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Contents

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Foreword

To be drafted by the ETSI Secretariat.

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Scope

This European Telecommunication Standard (ETS) describes the Universal Mobile Telecommunications System (UMTS) terminal and IC card aspects from the service point of view.

The basic mandatory functionality, features and logical internal interfaces related to mobile terminals and IC Cards in UMTS are specified. The division of functions between the terminal and the IC Card is described as well as the issues related to physical standardisation of these modules. However, the physical types of mobile terminals is not a subject for standardisation and therefore out of the scope of this ETS.

The service related aspects are discussed from the mobile terminal point of view, such as the means of identifying terminal capabilities to the network and end-to-end and possible software and data downloading functionality required.

(Normative) references

This ETS incorporates by dated or undated references, provisions from other publications. These references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of the publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ETS/SMG - 0102201, 1996: "Service Aspects; Service Principles (UMTS 22.01)";

[2] ISO - 7816-1, 1987: "Identification cards - Integrated circuit(s) cards with contacts, part 1: Physical characteristics";

[3] ISO - 7816-1, 1988: "Identification cards - Integrated circuit(s) cards with contacts, part 2: Dimensions and locations of the contacts";

[4] ISO - 7816-1, 1989: "Identification cards - Integrated circuit(s) cards with contacts, part 3: Electronic signals and transmission protocols";

[5] ISO - 7816-1, 1995: "Identification cards - Integrated circuit(s) cards with contacts, part 4: Inter_industry commands for interchange";

[6] ETS/SMG: "GSM plugin format description";

[7] ITU xxxx : "FPLMTS IC card specification ";

Definitions, symbols and abbreviations

For the purposes of this ETS the following abbreviations and definitions apply. Abbreviations and definitions can be found in the Vocabulary for UMTS [].

Definitions

first defined term: Defining text.

second defined term: Defining text.

Symbols

A	Symbol 1
B	Symbol 2

Abbreviations

~~XXX~~API	Application Programming Interface~~bbreviation 1~~
~~XXX~~PDA	~~Abbreviation 2~~Personal Digital Assistant

General

UMTS aims for offering service capabilities to enable~~for~~ wide variety of services, i.e. from simple services like speech to complex multimedia services containing several simultaneous media components and putting totally different requirements for the systems and for the user equipment's. By standardising service capabilities rather than actual services more flexibility is given for the service providers to create services on top of service capabilities. Same principle applies also for UMTS terminals, types of terminals is not standardised and therefore not limited in any way. It can clearly be seen that wide range of terminal types are likely in UMTS environment, e.g. speech only terminals, videophones, data terminals, wideband data terminals, fax terminals, multi-band/multi-mode terminals and any combinations of these.

The UMTS user service identity module (USIM) shall contain sufficient information to identify the user, sufficient information to identify service providers, authentication functionality and other specified UMTS functionality. UMTS IC card shall be standardised to support also other applications than UMTS USIM application in order to allow more versatile UMTS IC card functionality. It is clearly seen that the technical development of IC card technology increases the possibilities of IC card in UMTS context. Compared to current IC cards (e.g. GSM Phase 2 SIM cards) it is seen that the amount of memory and processing power increases remarkably. These development trends will meet the requirements of UMTS and are taken into account while defining the features and functions of UMTS IC card.

Terminal functions, features and interfaces~~, PT~~

Terminal functions and features

The UMTS standard does not restrict the functionality of the terminals in any ways. Standard shall ~~A~~allow~~ing~~ terminal specific features and functions to exist ~~is supported~~. However a minimum set of mandatory functions are required in order to ensure proper behaviour of the system.

Mandatory terminal functionality

The mandatory functionality of the UMTS terminals is related mainly to the interaction between the terminal and the network. For the purposes of identification of mandatory terminal functionality terminal types can be divided into two categories; interactive terminals (normal) and receive-only terminals (dummy broadcast listening or one way paging terminals) (*Note: This is still FFS*). Following functions are required from all UMTS terminals:

- USIM functionality (either integrated into the terminal or via IC card)
- Network registration
- Location update
- Authentication
- Originating or receiving a connection oriented or a connectionless service
- An equipment identification
- Basic identification of the terminal capability (classmark)
- Terminals capable for emergency calls should support emergency call without a USIM
- Terminal have to be able to sniff UMTS spectrum, read the service capabilities from the broadcast channels of different access networks, select the access network and to attach to the right network.

Terminal features

Standard supports following additional functionality for the UMTS terminals:

- The standard shall support the mechanism to download service related information (parameters, scripts or even software) into the terminal.
- API interface capability to allow information transfer through a well known interface
- Support of maintaining the VHE using same MMI and or another interface while roaming

The standard shall support the insertion of several cards, but shall not mandate the provision of this facility. Example scenario for this feature is a fax machine with a multiple IC card slots, where several users could insert their IC card and receive faxes.

