

**Stockholm, Sweden, 13<sup>th</sup> - 15<sup>th</sup> June 2001**

**Source:** Editor of referencing recommendation

**Title:** Q.REF-1 version 3.1 output from the SSG meeting in Geneva 7<sup>th</sup> to 11<sup>th</sup> May 2001

**Agenda item: 6.6**

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**ITU - Telecommunication Standardization Sector**

**Temporary Document WP2SSG-XXX**

### **Special Study Group**

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Geneva 7<sup>th</sup> – 11<sup>th</sup> May 2001

Question(s): Q.3

SOURCE\*: Editor of referencing recommendation

**TITLE: Q.REF-1 version 3.1 output from the SSG meeting in Geneva 7<sup>th</sup> to 11<sup>th</sup> May 2001**

#### **1. Introduction**

This version (3.0) is the clean version output from the SSG meeting in Geneva 7<sup>th</sup> to 11<sup>th</sup> May 2001. telephone conference 18<sup>th</sup> of April 2001.

Following changes has in inserted:

- Summary and Keywords are added
- Reference section is updated
- Abbreviation section is updated
- Reference of necessary specifications or recommendations has been inserted
- 33-Series of specifications has been inserted
- ARIB and TTC numbers for the specifications has been added
- 3GPP in front of the TS number has been deleted

#### **2. Proposal**

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**\* Contact:**

Anders Sjöberg  
Ericsson Radio Systems AB  
SE-164 80 Stockholm  
Sweden

Tel: +46 8 585 30268  
Fax: +46 8 508 77300  
E-mail: anders.sjoberg@era.ericsson.se

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INTERNATIONAL TELECOMMUNICATION UNION

**ITU-T**

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

**Q.REF-1**

(Draft 05/2001)

SERIES Q: SWITCHING AND SIGNALLING

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**IMT-2000 References to GSM evolved UMTS  
Core Network with UTRAN Access Network**

## IMT-2000 References to GSM evolved UMTS core NETWORK with UTRAN Access network

### Summary

This recommendation specifies the transposition of third generation mobile telecommunication specifications for release 1999 from third Generation Partnership Project (3GPP) into different regional standardisation organisations numbering scheme.

### Keywords

3GPP, Core Network, GSM, IMT-2000, Release 1999, third generation system, UMTS

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**\* Contact:**

Anders Sjöberg  
Ericsson Radio Systems AB  
SE-164 80 Stockholm  
Sweden

Tel: +46 8 585 30268  
Fax: +46 8 508 77300  
E-mail: anders.sjoberg@era.ericsson.se

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## Recommendation Q.REF-1

# IMT-2000 REFERENCES TO GSM EVOLVED UMTS CORE NETWORK WITH UTRAN ACCESS NETWORK

## 1 Scope

This recommendation identifies the IMT-2000 technical specifications for the Core Network belonging to the IMT-2000 family member GSM evolved UMTS core network with UTRAN access network. The recommendation includes the internal and external interfaces for the Core Network as well as the general architecture specifications.

This recommendation describes the architecture, interfaces and technical specifications based on 1999 release of the technical specifications.

These Core Network interfaces identified in this recommendation and the radio interfaces recommended in ITU-R M.1457 [1] constitute a complete system for the 3<sup>rd</sup> generation mobile system for terrestrial usage based on GSM evolved UMTS core network with UTRAN access network.

It is the intent of the ITU-T that the references in this document are only to documents that specify the network aspects of IMT-2000. In the event that a referenced document also includes material that specifies any of the radio aspects of IMT-2000, ITU-R Recommendation M.1457, "Detailed specifications of the radio interfaces of IMT-2000", takes precedence for those sections of the referenced document, which contain radio interface specifications.

## 2 References

The existing IMT-2000 Recommendations that are considered to be importance in the development of this particular Recommendation are as follows:

- |     |                              |   |
|-----|------------------------------|---|
| [1] | ITU-R Recommendation M.1457: | Detailed specifications of the radio interfaces of international mobile telecommunications-2000 (IMT-2000)                                    |
| [2] | ETSI TS 123.002:             | Network Architecture (Release 99)   |
| [2] | TTC JP-3GA-23.002            | Network Architecture (Release 99)   |
| [2] | T1                           | Network Architecture (Release 99)   |
| [3] | ARIB ARIB STD-T63-23.171     | Functional stage 2 description of location services in UMTS   |
| [3] | ETSI TS 123.171:             | Functional stage 2 description of location services in UMTS   |
| [3] | T1                           | Functional stage 2 description of location services in UMTS   |
| [4] | ETSI ETS 300 356-18:         | ISDN User Part (ISUP) version 2 for the international interface: Part 18: Completion of Calls to Busy Subscriber (CCBS) supplementary service |

- [5] ETSI EN 301 140-1: Intelligent Network (IN); Intelligent Network Application Protocol (INAP); Capability Set 2 (CS2); Part 1: Protocol Specification
- [6] ISO/IEC Recommendation 3309: Information technology – Telecommunication and information exchange between systems – High level data link control (HDLC) procedures – Frame structure
- [7] ISO/IEC Recommendation 4335: Information technology – Telecommunications and information exchange between systems – High level data link control (HDLC) procedures – Elements of procedures
- [8] ISO/IEC Recommendation 7809: Information technology – Telecommunication and information exchange between systems – High level data link control (HDLC) procedures – Classes of procedures
- [9] ISO Recommendation 8886: Information technology – Telecommunication and information exchange between systems – Data link service definitions for Open Systems interconnection
- [10] ITU-T Recommendation E.164 (1997): The international public telecommunication numbering plan
- [11] ITU-T Recommendation H.324 (1998): Terminal for low bit-rate multimedia communication
- [12] ITU-T Recommendation I.130 (1988): Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN
- [13] ITU-T Recommendation I.420 (1984): Basic user-network interface
- [14] ITU-T Recommendation I.460 (1999): Multiplexing, rate adaption and support of existing interfaces
- [15] ITU-T Recommendation I.461 (1993): Support of X.21, X.21 bis and X.20 bis based Data Terminal Equipments (DTEs) by an Integrated Services Digital Network (ISDN)
- [16] ITU-T Recommendation I.462 (1995): Support of packet mode terminal equipment by an ISDN
- [17] ITU-T Recommendation I.463 (2000): Support by an ISDN of data terminal equipments with V-Series type interfaces
- [18] ITU-T Recommendation Q.65 (2000): The unified functional methodology for the characterization of services and network capabilities
- [19] ITU-T Recommendation Q.920 (1993): ISDN user-network interface data link layer - General aspects
- [20] ITU-T Recommendation Q.921 (1997): ISDN user-network interface - data link

- [21] ITU-T Recommendation Q.921bis (1993): Abstract test suites for LAPD conformance tests
- [22] ITU-T Recommendation Q.922 (1992): ISDN data link layer specification for frame mode bearer services
- [23] ITU-T Recommendation Q.1214 (1995): Distributed functional plane for intelligent network CS-1
- [24] ITU-T Recommendation T.31 (1995): Asynchronous facsimile DCE control – Service Class 1
- [25] ITU-T Recommendation T.32 (1995): Asynchronous facsimile DCE control – Service Class 2
- [26] ITU-T Recommendation V.14 (1993): Transmission of start-stop characters over synchronous bearer channels
- [27] ITU-T Recommendation V.21 (1984): 300 bits per second duplex modem standardized for use in the general switched telephone network
- [28] ITU-T Recommendation V.22 (1988): 1200 bits per second duplex modem standardized for use in the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits
- [29] ITU-T Recommendation V.22bis (1988): 2400 bits per second duplex modem using the frequency division technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits
- [30] ITU-T Recommendation V.24 (2000): List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)
- [31] ITU-T Recommendation V.25bis (1996): Synchronous and asynchronous automatic dialling procedures on switched networks
- [32] ITU-T Recommendation V.25ter (1997): Serial asynchronous automatic dialling and control
- [33] ITU-T Recommendation V.26ter (1988): 2400 bits per second duplex modem using the echo cancellation technique standardized for use on the general switched telephone network and on point-to-point 2-wire leased telephone-type circuits
- [34] ITU-T Recommendation V.32 (1993): A family of 2-wire, duplex modems operating at data signalling rates of up to 9600 bit/s for use on the general switched telephone network and on leased telephone-type circuits
- [35] ITU-T Recommendation V.80 (1996): In-band DCE control and synchronous data modes for asynchronous DTE
- [36] ITU-T Recommendation V.250 (1999): Various extensions to V.250 basic command set

- [37] ITU-T Recommendation X.21bis (1988): Use on public data networks of Data Terminal Equipment (DTE) which is designed for interfacing to synchronous V-Series modems
- [38] ITU-T Recommendation X.25 (1996): Interface between Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE) for terminals operating in Packet Mode and connected to Public Data Networks be dedicated Circuit,
- [39] ITU-T Recommendation X.32 (1996): Interface between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and accessing a packet-switched public data network through a public switched telephone network or an integrated services digital network or a circuit-switched public data network
- [40] TIA Specification IS-99: Telecommunications Industry Association TIA IS-99: "Data Services Option Standard for Wideband Spread Spectrum Digital Cellular System.
- [41] TIA Specification IS-135: Telecommunications Industry Association TIA IS-135: "800 MHz Cellular Systems, TDMA Services, Async Data and Fax.
- [42] TIA Specification IS-617: Data Transmission Systems and Equipment – In Band DCE Control
- [43] ISO Recommendation 7498: Information processing systems – Open Systems Interconnection – Basic Reference Model
- [44] ITU-T Recommendation H.323 (2000): Packet-based multimedia communications systems

### **3 Definitions**

### **4 Abbreviations and acronyms**

This Recommendation uses the following abbreviations:

- 2G            Second Generation
- 3G            Third Generation
- 3GMS        Third Generation Mobile Communication System
- 3GPP        Third Generation Partnership Project
- ACELP      Algebraic Code Excited Linear Prediction Coder

|           |  |
|-----------|--|
| AID       | Application Identifier   |
| AMR       | Adaptive Multi-Rate  |
| AoC       | Advice of Charge   |
| AoCC      | Advice of Charge (Charging)  |
| AoCI      | Advice of Charge (Information)   |
| API       | Application Programming Interface  |
| ASE       | Application Service Element  |
| ASN.1     | Abstract Syntax Notation One   |
| AuC       | Authentication Centre  |
| BAIC      | Barring of All Incoming Call   |
| BAOC      | Barring of All Outgoing Call   |
| BIC-Roam  | Barring of Incoming Calls when Roaming outside the home PLMN country                   |
| BOIC      | Barring of Outgoing International Call   |
| BOIC-exHC | Barring of Outgoing International Calls except those directed to the Home PLMN Country |
| BS        | Base Station   |
| BSS       | Base Station System  |
| CAMEL     | Customised Applications for Mobile Network enhanced Logic                              |
| CAP       | CAMEL Application Part   |
| CBC       | Cell Broadcast Centre  |
| CBS       | Cell Broadcast Service   |
| CC        | Call Control   |
| CCBS      | Call Completion to Busy Subscriber   |
| CD        | Call Deflection  |
| CF        | Call Forwarding  |
| CFB       | Call Forwarding on mobile subscriber Busy  |
| CFNRc     | Call Forwarding on mobile subscriber Not Reachable                                     |
| CFNRy     | Call Forwarding on No Reply  |
| CFU       | Call Forwarding Unconditional  |
| CLI       | Calling Line Identity  |
| CLIP      | Calling Line Identification Presentation   |
| CLIR      | Calling Line Identification Restriction  |
| CM        | Configuration Management   |
| CMIP      | Common Management Information Protocol   |
| CN        | Core Network   |

|         |   |
|---------|---|
| CNAP    | Calling Name Presentation                               |
| COLP    | Connected Line identification Presentation              |
| COLR    | Connected Line identification Restriction               |
| CORBA   | Common Object Request Broker Architecture               |
| CS      | Circuit Switched  |
| CSE     | CAMEL Service Environment                               |
| CUG     | Closed User Group                                       |
| CW      | Call Waiting  |
| DCE     | Data Circuit terminating Equipment                      |
| DTE     | Data Terminal Equipment                                 |
| DTMF    | Dual Tone Multi Frequency                               |
| DTX     | Discontinuous Transmission                              |
| ECT     | Explicit Call Transfer supplementary service            |
| EIR     | Equipment Identity Register                             |
| EM      | Element Manager   |
| eMLPP   | enhanced Multi-Level Precedence and Pre-emption service |
| E-OTD   | Enhanced Observed Time Difference                       |
| EP      | Elementary Procedure                                    |
| GAD     | Geographical Area Description                           |
| GBS     | General Bearer Services                                 |
| GDMO    | Guidelines for the Definition of Managed Objects        |
| GERAN   | GSM EDGE Radio Access Network                           |
| GGSN    | Gateway GPRS Support Node                               |
| GLR     | Gateway Location Register                               |
| GMLC    | Gateway Mobile Location Centre                          |
| GMSC    | Gateway MSC   |
| GPRS    | General Packet Radio Service                            |
| GPS     | Global Positioning System                               |
| GSM     | Global System for Mobile communications                 |
| GSM-EFR | GSM Enhanced Full Rate speech Codec                     |
| gsmSCF  | GSM Service Control Function                            |
| gsmSRF  | GSM Specialised resource Function                       |
| gsmSSF  | GSM Service Switching Function                          |
| GSN     | GPRS Support Nodes                                      |

|        |  |
|--------|--|
| GTP    | GPRS Tunnelling protocol                         |
| HLR    | Home Location Register                           |
| HPLMN  | Home Public Land Mobile Network                  |
| HSCSD  | High Speed Circuit Switched Data                 |
| IC     | Integrated Circuits                              |
| IMEI   | International Mobile Equipment Identity          |
| IM-GSN | Intermediate GPRS Serving Node                   |
| IM-MSC | Intermediate Mobile-services Switching Centre    |
| IMSI   | International Mobile Station Identity            |
| IN     | Intelligent Network                              |
| IP     | Internet Protocol                                |
| IPLMN  | Interrogating PLMN                               |
| IrDA   | Infrared Data Association                        |
| IrMC   | Infrared Mobile Communications                   |
| IRP    | Integration Reference Point                      |
| ISDN   | Integrated Services Data Network                 |
| ISUP   | ISDN User Part                                   |
| IWF    | Interworking Function                            |
| LCS    | Location Service                                 |
| LMSI   | Local Mobile Station Identity                    |
| LMU    | Location Measurement Unit                        |
| LR     | Location Request                                 |
| MAP    | Mobile Application Part                          |
| MC     | Multicall  |
| ME     | Mobile Equipment                                 |
| MExE   | Mobile station application Execution Environment |
| MIM    | Management Information Model                     |
| MIME   | Multipurpose Internet Mail Extensions            |
| MLC    | Mobile Location Centre                           |
| MM     | Mobility Management                              |
| MMI    | Man-Machine Interface                            |
| MMS    | Multimedia Messaging Service                     |
| MNP    | Mobile Number Portability                        |
| MO     | Mobile Originated                                |

