICC with CLAss byte set to 'A0' shall return SW1SW2 '6E 00' (class not supported) to the terminal.

Similarly, activation of a GSM session excludes the activation of a USIM session.

At most one USIM session can be active at the same time.

5 Physical and logical characteristics

5.1 Transmission speed

Cards and terminals supporting an application based on the present specification shall support the transmission factor (F,D)=(512,32) in addition to those required by ETSI TS 102 221 [1].

It is recommended that terminals and cards supporting Multimedia Message storage functionality (see 3GPP TS 31.102 [2]) support the transmission factor (F,D)=(512,64) in addition to those specified in the present document.

5.2 Voltage classes

A UICC holding a 3GPP application shall support at least two consecutive voltage classes as defined in TS 102 221 [1], e.g. AB or BC. If the UICC supports more than two classes, they shall all be consecutive, e.g. ABC.

5.3 File Control Parameters (FCP)

This clause defines the contents of the data objects which are part of the FCP information where there is a difference compared to the values as specified in TS 102 221 [1]. Where options are indicated in TS 102 221 [1], this clause specifies the values to be used in the FCP related to 3GPP applications.

5.3.1 Minimum application clock frequency

This data object is indicated by tag '82' in the proprietary constructed data object in the FCP information, identified by tag 'A5', as defined in TS 102 221 [1]. This data object specifies the minimum clock frequency to be provided by the terminal during the 3GPP application session. The value indicated in this data object shall not exceed 3 MHz, corresponding to '1E'. The terminal shall use a clock frequency between the value specified by this data object and the maximum clock frequency for the UICC as defined in TS 102 221 [1]. If this data object is not present in the FCP response or the value is 'FF' then the terminal shall assume that the minimum clock frequency is 1 MHz.

5.4 Interface protocol

No extra guard time, indicated in TC1 in the ATR, needs to be supported when sending characters from the terminal to the card. The terminal may reject a UICC indicating values other than 0 or 255 in TC1.

6 Application protocol

When involved in administrative management operations, a 3GPP application interfaces with appropriate equipment. These operations are outside the scope of the present document.

When involved in network operations a 3GPP application interfaces with a terminal with which messages are exchanged. A message can be a command or a response.

- A 3GPP Application command/response pair is a sequence consisting of a command and the associated response.

- A 3GPP Application procedure consists of one or more 3GPP Application command/response pairs which are used to perform all or part of an application-oriented task. A procedure shall be considered as a whole, that is to say that the corresponding task is achieved if and only if the procedure is completed. The terminal shall ensure that, when operated according to the manufacturer's manual, any unspecified interruption of the sequence of command/response pairs which realise the procedure, leads to the abortion of the procedure itself.

- A 3GPP application session is the interval of time starting at the completion of the 3GPP application initialisation procedure and ending either with the start of the 3GPP session termination procedure, or at the first instant the link between the UICC and the terminal is interrupted.

During the 3GPP network operation phase, the terminal plays the role of the master and the 3GPP application plays the role of the slave.

A 3GPP application specification may specify some commands defined in TS 102 221 [1] as optional or define additional commands. The 3GPP application shall execute all applicable commands in such a way as not to jeopardise, or cause suspension, of service provisioning to the user. This could occur if, for example, execution of the AUTHENTICATE is delayed in such a way which would result in the network denying or suspending service to the user.

7 User verification and file access conditions

A 3GPP application uses 2 PINs for user verification, PIN and PIN2. PIN2 is used only in the ADF. The PIN and PIN2 are mapped into key references as defined in TS 102 221 [1]. The Universal PIN shall be associated with a usage qualifier, and other key references may also be associated with a usage qualifier as defined in TS 102 221 [1]. The PIN status is indicated in the PS_DO, which is part of the FCP response when an ADF/DF is selected. The coding of the PS_DO is defined in TS 102 221 [1].

PIN and PIN2 are coded on 8 bytes. Only (decimal) digits (0-9) shall be used, coded in CCITT T.50 [5] with bit 8 set to zero. The minimum number of digits is 4. If the number of digits presented by the user is less than 8 then the ME shall pad the presented PIN with 'FF' before sending it to the 3GPP application.

The coding of the UNBLOCK PINs is identical to the coding of the PINs. However, the number of (decimal) digits is always 8.

The security architecture as defined in TS 102 221 [1] applies to 3GPP applications with the following definitions and additions:

- A 3GPP application may reside on either a single-verification capable UICC or a multi-verification capable UICC.

- A 3GPP application residing on a multi-verification capable UICC shall support the replacement of its application PIN with the Universal PIN, key reference '11', as defined in TS 102 221 [1]. Only the Universal PIN is allowed as a replacement.

- A multi-verification capable UICC holding a 3GPP application shall support the referenced format using SEID as defined in TS 102 221 [1].

- Every file related to a 3GPP application shall have a reference to an access rule stored in EF_{ARR}.

- Disabling of PIN2 is allowed if supported by the 3GPP application, unless indicated otherwise.

The security architecture as defined in TS 102 221 [1] applies to terminals supporting 3GPP applications with the following definitions and requirements:

- A terminal shall support the use of level 1 and level 2 user verification requirements as defined in TS 102 221 [1].

- A terminal shall support the multi-application capabilities as defined in TS 102 221 [1].

- A terminal shall support the replacement of a 3GPP application PIN with the Universal PIN, key reference '11', as defined in TS 102 221 [1].

- A terminal shall support the security attributes defined using tag's '8C', 'AB' and '8B' as defined in TS 102 221 [1]. In addition both the referencing methods indicated by tag '8B' shall be supported as defined in TS 102 221 [1].