Terminal Interfaces

< Editors note: What functions are needed for the interface by the services, A cut from the meeting#8 minutes: It was agreed that APIs need to be standardised across whatever interfaces are provided by terminals (including air interfaces). APIs would allow software providing teminal functions to be upgraded. An extensible API which would enable various kinds of terminal functions (e.g. means of activating supplementary services, means of providing new speech or video coding) seems preferable.>

Internal interfaces

The IC Card interface

The IC Card interface is the most important internal interface of the terminal. An ~~well standardised~~ interface between the terminal and the IC Card shall be standardised~~is needed~~ from the physical and functional point of view. Following characteristics are identified for the physical interface:

- Physical interface shall be based on the [2-6]
- Future terminal and IC card technology development shall be considered for efficient implementation. Such aspects as voltage levels (3V and less), interface bit rates and even contactless interfaces.
- Physical interface shall support high bit rate transmission in order to support efficiently the applications on IC card.
- IC card physical interface shall support invocation and data manipulation of USIM application and other IC card applications.
-

Internal Application Execution Interface

Execution of service provider specific services and applications will be supported by UMTS terminals. An API will be standardised for the purpose of hiding terminal specific implementation issues. In order to support execution of external applications a script or a description language have to be identified. UMTS specific scripts should be avoided to maintain compatibility and therefore similar developments from other environments such as computer and PDA environments should be closely investigated.

External interfaces

Interfaces are needed for messages and information to be transferred between the terminal and an external device, e.g. a computer. Standardised interfaces and protocols shall be used as much as possible and UMTS specific enhancements will be specified for those~~if needed~~. No physical specifications shall be standardised for external interfaces of UMTS terminal.

External logical interfaces important for~~to~~ UMTS~~the~~ terminals can be e.g. AT-command set, a SW API for PC environment.~~, radio interface …~~

Functions provided by the IC Card, WA

Identities

Following identity requirements shall be fulfilled by the USIM and IC card:

· The USIM shall contain sufficient information to allow the access network to determine the identity of the service provider.

· The USIM shall contain sufficient information to allow the service provider to identify the subscriber and/or user.

· Where services are obtained from different service providers, provision shall be made for each service provider to be identified separately and each service provider may require a different user/subscriber identity.

· Where there is more than one subscription to the same service provider for the same service e.g. business and personal, provision shall be made for the user to select the appropriate identity. for the call

· Based upon their service capability some terminal types may select the appropriate identity automatically from the USIM.

Service capability

Following service capability requirements shall be fulfilled by the USIM and IC card:

· The card shall be able to store multiple applications such as GSM, DECT, electronic banking etc.

· User selectable data should be able to be stored on the IC card. This will include e.g. messages, the number store and user preferences.

· It shall be possible for entities either within or outside of the serving network to communicate directly with the IC card. This communication link shall be two way and may be initiated from either end. Information passed can be informative data, executable code, service parameters etc. To ensure interoperability between entities the IC card should support a standardised interpreted language e.g. JAVA.

· The USIM may act as an end point for communications connections. It shall be possible for applications on the IC card to initiate and terminate connections independently of the user

· The IC card may be used to store the user's service profile which will contain parameters associated with the services that may be used. These parameters are required by the terminal, the network/or the service provider to ensure that the services are provided and in particular that they are presented in a uniform manner to the user.

· Some services may be run entirely on the smart card with the interaction between the service provider and the user application taking place outside of the terminal which merely provides the link between the two. This will require a high bit rate I/O port between the terminal and smart card.

· The IC card shall have the ability to run more than one resident application simultaneously.

· Authorised interaction between applications resident on the IC card shall be possible subject to appropriate agreements between application providers.

~~· User selectable data should be able to be stored on the IC card. This will include e.g. messages, the number store and user preferences.~~

~~The card shall be able to store multiple applications such as GSM, DECT, electronic banking etc.~~

~~These applications shall be able to co-operate where appropriate.~~

~~The applications shall be separated by a 'fire wall' to preserve the integrity of the individual applications.~~

· IC card applications and updates of these applications may be downloadable from the network into the smart card.

· There shall be a user selectable default application that is activated when the card is plugged in or the terminal is switched on.

· The various applications shall be selectable with the handset.

· A toolkit shall be available to customise the card.

Security

Following security related requirements shall be fulfilled by the USIM and IC card:

· Information stored on the IC card shall be secured from unauthorised access or alteration. Verification of access privilege should be performed on the IC card itself and not delegated to another entity such as the terminal.