|         |  |
|---------|--|
| MPTY    | MultiParty                                   |
| MS      | Mobile Station                               |
| MSC     | Mobile Switching Centre                      |
| MSISDN  | Mobile Station International ISDN number     |
| MSP     | Multiple Subscriber Profile                  |
| MSRN    | Mobile Station Roaming Number                |
| MT      | Mobile Terminal                              |
| NE      | Network Element                              |
| NITZ    | Network Identity and Time Zone               |
| NM      | Network Management                           |
| NRM     | Network Resource Model                       |
| OACSU   | Off-Air Call Set-Up                          |
| ODB     | Operator Determined Barring                  |
| OSA     | Open Service Architecture                    |
| PBX     | Private Branch eXchange                      |
| PCM     | Pulse Code Modulation                        |
| PDC-EFR | ARIB PDC-EFR 6.7 kBit/s speech Codec         |
| PDN     | Public Data Network                          |
| PDP     | Packet Data Protocol                         |
| PDU     | Protocol Data Unit                           |
| PIX     | Proprietary application Identifier eXtension |
| PLMN    | Public Land Mobile Network                   |
| PS      | Packet Switched                              |
| PSE     | Personal Service Environment                 |
| PSTN    | Public Switching Telephone Network           |
| RANAP   | Radio Access Network Application Part        |
| RID     | Registered application provider IDentifier   |
| RLC/MAC | Radio Link Control/ Medium Access Control    |
| RLP     | Radio Link Protocol                          |
| RNC     | Radio Network Controller                     |
| RNS     | Radio Network System                         |
| RR      | Radio Resources                              |
| SAT     | SIM Application Toolkit                      |
| SC      | Service Centre                               |

|          |  |
|----------|--|
| SCCP     | Signalling Connection Control Part                   |
| SCR      | Source Controlled Rate                               |
| SCS      | Service Capability Servers                           |
| SGSN     | Serving GPRS Support Node                            |
| SID      | Silence Descriptor                                   |
| SIM      | GSM Subscriber Identity Module                       |
| SIWFS    | Shared Interworking Function Server                  |
| SME      | Short Message Entity                                 |
| SMIL     | Synchronised Multimedia Integration Language         |
| SM-RL    | Short Message Relay function                         |
| SMS      | Short Message Service                                |
| SMSC     | Short Message Service Center                         |
| SMSCB    | Short Message Service Cell Broadcast                 |
| SMTP     | Simple Mail Transfer Protocol                        |
| SOR      | Support of Optimal Routeing                          |
| SRNC     | Serving Radio Network Controller                     |
| SRNS     | Serving RNS  |
| SS       | Supplementary Service                                |
| SS7      | Signalling System No 7                               |
| TA       | Terminal Adaptation                                  |
| TAF      | Terminal Adaptation Function                         |
| TCAP     | Transaction Capabilities                             |
| TCH/F    | A full rate Traffic CHannel                          |
| TDMA_EFR | TIA IS-641 Enhanced speech Codec                     |
| TDMA_US1 | TIA TDMA-US1 (12.2 kBit/s Codec, similar to GSM-EFR) |
| TE       | Terminal Equipment                                   |
| TMSI     | Temporary Mobile Station Identity                    |
| TOA      | Time Of Arrival                                      |
| TrFO     | Transcoder Free Operation                            |
| TS       | Technical Specification                              |
| TUP      | Telephone User Part (SS7)                            |
| UDP      | User Datagram Protocol                               |
| UE       | User Equipment                                       |
| UICC     | Universal IC Card                                    |

|          |   |
|----------|---|
| UMTS     | Universal Mobile Telecommunications System                    |
| USAT     | USIM Application Toolkit                                      |
| USIM     | Universal Subscriber Identity Module                          |
| USSD     | Unstructured Supplementary Service Data                       |
| UTRA-FDD | Universal Terrestrial Radio Access- Frequency Division Duplex |
| UTRAN    | Universal Terrestrial Radio Access Network                    |
| UTRA-TDD | Universal Terrestrial Radio Access- Time Division Duplex      |
| UUS      | User-to-User Signalling                                       |
| VAD      | Voice Activity Detector                                       |
| VBS      | Voice Broadcast Service                                       |
| VGCS     | Voice Group Call Service                                      |
| VHE      | Virtual Home Environment                                      |
| VLR      | Visitor Location Register                                     |
| VPLMN    | Visited Public Land Mobile Network                            |
| WAP      | Wireless Application Protocol                                 |

## 5 Introduction

*Editor's Note: The introduction chapter will contain two parts. The first part will contain a general part for all the referencing recommendations. The second part will contain an introduction to this specific recommendation.*

The Core Network for UMTS is based on an evolved GSM Core Network from the 2<sup>nd</sup> generation mobile system. The technical specifications has been developed in a third generation partnership project and transposed to the involved regional standardisation organisations. 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 21<sup>st</sup> century.

Release 1999 is the first release of the 3<sup>rd</sup> generation of mobile communications technology for a world in which personal communication 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.

The technical specifications includes following objectives:

- a) To provide a single integrated system in which the user can access services in an easy to use and uniform way in all environments;
- b) To allow differentiation between service offerings of various serving networks and home environments;

- c) To provide a wide range of telecommunications services including those provided by fixed networks and requiring user bit rates of up to 2Mbits/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;
- d) To provide services via hand held, portable, vehicular mounted, movable and fixed terminals (including those with normally operated 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;
- e) To provide support of roaming users by enabling users to access services provided by their home environment in the same way even when roaming;
- f) To provide audio, data, video and particularly multimedia services;
- g) To provide for the flexible introduction of telecommunication services;
- h) To provide within the residential environment the capability to enable a pedestrian user to access all services normally provided by fixed networks;
- i) To provide within the office environment the capability to enable a pedestrian user to access all services normally provided by PBXs and LANs;
- j) To provide a substitute for fixed networks in areas of diverse population densities, under conditions approved by the appropriate national or regional regulatory authority;
- k) To provide support for interfaces, which allow the use of terminals normally, connected to fixed networks.

*Editor's Note: This chapter above should be reviewed at end of the process with this recommendation to find out if every point in the text is covered in the referred technical specifications.*

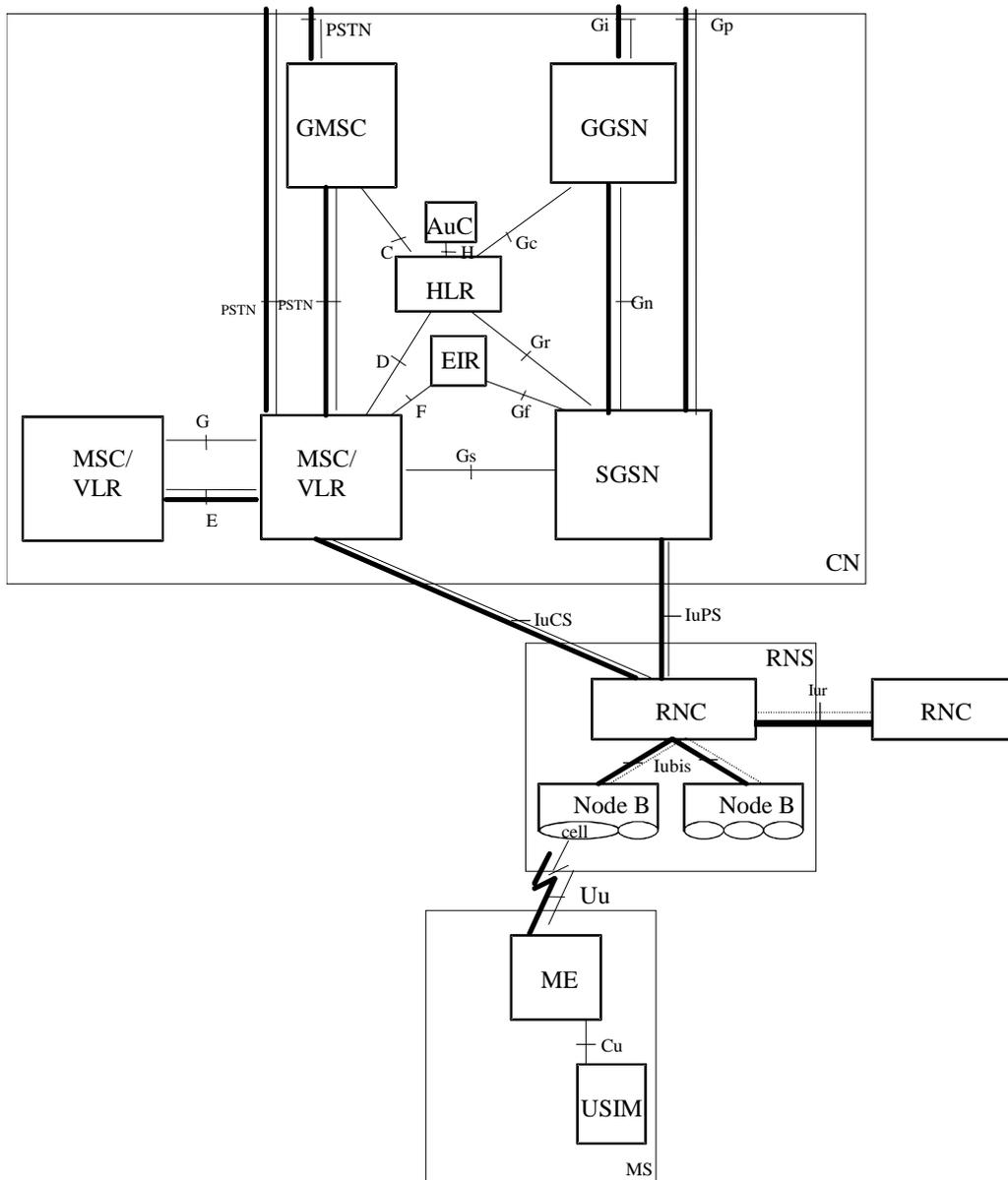
## **6 Basic architecture for the UMTS IMT-2000 family member**

This text is based on reference [2] section 5.1.

The basic configuration of a Public Land Mobile Network (PLMN) supporting GPRS and the interconnection to the PSTN/ISDN and PDN is presented in figure 6-1/Q.REF-1. This configuration presents signalling interfaces, which can be found in a PLMN. Implementations may be different: some particular functions may be gathered in the same equipment and then some interfaces may become internal interfaces.

In the basic configuration presented in figure 6-1/Q.REF-1, all the functions are considered implemented in different equipments. Therefore, all the interfaces within PLMN are external. This recommendation will only described the internal interfaces in the Core Network (CN) and the external interfaces to and from CN. Interfaces Iu, Iur and Iubis are defined in the UMTS 25.4xx-series of Technical Specifications, which are outside the scope of this recommendation. Interfaces C, D, E, F and G need the support of the Mobile Application Part of the signalling system No. 7 to exchange the data necessary to provide the mobile service. No protocols for the H-interface and for the I-interface are standardized. All the GPRS-specific interfaces (G- series) are defined in the UMTS 23-series and 24-series of Technical Specifications.

From this configuration, all the possible PLMN organisations can be deduced. In the case when some functions are contained in the same equipment, the relevant interfaces become internal to that equipment.



Legend:

Bold lines: interfaces supporting user traffic;

Dashed lines: interfaces supporting signalling.

NOTE 1: The figure shows direct interconnections between the entities. The actual links may be provided by an underlying network (e.g. SS7 or IP): this needs further studies.

NOTE 2: This is a simplified architecture figure. Not all nodes and interfaces are indicated.

NOTE 3: This figure differs from the original figure in reference [2]. This figure only shows the third generation aspects.

FIGURE 6-1/Q.REF-1

**Basic Configuration of a PLMN supporting CS and PS services and interfaces**

This text is based on text in reference [2] section 5.2.2.

The basic configuration of UMTS Location Services is presented in figure 6-2/Q.REF-1.

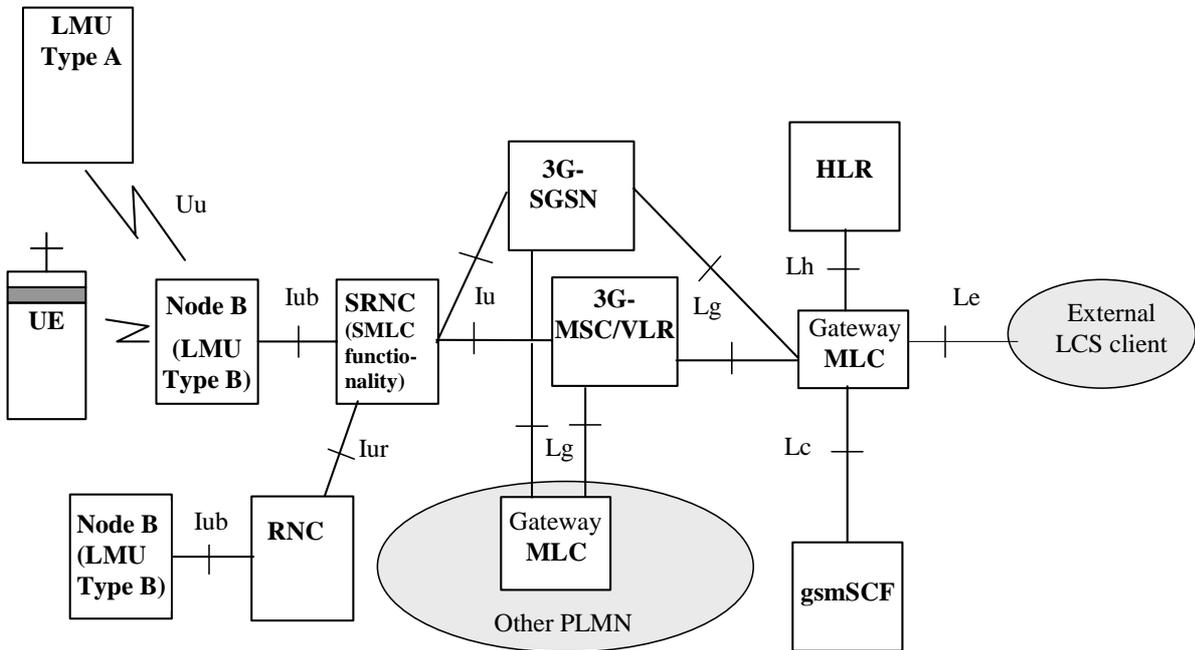


FIGURE 6-2/Q.REF-1

**Configuration of Location Services entities in an UMTS PLMN**

This text is based on text in reference [2] section 4a.4.

The CAMEL feature (Customised Applications for Mobile network Enhanced Logic) provides the mechanisms to support services consistently independently of the serving network.

The following figure shows the interconnection of the CAMEL-specific entities with the rest of the network. Only the interfaces specifically involved in CAMEL provisioning are shown, i.e. all the GMSC, MSC and HLR interfaces depicted in figure 1 are still supported by these entities even if not shown.

NOTE: The CAMEL-specific interfaces have no particular name. They are designated by the name of the two entities they link together, e.g. "the gsmSSF-gsmSCF interface".

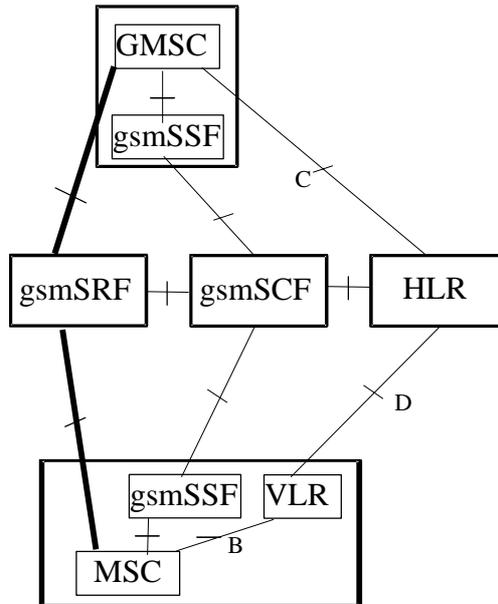


FIGURE 6-3/Q.REF-1

### Configuration of CAMEL entities

This text is based on text in reference [2] section 5.3.

