ETSI TS 122 101 V4.3.0 (2001-03)

Technical Specification

Universal Mobile Telecommunications System (UMTS);
Service aspects;
Service principles
(3GPP TS 22.101 version 4.3.0 Release 4)

ETSI

Important notice

Copyright Notification

ETSI

Intellectual Property Rights

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

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

Foreword

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

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

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under www.etsi.org/key .

Contents

Foreword

This Technical Specification has been produced by the 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 this TS, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version 3.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

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

z   the third digit is incremented when editorial only changes have been incorporated in the specification;

1 Scope

This Technical Specification (TS) describes the Service Principles for PLMNs specified by 3GPP.

3GPP specifications provide integrated personal communications services. The system will support different applications ranging from narrow-band to wide-band communications capability with integrated personal and terminal mobility to meet the user and service requirements of the 21st century.

3GPP specifications allow the realisation of a new generation of mobile communications technology for a world in which personal communications services should allow person-to-person calling, independent of location, the terminal used, the means of transmission (wired or wireless) and the choice of technology. Personal communication services should be based on a combination of fixed and wireless/mobile services to form a seamless end-to-end service for the user.

3GPP specifications should be in compliance with the following objectives:

to provide a single integrated system in which the user can access services in an easy to use and uniform way in all environments;

to allow differentiation between service offerings of various serving networks and home environments;

to provide a wide range of telecommunications services including those provided by fixed networks and requiring user bit rates of up to 2 Mbits/s as well as services special to mobile communications. These services should be supported in residential, public and office environments and in areas of diverse population densities. These services are provided with a quality comparable with that provided by fixed networks such as ISDN;

to provide services via hand held, portable, vehicular mounted, movable and fixed terminals (including those which normally operate connected to fixed networks), in all environments (in different service environments – residential, private domestic and different radio environments) provided that the terminal has the necessary capabilities;

to provide support of roaming users by enabling users to access services provided by their home environment in the same way even when roaming.

to provide audio, data, video and particularly multimedia services;

to provide for the flexible introduction of telecommunication services;

to provide within the residential environment the capability to enable a pedestrian user to access all services normally provided by fixed networks;

to provide within the office environment the capability to enable a pedestrian user to access all services normally provided by PBXs and LANs;

to provide a substitute for fixed networks in areas of diverse population densities, under conditions approved by the appropriate national or regional regulatory authority.

to provide support for interfaces which allow the use of terminals normally connected to fixed networks.

2 References

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

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

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

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

Release as the present document.

2.1   Normative References

[1]   3GPP TS 22.105 "Services and Service Capabilities"

[2]   3GPP TS 22.121: "Virtual Home Environment (VHE), Stage 1"

[3]   3GPP TS 22.038: "SIM application toolkit, stage 1"

[4]   3GPP TS 22.001: " Principles of Circuit telecommunication services supported by a Public Land Mobile Network (PLMN)".

[5]   3GPP TS 22.004: General on supplementary services"

[6]   3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)"

[7]   3GPP TS 22.066: "Support of Mobile Number Portability (MNP); Service description; Stage 1"

[8]   3GPP TS 22.079: " Support of Optimal Routing; Stage 1"

[9]   3GPP TS 22.129: "Handover Requiremen3GPP TS between UM3GPP TS and GSM or other Radio Systems"

[10]   3GPP TS 33.102: "Security Architecture"

[11]   3GPP TS 22.011: "Service Accessibility"

[12]   3GPP TS 22.016: "International mobile Station Equipment Identities (IMEI)"

[13]   24.008: " Mobile Radio Interface Layer 3 Specification"

[14]   3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)"

[15]   3GPP TS 21.133: "Security Threa3GPP TS and Requirements"

[16]   3GPP TS 33.120: "Security Principles"

[17]   3GPP TS 22.042: "Network Identity and Time Zone, Service Description, Stage 1"

[18]   GSM 02.09: "Digital cellular telecommunications system (Phase 2+); Security Aspects"

[19]   3GPP TS 31.102: "USIM Application Characteristics"

[20]   3GPP TS 22.121: "Architectural Requiremen3GPP TS for Release 99"

[21]   3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)"

[22]   3GPP TS 22.060: "General Packet Radio Service (GPRS)"

[23]   3GPP 3GPP TS 29.002: "Mobile Application Part (MAP) specification "

[24]   TR 23.972: "Circuit Switched Multimedia Telephony".

[25]   3GPP TS 22.140: "Multimedia messaging service; Stage 1".

[26]   3GPP TS 22.226: "Global Text Telephony, Stage 1."

3 Definitions, symbols and abbreviations

3.2 Definitions

For the purposes of this TS, the following definitions apply:

Authentication: a property by which the correct identity of an entity or party is established with a required assurance. The party being authenticated could be a user, subscriber, home environment or serving network.

Bearer: a bearer capability of defined capacity, delay and bit error rate, etc.

Bearer capability: a transmission function which the user equipment reques3GPP TS to the network.

Confidentiality: the avoidance of disclosure of information without the permission of i3GPP TS owner.

Home Environment: the home environment is responsible for enabling a user to obtain services in a consistent manner regardless of the user's location or terminal used (within the limitations of the serving network and current terminal).

IC Card: a card holding an Integrated Circuit containing subscriber, end user, authentication and/or application data for one or more applications.

Integrity: (in the context of security) is the avoidance of unauthorised modification of information.

Mobility: the ability for the user to communicate whilst moving independent of location.

Multimedia service: Multimedia services are services that handle several types of media such as audio and video in a synchronised way from the user's point of view. A multimedia service may involve multiple parties, multiple connections, and the addition or deletion of resources and users within a single communication session.

Number: A string of decimal digi3GPP TS that uniquely indicates the public network termination point. The number contains the information necessary to route the call to this termination point.

A number can be in a format determined nationally or in an international format. The international format is known as the International Public Telecommunication Number which includes the country code and subsequent digits, but not the international prefix.

Number portability: where the provision of directory numbers is independent of home environment and/or serving network.

One Stop Billing: one bill for all charges incurred using PLMN services.

Quality of Service: the collective effect of service performances, which determine the degree of satisfaction of a user of a service. It is characterised by the combined aspec3GPP TS of performance factors applicable to all services, such as:

> service operability performance;
>
> service accessibility performance;
>
> service retention performance;
>
> service integrity performance;
>
> and other factors specific to each service.

Roaming: the ability for a user to function in a serving network.

Security: the ability to prevent fraud as well as the protection of information availability, integrity and confidentiality.

Service: is set of functions offered to a user by an organisation.

Service Control: is the ability of the user, home environment or serving environment to determine what a particular service does, for a specific invocation of that service, within the limitations of that service.

Serving Network: the serving network provides the user with access to the services of home environment.

Subscriber: the responsibility for payment of charges incurred by one or more users may be undertaken by another entity designated as a subscriber. This division between use of and payment for services has no impact on standardisation.

Supplementary service: is a service which modifies or supplemen3GPP TS a basic telecommunication service. Consequently, it cannot be offered to a customer as a standalone service. It must be offered together with or in association with a basic telecommunication service. The same supplementary service may be common to a number of telecommunication services.

Teleservice: is a type of telecommunication service that provides the complete capability, including terminal equipment functions, for communication between users according to standardised protocols and transmission capabilities established by agreement between operators.

User: is a logical, identifiable entity which uses services.

User Profile: is the set of information necessary to provide a user with a consistent, personalised service environment, irrespective of the user's location or the terminal used (within the limitations of the terminal and the serving network).

User Equipment: is a combination of mobile equipment (ME) and SIM/USIM.

USIM: User Service Identity Module is an application residing on the IC-Card used for accessing services with appropriate security.

Virtual Home Environment: the virtual home environment is a system concept for personalised service portability between serving networks and between terminals.

3.2   Abbreviations

For the purposes of this TS, the following abbreviations apply:

BER	Bit Error Rate
CN	Core Network
DTMF	Dual Tone Multiple Frequency
ETSI	European Telecommunications Standards Institute
FDD	Frequency Division Duplex
GSM	Global System for Mobile Communications
IMT-2000	International Mobile Telecommunications 2000
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ITU	International Telecommunication Union
LAN	Local Area Network
ME	Mobile Equipment
MMI	Man Machine Interface
MO	Mobile Origination
MT	Mobile Termination
O&M	Operations and Maintenance
PBX	Private Branch eXchange
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
PIN	Personal Identity Number
PNP	Private Numbering Plan
POTS	Plain Old Telephony Service
QoS	Quality of Service
SIM	Subscriber Identity Module
SMS	Short Message Service
TDD	Time Division Duplex
UICC	UM3GPP TS IC Card
UE	User Equipment
USIM	User Service Identity Module
UMTS	Universal Mobile Telecommunications System
VHE	Virtual Home Environment

4   General

4.1   Aims of 3GPP specifications

It shall be capable of delivering audio, text, video and graphics direct to people and provide them with access to the next generation of information based services. It moves mobile and personal communications forward from existing systems, delivering massmarket low-cost digital telecommunication services.