· Service providers may access only those areas of the card for which they have the required privileges. A service provider rights to access or alter any information which is the property of the user or another service provider shall be configurable.

· Public key encryption schemes will need to be supported and therefore a number of authentication algorithms may reside on the IC card. It shall be possible for all authentication and ciphering of user traffic to take place on the IC card. It shall be possible for new authentication algorithms to be downloaded to the IC card in a manner as secure as embedding the algorithm in ROM at point of manufacture.

~~Identification of Terminal capabilities, WA~~

~~<***Editors note***: Is this the same than chapter 9?>~~

Software and data download~~, TL~~

<***Editors note***: Software download is an issue to be investigated. There exists a lot of possibilities via Internet and therefore need for specification work can be minimised. The interface for downloading can be specified in the level of system interface, meaning server interface for accessing and starting the downloading process. Terminal software implementation, structure and format is implementation dependent and standardisation might be impossible.>

Service specific data downloading

Identification of Terminal capabilities

In UMTS environment a huge number of different types of terminals is envisaged. All terminals have to support mandatory functions identified for UMTS terminals (see chapter 5.1.1). One of the mandatory functions is the identification of the terminal capability. Information provided in the identification of terminal capabilities contains the used selections in case of alternatives (e.g. which speech codecs are supported) as well as optional functions and features important from the used service point of view (e.g. certain data compression algorithm supported). Early identification of terminal capabilities will save network resources in case of an intended call between two incompatible terminals.

As UMTS is intended to be a future proof system evolving in the future all capabilities of the UMTS terminals cannot be identified and classified in the phase of standardisation. Therefore a basic classification of terminal capabilities is defined. UMTS terminals shall identify their basic capabilities when attached to the network. Further negotiation of enhanced capabilities and features have to be done between the calling parties (see chapter 9).

Basic Terminal Capabilities

Basic capabilities identified by the terminals are:

- Supported speech codec: GSM, GSM EFR, AMR, proprietary

- Supported display type: character, graphic

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Adaptation and negotiation~~, TL~~

< *Editors note*: This chapter might belong to the ETS 22.01 or some other general service management ETS>

UMTS service capabilities enables versatile possibilities for service creation and service variation. Mobile terminals in the UMTS environment are capable of producing different types of information, i.e. in

the actual protocol level as well as in the application level. Protocol level capabilities consist of different protocols, low level source coding methods etc. Application level capabilities consists of supported applications, supported audio-visual capabilities etc. Functionality to find out different capabilities of the terminals and to agree on the used capabilities have to be defined. By indicating the common elements of the communicating ends in the earliest possible phase resources are used more optimally. At least following different ways to perform service negotiation can be identified:

1) Prioritised list negotiation

Prioritised list negotiation allows several choices of service mapping to be offered by the initiating entity into the call setup message. A service mapping could consist of suggested attribute values for the communications channel, requested service and suggestion of used media components and their requirements (e.g. speech and video component). Upon receipt of this message, the peer entity should choose the highest priority option that it can support. If none of the offered mappings are acceptable, the call shall be released.

2) Exchanged attribute negotiation

Exchanged attribute negotiation provides a mechanism for peer (receiving) entities to suggest alternative service attributes in response to an unacceptable call setup request. This response is designed to provide additional information to the initiating entity such that a subsequent reattempt (using modified service attributes) is more likely to succeed. This negotiation shall be done also between the terminal and the network.

This exchange attribute negotiation functionality consists of capability exchange phase, negotiation phase and adaptation phase.

Capability exchange phase

In the capability exchange phase the initiating terminal sends the information of the intended service in a call setup message including it's capabilities to the other end. The receiving mobile responses to the call setup message with a capability information consisting of it's capabilities.

Negotiation phase

In the negotiation phase the initiating mobile investigates the information from the receiving mobile to finalise the level of service information to be used (speech, speech codec, video, video codec, etc.). Initiating terminal then selects the requested service capability if supported by the both terminals. In case of conflict in the service capability requested the receiving end can suggest a fall back solution, e.g. if video telephony is requested in the application level and one end supports only speech, it can propose only speech service instead of video telephony service.

Adaptation phase

In the adaptation phase the agreed capability will be acknowledged and all needed parameters will be agreed in order to adapt the both mobiles.

History

Document history		
Date	**Status**	**Comment**
20th August 1996	0.0.0	First draft created with scope , contents and some text.
15 October 1996	0.0.1	First comments from SMG1WPC added
21 November	0.0.2	Changes from the SMG1WPC#7 Bath meeting
4 December 1996	0.0.3	SMG1WPC#8 meeting, Dusseldorf, additions. Identification of missing aspects.
Xx April 1997	0.0.4	SMG1WPC#10 Sophia Antipolis …