The bold lines are used for interfaces supporting user data only, the dashed lines are used for interfaces supporting signalling only.

This text is based on text in reference [2] section 4.a.4.5.

The cell broadcast service (CBS) is a Teleservice, which enables an Information Provider to submit short messages for broadcasting to a specified area within the PLMN.

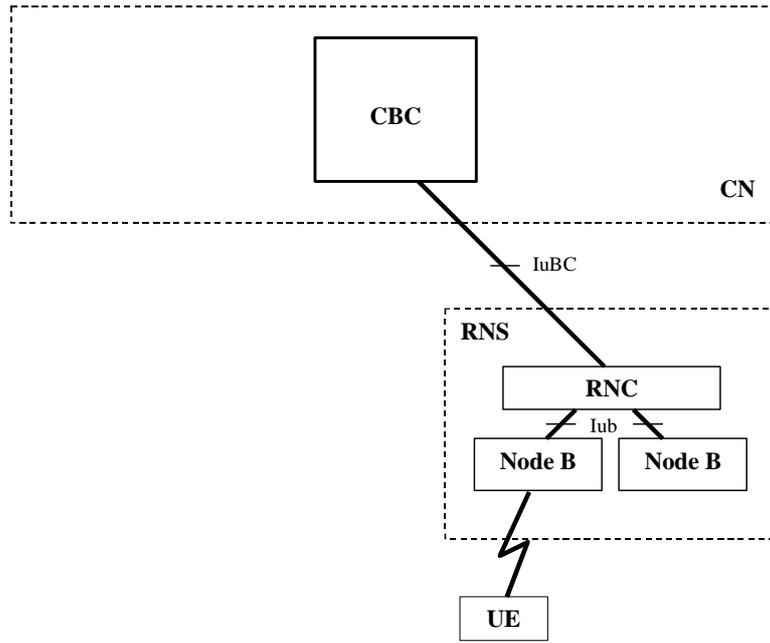


FIGURE 6-4/Q.REF-1

**Configuration of a PLMN supporting Cell Broadcast Service entities**

This text is based on text in reference [2] Annex A.

Global Location Register (GLR) is an optional functional entity to optimise signalling traffic between PLMNs. This entity handles location management of roaming subscriber in visited network without involving HLR. The location register function in the GLR stores subscription information and routing information for both CS services and PS services. This entity can be only located in a visited PLMN.

In the basic configuration with GLR introduction presented in figure 6-4/Q.REF-1, all the functions related to GLR introduction is considered implemented in different equipments. Therefore, all the interfaces within PLMN are external. Interfaces GLa, GLb, GLc, GLd, GLf, GLg, GLh, and GLi need the support of the Mobile Application Part of the signalling system No. 7 to exchange the data necessary to provide the mobile service. No protocols for the GLe interface are standardized. GLj and GLk need the support of GPRS Tunneling Protocol - Control to provide the packet domain services.

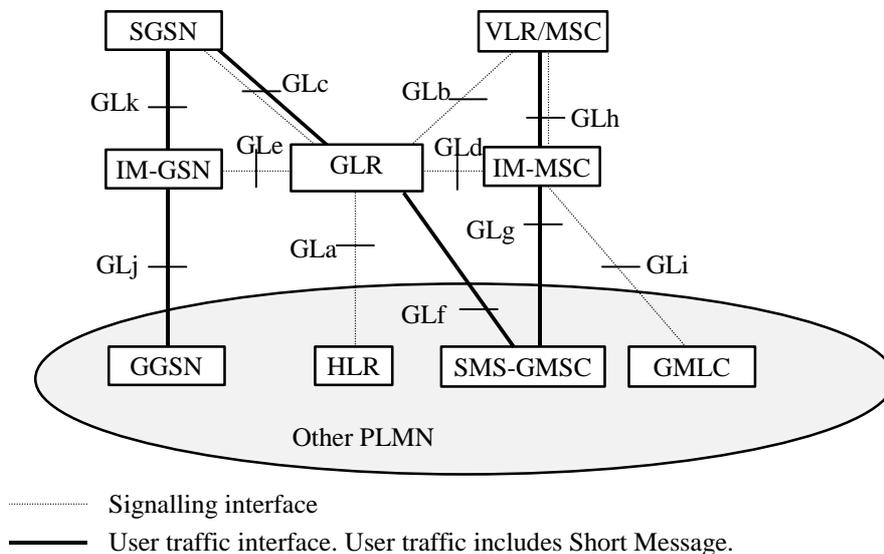


FIGURE 6-5/Q.REF-1

### Configuration of a PLMN and interfaces with GLR

## 7 Network Entities

### 7.1 Gateway Mobile Switching Centre (GMSC)

The text in this section is based on reference [2] section 4.1.2.2.

The Mobile Switching Center (MSC), which performs the routing function to the actual location of the Mobile Station (MS), is called the Gateway MSC (GMSC).

If a network delivering a call to the PLMN cannot interrogate the Home Location Register (HLR), the call is routed to an MSC. This MSC will interrogate the appropriate HLR and then route the call to the MSC where the mobile station is located.

The acceptance of an interrogation to an HLR is the decision of the operator.

The choice of which MSCs can act as Gateway MSCs is for the operator to decide (i.e. all MSCs or some designated MSCs).

## **7.2 Mobile Switching Centre and Visitor Location Register MSC/VLR (MSC/VLR)**

### **7.2.1 Mobile Switching Centre (MSC)**

The text in this section is based on reference [2] section 4.1.2.1.

The Mobile-services Switching Centre (MSC) constitutes the interface between the radio system and the fixed networks. The MSC performs all necessary functions in order to handle the circuit switched services to and from the mobile stations.

In order to obtain radio coverage of a given geographical area, a number of base stations are normally required; i.e. each MSC would thus have to interface several base stations. In addition several MSCs may be required to cover a country.

The Mobile-services Switching Centre is an exchange which performs all the switching and signalling functions for mobile stations located in a geographical area designated as the MSC area. The main difference between a MSC and an exchange in a fixed network is that the MSC has to take into account the impact of the allocation of radio resources and the mobile nature of the subscribers and has to perform in addition, at least the following procedures:

- procedures required for the location registration;
- procedures required for handover.

### **7.2.2 Visitor Location Register (VLR)**

The text in this section is based on reference [2] section 4.1.1.2.

A mobile station roaming in an MSC area is controlled by the Visitor Location Register in charge of this area. When a Mobile Station (MS) enters a new location area it starts a registration procedure. The MSC in charge of that area notices this registration and transfers to the Visitor Location Register the identity of the location area where the MS is situated. If this MS is not yet registered, the VLR and the HLR exchange information to allow the proper handling of calls involving the MS.

A VLR may be in charge of one or several MSC areas.

The VLR contains also the information needed to handle the calls set-up or received by the MSs registered in its data base (for some supplementary services the VLR may have to obtain additional information from the HLR). The following elements are included:

- the International Mobile Subscriber Identity (IMSI);
- the Mobile Station International ISDN number (MSISDN);
- the Mobile Station Roaming Number (MSRN),
- the Temporary Mobile Station Identity (TMSI), if applicable;
- the Local Mobile Station Identity (LMSI), if used;
- the location area where the mobile station has been registered;
- the identity of the SGSN where the MS has been registered. Only applicable to PLMNs supporting GPRS and which have a Gs interface between MSC/VLR and SGSN;

- the last known location and the initial location of the MS.

The VLR also contains supplementary service parameters attached to the mobile subscriber and received from the HLR.

### **7.3 Home Location Register (HLR)**

The text in this section is based on reference [2] section 4.1.1.1.

The Home Location Register (HLR) is a data base in charge of the management of mobile subscribers. A PLMN may contain one or several HLRs: it depends on the number of mobile subscribers, on the capacity of the equipment and on the organisation of the network. The following kinds of information are stored there:

- the subscription information;
- some location information enabling the charging and routing of calls towards the MSC where the MS is registered (e.g. the MS Roaming Number, the VLR Number, the MSC Number, the Local MS Identity);

and, if GPRS is supported, also:

- location information enabling the charging and routing of messages in the SGSN where the MS is currently registered (e.g. the SGSN Number);

and, if LCS is supported, also:

- a LCS privacy exception list, which indicates the privacy class of the MS subscriber;
- a GMLC list;
- a MO-LR list.

Different types of identity are attached to each mobile subscription and are stored in the HLR. The following identities are stored:

- the International Mobile Station Identity (IMSI);
- one or more Mobile Station International ISDN number(s) (MSISDN);

if GPRS is supported, the following identity is also stored:

- zero or more Packet Data Protocol (PDP) address(es);

and, if LCS is supported, the following identity is also stored:

- the LMU indicator.

There is always at least one identity, apart from the IMSI, attached to each mobile subscription and stored in the HLR.

The IMSI or the MSISDN may be used as a key to access the information in the database for a mobile subscription.

The data base contains other information such as:

- teleservices and bearer services subscription information;
- service restrictions (e.g. roaming limitation);
- a list of all the group IDs a service subscriber is entitled to use to establish voice group or broadcast calls;

- supplementary services; the HLR contains the parameters attached to these services; and, if GPRS is supported, also:
- information about if a GGSN is allowed to dynamically allocate PDP addresses for a subscriber.

#### **7.4 Authentication Centre (AuC)**

The text in this section is based on reference [2] section 4.1.1.3.

The Authentication Centre (AuC) is an entity which stores data for each mobile subscriber to allow the International Mobile Subscriber Identity (IMSI) to be authenticated and to allow communication over the radio path between the mobile station and the network to be ciphered. The AuC transmits the data needed for authentication and ciphering via the HLR to the VLR, MSC and SGSN which need to authenticate a mobile station.

The Authentication Centre (AuC) is associated with an HLR, and stores an identity key for each mobile subscriber registered with the associated HLR. This key is used to generate:

- data which are used to authenticate the International Mobile Subscriber Identity (IMSI);
- a key used to cipher communication over the radio path between the mobile station and the network.

The AuC communicates only with its associated HLR over an interface denoted the H-interface (see section 8.27).

#### **7.5 Equipment Identity Register (EIR)**

The text in this section is based on reference [2] section 4.1.1.4.

The Equipment Identity Register (EIR) is the logical entity which is responsible for storing in the network the International Mobile Equipment Identities (IMEIs) used.

The equipment is classified as "white listed", "grey listed", "black listed" or it may be unknown.

This functional entity contains one or several databases which store(s) the IMEIs used.

The mobile equipment may be classified as "white listed", "grey listed" and "black listed" and therefore may be stored in three separate lists.

An IMEI may also be unknown to the EIR.

An EIR shall as a minimum contain a "white list" (Equipment classified as "white listed").

#### **7.6 Gateway GPRS Support Node (GGSN)**

The text in this section is based on reference [2] section 4.1.3 and 4.1.3.2.

The UMTS GPRS Support Nodes (GSN) are the Gateway GSN (GGSN) and the Serving GSN (SGSN). They constitute the interface between the radio system and the fixed networks for packet switched services. The GSN performs all necessary functions in order to handle the packet transmission to and from the mobile stations.

Gateway GPRS Support Node (GGSN): "The location register function in the GGSN stores subscriber data received from the HLR and the SGSN. There are two types of subscriber data needed to handle originating and terminating packet data transfer:

- subscription information:
- the IMSI;
- zero or more PDP addresses.
- location information:
- the SGSN address for the SGSN where the MS is registered.

### **7.7 Serving GPRS Support Node (SGSN)**

The text in this section is based on reference [2] section 4.1.3 and 4.1.3.1.

"The UMTS GPRS Support Nodes (GSN) are the Gateway GSN (GGSN) and the Serving GSN (SGSN). They constitute the interface between the radio system and the fixed networks for packet switched services. The GSN performs all necessary functions in order to handle the packet transmission to and from the mobile stations."

Serving GPRS Support Node (SGSN): "The location register function in the SGSN stores two types of subscriber data needed to handle originating and terminating packet data transfer:

- subscription information:
- the IMSI;
- one or more temporary identities;
- zero or more PDP addresses.
- location information:
- depending on the operating mode of the MS, the cell or the routing area where the MS is registered;
- the VLR number of the associated VLR (if the Gs interface is implemented);
- the GGSN address of each GGSN for which an active PDP context exists."

### **7.8 Gateway Mobile Location Centre (GMLC)**

The text in this section is based on reference [2] section 4a.3.2.

The Gateway Mobile Location Centre (GMLC) is the first node an external Location Application accesses in the PLMN. The GMLC performs registration authorization and requests routing information from the HLR. There may be more than one GMLC in a PLMN.

### **7.9 GSM Service Control Function (gsmSCF)**

This text is based on text in reference [2] section 4a.4.1.

A functional entity that contains the CAMEL service logic to implement Operator Specific Service. It interfaces with the gsmSSF, the gsmSRF and the HLR.

#### **7.10 GSM Service Switching Function (gsmSSF)**

This text is based on text in reference [2] section 4a.4.2.

A functional entity that interfaces the MSC/GMSC to the gsmSCF. The concept of the gsmSSF is derived from the IN SSF, but uses different triggering mechanisms because of the nature of the mobile network.

#### **7.11 GSM Specialised Resource Function (gsmSRF)**

This text is based on text in reference [2] section 4a.4.3.

A functional entity which provides various specialized resources. It interfaces with the gsmSCF and with the MSC. This entity is defined in ITU-T Q.1214 [23] with variations defined in TS 23.078 [see section 10.3.25].

#### **7.12 Gateway Location Register (GLR)**

The text in this section is based on reference [2] annex 2.

The Gateway Location Register (GLR) handles location management of roaming subscriber in visited network without involving HLR. The location register function in the GLR stores subscription information and routing information for both CS services and PS services. This entity can be only located in a visited PLMN. "The GLR is an optional functional entity to optimize signalling traffic between PLMNs.

#### **7.13 Intermediate GPRS Serving Node (IM-GSN)**

The text in this section is based on reference [2] annex 2.

The Intermediate GPRS Serving Node (IM-GSN) is used as serving GSN towards home network and relay some PDU notification messages between serving GSN and Gateway GSN. This entity can be only located in a visited PLMN.

#### **7.14 Intermediate Mobile-services Switching Centre (IM-MSC)**

*[Editor's Note: A description of the node IM-MSC will be inserted here.]*

The text in this section is based on reference [2] annex 2.

The Intermediate Mobile-services Switching Centre (IM-MSC) is used as serving MSC towards home network and relay some messages between home network and serving MSC. This entity can be only located in a visited PLMN.

## **8 Interfaces**

### **8.1 C-Interface (Gateway Mobile Switching Centre (GMSC)—Home Location Register (HLR))**

The text in this section is based on the text in reference [2] section 6.4.1.2.

The Gateway MSC must interrogate the HLR of the required subscriber to obtain routing information for a call or a short message directed to that subscriber.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities.

For Customized Applications for Mobile network Enhanced Logic (CAMEL) purposes, this interface is used e.g. at terminating calls to exchange routing information, subscriber status, location information, subscription information, etc.

### **8.2 D Interface (Visitor Location Register (VLR)—Home Location Register (HLR))**

The text in this section is based on the text in reference [2] section 6.4.1.3.