The aims are:

to enable users to access a wide range of telecommunications services, including many that are today undefined as well as multi-media and high data rates.

to facilitate the provision of a high quality of service (particularly speech quality) similar to that provided by fixed networks;

to facilitate the provision of small, easy to use, low cost terminals with long talk time and long standby operation;

to provide an efficient means of using network resources (particularly radio spectrum).

4.2   Standardisation of Service Capabilities

Existing systems have largely standardised the complete se3GPP TS of teleservices, applications and supplementary services which they provide. As a consequence, substantial re-engineering is often required to enable new services to be provided and the market for services is largely determined by operators and standardisation. This makes it more difficult for operators to differentiate their services.

3GPP shall therefore standardise service capabilities and not the services themselves. Service capabilities consist of bearers defined by QoS parameters and the mechanisms needed to realise services. These mechanisms include the functionality provided by various network elements, the communication between them and the storage of associated data. This 3GPP TS provides a conceptual description of a service architecture and architecture requiremen3GPP TS which aim to provide service capabilities. It is intended that these standardised capabilities should provide a defined platform which will enable the support of speech, video, multi-media, messaging, data, other teleservices, user applications and supplementary services and enable the market for services to be determined by users and home environments.

4.3   Efficient Use of Network Resources

Service capabilities shall take account of the discontinuous and asymmetric nature of most teleservices and user applications in order to make efficient use of network resources (particularly radio resources).

Service capabilities shall be provided in a wide range of radio operating environmen3GPP TS (where a radio environment is characterised in terms of propagation environment, mobile equipment relative speeds and traffic characteristics – see [2]). Although 3GPP aims to minimise the number of radio interfaces and to maximise commonality between them, it may utilise several radio interfaces, each optimised for different environments. Each radio interface might provide differing service capabilities. 3GPP specifications include UTRAN radio interface supporting two modes (TDD and FDD)and GERAN radio interface.

3GPP specifications shall provide a mechanism which will enable a piece of user equipment (UE) to adapt to different radio interfaces as necessary and to determine the service capabilities available. The specifications shall also provide a mechanism which will enable a UE to select radio interfaces capable of providing appropriate service capabilities.

4.4   Compatibility with Global Standards

3GPP specifications aim to be compatible with IMT-2000 and to provide global terminal mobility (roaming), enabling the user to take his/her terminal to different regions of the world and to be provided with services. It is probable that different regions of the world will adopt different radio interface technologies. IMT-2000, as a global standard, should therefore enable a IMT-2000 terminal to determine the radio interface technology and the radio interface standard used

in a region. Global terminal roaming also requires the global standardisation of service capabilities. As far as possible the method of indication of the radio interface standard and available service capabilities shall be aligned with IMT-2000.

3GPP specifications shall enable users to access the services provided by their home environment in the same way via any serving network provided the necessary service capabilities are available in the serving network.

The 3GPP specifications will be available for the partner organisations to adopt as their regional standards. For example in Europe, ETSI may adopt them as standards for both GSM and UMTS.

4.5 Virtual Home Environment

The 3GPP specifications aim to provide the user with a comprehensive set of services and features, which have the "same look and feel" wherever they are used. For further information see 3GPP 22.121 [2]. Especially the VHE shall provide for:

> a generic set of services / features and access capabilities, if the required service capabilities are available in the visited network;

> the means for serving network, home environmen3GPP TS and user to re-use existing system capabilities to define their own specific features / services;

> user personalisation of features / services;

> a personalised service set being used via all access and transport networks, subject to physical limitations;

> the ability for the user to have access to personalised services from any suitable UE;

> regional or network based variations, enhancemen3GPP TS to the basic services;

> future evolution of 3GPP specification itself.

4.6 Functionality of Serving Network and Home Environment

The following functionality shall be the responsibility of the home environment:

> User Authentication.

> SIM/USIM Issue.

> Billing.

> User Profile/VHE Management.

The following functionality shall be the responsibility of the serving network:

> Radio or other means of access.

> Transport and signalling.

The following functionality may be the responsibility of either the serving network, the home environment or an appropriate combination of both

> Service Control.

> QoS negotiation.

> Mobility management, including roaming.

> Automatic establishment of roaming agreements.

4.7 PLMN Architecture

The network is logically divided into a radio access network and a core network, connected via an open interface. From a functional point of view the core network is divided into a Packet Switched Domain, and a Circuit Switched Domain.

CS CN domain suppor3GPP TS bearer independent transport. There is no difference in service offering or UE functionality due to different transport.

For further information see 3GPP TS 23.121 [20].

5 Evolution

5.1 Support of 2G services

The 3GPP specifications shall be capable of supporting existing 2G services in a manner which is transparent to the users of these services.

3GPP specifications shall provide some mechanisms which permit 2G users to roam easily onto 3G networks and access at least a minimum set of services. See Figure 4 for clarification.

3GPP specifications shall provide some mechanisms which permit 3G users to roam easily onto 2G systems and access at least a minimum set of services.

5.2 Provision and evolution of services

Since a phased approach has been adopted, the same general service principles shall apply to each phase. Support of services from an end user perspective is understood to be an important driver for established mobile users to stay with their existing operator while taking the new services into use. It is therefore important to enable operators to offer continued support of legacy services in future releases. Previous release services shall as a principle also be supported in the following releases.

Networks shall be capable of providing a specified core set of capabilities.

The core set of capabilities should permit home environment to offer a range of distinctive services including those which cannot be implemented on systems based on previous release specifications.

It shall be possible for the home environment to develop services with full roaming capability.

The radio interface should not unnecessarily restrict the development of new services (within physical limitations).

The standard shall provide a mechanism, which allows a terminal to be easily upgraded so that it can access new services, which are within the physical limitations of the terminal.

6 Principles for new service capabilities

6.1 General

3GPP specifications shall enable the user of a single terminal to establish and maintain several connections simultaneously. It shall efficiently cater for applications which have variable requiremen3GPP TS relating to specific QoS parameters (e.g. throughput) whilst meeting other QoS targets. It shall also cater for applications which are able to take adapt to a range of variations in QoS.

6.2 Multimedia

3GPP specifications shall support development of multimedia services and provide the necessary capabilities.

Multimedia services combine two or more media componen3GPP TS (e.g. voice, audio, data, video, pictures) within one call. A multimedia service may involve several parties and connections (different parties may provide different media components) and therefore flexibility is required in order to add and delete both resources and parties.

Multimedia services are typically classified as interactive or distribution services.

Interactive services are typically subdivided into conversational, messaging and retrieval services:

Conversational services are real time (no store and forward), usually bi-directional where low end to end delays (< 100 ms) and a high degree of synchronisation between media componen3GPP TS (implying low delay variation) are required. Video telephony and video conferencing are typical conversational services."

Messaging services offer user to user communication via store and forward uni3GPP TS (mailbox or message handling devices). Messaging services might typically provide combined voice and text, audio and high-resolution images.

Retrieval services enable a user to retrieve information stored in one or many information centres. The start at which an information sequence is sent by an information centre to the user is under control of the user. Each information centre accessed may provide a different media component, e.g. high resolution images, audio and general archival information.

Distribution services are typically subdivided into those providing user presentation control and those without user presentation control.

Distribution services without user control are broadcast services where information is supplied by a central source and where the user can access the flow of information without any ability to control the start or order of presentation e.g. television or audio broadcast services.

Distribution services with user control are broadcast services where information is broadcast as a repetitive sequence and the ability to access sequence numbering allocated to frames of information enables the user (or the user's terminal) to control the start and order of presentation of information.

6.2.1 Circuit Switched (CS) multimedia calls

The following basic requiremen3GPP TS are be supported for CS multimedia [24]:

CS multimedia shall be based on a 3GPP specific subset of H.324M.

All call scenarios shall be supported, i.e. Mobile Originating and Mobile Terminating call against Mobile, ISDN and PSTN call party.

Single and multiple numbering schemes shall be supported.

Speech fallback to 3GPP TS 11 [14] shall be supported, i.e. if setup of the multimedia call fails the call will be set up as a speech call. At release '99 only fallback case supported is from '3.1kHz Ext. PLMN' to speech.

CS Multimedia call is a Bearer Service, which utilises Synchronous Transparent Data service.

Different bitrates as specified at 22.002 [21] shall be supported.

Supplementary services apply to multimedia calls as for Synchronous Transparent Data service according to 22.004[5].

6.2.2 Multimedia Messaging Service (MMS)

The following basic requiremen3GPP TS are be supported for MMS:

Store-and-forward multimedia messaging service with mobile and non-mobile users [25].

MMS shall be capable of supporting integration of different types of messaging (e.g. fax, SMS, Multimedia, voicemail, e-mail etc.) in a consistent manner.

Streamed and batch delivery for both message download from the network to the terminal, and messages upload from the terminal to the network.

6.2.3 Text Conversation

Global Text Telephony (GTT) is a feature that enables real-time text conversation [28].

- GTT enables real time, character by character, text conversation to be included in any conversational service, Circuit Switched as well as IP based.