The access rule is referenced in the FCP using tag '8B'. The TLV object contains the file ID (the file ID of EF_{ARR}) and record number, or file ID (the file ID of EF_{ARR}), SEID and record number, pointer to the record in EF_{ARR} where the access rule is stored. Each SEID refers to a record number in EF_{ARR}. EFs having the same access rule use the same record reference in EF_{ARR}. For an example EF_{ARR}, see TS 102 221 [1].

8 Files

This clause specifies general requirements for EFs for 3GPP applications.

EFs contain data items. A data item is a part of an EF which represents a complete logical entity. The 3GPP application specification defines the access conditions, data items and coding for each file.

EFs or data items having an unassigned value, or which are cleared by the terminal, shall have their bytes set to 'FF'. After the administrative phase all data items shall have a defined value or have their bytes set to 'FF', unless specified otherwise in other 3GPP specifications. For example, for a deleted LAI in the EF_{LOCI} file defined in TS 31.102 [2], the last byte takes the value 'FE' (refer to TS 24.008 [6]). If a data item is modified by the allocation of a value specified in another 3GPP TS, then this value shall be used and the data item is not unassigned.

EFs are mandatory (M), optional (O), or conditional (C). A conditional file is mandatory if required by a supported feature, as defined by the 3GPP application.(e.g; PBR in 3GPP TS 31.102 [2]). The file size of an optional EF may be zero. All implemented EFs with a file size greater than zero shall contain all mandatory data items. Optional data items may either be filled with 'F', or, if located at the end of an EF, need not exist.

When the coding is according to ITU-T Recommendation T.50 [5], bit 8 of every byte shall be set to 0.

8.1 Contents of the EFs at the MF level

There are four EFs at the Master File (MF) level specified in TS 102 221 [1] (EF_{ICCID}; EF_{DIR}, EF_{PL} and EF_{ARR}), which are all mandatory for 3GPP.

The EF_{DIR} file contains the Application Identifiers (AIDs) and the Application Labels of the 3GPP applications present on the card as mandatory elements. The AIDs of 3GPP applications are defined in ETSI TS 101 220 [3]. The 3GPP applications can only be selected by means of the AID selection. The EF_{DIR} entry shall not contain a path object for application selection. It is recommended that the application label does not contain more than 32 bytes.

Annex A (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.

Date	Meeting	TSG Doc.	CR	Rev	Cat	Subject/Comment	Old	New
2000-04	TP-07	TP-000013	001	3	B	Security Attributes	3.0.0	3.1.0
		TP-000013	002	2	B	Incorporation of the USAT (USIM application toolkit) features.		
		TP-000013	003	3	B	File Control Parameters		
		TP-000013	004	1	F	Coding of status words		
		TP-000013	006		B	Definition of application session related procedures		
		TP-000013	007		D	Collection of 31.101 editorial changes		
		TP-000013	008		C	Power consumption		
		TP-000013	009		F	Changes to UICC specific files		
		TP-000013	010		F	Reservation of file IDs		
2000-07	TP-08	TP-000094	011		F	Error detection and character repetition	3.1.0	3.2.0
		TP-000094	012		F	Use of status codes 6200, 6400 and 6500		
		TP-000094	013		F	Correction of P2 value for the ACTIVATE and DEACTIVATE commands		
		TP-000094	014		F	Clarification of the UICC characteristics byte		
		TP-000094	015		F	Correction of ACTIVATE/DEACTIVATE commands		
		TP-000094	016		F	Clarification of the file descriptor		
		TP-000094	017		F	Selection by path correction		
		TP-000094	018	1	F	Correction of ATR examples		
		TP-000094	019		F	SEARCH RECORD command: alignment with ISO/IEC 7816-9		
		TP-000094	020		F	Correction to T=0 mechanism		
		TP-000094	022		F	Correction of the application activation termination procedures		
2000-10	TP-09	TP-000151	023		F	Replacement of the technical contents with a reference to ETSI TS 102 221. (Note: ETSI TS 101 221 is identical in technical content to TS 31.101 v3.2.0 plus the addition of several changes as listed in the annex of TS 102 221)	3.2.0	3.3.0
2001-03	TP-11					Issued as version 4.0.0 in order to create a complete set of specifications for release 4. The contents of version 4.0.0 are identical to the contents of version 3.3.0	3.3.0	4.0.0
2002-09	TP-17					Issued as version 5.0.0 in order to create a complete set of specifications for release 5. The contents of version 5.0.0 are identical to the contents of version 4.0.0. This was required as CR 024 created release 6 of the specification.	4.0.0	5.0.0
		TP-020235	024		B	Increase of the ME/UICC interface speed for release 6	5.0.0	6.0.0
2002-12	TP-18	TP-020279	027		D	Gather all 3GPP-specific card platform requirements in TS 31.101.	6.0.0	6.1.0
2003-06	TP-20	TP-030120	028		F	Clarification on the support of extra guardtime	6.1.0	6.2.0
2004-09	TP-25	TP-040180	029		B	Requirement for higher UICC/Terminal interface speed	6.2.0	6.3.0
		TP-040180	030		B	Move "GSM/USIM application interactions and restrictions" from ETSI TS 102 221	6.2.0	6.3.0
2004-12	TP-26	TP-040255	033		F	Correction of non specific references	6.3.0	6.4.0
2004-12	TP-26					Reinstation of original bullets in reference clause	6.4.0	6.4.1

History

Document history		
V6.4.1	December 2004	Publication