This interface is used to exchange the data related to the location of the mobile station and to the management of the subscriber. The main service provided to the mobile subscriber is the capability to set up or to receive calls within the whole service area. To support this, the location registers have to exchange data. The VLR informs the HLR of the location of a mobile station managed by the latter and provides it (either at location updating or at call set-up) with the roaming number of that station. The HLR sends to the VLR all the data needed to support the service to the mobile subscriber. The HLR then instructs the previous VLR to cancel the location registration of this subscriber. Exchanges of data may occur when the mobile subscriber requires a particular service, when he wants to change some data attached to his subscription or when some parameters of the subscription are modified by administrative means.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities.

For Customized Applications for Mobile network Enhanced Logic (CAMEL) purposes, this interface is used to send the CAMEL related subscriber data to the visited PLMN and for provision of MSRN. The interface is also used for the other purposes, e.g. to retrieve subscriber status and location information of the mobile subscriber or to indicate suppression of announcement for a CAMEL service.

### **8.3 E Interface (Mobile Switching Centre (MSC)—Mobile Switching Centre (MSC))**

The text in this section is based on the text in reference [2] section 6.4.1.4.

When a mobile station moves from one MSC area to another during a call, a handover procedure has to be performed in order to continue the communication. For that purpose the MSCs have to exchange data to initiate and then to realise the operation.

After the handover operation has been completed, the MSCs will exchange information to transfer A-interface signalling as necessary.

When a short message is to be transferred between a Mobile Station and Short Message Service Centre (SC), in either direction, this interface is used to transfer the message between the MSC serving the Mobile Station and the MSC, which acts as the interface to the SC.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities.

#### **8.4 F Interface (Visitor Location Register (VLR)—Equipment Identity Register (EIR))**

The text in this section is based on the text in reference [2] section 6.4.1.5.

This interface is used between MSC and EIR to exchange data, in order that the EIR can verify the status of the IMEI retrieved from the Mobile Station.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities.

#### **8.5 G Interface (Visitor Location Register (VLR)—Visitor Location Register (VLR))**

The text in this section is based on the text in reference [2] section 6.4.1.6.

When a mobile subscriber moves from a VLR area to another Location Registration procedure will happen. This procedure may include the retrieval of the IMSI and authentication parameters from the old VLR.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities.

#### **8.6 Gc Interface (Home Location Register (HLR)—Gateway GPRS Support Node (GGSN))**

The text in this section is based on the text in reference [2] section 6.4.2.3.

This optional signalling path may be used by the GGSN to retrieve information about the location and supported services for the mobile subscriber, to be able to activate a packet data network address.

There are two alternative ways to implement this signalling path:

- If an SS7 interface is implemented in the GGSN, signalling between the GGSN and the HLR uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP);
  
- If there is *no* SS7 interface in the GGSN, any GSN in the same PLMN and which has an SS7 interface installed can be used as a GTP to MAP protocol converter, thus forming a signalling path between the GGSN and the HLR.

#### **8.7 Gf Interface (Equipment Identity Register (EIR)—Serving GPRS Support Node (SGSN))**

The text in this section is based on the text in reference [2] section 6.4.2.4.

This interface is used between SGSN and EIR to exchange data, in order that the EIR can verify the status of the IMEI retrieved from the Mobile Station.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP).

### **8.8 Gi Interface (Gateway GPRS Support Node (GGSN)--Public Network)**

The text in this section is based on the text in reference [2] section 7.2.

This interface connects the PLMN to external public or private packet data networks.

### **8.9 GLa Interface (Gateway Location Register (GLR)—Home Location Register (HLR))**

The text in this section is based on the text in reference [2] section A.5.1.

In circuit switched domain, this interface is the same as that between the VLR and the HLR. The HLR regards the GLR as the VLR via this interface. On the other hand, in packet switched domain, this interface is the same as that between the SGSN and the HLR. The HLR regards the GLR as the SGSN via this interface.

### **8.10 GLb Interface (Gateway Location Register (GLR)—Mobile Switching Centre/Visitor Location Register (MSC/VLR))**

The text in this section is based on the text in reference [2] section A.5.2.

This interface is the same as those between the VLR and the HLR. The VLR regards the GLR as the HLR via this interface.

### **8.11 GLc Interface (Gateway Location Register (GLR)—Serving GPRS Support Node (SGSN))**

The text in this section is based on the text in reference [2] section A.5.3.

This interface is the same as those between the SGSN and the HLR. The SGSN regards the GLR as the HLR via this interface.

### **8.12 GLd Interface (Gateway Location Register (GLR)—Intermediate Mobile services Switching Centre (IM-MSC))**

The text in this section is based on the text in reference [2] section A.5.4.

In the network with the GLR, when the IM\_MSC receives a message, it interrogates the GLR for the routing information of the MSC. However, this interface is internal because GLR and IM-MSC are implemented in the same physical node and the protocol on this interface is not specified.

### **8.13 GLe Interface (Gateway Location Register (GLR)—Intermediate GPRS Serving Node (IM-GSN))**

The text in this section is based on the text in reference [2] section A.5.5.

In the network with the GLR when the IM\_GSN receiving a PDU notification from the GGSN, the IM\_GSN relays the notification to the SGSN by interrogating via the interface the routing information to the GLR. The interrogation uses the same operation on the interface between the SGSN and the HLR.

### **8.14 GLf Interface (Gateway Location Register (GLR)—Short Message Service-Gateway Mobile Switching Centre (SMS-GMSC))**

The text in this section is based on the text in reference [2] section A.5.6.

This interface is used to forward mobile-terminated short messages in the network with the GLR in case of SMS transfer over GPRS. Signalling on this interface uses the Mobile Application Part (MAP).

The SMS-GMSC regards the GLR as the SGSN via this interface.

#### **8.15 GLg Interface (Intermediate Mobile-services Switching Centre (IM-MSC)—Short Message Service-Gateway Mobile Switching Centre (SMS-GMSC))**

The text in this section is based on the text in reference [2] section A.5.7.

This interface is used to forward short messages in the network with the GLR in case of SMS transfer over non-GPRS. Signalling on this interface uses the Mobile Application Part (MAP)

The SMS-GMSC regards the IM\_MSC as the MSC via this interface.

#### **8.16 GLh Interface (Intermediate Mobile-services Switching Centre (IM-MSC)—Mobile Switching Centre/Visitor Location Register (MSC/VLR))**

The text in this section is based on the text in reference [2] section A.5.8.

This interface is used to forward short messages in the network with the GLR in case of SMS transfer over non-GPRS. Also this interface is used to exchange data needed by the MSC to perform subscriber authorization and allocate network resources. Signalling on this interface uses the Mobile Application Part (MAP).

#### **8.17 GLi Interface (Intermediate Mobile-services Switching Centre (IM-MSC)—Gateway Mobile Location Centre (GMLC))**

The text in this section is based on the text in reference [2] section A.5.9.

Also this interface is used to exchange data needed by the MSC to perform subscriber authorization and allocate network resources. Signalling on this interface uses the Mobile Application Part (MAP).

The GMLC regards the IM\_MSC as the MSC via this interface.

#### **8.18 GLj Interface (Intermediate GPRS Serving Node (IM-GSN)—Gateway GPRS Support Node (GGSN))**

The text in this section is based on the text in reference [2] section A.5.10.

In the network with the GLR when receiving a PDP PDU from the external network the GGSN sends a notification to the IM\_GSN by the routing information from the HLR. The GGSN regards the IM\_GSN as the SGSN via this interface.

#### **8.19 GLk Interface (Intermediate GPRS Serving Node (IM-GSN)—Serving GPRS Support Node (SGSN))**

The text in this section is based on the text in reference [2] section A.5.11.

In the network with the GLR when receiving a PDP notification from the GGSN, the IM\_GSN relays the notification to the SGSN by the routing information from the GLR. The SGSN regards the IM\_GSN as the GGSN via this interface.

## **8.20 Gn Interface (Gateway GPRS Support Node (GGSN)—Serving GPRS Support Node (SGSN))**

The text in this section is based on the text in reference [2] section 6.4.2.2.

These interfaces are used to support mobility between the SGSN and GGSN. The Gn interface is used when GGSN and SGSN are located inside one PLMN. The Gn interface also includes a part that allows SGSNs to communicate subscriber and user data, when changing SGSN.

Signalling on this interface uses the User Datagram Protocol, UDP/IP.

## **8.21 Gp Interface (Serving GPRS Support Node (SGSN)--Public Network)**

The text in this section is based on the text in reference [2] section 6.4.2.2.

The Gp-interface is used if GGSN and SGSN are located in different PLMNs. The Gp interface also includes a part that allows SGSNs to communicate subscriber and user data, when changing SGSN.

Signalling on this interface uses the User Datagram Protocol, UDP/IP.

## **8.22 Gr Interface (Home Location Register (HLR)—Serving GPRS Support Node (SGSN))**

The text in this section is based on the text in reference [2] section 6.4.2.1.

This interface is used to exchange the data related to the location of the mobile station and to the management of the subscriber. The main service provided to the mobile subscriber is the capability to transfer packet data within the whole service area. The SGSN informs the HLR of the location of a mobile station managed by the latter. The HLR sends to the SGSN all the data needed to support the service to the mobile subscriber. Exchanges of data may occur when the mobile subscriber requires a particular service, when he wants to change some data attached to his subscription or when some parameters of the subscription are modified by administrative means.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP).

## **8.23 Gs Interface (Mobile Switching Centre (MSC)/Visitor Location Register (VLR)—Serving GPRS Support Node (SGSN))**

The text in this section is based on the text in reference [2] section 6.4.3.1.

The SGSN may send location information to the MSC/VLR via the optional Gs interface. The SGSN may receive paging requests from the MSC/VLR via the Gs interface. The MSC/VLR may indicate to an SGSN, via the Gs interface, that an UE is engaged in a service handled by the MSC.

Signalling on this interface uses connectionless SCCP (without TCAP). SCCP Global Title (GT) is used for addressing.

## **8.24 gsmSCF—HLR Interface**

This text is based on text in reference [2] section 6a.4.4.

This interface is used by the gsmSCF to request information from the HLR. As a network operator option the HLR may refuse to provide the information requested by the gsmSCF.

This interface is also used for USSD operations, both for gsmSCF-initiated dialogues and MS-initiated dialogues (relayed via HLR). It is a network operator option whether to support or not USSD operations on this interface.

### **8.25 gsmSCF—gsmSRF Interface**

This text is based on text in reference [2] section 6a.4.5

This interface is used by the gsmSCF to instruct the gsmSRF to play tones/announcements to the users.

### **8.26 gsmSSF—gsmSCF Interface**

This text is based on text in reference [2] section 6a.4.2.

This interface is used by the gsmSCF to control a call in a certain gsmSSF and to request the gsmSSF to establish a connection with a gsmSRF. Relationships on this interface are opened as a result of the gsmSSF sending a request for instructions to the gsmSCF.

### **8.27 H Interface (Home Location Register (HLR)—Authentication Centre (AuC))**

The text in this section is based on the text in reference [2] section 6.4.3.2.

When an HLR receives a request for authentication and ciphering data for a Mobile Subscriber and it does not hold the requested data, the HLR requests the data from the AuC. The protocol used to transfer the data over this interface is not standardised.

### **8.28 IuBC Interface (Core Network (CN)—Radio Network Controller (RNC))**

The text in this section is based on the text in reference [2] section 6a.5.1.

The interface between the CBC and the RNS is specified in the 25.41x-series of 3G Technical Specifications.

The CBC-RNS interface is used to carry information concerning:

- The CBS messages itself; and
- CBS delivery parameter.

### **8.29 IuCS Interface (Mobile Switching Centre (MSC)—Radio Network Controller (RNC))**

The text in this section is based on the text in reference [2] section 6.2.1.2.

The interface between the MSC and its RNS is specified in the 25.41x-series of UMTS Technical Specifications.

The RNS-MSC interface is used to carry information concerning:

- RNS Management;
- Call handling;
- Mobility management.

### **8.30 IuPS Interface (Serving GPRS Support Node (SGSN)—Radio Network Controller (RNC))**

The text in this section is based on the text in reference [2] section 6.2.2.2.

The RNS-3G-SGSN interface is used to carry information concerning:

- Packet data transmission;
- Mobility management.

The Iu\_PS interface is defined in the 25.41x-series of UMTS Technical Specifications.

### **8.31 Lc Interface (Gateway Mobile Location Centre (GMLC)—GSM Service Control Function (gsmSCF))**

The text in this section is based on the text in reference [3] section 6.3.10.

The Lc interface supports CAMEL access to LCS.

### **8.32 Le Interface (Gateway Mobile Location Centre (GMLC)--External LCS client)**

The text in this section is based on the text in reference [2] section 7.3.

This interface connects the PLMN to the external LCS Client.

### **8.33 Lg Interface (Mobile Switching Centre (MSC)/Visitor Location Register (VLR)—Mobile Location Centre (MLC))**

The text in this section is based on the text in reference [2] section 6a.3.1.

The MSC -GMLC interface is used to exchange data needed by the MSC to perform subscriber authorization and allocate network resources. The GMLC provides the IMSI and requested Quality of Service information.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP).

### **8.34 Lh Interface (Home Location Register (HLR)—Gateway Mobile Location Centre (GMLC))**

The text in this section is based on the text in reference [2] section 6a.3.4.

This interface is used by the GMLC to retrieve the VMSC location and IMSI for a particular mobile.

Signalling on this interface uses the Mobile Application Part (MAP), which in turn uses the services of Transaction Capabilities (TCAP).

### **8.35 Mobile Switching Centre (MSC)—gsmSCF Interface**

This text is based on text in reference [2] section 6a.4.6

This interface is used by the MSC to send supplementary service invocation notifications to the gsmSCF.

### **8.36 PSTN Interface (Mobile Switching Centre (MSC)/Visitor Location Register (VLR)—Public Switching Telephone Network (PSTN))**

The text in this section is based on the text in reference [2] section 7.1.

The MSC is based on a normal ISDN exchange. It has, for call control, the same interface as the fixed network exchanges. The signalling interface considered in the GSM Technical Specifications is related to the signalling system No. 7 User Parts TUP and ISUP associated to the circuits used for incoming and outgoing calls.

## 9 Technical specifications structure

This section provides an overview of the specifications for this IMT-2000 Family member based on GSM evolved UMTS core Network with UTRAN access network. Details for these specifications may be found in section 10.

The following text describes the numbering scheme for the specifications and reports for the 3GPP 3rd Generation Mobile System.

Specifications for Release 1999 of the 3rd Generation mobile system are identified by the "ab.cde" numbering scheme.

Where existing GSM Specifications are enhanced or modified by the TSGs for the 3rd Generation Mobile System, the specification title and version should change (title reflecting 3rd Generation Mobile System). The GSM number (ab) has increased by 20 and a "c" digit equal to zero added (e.g., GSM 07.07 becomes 3GTS 27.007) indicating the GSM heritage of the Specification.

For newly created 3GPP Specifications the "c" digit is not zero.

For newly created 3GPP Technical Reports, the "c" digit is normally equal to nine, e.g., a report in the 23 series will have a number 23.9de. The "c" digit equal to eight may be used for overflow of the ab.9de range, or allocated to reports not intended for external circulation.

The following Series titles and descriptions are used for guidance only and may be further developed with experience.

The specification series are:

|           |  |
|-----------|--|
| 21-series | Requirements specifications            |
| 22-series | Service aspects                        |
| 23-series | Technical realisation                  |
| 24-series | Signalling protocols (UE - CN network) |
| 25-series | UTRA aspects <sup>1</sup>              |
| 26-series | Codecs (speech, video, etc.)           |
| 27-series | Data                                   |
| 28-series | Reserved for future use                |
| 29-series | Signalling protocols                   |
| 30-series | Programme management <sup>2</sup>      |
| 31-series | User Identity Module (UIM)             |
| 32-series | Operation and maintenance              |
| 33-series | Security aspects                       |
| 34-series | Test specifications <sup>2</sup>       |

NOTE: 1: Technical specifications in this series are not included in the scope for this recommendation. They are described in reference [1].