- It is possible to use the text component in a session together with other media components, especially video and voice.

- Interworking with existing text telephony in PSTN as well as emerging forms of standardised text conversation in all networks is within the scope of this feature.

- The text media component can be included initially in the session, or added at any stage during the session.

- The text component is intended for human input and reading, and therefore suppor3GPP TS human capabilities in text input speed. The character set support is suitable for the languages the users communicate in.

- GTT specifies limited interoperation with Multimedia Messaging Services including a possibility to divert to messaging in case of call failure and sharing user interface equipment and external UE interfaces.

6.3 Service Management Requirements

3GPP specifications shall include standardised protocols enabling service management. It shall enable control, creation and subscription of service capabilities and services, and the management of user profiles.

7 Service architecture

In order to provide standardisation of service capabilities a service architecture shown by Figure 2 is envisaged
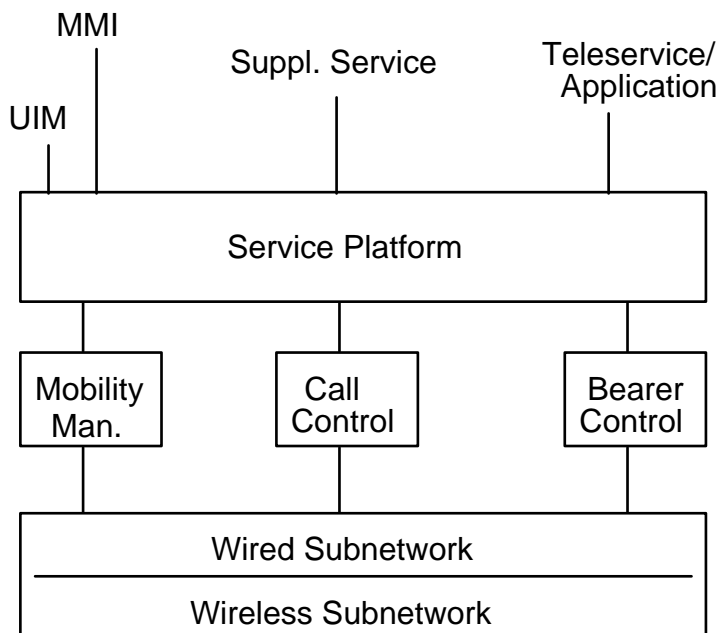
Figure 2: Service Architecture

A number of bearers shall be provided that can differ in flexibility and offer different capabilities. Bearers may be characterised by parameters such as "throughput", "delay tolerance", "maximum bit error rate", "symmetry" etc. These bearers enable information to be transferred appropriate to the provision of teleservices, and end user applications generally, via subnetworks which typically provide different specified qualities of service.

The assignment and release of bearers is provided by the bearer control function. Provision should be made for several bearers to be associated with a call and for bearers to be added to a call and/or to be released from a call following call establishment. The bearers should be independent of radio environments, radio interface technology and fixed wire transmission systems.

Adaptation/Interworking functions are required in order to take account of the differences between the bearers used for the provision of a teleservice/application in the fixed network and the bearers. Adaptation/Interworking functions are required which take account of the discontinuous and/or asymmetrical nature of most teleservices/applications.

The service platform shall provide interfaces (to serving networks and home environments) appropriate to the support, creation and control of supplementary services, teleservices and user applications. The service platform will also provide interfaces enabling subscribers to control supplementary services, teleservices and user applications.

Supplementary service provision and control will be independent of radio operating environment, radio interface technology and fixed wire transmission systems.

As far as possible, the service platform is required to enable new supplementary services, teleservices and/or end user applications to be supported at minimum cost, with minimum disruption of service and within the shortest possible time.

8 Quality of Service (QoS)

The Quality of Service (QoS) parameters should be identified together with appropriate parameter values which set targe3GPP TS to be reached when designing 3GPP specifications, and which also will serve as guidelines for network design and service provision.

The QoS for call set-up time, as an example, can be defined in terms of a mean value and as a percentage of cases which should not exceed a certain time limit. Further information can be found in 3GPP 3GPP TS 22.105[1].

9 Emergency Calls

9.1 General requirements

It shall be possible to establish an emergency speech call. Emergency calls will be routed to the emergency services in accordance with national regulations for where the subscriber is located. This may be based upon one or more default numbers stored in the ME. It shall be allowed to establish an emergency call without the need to dial a dedicated number to avoid the mis-connection in roaming case, such as menu, by use of a 'red button', or a linkage to a car air bag control. Emergency Calls shall be supported by the UE without a SIM/USIM being present. No other type than Emergency calls shall be accepted without a SIM/USIM.

The Emergency call teleservice is required only if the UE suppor3GPP TS telephony.

  Note: It will be left to the national authorities to decide whether the network should accept emergency calls without the SIM/USIM.

It shall be possible to initiate emergency calls to different emergency call centers, depending on the type of emergency. The following types of emergency calls shall be possible:

- Police

- Ambulance

- Fire Brigade

- Marine Guard

- Mountain Rescue

- Spare, at least [three] different types

When a SIM/USIM is present, subscriber specific emergency call set-up MMI shall be provided. The Home Environment operator shall specify preferred emergency call MMI(s) (e.g. 911 for US citizens or 110, 118 and 119 for Japanese citizens). This shall be stored in the SIM/USIM and the ME shall read this and use any entry of these digi3GPP TS to set up an emergency call. It shall be possible to store more than one instance of this field.

Note: Release '98 and earlier SIM cards have the capability to store additional emergency call set-up MMI. However in many cases this has not been used.

It shall be possible to tie any emergency call number, specified in the preferred emergency call MMI(s) above, to any single emergency call type or to any combination of emergency types. The association between emergency numbers and emergency call type shall be able to be programmed by the Home Environment operator into the SIM/USIM.

Example:

Police (Albania)

Police and Fire Brigade (Greek cities)

Ambulance and Fire Brigade (Belgium)

Police and Ambulance (Italy)

General emergency call, all categories (Sweden)

Fire Brigade (Italy)

Ambulance (Austria)

Note: if the UE does not recognise the emergency call MMI(s) (i.e. the dialled number is not stored in SIM/USIM) but the serving network recognises the dialled number as an emergency call number used in the country, a normal call set up takes place over the radio interface and after the serving network has recognised the emergency number the call is routed as an emergency call.

When a SIM/USIM containing stored emergency numbers is present, only those numbers are identified as emergency numbers, i.e. default emergency numbers stored in the ME are ignored.

The following emergency numbers shall be stored in the ME for use when no emergency numbers are stored in the SIM: 000, 08, 112, 110, 911 and 999.

Note: Emergency numbers stored in the ME, for use when no emergency numbers are stored in the SIM, should not overlap with existing service numbers used by any operator.

The user friendly MMI which specifies the type of emergency directly (e.g. menu) should be supported for use in any (i.e. home or visited) PLMN to avoid the mis-connection in roaming case. This shall be allowed to both with and without SIM/USIM being present.

The following emergency numbers shall be stored in the ME for use without SIM/USIM: 000, 08, 112, 110, 118, 119, 911 and 999.

9.2 Emergency calls when attached to a CS CN Domain

PLMNs shall support an emergency call teleservice as defined in 3GPP TS 22.003 [14] (TS12).

9.3 Emergency Calls when Attached to a Data Only Network

If an UE with voice capability attemp3GPP TS to make an emergency call while camping on a PLMN that does not support voice service to the UE, a new PLMN selection shall immediately take place, and the UE shall select the first available PLMN that suppor3GPP TS emergency calls to the UE.

10 Numbering principles

The following network addressing schemes listed below shall be supported at the relevant domains:

E.164,

E.168,

E.212,

X.121,

Internet (including e.g. IP address).

10.1 Number portability

10.1.1 Requiremen3GPP TS for CS CN domain

Some numbering schemes shall be fully independent of the supporting serving network and the home environment, allowing users to transfer this number to another home environment. For further information see 3GPP TS 22.066 [7].

An MSISDN shall be allocated to each new user at the start of a subscription. This number may be allocated from one of several numbering domains. For example:

home / serving environment numbering scheme;

national numbering scheme;

regional numbering scheme;

global numbering scheme.

A user shall be able to move subscription from one home environment to another without changing the MSISDN provided that the new home environment offers service in the same geographic domain. It is envisaged that home environment s will be able to allocate MSISDNs from each of these domains as required.

10.1.2 Requiremen3GPP TS for PS CN domain

None identified.

10.2 Evolution path

Since 3GPP specifications aim to be aligned with IMT-2000, a primary goal in numbering is the provision of global user numbering in line with steps taken by the ITU – SG2.

The numbering scheme and network implementation chosen shall allow for international/global evolution.

10.3 User / USIM Identification

It is a requirement that the user can be uniquely identified by the home environment from which the service is being obtained. This identification may be unknown to the serving network on which the user is roaming.

Serving networks need to be able to communicate with, authenticate and commercially deal with the home environment associated with any SIM/USIM being registered on their network. This shall require a SIM/USIM identity scheme which uniquely identifies each SIM/USIM, and a mapping scheme which allows the USIM identity to be used as a identifier with the "owning" home environment.

Serving networks also require to be able to route efficiently any communication to and from SIM/USIMs (or rather the devices on which they are registered). An address scheme is therefore required for operators to access and map any outgoing or incoming communication to SIM/USIMs and thus devices on their networks

It shall be possible for several numbers to be associated with a single subscription on a single UICC.

10.4 Terminal Identification

It is a requirement that the terminal can be uniquely identified by the home environment and serving network. This shall require a terminal identity scheme which uniquely identifies each terminal, see 3GPP TS 22.016[12].

10.5 Home Environment / Serving Network Identification

Serving networks need to be able to communicate with, authenticate and commercially deal with the home environment associated with any SIM/USIM being registered on their network. This shall require a SIM/USIM identity scheme which uniquely identifies each SIM/USIM, and a mapping scheme which allows the SIM/USIM identity to be used as a identifier with the "owning" home environment.

Home / serving environmen3GPP TS need to route communication to the current location of the user. This shall require a identity scheme which uniquely identifies the serving environment and shall be used for routing purposes.

10.6 Private numbering

A user may wish to use private numbers for the purposes of calling frequent numbers. Therefore there is a requirement for the use, by the user, of Private Numbering Plans (PNPs). These schemes may belong to the user himself, to a home environment or a third party.

10.7 Numbering schemes

10.7.1 Multiple numbering scheme

The standards shall support the possiblity of allowing the bearer service associated with an MT call to be implicitly defined by the destination MSISDN, for example to use a different MSISDN to establish voice, fax or data . It will be possible for multiple MSISDNs to be associated with a single subscription.

10.7.2 Single numbering scheme

The standards shall support the possibility of allowing MT calls of different bearer types (eg voice, fax, data) to be routed to a single MSISDN. It is recognised that the implementation of this may depend on the availability of bearer information associated with an incoming call from the adjoining transit network. In particular the standards will support this possibility in the case of an adjoining ISDN transit network.

10.8 Optimal routing for CS CN domain

The implementation of the numbering scheme used shall allow for optimal routing; i.e. routing shall not take place simply on the number dialled. See 3GPP TS 22.079 [8] for some scenarios.

11 Human Factors and user procedures

The User Interface (MMI) from the end-user's point of view should be as flexible as possible while still meeting the general service requirements. In addition it should be capable of being updated so as to meet new services which are still to be envisaged.

In general the following principles should be encompassed:

activation of services should be as simple as possible with minimum input expected from the user;

feedback, to the user from the various services, should be meaningful;

any error recovery procedures provided should be simple to understand and execute.

input from the user and information to the user should be provided in alternative selectable modes in order to match user capabilities, preferences and situation.

However, a detailed specification for the User Interface shall not be defined. In particular given the global nature of the third generation systems, for different regions of the world, different criteria will determine the implementation of the User Interface. Also it is unlikely that there will be a single common handset which will meet all the service requiremen3GPP TS and therefore a common User Interface would be impractical.

Given the flexibility of the services, there should be a wide range of User Interface possibilities. These possibilities include simple terminals with a single on/off button through to complex terminals providing support to hearing/visually impaired users.

Control of supplementary services (3GPP TS 22.004 [5]), may use MMI procedures specified in 3GPP TS 22.030 [6] and existing GSM MMI related UE features (Annex A) may also be used. In particular the following features are highly desirable for uniform UE implementation where appropriate:

- Mapping of numeric keys to European alphabetic keys to ensure compatible mnemonic dialing as defined in 3GPP TS 22.030 [6],

- "+" key function to enable one key international access as defined in Annex A

- Structure of the MMI as described in 3GPP TS 22.030 [6]

- Presentation of IMEI (International Mobile Equipment Identity) as defined in 3GPP TS 22.030 [6]

12 UICC, USIM and Terminal

This clause defines the functional characteristics and requiremen3GPP TS of the User Service Identity Module (USIM). The USIM is an application residing on a UICC.

12.1 The USIM and User Profiles

12.1.1 The SIM/USIM

Every SIM/USIM shall have a unique identity and shall be associated with one and only one home environment.

It shall be possible for a home environment to uniquely identify a user by the SIM/USIM.

The SIM/USIM shall be used to provide security features.

For access to services, provided by PS or CS CN domains, a valid SIM/USIM shall be required.

The SIM/USIM shall be able to support SIM Application Toolkit as specified in 3G 3GPP TS 22.038 [3].

The SIM/USIM shall reside on a UICC, 3GPP specifications shall adopt both of the GSM SIM card physical formats. Other forma3GPP TS may also be supported. SIM/USIM specific information shall be protected against unauthorised access or alteration.

It shall be possible to update USIM specific information via the air interface, in a secure manner.

Figure 4 shows as an example the support of roaming users between GSM and 3G home environment.
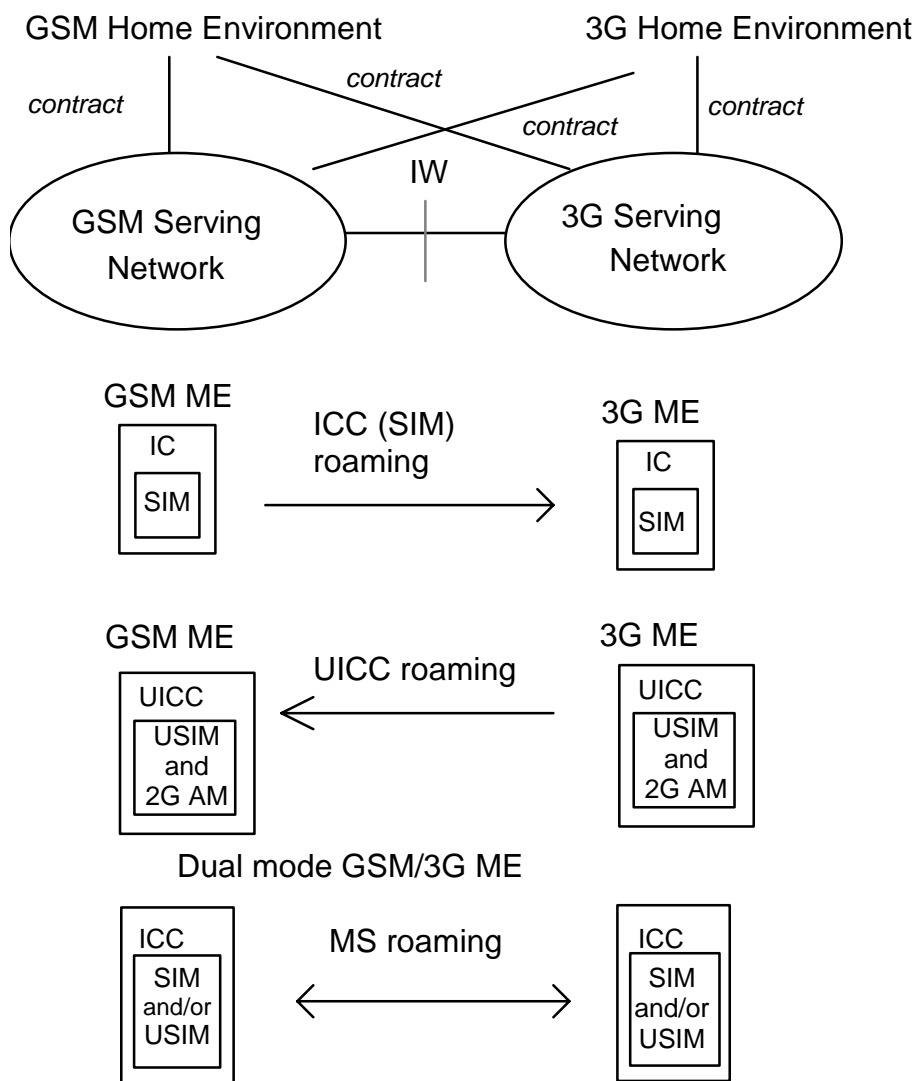
2G AM: 2G Access Module

Figure 4 UICC roaming scenarios

12.1.2   User Profiles

It shall be possible for a user to be associated with one or a number of user profiles, which the user can select and activate on a per call basis. The user profile contains information which may be used to personalise services for the user.

It shall be possible for one or more user profiles associated with the same user to be active simultaneously so that the user may make or receive calls associated with different profiles simultaneously. Activation of profiles shall be done in a secure manner, for example with the use of a PIN.

For terminating calls the correct profile shall be indicated by the user address used (e.g. MSISDN), each profile will have at least one unique user address associated with it. For originating calls the user shall be able to choose from the available profiles, the appropriate one for the call. A profile identity will need to be associated with the call for accounting and billing purposes. User profile identities need not be standardised but a standardised means is required for indicating that a particular profile is being used.

Simultaneous use of the same user profile on multiple terminals for the same type of service shall not be allowed.

User profiles associated with different home environmen3GPP TS shall not share the same user address.