NOTE: 2: Technical specifications in these series are not included in the scope for this recommendation.

## 10 Technical Specifications

### 10.1 21-Serie, Requirements Specifications

#### 10.1.1 TS 21.101 3rd Generation mobile system Release 1999 Specifications

The document identifies the 3<sup>rd</sup> generation mobile system specifications for Release 1999. The specifications and reports of 3GPP Release 1999 have a major version number 3 (e.g. 3.x.y).

Release 1999 Technical Specifications and Technical Reports were functionally frozen at the 6<sup>th</sup> Technical Specification Group meetings (TSG#6) in December 1999.

|      | Document No.        | Version | Status | Issued date | Location |
|------|---------------------|---------|--------|-------------|----------|
| ARIB | ARIB STD-T63-21.101 |         |        |             |          |
| ETSI |                     |         |        |             |          |
| T1   |                     |         |        |             |          |
| TTC  | JP-3GA-21.101       |         |        |             |          |

#### 10.1.2 TS 21.111 USIM and IC card requirements

This document defines the requirements of the USIM (Universal Subscriber Identity Module) and the IC card for 3G (UICC). These are derived from the service and security requirements defined in TS 22.100 and TS 22.101. The USIM is a 3G application on an IC card. It inter-operates with a 3G terminal and provides access to 3G services. This document is intended to serve as a basis for the detailed specification of the USIM and the UICC, and the interface to the 3G terminals.

|      | Document No.        | Version | Status | Issued date | Location |
|------|---------------------|---------|--------|-------------|----------|
| ARIB | ARIB STD-T63-21.111 |         |        |             |          |
| ETSI |                     |         |        |             |          |
| T1   |                     |         |        |             |          |

#### 10.1.3 TS 21.133 Security Threats and Requirements

This specification takes notice of the Security Principles and Objectives as set out in TS 33.120. It contains an evaluation of perceived threats to 3GPP and produces subsequently a list of security requirements to address these threats.

As teleservices and applications will not, in general, be standardised, it is difficult to predict their exact nature. Therefore, this specification considers all security threats and aims at listing generic security requirements that shall be applicable irrespective of the actual services offered. The list of threats and requirements may however need to be updated as the 3GPP system evolves.

The threat analysis performed relies to a large extent on previous experiences with 2G systems, in particular GSM, and takes into account known problems from that area.

The security requirements listed in this specification shall be used as input for the choice of security features and the design of the 3GPP security architecture as specified in TS 33.102.

|      | Document No.        | Version | Status | Issued date | Location |
|------|---------------------|---------|--------|-------------|----------|
| ARIB | ARIB STD-T63-21.133 |         |        |             |          |
| ETSI |                     |         |        |             |          |

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## 10.2 22-Serie, Service Aspects

### 10.2.1 TS 22.001 Principles of Circuit Telecommunication Services Supported by a Public Land Mobile Network (PLMN)

The document covers the definition of the circuit telecommunication services supported by a PLMN. The purpose of the present document is to provide a method for the characterization and the description of these telecommunication services.

TS 22.101 describes overall service principles of a PLMN.

|  |      | Document No.        | Version | Status | Issued date | Location |
|--|------|---------------------|---------|--------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.001 |         |        |             |          |
|  | ETSI |                     |         |        |             |          |
|  | T1   |                     |         |        |             |          |

### 10.2.2 TS 22.002 Circuit Bearer Services Supported by a PLMN

The document defines a set of Circuit Bearer Services to be provided to PLMN subscribers by a PLMN itself and in connection with other networks. This Technical Specification should also be used as a reference for defining the corresponding required mobile network capabilities.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.002 |         |                |             |          |
|  | ETSI | TS 122.002          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.3 TS 22.003 Circuit Teleservices supported by a Public Land Mobile Network (PLMN)

The document describes and defines a recommended set of Circuit Teleservices to be supported by a PLMN in connection with other networks as a basis for defining the network capabilities required.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.003 |         |                |             |          |
|  | ETSI | TS 122.003          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.4 TS 22.004 General on Supplementary Services

The purpose of the document is to define a recommended set of supplementary services to the Teleservices and Bearer services, which will be supported by a PLMN in connection with other networks as a basis for the definition of the network capabilities required.

Supplementary services not covered in TS 22.004 cannot be introduced unilaterally in any PLMN if they require modification of the signalling Specifications.

Technical realization of supplementary services is described in TS 23.011 and TS 24.010.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.004         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.004(R99) |         |                |             |          |

### 10.2.5 TS 22.011 Service accessibility

The purpose of this Technical Specification is to describe the service access procedures as presented to the user.

Definitions and procedures are provided in this Technical Specification for international roaming, national roaming and regionally provided service. These are mandatory in relation to the technical realization of the Mobile Station (UE).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.011         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.011(R99) |         |                |             |          |

### 10.2.6 TS 22.016 International Mobile Equipment Identities (IMEI)

The document defines the principal purpose and use of International Mobile station Equipment Identities (IMEI).

TS 23.003 describes the technical manner of numbering, addressing and identification.

Note: The present document covers description for GSM only. The document needs to be updated to make it applicable to 3GPP.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.016 |         |                |             |          |
|  | ETSI | TS 122.016          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.7 TS 22.022 Personalisation of GSM ME Mobile functionality specification - Stage 1

The document provides functional specifications of five features to personalise Mobile Equipment (ME) for GSM and 3G systems. These features are called:

- Network personalisation;
- Network subset personalisation;
- Service Provider (SP) personalisation;
- Corporate personalisation;
- USIM personalisation.

The document specifies requirements for MEs, which provide these personalisation features.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.022 |         |                |             |          |
|  | ETSI | TS 122.022          |         | ETSI published |             |          |

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### 10.2.8 TS 22.024 Description of Charge Advice Information (CAI)

The charging supplementary service is described in TS 22.086. These services are designed to supply to a mobile user sufficient information to allow a real-time estimate to be made of the bill, which will eventually be levied in the home PLMN on the Mobile Station (MS) subscriber.

In the case of certain MS uses, for example a mobile payphone, this estimate could be subject to further processing (e.g. to present the charges in currency, rather than units, this may include an additional mark up). This additional processing is not described in this document in order to avoid constraining the evolution of the MS product in this area.

This document gives an overall view of how this supplementary service shall operate both in the PLMN and within the MS. Text given in this document is required to define functionality and is not intended to constrain implementation.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.024         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.024(R99) |         |                |             |          |

### 10.2.9 TS 22.030 Man-Machine Interface (MMI) of the Mobile Station (MS)

The document defines the requirements for and gives guidelines on the MMI on the User Equipment (UE). This includes the requirements of the user procedures for call control and supplementary service control, the requirements on the physical input media and the output, such as indications and displayed information.

The document included requirements only to UE connected to CS Domain. See TS 22.101; for overall service principles and TS 22.001 for Circuit telecommunication services.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.030 |         |                |             |          |
|  | ETSI | TS 122.030          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.10 TS 22.034 High Speed Circuit Switched Data (HSCSD) - Stage 1

The document specifies the Stage 1 description of High Speed Circuit Switched Data (HSCSD). HSCSD is a feature that introduces General Bearer Services and a multislot mechanism is used for user rates that can be achieved with one or more TCH/F. Multislot also defines a flexible use of air interface resources, which makes efficient and flexible use of higher user rates feasible.

The Multislot mechanism is only applicable to GERAN.

At UTRAN radio access parameters used for GBS user data are specified at TS 23.107.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.034 |         |                |             |          |
|  | ETSI | TS 122.034          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.11TS 22.038 SIM application toolkit (SAT); Stage 1

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

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

This Technical Specification contains the core requirements for a USIM/SIM application Toolkit (SAT/USAT), which are sufficient to provide a complete service.

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

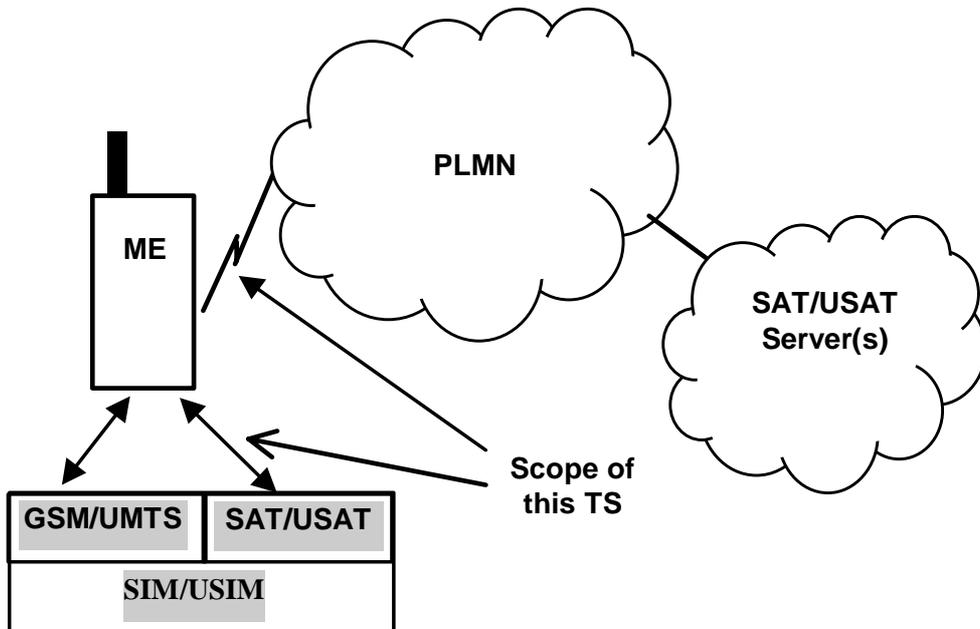


Figure 10.2.38-1/Q.REF-1

#### Scope of this Technical Specification

As indicated in Figure 10.2.38-1/Q.REF-1, the scope of this Technical Specification encompasses the SAT/USAT functionality in the UE/MS (comprising USIM/SIM and ME) and the interaction with the PLMN environment. The SAT/USAT Server is not necessarily a separate entity as shown in the figure; nodes providing SAT/USAT services may also exist within the PLMN. The functionalities of the SAT/USAT servers (such as charging aspects, security level classification etc.) are not covered by this specification.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.038 |         |                |             |          |
|  | ETSI | TS 122.038          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.12TS 22.041 Operator Determined Call Barring

The document describes the network feature Operator Determined Barring (ODB).

This allows the network operator or service provider to regulate, by means of an exceptional procedure, access by the subscribers to services (both Circuit and Packet Oriented), by the barring of certain categories of outgoing or incoming calls/ Packet Oriented Services or of roaming. ODB shall take effect immediately and shall terminate ongoing calls and bar future calls/ Packet Oriented Services.

The purpose of this network feature is to be able to limit the service provider's financial exposure to new subscribers, or to those who have not promptly paid their bills. It may only be applied to the service provider's own subscribers.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.041         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.041(R99) |         |                |             |          |

### 10.2.13TS 22.042 Network Identity and Time Zone (NITZ), stage 1

The document describes the feature Network Identity and Time zone (NITZ).

This feature provides the means for serving PLMNs to transfer current identity, time, Daylight Saving Time and the local time zone to Mobile Stations (MS)s, and for the MSs to store and use this information. This enhances roaming by permitting accurate indication of PLMN identities that are either newer than the Mobile Equipment (ME) or has changed their name since the ME was sold. Additionally time, Daylight Saving Time and time zone information can be utilised by MEs as desired.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.042         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.042(R99) |         |                |             |          |

### 10.2.14TS 22.057 Mobile Station Application Execution Environment (MExE); Stage 1

This Technical Specification (TS) defines the stage one description of the Mobile Station Application Execution Environment (MExE). Stage one is an overall service description, primarily from the subscriber's and service providers' points of view, and does not deal with the details of the human interface itself.

This Technical Specification includes information applicable to network operators, service providers and terminal, switch and database manufacturers.

This Technical Specification contains the core requirements for a Mobile Station Application Execution Environment (MExE), which is sufficient to provide a complete service.

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

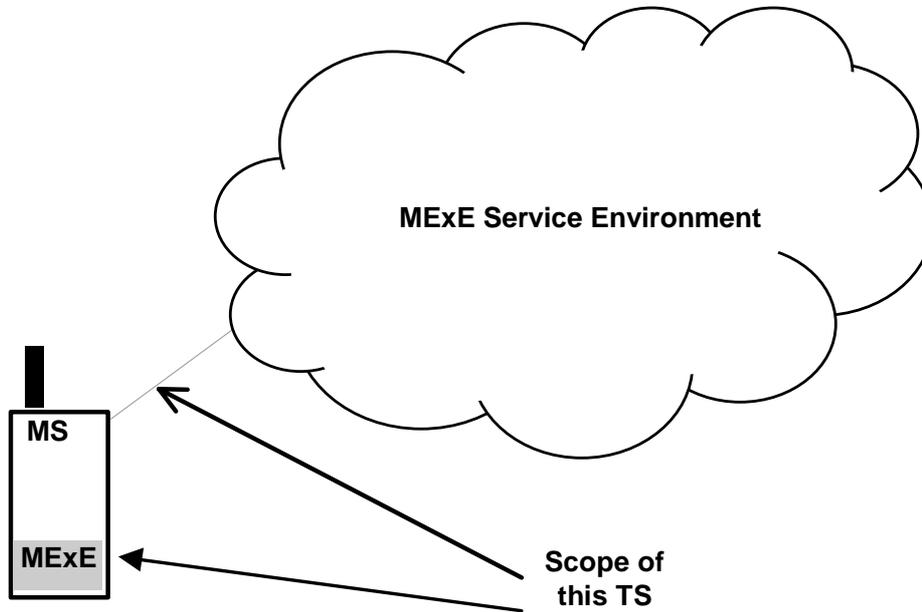


Figure 10.2.14-1/Q.REF-1

### Scope of this Technical Specification

As indicated in Figure 10.2.14-1/Q.REF-1, the scope of this Technical Specification encompasses the MExE functionality in the MS, interaction with the MExE service environment. The MExE service environment is not necessarily restricted to the PLMN, and nodes providing MExE services (i.e. MExE servers) may also exist outside the PLMN. Aspects of the support provided by MExE servers within the MExE service environment (such as charging aspects, security level classification etc.) are covered by this specification, but not the MExE servers themselves.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.057 |         |                |             |          |
|  | ETSI | TS 122.057          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

### 10.2.15 TS 22.060 General Packet Radio Service (GPRS); Stage 1

This Technical Specification defines the stage one description of the General Packet Radio Service (GPRS). Stage one is an overall service description, primarily from the service subscriber's and user's points of view, but does not deal with the details of the human interface itself. This Technical

Specification includes information applicable to network operators, service providers and terminal, switch and data base manufacturers.

This Technical Specification contains the core requirements for the packet switched networks specified by 3GPP, which are sufficient to provide a complete service. It defines a set of bearer services that provide packet mode transmission within the PLMN and interwork with external networks.

The term GPRS shall be used in this document to refer to GPRS, EGPRS and the PS Domain of the 3G PLMN.