12.1.3 UICC usage in 2G Terminals

It shall be possible to use the UICC in 2G terminals to provide access to GSM networks. In order to achieve that option, it shall be possible to store a module containing 2G access functionalities on the UICC, which shall be accessed via the standard GSM SIM-terminal interface.

12.1.4 Multiple USIMs per UICC

The standard shall support more than one USIM per UICC even when those USIMs are associated with different home environments. Only one of the USIMs or the SIM shall be active at a given time. While the UE is in idle mode, it shall be possible for the user to select/reselect one USIM application amongst those available on the UICC. At switch on, the Last Active USIM shall be automatically selected. The Last Active USIM shall be stored on the UICC. By default if there is no Last Active USIM defined in the UICC, the user shall be able to select the active USIM amongst those available on the UICC.

The standard must not prevent the coexistence of USIM applications, each associated with different home environmen3GPP TS on the same UICC, so long as the security problems which arise from such a coexistence are solved.

12.2 The UICC

Access to services via GSM and 3G networks with a single UICC shall be possible.

12.2.1 The UICC and Applications other than the USIM

It shall be possible for the UICC to host other applications in addition to the USIM, see figure 3. Service providers, subscribers or users may need to establish additional data or processes on the UICC. Each application on an UICC shall reside in i3GPP TS own domain (physical or logical). It shall be possible to manage each application on the card separately. The security and operation of an application in any domain shall not be compromised by an application running in a different domain. Applications may need to use their own security mechanisms which are separate to those specified by 3GPP e.g. electronic commerce applications.

Examples of other UICC applications are: USIM, Phase 2+ SIM, off-line user applications like UPT, electronic banking, credit service, etc.

Applications should be able to share some information such as a common address book.

It shall be possible to address applications, which reside on the UICC, via the air interface.
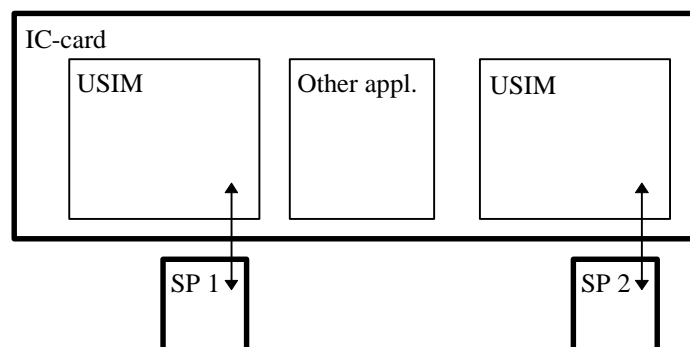

Figure 3 Example of a Multifunction UICC

12.3 Terminals and Multiple UICCs

A single terminal may support the use of multiple UICC (e.g with applications like USIM, SIM and/or banking, credit card,…). Only one UICC shall be active at a time to access a PLMN. In case the active UICC contains more than one USIM or SIM, the requiremen3GPP TS of 11.1.4 shall apply.

If the UICC with the active USIM or SIM is removed from the mobile terminal during a call (except for emergency calls), the call shall be terminated immediately.

13 Types of features of Ues

3GPP specifications should support a wide variety of user equipment, i.e. setting any limitations on terminals should be avoided as much as possible. For example user equipment like hand-portable phones, personal digital assistan3GPP TS and laptop computers can clearly be seen as likely terminals.

In order not to limit the possible types of user equipment they are not standardised. The UE types could be categorised by their service capabilities rather than by their physical characteristics. Typical examples are speech only UE, narrowband data UE, wideband data UE, data and speech UE, etc..

In order to enhance functionality split and modularity inside the user equipment the interfaces of UE should be identified. Interfaces like UICC-interface, PCMCIA-interface and other PC-interfaces, including software interfaces, should be covered by references to the applicable interface standards.

Ues have to be capable of supporting a wide variety of teleservices and applications provided in PLMN environment. Limitations may exist on Ues capability to support all possible teleservices and information types (speech, narrowband data, wideband data, video, etc.) and therefore functionality to indicate capabilities of a UE shall be specified.

The basic mandatory UE requiremen3GPP TS are:

- Support for GSM phase 2 and 2+ SIM cards, phase 1 5V SIM cards shall not be supported;

- Home environment and serving network registration and deregistration;

- Location update;

- Originating or receiving a connection oriented or a connectionless service;

- An unalterable equipment identification; IMEI, see 3GPP TS 22.016 [12];

- Basic identification of the terminal capabilities related to services such as; the support for software downloading, application execution environment/interface, MexE terminal class, supported bearer services.

- Terminals capable for emergency calls shall support emergency call without a SIM/USIM.

- Support for the execution of algorithms required for encryption, for CS and PS services. Support for non encrypted mode is required;

- Support for the method of handling automatic calling repeat attempt restrictions as specified in 3GPP TS 22.001 [4];

- At least one capability type shall be standardised for mobile terminals supporting the GERAN and UTRAN radio interfaces.

- Under emergency situations, it may be desirable for the operator to prevent UE users from making access attemp3GPP TS (including emergency call attempts) or responding to pages in specified areas of a network, see 3GPP TS 22.011 [11];

- Ciphering Indicator for terminals with a suitable display;

    The ciphering indicator feature allows the ME to detect that ciphering is not switched on and to indicate this to the user. The ciphering indicator feature may be disabled by the home network operator setting data in the SIM/USIM. If this feature is not disabled by the SIM, then whenever a connection is in place, which is, or becomes unenciphered, an indication shall be given to the user. Ciphering itself is unaffected by this feature, and the user can choose how to proceed;

- Support for PLMN selection.

- Support for handling of interactions between toolki3GPP TS concerning the access to UE MMI input/output capabilities;

Whenever an application (e.g. a SAT/MExE/WAP application) requires the access to the UE MMI input/output capabilities (e.g. display, keyboard,…), the UE shall grant this access subject to the capabilities of the UE. This shall not cause the termination of any other applications (e.g. WAP browser or MExE/SAT application) which were previously using these UE resources. The UE shall give the user the ability to accept or reject the new application. In the case that the application request is rejected, the access to the UE MMI input/output capabilities is returned to the applications which were previously using these UE resources. If the user decides to continue with the new application, then when this new application is terminated, the access to the UE MMI input/output capabilities shall be returned to the UE to be re-allocated to applications (e.g. the preceding application which was interrupted). Subject to the capabilities of the UE, the user shall have the ability to switch the MMI input/output capabilities between applications.

Note: Rejecting a request to access the UE MMI input/output capabilities by an application does not necessarily mean that it is terminated, but only that the access to the UE MMI input/output capabilities are not granted to this application. Handling of rejection (termination, put on hold,…) is the responsibility of the application.

Annex A describes a number of features, which may optionally be supported by the ME.

14   Charging principles

The cost of the call may cover the cost of sending, transporting, delivery and storage. The cost of call related signalling may also be included. Provision shall be made for charging based on time, destination, location, volume, bandwidth and quality. Charges may also be levied as a result of the use of value added services.

It shall be possible for information relating to chargeable even3GPP TS to be made available to the home environment at short notice. The requiremen3GPP TS shall include:

Immediately after a chargeable event is completed;

At regular intervals of time, volume or charge during a chargeable event.

Standardised mechanisms of transferring charging information are required to make these requiremen3GPP TS possible.

It should be possible for multiple leg calls (e.g. forwarded, conference or roamed) to be charged to each party as if each leg was separately initiated. However, in certain types of call, the originating party may wish/be obliged to pay for other legs (e.g. SMS MO may also pay for the MT leg.).

Provision shall be made for the chargeable party to be changed during the life of the call. There shall be a flexible billing mechanism which may include the use of stored value cards, credit cards or similar devices.

The chargeable party (normally the calling party) shall be provided with an indication of the charges to be levied (e.g. via the called number automatically or the Advice of Charge supplementary service) for the duration of the call (even though the user may change service environment)The user shall be able to make decisions about the acceptable level of accumulated charge dynamically or through their service profile.

If a user is to be charged for accepting a call then their consent should be obtained. This may be done dynamically or through their service profile.

15 Handover Requirements

Any handover required to maintain an active service while a user is mobile within the coverage area of a given network, shall be seamless from the user's perspective. However handovers that occur between different radio environmen3GPP TS may result in a change of the quality of service experienced by the user.

It shall be possible for users to be handed over between different networks subject to appropriate roaming/commercial agreements.

For further information see 3GPP TS 22.129 [9].

16 Network Selection

Network selection procedures are defined in 3GPP TS 22.011 [11].

Other procedures may be offered by the UE.

17 Security

Security matters are considered in 3GPP TS 21.133 [15] and 3GPP TS 33.120 [16].

Annex A (normative):
Description of optional user equipment features

A.1 Display of called number

This feature enables the caller to check before call setup whether the selected number is correct.

A.2 Indication of call progress signals

Indications shall be given such as tones, recorded messages or visual display based on signalling information returned from the PLMN. On data calls, this information may be signalled to the DTE.

Call progress indicators are described in 3GPP 3GPP TS 22.001 [4].