The GPRS shall not prevent the user's operation of other UMTS services.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 122.060         |         | ETSI published |             |          |
| TI   |                    |         |                |             |          |
| TTC  | JP-3GA-22.060(R99) |         |                |             |          |

### **10.2.16TS 22.066 Support of Mobile Number Portability (MNP); Stage 1**

This Technical Specification defines the stage one description of the Support of Mobile Number Portability between networks in the same country as well as North America cross-sector portability (i.e., number portability between fixed and GSM mobile networks). Stage one is an overall service description, primarily from the service subscriber's and user's points of view, but does not deal with the details of the human interface itself.

Mobile Number Portability (MNP) is applicable only to those telecommunication services identified by an MSISDN.

This specification includes information applicable to network operators, service providers and terminal, switch and database manufacturers.

This specification contains the core requirements for the Support of Mobile Number Portability between network operators in the same country as well as North America cross-sector portability, which are sufficient to provide a complete service.

Other cross-sector portability options (e.g. number portability between fixed and mobile networks outside the North American Region) are outside the scope of this technical specification. It is highly desirable however, that technical solutions for MNP should be sufficiently flexible to allow for possible enhancements, e.g. cross-sector number portability, and MNP between analogue and digital mobile networks. Additional functionalities not documented in this specification may implement requirements, which are considered outside the scope of this specification. This additional functionality may be on a network-wide basis, nation-wide basis or particular to a group of users. Such additional functionality shall not compromise conformance to the core requirements of the service.

Porting between Service Providers (i.e. service provider portability), which does not involve a change of Network Operator is outside the scope of this specification.

The relationship between Service Providers and Network Operators is outside the scope of this specification.

The relationship between a Service Provider and subscriber is outside the scope of this specification. The interface between the Mobile Station (MS) and any external applications are outside the scope of this specification. Charging principles are outside the scope of this specification

except where explicitly stated in the text.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.066         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.066(R99) |         |                |             |          |

### 10.2.17TS 22.067 Enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 1

The document specifies the stage 1 description of the enhanced Multi-Level Precedence and Pre-emption Service (eMLPP). This service has two parts: precedence and pre-emption. Precedence involves assigning a priority level to a call in combination with fast call set-up. Pre-emption involves the seizing of resources, which are in use by a call of a lower precedence, by a higher-level precedence call in the absence of idle resources. Pre-emption can also involve the disconnection of an on-going call of lower precedence to accept an incoming call of higher precedence.

The eMLPP service is provided as a network operator's option to a domain of a network. The domain can be the whole network or a subset of the network. The eMLPP service applies to all network resources in the domain that is in common use. The eMLPP service is applicable to all mobile stations in the domain with all or some mobile stations having a respective subscription assigning precedence according to the eMLPP service.

eMLPP is a supplementary service and shall be provided to a subscriber for all basic services subscribed to and for which eMLPP applies.

NOTE: It is under study whether normal GSM Phase 2 Mobile Stations will be able to be used for this service.

The service is described from the service subscriber's and user's point of view, in particular:

- The procedure for normal operation with successful outcome;
- The action to be taken in exceptional circumstances;
- The interaction with other services and features.

The document does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate specifications.

The document is applicable to teleservices 1x and 6x and to all bearer services used in a mobile network if eMLPP is provided. Any interaction with other services and/or networks not dealt with in clauses 8 or 9 is outside the scope of the present document.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.067 |         |                |             |          |
|  | ETSI | TS 122.067          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.18TS 22.071 Location Services (LCS); Stage 1 (T1P1)

The document provides the Stage One description of Location Services (LCS) networks. A Stage One description provides an overall service description, primarily from the service subscriber's and user's points of view, but not dealing with the details of the Man Machine Interface (MMI). This

Technical Specification includes information applicable to network operators, service providers and terminal, base station system, switch and data base manufacturers.

NOTE: Location Services may be considered as a network provided enabling technology consisting of standardized service capabilities, which enables the provision of location applications. This application may be service provider specific. The description of the numerous and varied possible location applications which are enabled by this technology are outside the scope of this specification. However, clarifying examples of how the functionality being specified may be used to provide specific location services is included in various sections of the specification.

The document contains the core requirements for the LCS to an extent sufficient to derive a complete definition of the LCS at the service level. However, the present document also documents some additional requirements, which may suggest in a non-normative manner certain ways the system may be implemented to support the LCS feature.

LCS can be offered without subscription to basic telecommunication services. LCS is available to the following categories of LCS clients:

Value Added Services LCS Clients – use LCS to support various value added services. These clients can include MS subscribers as well as non-subscribers to other services.

PLMN Operator LCS Clients – use LCS to enhance or support certain O&M related tasks, supplementary services, IN related services and bearer services and teleservices.

Emergency Services LCS Clients – use LCS to enhance support for emergency calls from subscribers.

Lawful Intercept LCS Clients – use LCS to support various legally required or sanctioned services.

LCS is applicable to any target MS whether or not the MS supports LCS, but with restrictions on choice of positioning method or notification of a location request to the MS user when LCS or individual positioning methods, respectively, are not supported by the MS.

LCS will be developed in phases. Phase 1 includes provision of the following:

LCS Phase 1. This is the initial default phase of LCS. It provides a generic flexible architecture capable of supporting all positioning methods. Specific support is provided for Time Of Arrival (TOA), Enhanced Observed Time Difference (E-OTD) and Global Positioning System (GPS) based positioning methods. Support is provided for emergency services, value added services and PLMN operator services.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.071 |         |                |             |          |
|  | ETSI | TS 122.071          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.19TS 22.072 Call Deflection (CD); Stage 1

Call Deflection (CD) enables the served mobile subscriber to respond to an incoming call offered by the network by requesting redirection of this call to another number specified in the response. The CD supplementary service can only be invoked before the connection is established by the served mobile subscriber, i.e. in response to the offered call, or during the period that the served subscriber is being informed of the call. The served subscriber's ability to originate calls is unaffected by the CD supplementary service.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.072         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.072(R99) |         |                |             |          |

### 10.2.20TS 22.078 CAMEL; Stage 1

This standard specifies the stage 1 description for the Customised Applications for Mobile network Enhanced Logic (CAMEL) feature, which provides the mechanisms to support services consistently independently of the serving network. The CAMEL features shall facilitate service control of operator specific services external from the serving PLMN. The CAMEL feature is a network feature and not a supplementary service. It is a tool to help the network operator to provide the subscribers with the operator specific services even when roaming outside the HPLMN.

CAMEL is developed in phases.

- CAMEL phase 1. This is the default phase in this specification.
- CAMEL phase 2.
- CAMEL phase 3.

A VPLMN or IPLMN supporting CAMEL phase 2 shall also support CAMEL phase 1.

The CAMEL feature is applicable

- To mobile originated and mobile terminated call related activities;
- As a CAMEL phase 2 function, to supplementary service invocations;
- As a CAMEL Phase 3 function, to SMS MO, to GPRS sessions and PDP contexts, to the control of HLR subscriber data, to the control of network signalling load.

The mechanism described addresses especially the need for information exchange among the VPLMN, HPLMN and the CAMEL Service Environment (CSE) for support of such operator specific services. Any user procedures for operator specific services are outside the scope of this standard.

This specification describes the interactions between the functions of the VPLMN, HPLMN, IPLMN and the CSE.

The second phase of CAMEL enhances the capabilities of phase 1. The following capabilities are added:

- Additional event detection points;
- Interaction between a user and service using announcements, voice prompting and information collection via in band interaction or USSD interaction;
- Control of call duration and transfer of Advice of Charge Information to the mobile station;
- The CSE can be informed about the invocation of the supplementary services ECT, CD and MPTY;
- For easier post-processing, charging information from a serving node can be integrated in normal call records.

The third phase of CAMEL enhances the capabilities of phase 2. The following capabilities are added:

- Support of facilities to avoid overload;

- Capabilities to support Dialed Services;
- Capabilities to handle mobility events, such as (Not-) reach ability and roaming;
- Control of GPRS sessions and PDP contexts;
- Control of mobile originating SMS through both circuit switched and packet switched serving network entities;
- Interworking with SoLSA (Support of Localised Service Area). Support for this interworking is optional;
- The CSE can be informed about the invocation of the GSM supplementary service CCBS.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.078         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.078(R99) |         |                |             |          |

### 10.2.21TS 22.079 Support of Optimal Routing; Stage 1

This Stage 1 description of the first phase of Support of Optimal Routing (SOR):

- Compiles the basic service requirements for SOR;
- Describes the interactions for Supplementary Services (SS) in order to cater for SOR;
- Refers to modifications to network features required by SOR.

This specification does not address the following:

- There is no need for optimisation of the routing of calls originally directed to a fixed network subscriber, because the physical address of a fixed network terminating line cannot differ from its logical address.
- SOR in non-PLMNs is not a subject of this Technical Specification, but might be possible by bilateral arrangement between PLMN operators and those non-PLMN operators.

The purpose of SOR is to reduce the number of unnecessary inter-PLMN call legs.

The first phase of SOR applies to:

- Optimal Routing for the benefit of the B party i.e. Mobile terminated calls with late call forwarding to the home or visited country (scenarios 1 and 2), and optionally;
- Optimal Routing for the benefit of the A party, e.g. Mobile to mobile calls where both mobile subscribers are in the same country (scenarios 3 to 10).

The complete set of scenarios included in the phase 1 of Optimal Routing is presented in the paragraph for normal procedures. All other scenarios are excluded from Phase 1 of Optimal Routing.

Note that Optimal Routing is applicable to national roaming situations that are to calls directed to a mobile subscriber roaming in her home country, but registered in a PLMN different from her HPLMN.

All further call scenarios, including multiple call forwarding, are left to subsequent phases of SOR. Subsequent phases of SOR shall be backwards compatible with this first phase.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.079         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.079(R99) |         |                |             |          |

### 10.2.22TS 22.081 Line Identification Supplementary Services; Stage 1

The document describes the Supplementary Services belonging to the group Line Identification Supplementary Services.

The general aspects, including definitions and recommended provision, of the description of the Supplementary Services are given in TS 22.004.

The group of Line Identification Supplementary Services is divided into the following four Supplementary Services:

- CLIP - Calling line identification presentation;
- CLIR - Calling line identification restriction;
- COLP - Connected line identification presentation;
- COLR - Connected line identification restriction.

**Definition of line identity:** The line identity is made up of a number of information units:

- The subscriber's national ISDN/MSISDN number (MSISDN number is the number stored in the VLR);
- The country code;
- Optionally, sub address information. The PLMN cannot be responsible for the content of this sub address. (For definition of the sub address see ITU-T Recommendation E.164 [10] sub clause 11.2).

In a full ISDN environment, the line identity shall include all the address information necessary to unambiguously identify a subscriber.

The calling line identity is the line identity of the calling party.

The connected line identity is the line identity of the connected party.

If for the line identity of the calling party or the connected party additional line identification is received (additional calling party/connected party number) in a PLMN this additional line identification shall be used for the presentation purpose of the line identification presentation services.

**Definition of Presentation and Screening Indicators:** In addition to or instead of the line identity, the network may give a Presentation Indicator (PI) and/or a Screening Indicator (SI) to the served subscriber. The following information may be given:

- Presentation Indicator showing:
  - a) Presentation allowed, or
  - b) Presentation restricted, or
  - c) Number not available due to interworking;

If Presentation Indicator is set to "Presentation Restricted", then the MS can get additional information on the Cause of no CLI, if provided by the network.

The Cause of no CLI value may be one of the following:

- Unavailable
- Reject by user
- Interaction with other services
- Coin line / pay phone
- Screening Indicator showing:
  - a) User provided, verified and passed, or
  - b) User provided, not screened, or
  - c) Network provided.

If the line identity is that of a PLMN subscriber, then:

The national number and the country code shall always be provided by the network;  
The subaddress shall only be included if it is provided by the user (or user equipment);  
The screening indicator shall indicate "network provided".

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.081         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.081(R99) |         |                |             |          |

### 10.2.23TS 22.082 Call Forwarding (CF) Supplementary Services; Stage 1

This specification describes the supplementary services belonging to the group CALL OFFERING SUPPLEMENTARY SERVICES.

The general aspects, including definitions and recommended provision, of the description of the supplementary services are given in specification TS 22.004.

The group of supplementary services CALL OFFERING SUPPLEMENTARY SERVICES is divided into four different supplementary services:

- Call forwarding unconditional;
- Call forwarding on mobile subscriber busy;
- Call forwarding on no reply;
- Call forwarding on mobile subscriber not reachable.

#### Indication of active Call forwarding supplementary service.

An indication that a Call forwarding service is currently active and operative on a number will be given to the forwarding party each time an outgoing call is made. There will be one indication for Unconditional call forwarding and another common indication for the Conditional call forwarding services.

#### Note on the use of the forwarded-to number at registration.

If the forwarded-to number is a number in the HPLMN country, it may be entered by the served mobile subscriber in three different formats, independent of her actual location, according to the schemes:

- 1) National (significant) number.
- 2) National (trunk) prefix plus national (significant) number.
- 3) International prefix\*, country code, national (significant) number.

Scheme 3) Storage of numbers in this format is mandatory for all PLMN operators.

If the forwarded-to number is a number in a country other than the HPLMN country, it shall be entered by the served mobile subscriber, independent of her actual location, according to the following scheme:

- International prefix (NOTE), country code, national (significant) number.

NOTE: The MMI for entering of international prefix is defined in TS 22.030.

The maximum forwarded-to number length is 28 digits.

**Principles for interaction with the Barring of Outgoing Calls supplementary services.**

Numbers allowed to call according to the Barring of Outgoing call service condition are allowed as forwarded-to numbers for the served mobile subscriber.

Numbers not allowed to call according to the Barring of Outgoing call service condition are not allowed as forwarded-to numbers for the served mobile subscriber.

For Unconditional Call Forwarding the forwarded leg is treated as an outgoing call from the HPLMN country.

For the Conditional Call Forwarding services the forwarded leg is treated as an outgoing call from the LPLMN (HPLMN or VPLMN) country.

**Principles for interaction with the Barring of Incoming Calls supplementary services.**

When Barring of all incoming calls is active for the served mobile subscriber - no Call forwarding services are allowed for her.

When Barring of all incoming calls when roaming outside the HPLMN country is active and operative - i.e. the served mobile subscriber is roaming outside the HPLMN country, the Conditional Call Forwarding services are not allowed.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.082         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.082(R99) |         |                |             |          |

**10.2.24TS 22.083 Call Waiting (CW) and Call Hold (HOLD) Supplementary Services; Stage 1**

The document describes the Supplementary Services belonging to the group Call Completion Supplementary Services.

The general aspects, including definitions and recommended provision, of the description of Supplementary Services are given in TS 22.004.

The group of Call Completion Supplementary Services is divided into the following two Supplementary Services:

- Call waiting;
- Call hold.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.083         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.083(R99) |         |                |             |          |

### 10.2.25TS 22.084 MultiParty (MPTY) Supplementary Service; Stage 1

The document describes the Supplementary Services belonging to the group MultiParty Supplementary Services.

The general aspects, including definitions and recommended provision, of the description of the Supplementary Services are given in TS 22.004.

The group of Supplementary Services MultiParty Supplementary Services consists of one Supplementary Service:

- MultiParty service.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 122.084         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-22.084(R99) |         |                |             |          |

### 10.2.26TS 22.085 Closed User Group (CUG) Supplementary Services; Stage 1

The document describes the Supplementary Services belonging to the group Community Of Interest Supplementary Services.

The general aspects, including definitions and recommended provision, of the description of the Supplementary Services are given in TS 22.004.