A.3 Country/PLMN indication

The country/PLMN indicator shows in which PLMN the UE is currently registered. This indicator is necessary so that the user knows when "roaming" is taking place and that the choice of PLMN is correct. Both the country and PLMN will be indicated. When more than one visited PLMN is available in a given area such information will be indicated.

The PLMN name is either:

- stored in the ME and associated with the MCC+MNC combination received on the broadcast channel;

- NITZ (see 22.042 [17]) (in which case it overrides the name stored in the UE);

- stored in the USIM and associated with the MCC+MNC combination received on the broadcast channel (in which case it overrides the name stored in the UE and – if present – the NITZ name).

The PLMN name stored in the USIM has the highest priority, followed by the PLMN name provided by NITZ. The PLMN name stored in the ME has the lowest priority.

A.3.1 Service Provider Name indication

When the UE is in idle mode and the broadcasted network identification is identical to the respective entry on the USIM, the UE shall display the service provider name. The service provider name is stored in the USIM in text and/or optionally graphic format.

It shall be possible to indicate on the USIM at least 10 network identifications in which the service provider name shall be displayed.

In addition it shall be possible to indicate on the USIM whether the radio connectivity provider name (network operator), if different from the service provider, is also displayed in parallel with the service provider name.

When roaming, i.e. the broadcasted network identification does not match the respective entry on the USIM or the entries in which networks only the service provider should be displayed, and the UE is in idle mode, the visited network operator name shall always be displayed. As an option the service provider name can be also displayed in parallel to the visited network operator name.

A.4 Keypad

A physical means of entering numbers, generally, though not necessarily, in accordance with the layout shown in figure A.1.

See also 3GPP TS 22.030 [6] (Man-Machine Interface).

Additional keys may provide the means to control the UE (e.g. to initiate and terminate calls).

```
┌─────────────────────────────────────────┐
│                                          │
│                                          │
│     1              2              3       │
│                                          │
│     4              5              6       │
│                                          │
│     7              8              9       │
│                                          │
│     *              0              #       │
│                                          │
│                                          │
└─────────────────────────────────────────┘
```

Figure A.1

A.5 Short message indication and acknowledgement

This feature allows the delivery of short messages to a UE from a service centre. Such messages are submitted to the service centre by a telecommunications network user who can also request information of the status of the message by further interrogation of the service centre. The service centre then transmi3GPP TS the message to an active UE user.

The UE must therefore provide an indication to the user that a message has been received from the service centre and must also send an acknowledgement signal to the PLMN to show that this indication has been activated. The PLMN then returns this acknowledgement to the service centre.

The short message service teleservice is described in specification 3GPP TS 22.003 [14].

A.6 Short message overflow indication

An indication shall be given to the user of the short message service when an incoming message cannot be received due to insufficient available memory.

A.7 International access function

Provision is made for a direct, standard method of gaining international access. For this purpose the UE may have a key whose primary or secondary function is marked "+". This is signalled over the air interface and would have the effect of generating the international access code in the network. It may be used directly when setting up a call, or entered into the memory for abbreviated dialling.

This feature is of benefit since the international access code varies between CEPT countries, which might cause confusion to a user, and prevent the effective use of abbreviated dialling when roaming internationally. Users may still place international calls conventionally, using the appropriate international access code.

A.8 Service Indicator (SI)

An indication is given to the user that there is adequate signal strength (as far as can be judged from the received signal) to allow a call to be made.

A.9 Dual Tone Multi Frequency (DTMF)

The UE shall be capable of initiating DTMF in accordance with specifications 3GPP TS 22.003 [14]. Optionally, the UE may provide a suppress function which allows the user to switch off the DTMF function.

A.10 On/Off switch

The UE may be provided with a means of switching i3GPP TS power supply on and off. Switch-off shall be "soft", so

that on activation, the UE completes the following housekeeping functions: termination of a current call, detach (where applicable) and storing required data in the SIM/USIM before actually switching off. As far as possible, this procedure should also apply on power failure (e.g. remote switch-off or low battery).

A.11 Sub-Address

This feature allows the mobile to append and/or receive a sub-address to a Directory Number, for use in call set-up, and in those supplementary services that use a Directory Number.

A.12 Short Message Service Cell Broadcast

The Short Message Service Cell Broadcast enables the mobile equipment to receive short messages from a message handling system.

The short message service cell broadcast teleservice is described in specification 3GPP TS 22.003 [14]

A.13 Short Message Service Cell Broadcast DRX

This feature enables a mobile equipment to save on battery utilization, by allowing the mobile equipment to not listen during the broadcast of messages the subscriber is not interested in.

A.14 Support of the extended Short message cell broadcast channel

This feature allows a mobile equipment by supporting of the extended Short message cell broadcast channel to enhance the capacity of the service. The support of the extended channel has low priority, i.e. the UE can interrupt the reading of this channel if idle mode procedures have to be executed.

A.15 Network Identity and Timezone

The feature provides the means for serving PLMNs to transfer current identity, universal time and the local timezone to mobile equipments, and for the mobile equipmen3GPP TS to store and use this information. This enhances roaming by permitting accurate indication of PLMN identities that are either newer than the ME or have changed their name since the ME was sold. Additionally time and timezone information can be utilized by Mes as desired.

The network name time and timezone information will normally be transferred from the network to the ME:

1) Upon registering on the network.

2) When the UE geographically relocates to a different Local Time Zone.

3) When the network changes i3GPP TS Local Time Zone, e.g. between summer and winter time.

4) When the network changes i3GPP TS identity.

5) At any time during a signalling connection with mobile equipment.

Further details of this feature are described in 3GPP TS 22.042 [15].

A.16 Network's indication of alerting in the UE

This feature provides the means for serving PLMNs to transfer to a UE an indication that may be used by the UE to alert the user in a specific manner in the following cases:

- mobile terminating call

- network initiated USSD

- network initiated Mobile Originated (MO) connection, if the ME suppor3GPP TS the "network initiated MO connection " feature.

Eight different indications are defined, whether the mobile terminating traffic is a call or USSD or related to the network initiated MO connection procedure. These indications are sent by the network and received by the UE:

- Three of these indications are used as levels, reflecting some kind of urgency: level 0 indicates that the UE shall not alert the user for USSD and remain silent in the case of call, level 2 shall be considered by the UE as more important than level 1 for the purpose of alerting the user.

- The five other indications are used as categories, identifying different types of terminating traffic. The UE shall inform the user in a specific manner for each of these five categories. Nevertheless, the possible forms of the alert (different ringing tones, displayed text, graphical symbols…) is still up to the mobile manufacturer (some forms of aler3GPP TS can be simultaneously used, e.g. ringing tones and text on the display).

The management of the feature by the UE requires for the handling of categories that :

- The SIM/USIM stores for each category an informative text (maximum 25 characters per category) describing the type of terminating traffic associated with the category. This information could be used by the UE when alerting the user (display on the screen). It is necessary for the network operator to be able to change the meaning of each category.

- The user has the ability to set up his/her own association between the type of terminating traffic (identified by each category) and the different types of alert provided by the UE. To help the user in this choice, the UE uses the informative text associated with each category (as stored in the SIM/USIM). The UE should keep this association when switched off.

  Default settings should also be defined in the ME for the following cases :

  - when the UE receives a call, USSD or a request for a network initiated MO connection with no alerting indication,

  - when the UE receives a call, USSD or a request for a network initiated MO connection with a category of alerting not defined in the SIM/USIM.

  These default settings should be separated per type of mobile terminated traffic received (call, USSD or request for a network initiated MO connection).

A UE supporting the feature shall act according to the following poin3GPP TS in case of mobile terminating traffic :

- when a mobile terminating traffic is received without any indication (level or category), the ME shall act as if it was not supporting the feature, i.e. use a default alert (e.g. associated with this type of mobile terminating traffic).

- if a level is indicated, the UE shall use an alert enabling the user to differentiate between the three levels.

- if a category is indicated, then :

  - if the SIM/USIM used in the UE does not store any information on that feature, the UE shall ignore the category received with any mobile terminating traffic and act as if it was not supporting the feature, i.e. use a default alert (e.g. associated with this type of mobile terminating traffic).

  - if the category is not defined in the SIM/USIM, the UE shall act as if it was not supporting the feature, i.e. use a default alert (e.g. associated with this type of mobile terminating traffic).

  - if the category is defined in the SIM/USIM, the UE shall use the alert associated with this category. In addition, it would be very useful for the user to be notified of the informative text associated with this category (e.g on the display).

Some interactions between this feature and other services related to alerting are described below :

- the call waiting service has priority on this feature, i.e. the call waiting tone will be played and not the alert derived by this feature. If possible, two different indications should be given to the user (e.g. the call waiting tone and a text on the display indicating call waiting, and in addition a text relative to the type of the new call received).

- the presentation of the calling line identity takes priority on this feature, if it is not possible to display this information and another information related to this feature.

- In case of interaction between this feature and UE specific features to alert the user (e.g. whole silent mode), the user should still be able to differentiate between the different levels or different types of terminating traffic, even if the alert itself may be changed.

A.17　Network initiated Mobile Originated (MO) connection

The "Network Initiated Mobile Originated connection" feature allows the network to ask the mobile equipment to establish a mobile originated connection. The serving PLMN provides the mobile equipment with the necessary information which is used by the mobile equipment to establish the connection.

Currently only the network initiated mobile originated call feature is specified. It is mandatory for a UE supporting CCBS and is used in the case of a CCBS recall.

A.18　Abbreviated dialling

The directory number or part of it is stored in the mobile equipment together with the abbreviated address. After retrieval the directory number may appear on the display.

Abbreviated dialling numbers stored in the UE or SIM/USIM may contain wild characters.

If wild characters are used to indicate missing digits, each wild character shall be replaced for network access or supplementary service operation, by a single digit entered at the keypad. The completed directory number is transmitted on the radio path.

A.19　Barring of Dialled Numbers

This feature provides a mechanism so that by the use of an electronic lock it is possible to place a bar on calling any numbers belonging to a pre-programmed list of numbers in the SIM/USIM.

Barred Dialling Numbers stored in the /USIM may contain wild characters.

Under control of PIN2, "Barred Dialling Mode" may be enabled or disabled. The selected mode is stored in the SIM/USIM.

Under PIN2 control, it shall be possible to add, modify or delete a particular "Barred Dialling Number" (BDN) and to allocate or modify i3GPP TS associated comparison method(s). This BDN may have the function of an abbreviated dialling number / supplementary service control (AND/SSC), overflow and/or sub-address.

When BDN is inactive, no special controls are specified, and the barred dialling numbers may be read (though not modified or deleted, except under PIN2 control) as if they were normal abbreviated dialling numbers. Access to keyboard and normal abbreviated dialling numbers (including sub-address) is also permitted.

When Barring of Dialled Numbers is active:

- Considering a number dialled by the user, if it exis3GPP TS a BDN for which there is a successful comparison (see below) between that BDN and the dialled number, then the ME shall prevent the call attempt to that number. If there is no BDN to fulfil those conditions, the call attempt is allowed by the ME.

With each BDN is associated one (or a combination of) comparison method(s) used between that BDN and the number dialled by the user. At least three different comparison methods are possible:

- The comparison is made from the first digit of that BDN, from the first digit of the dialled number and for a number of digi3GPP TS corresponding to the length of the BDN.

- The comparison is made from the first digit of that BDN, from any digit of the dialled number and for a number of digi3GPP TS corresponding to the length of the BDN.

- The comparison is made backwards from the last digit of that BDN, from the last digit of the dialled number and for a number of digi3GPP TS corresponding to the length of the BDN.

- If a BDN stored in the SIM/USIM contains one or more wild characters in any position, each wild character shall be replaced by any single digit when the comparison between that BDN and the dialled number is performed.

- If a BDN contains a sub-address, and the same number without any sub-address or with that sub-address is dialled, the ME shall prevent the call attempt to that number.

- Numbers specified as "barred" may only be modified under PIN2 control.

- If the ME does not support barring of dialled numbers, the UE shall not allow the making or receiving calls. However, this feature does not affect the ability to make emergency calls.

If "Fixed Number Dialling" and "Barring of Dialled Numbers" are simultaneously active, the dialled number shall be checked against the two features before the ME allows the call attempt. In that case, a dialled number will only be allowed by the ME if it is in the FDN list and if the comparison between that number and any number from the BDN list is not successful.

The UE may support other selective barrings, e.g. applying to individual services (e.g. telephony, data transmission) or individual call types (e.g. long distance, international calls).

A.20 DTMF control digi3GPP TS separator

Provision has been made to enter DTMF digi3GPP TS with a telephone number, and upon the called party answering the UE shall send the DTMF digi3GPP TS automatically to the network after a delay of 3 seconds (± 20 %). The digi3GPP TS shall be sent according to the procedures and timing specified in GSM 04.08 [13].

The first occurrence of the "DTMF Control Digi3GPP TS Separator" shall be used by the ME to distinguish between the addressing digi3GPP TS (i.e. the phone number) and the DTMF digits. Upon subsequent occurrences of the separator, the UE shall pause again for 3 seconds (± 20 %) before sending any further DTMF digits.

To enable the separator to be stored in the address field of an Abbreviated Dialling Number record in the SIM/USIM, the separator shall be coded as defined in 3GPP TS 31.102 [19]. The telephone number shall always precede the DTMF digi3GPP TS when stored in the SIM/USIM.

The way in which the separator is entered and display in the UE, is left to the individual manufacturer's MMI.

Mes which do not support this feature and encounter this separator in an AND record of the SIM/USIM will treat the character as "corrupt data" and act accordingly.

A.21 Selection of directory number in messages

The Short Message (Point to Point MT or MO, or Cell Broadcast), Network Initiated USSD or Network Response to Mobile Originated USSD message strings may be used to convey a Directory Number which the user may wish to call. This can be indicated by enclosing the directory number in a pair of inverted commas (" ").

If the displayed message contains these characters enclosing a directory number, a call can be set up by user action. Normal (unspecified) or International format (using + symbol) may be used.

The message may contain more than one directory number, in which case it is for the user to select the one required.

A.22 Last Numbers Dialled (LND)

The Last "N" Numbers dialled may be stored in the SIM/USIM and/or the ME. "N" may take the value up to 10 in the SIM/USIM. It may be any value in the ME. The method of presentation of these to the user for setting up a call is the responsibility of the UE but if these numbers are stored in both the SIM/USIM and the UE, those from the SIM/USIM shall take precedence.

A.23 Service Dialling Numbers

The Service Dialling Numbers feature allows for the storage of numbers related to services offered by the network operator/service provider in the SIM/USIM (e.g. customer care). The user can use these telephone numbers to make

outgoing calls, but the access for updating of the numbers shall be under the control of the operator.

NOTE: No MMI is envisaged to be specified for these numbers and it is left to mobile manufacturer
         implementations.

A specific example of Service Dialling Numbers is the storage of mailbox dialling numbers on the SIM/USIM for access to mailboxes associated with Voicemail, Fax, Electronic Mail and Other messages.

A.24   Fixed number dialling

This feature provides a mechanism so that by the use of an electronic lock it is possible to place a bar on calling any numbers other than those pre-programmed in the SIM/USIM.

Under control of PIN 2, "Fixed Dialling Mode" may be enabled or disabled. The mode selected is stored in the SIM/USIM.

Fixed Dialling Numbers (FDNs) are stored in the SIM/USIM in the Fixed Dialling Number field. FDN entries are composed of a destination address/Supplementary Service Control. Destination addresses may have the format relevant to the bearer services/teleservices defined in [21] and [14]. FDN entries may take the function of an Abbreviated Dialling Number/Supplementary Service Control (AND/SSC), Overflow and/or sub-address. Fixed Dialling Numbers stored in the SIM/USIM may contain wild card characters.

The Fixed Dialling feature is optional, however when Fixed Dialling Mode is enabled, an ME supporting the feature shall;

- Prevent the establishment of bearer services/teleservices to destination addresses which are not in FDN entries on a per bearer service/teleservice basis. The list of bearer services/teleservices excluded from the FDN check shall be stored in the SIM/USIM. Those bearer services/teleservices are characterised by their service code as described in [23]. For instance if the SMS teleservices is indicated in this list, SMS can be sent to any destination. By default, the ME shall prevent the establishment of any bearer service/teleservice to destination addresses which are not in FDN entries.

- Only allow modification, addition or deletion of Fixed Number Dialling entries under control of PIN2.

- Allow the establishment of bearer services/teleservice to destination addresses stored in FDN entries. For SMS, the Service Center address and the end-destination address shall be checked.

- Support the reading and substitution of wildcards in any position of an FDN entry, via the ME MMI.

- Allow the user to replace each wildcard of an FDN entry by a single digit, on a per call basis without using PIN2. The digit replacing the wildcard may be used for network access or supplementary service operation.

- Only allow Supplementary Service (SS) Control (in Dedicated or Idle mode) if the SS control string is stored as an FDN entry.

- Allow the extension of an FDN entry by adding digi3GPP TS to the Fixed Dialling number on a per call basis.

- Allow the emergency numbers (see Section 8.4) to be called, even if it is not an FDN entry.

- Allow normal access to AND fields (i.e. allow AND entries to be modified, added or deleted) and the keyboard.

- Allow use of ADNs subject to the FDN filter.

When FDN is disabled, an ME supporting FDN shall;

- Allow FDN entries to be read as though they were normal AND entries.

- Only allow modification, addition or deletion of Fixed Number Dialling entries under control of PIN2.

- Allow normal access to AND fields and the keyboard.

If the ME does not support FDN, the UE shall not allow the making or receiving of calls when Fixed Dialling is enabled. However, emergency calls (112 and other user defined emergency numbers) shall still be possible.

NOTE: Wildcards are stored on the SIM/USIM. The wildcard coding is given in 3GPP TS 31.102 [19].