The group of Community Of Interest Supplementary Services includes one Supplementary Service:

- Closed user group.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 122.085         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-22.085(R99) |         |                |             |          |

### 10.2.27TS 22.086 Advice of Charge (AoC) Supplementary Services; Stage 1

The document describes the supplementary services belonging to the group Charging Supplementary Services.

The general aspects, including definitions and recommended provision, of the description of the supplementary services are given in TS 22.004.

Charging services are the supplementary services associated with charging aspects. The group of supplementary services Charging Supplementary Services comprises two services:

- Advice of Charge (Information);
- Advice of Charge (Charging).

Advice of Charge (AoC) supplementary services will use the Charge Advice Information described in TS 22.024.

In principle, the same type of Mobile Station (MS) can be used for both services of Advice of Charge (AoC), except where the application demands special features - e.g. the payment mechanism in a payphone.

Only one of these services may be subscribed to at any one time.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.086         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.086(R99) |         |                |             |          |

### 10.2.28 TS 22.087 User-to-user signalling (UUS); Stage 1

The User-to-User Signalling (UUS) supplementary service allows a mobile subscriber to send/receive a limited amount of information to/from another PLMN or ISDN subscriber over the signalling channel in association with a call to the other subscriber.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.087         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.087(R99) |         |                |             |          |

### 10.2.29 TS 22.088 Call Barring (CB) Supplementary Services; Stage 1

The document describes the supplementary services belonging to the group Call Restriction Supplementary Services.

The general aspects - including definitions and recommended provision - of the description of the supplementary services are given in TS 22.004.

The Call Restriction supplementary services allow the possibility for a mobile subscriber to have barring of certain categories of outgoing or incoming calls at the mobile subscribers access.

The group of Call Restriction Services includes two supplementary services:

- Barring of outgoing calls;
- Barring of incoming calls.

By use of subscription options, the mobile subscriber can at provision time select a set of one or more barring programs to determine the categories of calls to be barred. The following categories are defined:

- All outgoing calls;
- Outgoing international calls;
- Outgoing international calls except those directed to the home PLMN country;
- All incoming calls;
- Incoming calls when roaming outside the home PLMN country.

NOTE 1: Each category (barring program) is handled as a single supplementary service.

NOTE 2: The call barring program "incoming calls when roaming outside the home PLMN country" is only relevant if as a general rule the called mobile subscriber pays the charges for the forwarded part of the call from his home PLMN country to any other country.

The barring services can be offered to a mobile subscriber with a password option allowing the activation and deactivation by the subscriber. One password per mobile subscriber is supported by the network for all barring services. For the definition of the password, the description of its use and its management, see TS 22.004.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.088         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.088(R99) |         |                |             |          |

### 10.2.30TS 22.090 Unstructured Supplementary Service Data (USSD); Stage 1

The document defines the stage 1 description of Unstructured Supplementary Service Data (USSD) for use in one or a number of Public Land Mobile Networks (PLMNs).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.090         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.090(R99) |         |                |             |          |

### 10.2.31TS 22.091 Explicit Call Transfer (ECT) Supplementary Service; Stage 1

The document specifies the stage 1 description of Explicit Call Transfer (ECT) from the service subscriber's and user's points of view, in particular:

- The procedures for normal operation with successful outcome;
- The action to be taken in exceptional circumstances;
- The interaction with other supplementary services.

The present document does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate Technical Specifications.

The charging principles applied to ECT are established in the present document in terms of the charging information required to be collected. Any subsequent charging implications are outside of the scope of the document.

Any interactions with other networks not dealt with in Clause 9 are outside the scope of the document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.091         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.091(R99) |         |                |             |          |

### 10.2.32TS 22.093 Call Completion to Busy Subscriber (CCBS); Stage 1

The document specifies the stage 1 description of Completion of Calls to Busy Subscriber (CCBS) from the subscriber's and user's points of view; in particular:

- The procedures for normal operation with successful outcome;
- The action to be taken in exceptional circumstances;
- The interaction with other supplementary services.

The document does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate specifications.

The charging principles applied to CCBS are outside of the scope of this specification.

Any interactions with other networks not dealt with in the document is outside the scope of the document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.093         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.093(R99) |         |                |             |          |

### 10.2.33TS 22.094 Follow Me Stage 1

The document specifies the stage 1 description for the Follow Me feature.

The Follow Me feature enables a mobile subscriber A to manipulate the Follow Me data of a party B in such a way that - under certain conditions - subsequent calls directed to party B will be forwarded to subscriber A.

The feature is described from the service subscriber's and user's point of view, in particular:

- The procedure for normal operation with successful outcome;
- The action to be taken in exceptional circumstances;
- The interaction with other GSM services and features.

This Technical Specification does not deal with the Man-Machine Interface (MMI) requirements, but makes reference to the appropriate specifications.

Any interaction with other services and/or networks not dealt with in this specification is outside the scope of this Technical Specification.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.094         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.094(R99) |         |                |             |          |

### 10.2.34TS 22.096 Calling Name Presentation (CNAP); Stage 1 (T1P1)

The document describes the supplementary services belonging to the group Name Identification supplementary services.

The general aspects, including definitions and recommended provision, of the description of the supplementary services are given in TS 22.004.

The group of Name Identification supplementary services is divided into the following supplementary services:

CNAP Calling Name Presentation.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.096         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.096(R99) |         |                |             |          |

### 10.2.35TS 22.097 Multiple Subscriber Profile (MSP); Stage 1

The document gives an overall view of how this service shall operate both in the PLMN and within the Mobile Station (MS). This Technical Specification defines functionality and is not intended to constrain implementation.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.097         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.097(R99) |         |                |             |          |

### 10.2.36TS 22.100 UMTS Phase 1

The UMTS system will be defined in a phased approach. The present document specifies the requirements for Release '99 of UMTS. Some requirements, which are necessary to ensure a smooth transition to later releases, are also indicated. The present document should, however, be read in conjunction with the other 22.000 series documents, which provide a complete description of the requirements for UMTS Release '99.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.100 |         |                |             |          |
|  | ETSI | TS 122.100          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.2.37TS 22.101 UMTS Service principles

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 21<sup>st</sup> 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:

- a) To provide a single integrated system in which the user can access services in an easy to use and uniform way in all environments;
- b) To allow differentiation between service offerings of various serving networks and home environments;
- c) 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;
- d) 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;

- e) To provide support of roaming users by enabling users to access services provided by their home environment in the same way even when roaming.
- f) To provide audio, data, video and particularly multimedia services;
- g) To provide for the flexible introduction of telecommunication services;
- h) To provide within the residential environment the capability to enable a pedestrian user to access all services normally provided by fixed networks;
- i) To provide within the office environment the capability to enable a pedestrian user to access all services normally provided by PBXs and LANs;
- j) To provide a substitute for fixed networks in areas of diverse population densities, under conditions approved by the appropriate national or regional regulatory authority.
- k) To provide support for interfaces, which allow the use of terminals normally, connected to fixed networks.

|      | Document No.        | Version | Status         | Issued date | Location |
|------|---------------------|---------|----------------|-------------|----------|
| ARIB | ARIB STD-T63-22.101 |         |                |             |          |
| ETSI | TS 122.101          |         | ETSI published |             |          |
| T1   |                     |         |                |             |          |

### 10.2.38TS 22.105 Services & Service capabilities

Existing systems have largely standardised the complete sets of bearer services, teleservices and supplementary services, which they provide. 3GPP specifications specify service capabilities rather than services, allowing service differentiation and system continuity. This Technical Specification (TS) describes how and what kind of services the user has access to.

|      | Document No.        | Version | Status         | Issued date | Location |
|------|---------------------|---------|----------------|-------------|----------|
| ARIB | ARIB STD-T63-22.105 |         |                |             |          |
| ETSI | TS 122.105          |         | ETSI published |             |          |
| T1   |                     |         |                |             |          |

### 10.2.39TS 22.115 Service Aspects Charging and billing

The document describes the Service Aspects of charging and billing of the Universal Mobile Telecommunications System (UMTS).

The document is not intended to duplicate existing standards or standards being developed by other groups on these topics, and will reference these where appropriate. The document will elaborate on the charging requirements described in the Charging Principles in TS 22.001 Service Principles. It will allow the generation of accurate charging information to be used in the commercial and contractual relationships between the parties concerned.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 122.115         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-22.115(R99) |         |                |             |          |

### 10.2.40TS 22.121 Provision of Services in UMTS - The Virtual Home Environment; Stage 1

The document specifies the content of the stage one requirement for realisation of VHE.

Virtual Home Environment (VHE) is defined as a concept for personal service environment (PSE) portability across network boundaries and between terminals. The concept of the VHE is such that users are consistently presented with the same personalised features, User Interface customisation and services in whatever network and whatever terminal (within the capabilities of the terminal and the network), wherever the user may be located.

A key feature to support VHE is the ability to build services using a standardised application interface.

Requirements not applicable for R99 will be explicitly indicated.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.121         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.121(R99) |         |                |             |          |

### 10.2.41TS 22.129 Handover Requirements between UMTS and GSM or other Radio Systems

The scope of this document includes service requirements for handover maintaining continuity of service to a wireless terminal as it moves between the radio coverage area, or "cells", associated with different base station sites. This functionality is called "handover". Handover can also occur due to change of radio resource providing a service without necessarily any change of the base stations involved. In particular, when the radio resources providing a service change from one of the UTRA radio access modes to the other (UTRA-FDD and UTRA-TDD), this is regarded as handover. Particular emphasis has been placed on the description of requirements for service continuity within UTRAN and between UTRAN and GERAN but requirements specific to other systems are incorporated as required.

It is a key requirement to allow for dual or multi-mode terminals to handover traffic from UTRAN to other radio systems such as GERAN and vice versa. This document describes the service requirements for intra- and inter- system handover.

The following subject areas are within the scope of these service requirements:

- User perceived performance that may be influenced by handover;
- Operational requirements relating to handover;
- Security requirements.

The requirements set forth in this document are service requirements, in that they fulfil the following:

- The requirements are independent of the implementation of the UTRAN;
- The extent to which the requirements are met are in principle verifiable using observable that are not internal to the UTRAN.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.129         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.129(R99) |         |                |             |          |

### 10.2.42 TS 22.135 Multicall Stage 1

The document describes Multicall supplementary service for UMTS phase 1 release '99.

The general aspects, including definitions and recommended provision, of the description of the 3GPP Supplementary Services are given in TS 22.004.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 122.135         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-22.135(R99) |         |                |             |          |

### 10.2.43 TS 22.140 Multimedia Messaging Service Stage 1

This Technical Specification (TS) defines the stage one description of the non real-time Multimedia Messaging Service, MMS. Stage one is the set of requirements which shall be supported for the provision of non real-time multimedia messaging service, seen primarily from the subscriber's and service providers' points of view.

This Technical Specification includes information applicable to network operators, service providers, terminal and network manufacturers.

This Technical Specification contains the core requirements for the Multimedia Messaging Service, which is sufficient to provide a complete service.

Additional functionalities not documented in this Technical Specification may implement requirements, which are considered outside the scope of this TS. Such additional functionality may be on a network-wide basis, nation-wide basis or particular to a group of users. Such additional functionality shall not compromise conformance to the core requirements of the service.

This TS defines the requirements for MMS to be understood as a framework to enable non real-time transmissions for different types of media including such functionality as:-

- Multiple media elements per single message
- Negotiate different terminal and network MM capabilities
- Notification and acknowledgement of MM related events (e.g. delivery, deletion, ...)
- Handling of undeliverable MM
- Flexible charging

The above list is not exhaustive.

Thus the MMS enables a unified application, which integrates the composition, storage, access, and delivery of different kinds of media, e.g. text, voice, image or video in combination with additional mobile requirements.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-22.140 |         |                |             |          |
|  | ETSI | TS 122.140          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

### 10.3 23-Serie, Technical Realisation

#### 10.3.1 TS 23.002 Network Architecture

The purpose of the document is to present the possible architectures of the mobile system. The document contains a definition of the different functional entities needed to support the mobile service. The configuration of a PLMN is described as well as the organisation of the functional entities; the configuration presented is the most general in order to cope with all the possible implementations, which can be imagined in the different countries. To illustrate that purpose, some examples of possible configurations are presented. The document contains also a brief description of the interfaces involved, which shows the principle of the organisation considered.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.002         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.002(R99) |         |                |             |          |

#### 10.3.2 TS 23.003 Numbering, Addressing and Identification

The document defines:

- a) An identification plan for mobile subscribers in the GSM system;
- b) Principles of assigning telephone and ISDN numbers to MSs in the country of registration of the MS;
- c) Principles of assigning Mobile Station (MS) roaming numbers to visiting MSs;
- d) An identification plan for location areas, routing areas, and base stations in the GSM system;
- e) An identification plan for MSCs, SGSNs, GGSNs, and location registers in the GSM system;
- f) Principles of assigning international mobile equipment identities;
- g) Principles of assigning zones for regional subscription;
- h) An identification plan for groups of subscribers to the Voice Group Call Service (VGCS) and to the Voice Broadcast Service (VBS); and identification plan for voice group calls and voice broadcast calls; an identification plan for group call areas;
- i) Principles for assigning Packet Data Protocol (PDP) addresses to mobile stations;
- j) An identification plan for point-to-multipoint data transmission groups;
- k) An identification plan for CN domain, RNC and service area in the UTRAN system.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.003         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.003(R99) |         |                |             |          |

#### 10.3.3 TS 23.007 Restoration procedures

The data stored in location registers are automatically updated in normal operation; the main information stored in a location register defines the location of each mobile station and the subscriber data required to handle traffic for each mobile subscriber. The loss or corruption of these data will seriously degrade the service offered to mobile subscribers; it is therefore necessary to

define procedures to limit the effects of failure of a location register, and to restore the location register data automatically. The document defines the necessary procedures.

The basic principle is that restoration should be based on radio contact to avoid faulty data being spread in the system.

Subscriber data for supplementary services must also be correctly restored, although the impact on service of corruption of supplementary service data is less severe.

Procedures for supporting these functions are defined in TS 29.002 and TS 29.060.

The MAP operation "IMSI Attach" is used only in MAP version 1; in MAP version 2 the same function is performed by the MAP operation "Update Location Area". References in this specification to IMSI attach apply only to MAP version 1 network entities.

If the restoration of subscriber data in the VLR is triggered by Location Updating or IMSI Attach, the VLR retrieves subscriber data from the HLR by sending an "Update Location" request, which triggers one or more "Insert Subscriber Data" operations from the HLR. The "Update Location" request may also be used to send the LMSI to the HLR.

If the restoration of subscriber data in the VLR is triggered by a "Provide Roaming Number" request, the behaviour of the VLR depends on whether it is implemented according to MAP version 1 or MAP version 2. For MAP version 2, the VLR retrieves subscriber data from the HLR by sending a "Restore Data" request, which triggers one or more "Insert Subscriber Data" operations from the HLR. The "Restore Data" request is also used to send the LMSI to the HLR. For MAP version 1, the VLR retrieves subscriber data from the HLR by sending a "Send Parameters" request with parameter type "Subscriber Data", which cannot be used to send the LMSI to the HLR.

The VLR number and MSC number in the subscriber data in the HLR are updated by the "Update Location" procedure.

The GGSN (Gateway GPRS Support Node) is the point of PDN interconnection with the GSM PLMN supporting GPRS. The GGSN contains routing information for GPRS users with a PDP context active. The necessary procedures needed to restore GGSN data information after a restart is described in this document.