A.25 Message Waiting Indication

A short message may be used to provide and indication to the user about the status and number of types of messages waiting on systems connected to the PLMN. The ME shall present this indication as an icon on the screen, or other MMI indication, and store the indication status on the SIM/USIM to allow the status to be retained through power off/on, SIM/USIM movement between UEs etc.

The ME shall be able to accept and acknowledge these message waiting status short messages irrespective of the memory available in the SIM/USIM.

Annex B (informative): Change history

Meeting No.	Tdoc. No.	CR. No.	Section affected	New version	Subject/Comments
					Change history
SMG#22	302/97	001	4.6 (Role Model)	3.1.0	SMG3 queried the separation of network operator into core and access, which, on examination, SMG1 find unhelpful
SMG#22	319/97 (SMG1 WPC 125/97)	002		3.1.0	Editorial Changes: FLMP3GPP TS was replaced by IMT 2000, 2 new references given, additional clarifications.
SMG#22	320/97	003	8.5, 9.3, 9.5, 17	3.1.0	Changes on Emergency Calls, User identification, Multiple profiles and additional handover requirements.
After SMG#23	SMG1 433u/97 965/97	004		Draft 3.2.0	Based on Approved Changes at SMG#22 Distributed at SMG1 in Dresden Nov 3-7, 97 to be Approved at SMG#24
SMG#24	966/97	005	Sections 8, 9, 11	3.2.1	Restructuring of sections 8,9 and 11 to gather all requiremen3GPP TS relating to multiple subscriptions into one section and to improve the clarity.
SMG#24	967/97	006	Section 8.1	3.2.1	To improve the accuracy of text on numbering principles and minor editorial change to section 8.1
SMG#27	98-0551	007	Section 4.6 and misc.	3.3.0	Removal of commercial role model from the specification in order to improve clarity
SMG#27	*98-0552 (Not Approved)*	*008*	*New Section 18 (Not Applied)*	*3.3.0*	*To include requiremen3GPP TS for network selection in service principles: NOT APPROVED > NOT APPLIED*
Pre-SMG#28	*(SMG1 Tdoc 98-0893)* 99-040	008 r4 Rejected	New Section 18 Applied	[Draft 3.4.0]	Added Network Selection section – Agreed by correspondence – Jan 13, 1999 – Prepared with CRs applied with revision marks
SMG#27	98-0553	009	Section 4.3	3.3.0	To remove unnecessary reference to IN and B-ISDN
SMG#27	98-0682	010	Section 11	3.3.0	To improve the clarity of service requiremen3GPP TS for multiple user profiles
Pre-SMG#28	*(SMG1 Tdoc 98-0869)* 99-040	011	Sections 1, 2, 3, 4, 9, 10, 12, 17	Draft 3.4.0	Clean up for UM3GPP TS phase 1 Agreed at SMG1 Rome
Pre-SMG#28	*(SMG1 Tdoc 98-852)* 99-040	012	Sections 3,8,9,11,14,15	Draft 3.4.0	Changes in IC card and terminal service requiremen3GPP TS Agreed at SMG1 Rome
Pre-SMG#28	*(SMG1 Tdoc 98-0894)* 99-040	013r1	Section 3.2 & 4.3	Draft 3.4.0	Clarification of general requiremen3GPP TS for efficient use of radio resources Agreed by correspondence – Jan 13, 1999 – Prepared with CRs applied with revision marks
NOTE				Draft 3.4.0	SMG1 agreed only
pre-SMG#28	99-040	015 Rejected	17	Draft 3.4.0	According to the outcome of the SMG 1 ad-hoc meeting on handover issues it is proposed that inter-operator handover is not required for UM3GPP TS phase 1.(rejected by smg#28)

Meeting No.	Tdoc. No.	CR. No.	Section affected	New version	Subject/Comments
SMG#28	99-305	008r5	Revised Section 18	3.4.0	Network Selection presented at SMG#28 in 2201_008r4 was further revised and Approved at SMG#28.
NOTE				3.4.0	Removal of Section 12 on UPT with CR 011 causes a skip section from Section 11 to 13.

Change history

TSG SA#	SA Doc.	SA1 Doc	Spec	CR	Rev	Rel	Cat	Subject/Comment	Old	New	WI
SP-03	SP-99104	S1-99202	22.101	A016		R99	B	Control of supplementary services (GSM 02.04), may use MMI procedures specified in GSM 02.30 and existing GSM MMI related MS features (GSM 02.07) may also be used.	3.4.0		
Post-SA#3			22.101			R99		Updated Logo, …	3.5.0	3.5.1	
SP-04	SP-99229	S1-99387	22.101	021		R99	B	MultiNumbering: It will be possible for multiple MSISDNs to be associated with a single subscription.	3.5.0	3.6.0	
SP-04	SP-99226	S1-99395	22.101	020	7	R99	B	Emergency: To route the call to the appropriate emergency service if more than one emergency number is supported in a country.	3.5.0	3.6.0	
SP-05	SP-99439	S1-99737	22.101	025		R99	B	Support of SAT by USIM	3.6.0	3.7.0	
SP-05	SP-99439	S1-99816	22.101	024		R99	B	Clarification on the usage on 2G SIM and 3G USIM	3.6.0	3.7.0	
SP-05	SP-99435	S1-99851	22.101	022		R99	C	Clarification of Emergency Call requirements	3.6.0	3.7.0	
SP-06	SP-99524	S1-991031	22.101	029		R99	B	Emergency Call	3.7.0	3.8.0	
SP-06	SP-99527	S1-991038	22.101	028		R99	C	FDN	3.7.0	3.8.0	
SP-06	SP-99519	S1-991026	22.101	026		R99	D	Mainly editorial update for GSM/3GPP use.	3.7.0	3.8.0	
SP-07	SP-000060	S1-000112	22.101	030		R99	A	Support of encryption in GPRS mobile stations	3.8.0	3.9.0	
SP-07	SP-000070	S1-000137	22.101	031		R99	F	Fixed Dialing Number (FDN)	3.8.0	3.9.0	
SP-08	SP-000210	S1-000271	22.101	033		R99	D	Network selection procedures removed from section 16, reference to 22.011 added	3.9.0	3.10.0	
SP-08	SP-000200	S1-000350	22.101	035		R99	B	Emergency Calls and numbers used	3.9.0	3.10.0	
SP-08	SP-000201	S1-000362	22.101	038		R99	F	CS multimedia support	3.9.0	3.10.0	
SP-08	SP-000202	S1-000326	22.101	039		R99	F	Clarification for USIM Application selection	3.9.0	3.10.0	
SP-08	SP-000210	S1-000270	22.101	034		R00	D	Network selection procedures removed from section 16, reference to 22.011 added	3.9.0	4.0.0	
SP-08	SP-000200	S1-000351	22.101	036		R00	B	Emergency Calls and numbers used	3.9.0	4.0.0	
SP-08	SP-000213	S1-000352	22.101	037		R00	B	Emergency Call enhancements	3.9.0	4.0.0	
SP-09	SP-000383	S1-000603	22.101	040		R4	B	Multimedia messaging	4.0.0	4.1.0	
SP-09	SP-000383	S1-000605	22.101	041		R4	C	Service Management requirements	4.0.0	4.1.0	
SP-09	SP-000430	S1-000700	22.101	042	1	R4	F	General corrections and clarifications to 22.101 for Release 2000	4.0.0	4.1.0	
SP-09	SP-000383	S1-000598	22.101	046		R4	D	Editorial changes to 22.101 for Release 2000	4.0.0	4.1.0	
SP-09	SP-000430	S1-000698	22.101	047	1	R4	C	Numbering Principles	4.0.0	4.1.0	
SP-09	SP-000383	S1-000620	22.101	048		R4	C	Service evolution	4.0.0	4.1.0	
SP-09	SP-000391	S1-000573	22.101	049		R4	D	Emergency Call	4.0.0	4.1.0	

Change history											
TSG SA#	**SA Doc.**	**SA1 Doc**	**Spec**	**CR**	**Rev**	**Rel**	**Cat**	**Subject/Comment**	**Old**	**New**	**WI**
SP-09	SP-000405	S1-000649	22.101	050		R4	B	Text Conversation	4.0.0	4.1.0	
SP-10	SP-000533	S1-000798	22.101	058		Rel-4	A	Deleting Encrypted USIM-ME interface	4.1.0	4.2.0	TEI4
SP-11	SP-010053	S1-010071	22.101	062		Rel-4	A	Handling of interactions between applications requiring the access to UE resources	4.2.0	4.3.0	Service Clean up R99
SP-11	SP-010054	S1-010207	22.101	064		Rel-4	B	PLMN name indication	4.2.0	4.3.0	TEI4
SP-11	SP-010055	S1-010178	22.101	066		Rel-4	B	CR to 22.101 on Introduction of CPHS features	4.2.0	4.3.0	UICC1-CPHS
SP-11	SP-010056	S1-010209	22.101	068		Rel-4	B	Display of service provider name in the UE	4.2.0	4.3.0	TEI4

History

Document history		
V4.3.0	March 2001	Publication