The SGSN (Serving GPRS Support Node) is the node that is serving the MS. The SGSN stores information regarding e.g. mobility management, routing and security. The necessary procedures needed to restore this SGSN information after a restart is described in this document.

A Type A LMU (Location Measurement Unit) is a network node, accessed over the GSM air interface that is functionally similar to an MS. All requirements associated with a non-GPRS MS in this specification apply also to a Type A LMU except where specified otherwise.

|  |      | Document No.  | Version | Status         | Issued date | Location |
|--|------|---------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.007    |         | ETSI published |             |          |
|  | T1   |               |         |                |             |          |
|  | TTC  | JP-3GA-23.007 |         |                |             |          |

#### 10.3.4 TS 23.008 Organisation of subscriber data

The document provides details concerning information to be stored in home location registers, visitor location registers and GPRS Support Nodes concerning mobile subscriber.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.008         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.008(R99) |         |                |             |          |

### 10.3.5 TS 23.009 Handover procedures

The document contains a detailed description of the handover procedures to be used in PLMNs. The purpose of the handover procedures, as described in the document, are to ensure that the connection to the Mobile Station (MS) or User Equipment (UE) is maintained as it moves from one cell or radio network to another. The document defines the circuit switched handover functionality based on the service requirements in TS 22.129.

The present document considers the following four cases:

- i) Handover between Base Stations connected to the same MSC, this is termed an Intra-MSC handover;
- ii) Handover between Radio Network Subsystems connected to the same 3G\_MSC, this is termed an Intra-3G\_MSC handover/relocation. This case also includes inter-system handover between RNS and BSS if the 3G\_MSC supports the A-interface;
- iii) Handover between Base Stations connected to different MSCs, this is termed an Inter-MSC handover. This category can be sub-divided into three further procedures:
  - a) The Basic Inter-MSC Handover procedure, where the MS is handed over from a controlling MSC (MSC-A) to another MSC (MSC-B);
  - b) The Subsequent Inter-MSC Handover procedure, where the MS is handed over from MSC-B to a third MSC (MSC-B');
  - c) The Subsequent Inter-MSC hand back, where the MS is handed back from MSC-B to MSC-A.
- iv) Handover between Radio Network Subsystems connected to different 3G\_MSCs, this is termed an Inter-3G\_MSC handover/relocation. This category can be divided into three further sub-procedures:
  - a) The Inter-3G\_MSC Handover procedure from UMTS to GSM, where the UE/MS is handed over from a controlling 3G\_MSC (3G\_MSC-A) to an MSC (MSC-B);
  - b) The Inter-3G\_MSC Handover procedure from GSM to UMTS, where the UE/MS is handed over from a controlling MSC (MSC-A) to a 3G\_MSC (3G\_MSC-B);
  - c) The Inter-3G\_MSC Relocation procedure, where the UE is relocated from 3G\_MSC-A to 3G\_MSC-B. This procedure can also be combined with a hard change of radio resources (Hard Handover with switch in the core network).

The MSC in this category can optionally be a 3G\_MSC supporting the A-interface. The three sub-procedures do also cover subsequent handover/relocation to a third MSC-B' or 3G\_MSC-B' and subsequent handover/relocation back to MSC-A or 3G\_MSC-A.

In both cases i) and iii) the same procedures as defined in the TS 08.08 and the TS 24.008 shall be used on the A-interface and on the Radio Interface, respectively.

In case ii) the same procedures as defined in the TS 25.413 and the TS 24.008 shall be used on the Iu-interface. If the 3G\_MSC in case ii) also supports the A-interface, the TS 08.08 and the TS 24.008 shall be used on the A-interface.

In case iii) the handover procedures shall transport the A-interface messages between MSC-A and MSC-B described in the Mobile Application Part (MAP), TS 29.002.

In case iv) the handover procedures shall transport the A-interface messages between 3G\_MSC and MSC described in the Mobile Application Part (MAP), TS 29.002.

In case iv) the relocation procedure shall transport the Iu-interface messages between 3G\_MSC-A and 3G\_MSC-B described in the Mobile Application Part (MAP), TS 29.002.

The interworking between the TS 29.002 protocol and the TS 08.08 protocol is described in the TS 29.010.

Handovers, which take place on the same MSC are termed Intra-MSC handovers; this includes both Inter-BSS and Intra-BSS handovers.

Handovers, which take place on the same 3G\_MSC are termed Intra-3G\_MSC handovers; this includes Inter-RNS handovers and optionally RNS to BSS and BSS to RNS handovers.

The document also covers the requirements for handover in ongoing GSM voice group calls, directed retry and handover without a circuit connection between (U)MSCs. The document does not consider the case of handovers between radio channels on the same BSS (Intra-BSS handover) or the handover of packet radio services. The Inter-RNS handover case that results in a relocation is covered by the present document but not other Inter-RNS or Intra-RNS handover cases.

For voice broadcast calls in GSM, the speaker uses normal point-to-point handover procedures, whilst the listeners use idle mode cell reselection procedures, as for the voice group call listeners.

Voice group calls are only applicable to GSM and handover of voice group calls is therefore only possible in GSM.

Inter-MSC hand-over imposes a few limitations on the system. After inter-MSC hand-over:

- Call re-establishment is not supported.

The list of TS 08.08 features supported during and after Inter-MSC handover is given in TS 09.08.

In the Inter-MSC handover case, the interworking between a Phase 1 BSSMAP protocol possibly used by one MSC and the Phase 2 BSSMAP protocol used in the Phase 2 MAP protocol on the E-interface is performed by this MSC.

NOTE: The message primitive names used in the SDL diagrams and message flows in the present document do not represent the actual messages specified in the GSM or 3GPP stage 3 technical specifications. The primitive names are only intended to be indicative of their use in the document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.009         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.009(R99) |         |                |             |          |

### 10.3.6 TS 23.011 Technical Realization of Supplementary Services - General Aspects

The document describes the general aspects on how supplementary services in the GSM system are realised from a technical point of view.

Description of technical realisation for specific supplementary services can be found in TS 23.08x and 23.09x-series technical specifications.

All supplementary services may require signalling on the radio path. Signalling procedures and messages used are defined in the TS 24.08x and 24.09x-series of technical specifications.

For some supplementary services information needs to be transferred between the Home Location Register (HLR), the Visitor Location Register (VLR) and the Mobile services Switching Centre (MSC). Signalling procedures for such information transfer are defined in TS 29.002.

Definitions and descriptions of supplementary services are given in the TS 22.08x and TS 22.09x-series of technical specifications.

Definitions are given in TS 22.004.

NOTE: The technical specifications on the technical realisation of supplementary services do not distinguish between subscriber, user and customer, since all three do not fully cover the textual needs. Generally the term "subscriber" is used, even if this person is not having the subscription.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.011         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.011(R99) |         |                |             |          |

### 10.3.7 TS 23.012 Location management procedures

The document describes the location management procedures for the circuit switched domain, with respect to the application level functional behaviour. This is to be distinguished from the corresponding protocol handling behaviour, which is specified in TS 29.002. The following location management procedures are included:

- Location updating;
- Location cancellation;
- MS purging;
- IMSI attach/detach.

The procedures in the Mobile Station (MS) are described in GSM 03.22. The procedures between MSC, VLR and HLR utilise the Mobile Application Part (MAP) and details concerning the protocol handling are contained in TS 29.002.

The document excludes location management procedures for the packet switched domain, which are covered in TS 23.060.

The descriptions herein depict a logical separation between the MSC and VLR. This logical separation, as well as the messages transferred between the two logical entities are the basis of a model used to define the externally visible behaviour of the MSC/VLR, which may be a single physical entity. They do not impose any requirement except the definition of the externally visible behaviour.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.012         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.012(R99) |         |                |             |          |

### 10.3.8 TS 23.014 Support of Dual Tone Multi Frequency (DTMF) signalling

The document describes how Dual Tone Multi Frequency (DTMF) signals are supported in the GSM system.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.014         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.014(R99) |         |                |             |          |

### 10.3.9 TS 23.015 Technical realisation of Operator Determined Barring (ODB)

The network feature Operator Determined Barring (ODB) allows a network operator or service provider to regulate access by subscribers to GSM services, by the barring of certain categories of incoming or outgoing traffic or of roaming. Operator Determined Barring applies to all bearer services and teleservices except the Emergency Call teleservice; the teleservice Short Message Point-to-Point is therefore subject to Operator Determined Barring in the same way as circuit-switched calls.

The application of specific categories of Operator Determined Barring to a subscription is controlled by the network operator or service provider, using administrative interaction at the HLR; this interface is not standardised.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.015         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.015(R99) |         |                |             |          |

### 10.3.10 TS 23.016 Subscriber data management - Stage 2

This specification gives the stage 2 description of the subscriber data management handling between:

- The Home Location Register (HLR) and the Visitor Location Register (VLR);
- The Home Location Register (HLR) and the Serving GPRS Support Node (SGSN).

A number of procedures require updating of subscriber information:

- Location updating;
- Restoration;
- Modification of data by the operator;
- Modification of data by the subscriber via the Mobile Station (MS).

Updating of subscriber information from HLR to SGSN is required in the following situations:

- GPRS location updating;
- Modification of data by the operator.

Only the rules for the updating of subscriber data from the HLR to the VLR and from the HLR to the SGSN are described in this specification. Public Land Mobile Network (PLMN) specific and Unstructured Supplementary Service Data (USSD) subscriber data are out of scope of this specification. The GPRS context update from the SGSN to the GGSN is out of scope of this specification.

|  |      | Document No. | Version | Status         | Issued date | Location |
|--|------|--------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.016   |         | ETSI published |             |          |
|  | T1   |              |         |                |             |          |

|  |     |                    |  |  |  |  |
|--|-----|--------------------|--|--|--|--|
|  | TTC | JP-3GA-23.016(R99) |  |  |  |  |
|--|-----|--------------------|--|--|--|--|

### 10.3.11TS 23.018 Basic Call Handling - Technical realisation

This Technical Specification (TS) specifies the technical realisation of the handling of calls originated by a UMTS or GSM mobile subscriber and calls directed to a UMTS or GSM mobile subscriber, up to the point where the call is established. Normal release of the call after establishment is also specified.

In this specification, the term MS is used to denote a UMTS or GSM MS, as appropriate.

The handling of DTMF signalling and Off-Air Call set-up (OACSU) are not described in this specification.

The details of the effects of UMTS or GSM supplementary services on the handling of a call are described in the relevant 23.07x, 23.08x and 23.09x series of specifications.

The specification of the handling of a request from the HLR for subscriber information is not part of basic call handling, but is required for both CAMEL (TS 23.078) and optimal routing (TS 23.079). The use of the Provide Subscriber Information message flow is shown in TS 23.078 and TS 23.079.

The specification of the handling of data calls re-routed to a SIWFS is described in TS 23.054.

The logical separation of the MSC and VLR, and the messages transferred between them is the basis of a model used to define the externally visible behaviour of the MSC/VLR, which is a single physical entity. They do not impose any requirement except the definition of the externally visible behaviour.

If there is any conflict between this specification and the corresponding stage 3 specifications (TS 24.008, TS 25.413, GSM 08.08 and TS 29.002), the stage 3 specifications shall prevail.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.018         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.018(R99) |         |                |             |          |

### 10.3.12TS 23.032 Universal Geographical Area Description (GAD)

The document defines an intermediate universal Geographical Area Description, which subscriber applications or GSM services can use and the network can convert into an equivalent radio coverage map.

For GSM services which involve the use of an "area", it can be assumed that in the majority of cases the Service Requester will be forbidden access to data on the radio coverage map of a particular PLMN and that the Service Requester will not have direct access to network entities (e.g. BSC/BTS).

The interpretation by the PLMN operator of the geographical area in terms of cells actually used, cells that are partly within the given area and all other technical and quality of service aspects are out of the scope of the document.

This specification also provides a description of velocity that may be associated with a universal Geographical Area Description when both are applied to a common entity at a common time.

|  |      | Document No. | Version | Status         | Issued date | Location |
|--|------|--------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.032   |         | ETSI published |             |          |

|  |     |                    |  |  |  |  |
|--|-----|--------------------|--|--|--|--|
|  | T1  |                    |  |  |  |  |
|  | TTC | JP-3GA-23.032(R99) |  |  |  |  |

### 10.3.13 TS 23.034 High Speed Circuit Switched Data (HSCSD) - Stage 2

The document contains the stage 2 service description for a High Speed Circuit Switched Data (HSCSD) on GSM/GERAN. HSCSD utilizes the multislot mechanism, i.e. using multiple traffic channels (/bearers) for the communication. In Iu mode one bearer can provide all needed data rates, and the multislot mechanism is therefore not needed. The Iu mode aspects concerning HSCSD are described exclusively.

In analogy with ITU-T Recommendations I.130 [12] (refer to annex A) and with reference of ITU-T Recommendations VI.1 Q.65 [18] (Stage 2 of the method for characterization of services supported by an ISDN), the second stage of the HSCSD is defined as follows.

Stage 2 identifies the functional capabilities and information flows needed to support the service as described in High Speed Circuit Switched Data (HSCSD) - Stage 1, TS 22.034. Furthermore, it identifies various possible physical locations for the functional capabilities. The output of Stage 2, which is signalling system independent, is used as an input to Stage 3, the design of signalling system and switching specifications.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.034         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.034(R99) |         |                |             |          |

### 10.3.14 TS 23.038 Alphabets & Language

This Technical Specification defines the alphabets, languages and message handling requirements for SMS, CBS and USSD and may additionally be used for Man Machine Interface (MMI) (TS 22.030).

The specification for the Data Circuit terminating Equipment/Data Terminal Equipment (DCE/DTE) interface (TS 27.005) will also use the codes specified herein for the transfer of SMS data to an external terminal.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.038 |         |                |             |          |
|  | ETSI | TS 123.038          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.3.15 TS 23.039 Interface Protocols for the Connection of Short Message Service Centers (SMSCs) to Short Message Entities (SMEs)

The document describes a range of alternative interfaces, which may be utilised by Short Message Service Centre (SMSC), and Short Message Entity (SME), developers for the connection of SMEs to SMSCs.

The purpose of the document is to provide a single document within which the various proprietary SMSC to SME interface standards may be accommodated as optional implementations.

As stated in TS 23.040, the functionality of the SMSC is outside of the scope of the 3GPP Technical Specifications. As a result, no standardised interfaces have been specified for the connection of

SMEs to the SMSC. In the absence of a prevailing standard, SC (Service Centre), developers have devised their own protocols, which have not necessarily been based on any existing standards and are therefore largely incompatible with one another.

This document by referring to the various de-facto protocols will limit the further proliferation of proprietary standards and will benefit new SC/SME developers who may then adopt one or more of the existing protocols outlined in the present document.

This document does not provide recommendations, as to the preferred protocol implementation as all are regarded as being of equal merit. SC/SME implementors should therefore adopt the protocol most suited to their particular implementation, application or market.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.039 |         |                |             |          |
|  | ETSI | TS 123.039          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.3.16TS 23.040 Technical realisation of Short Message Service

The document describes the Short Message Service (SMS) for GSM/UMTS networks. It defines:

- The services and service elements;
- The network architecture;
- The Service Centre functionality;
- The MSC functionality (with regard to the SMS);
- The SGSN functionality (with regard to the SMS);
- The routing requirements;
- The protocols and protocol layering;

For the Teleservice Short Message Service as specified in the GSM TS 02.03 and TS 22.105.

The use of radio resources for the transfer of short messages between the MS and the MSC or the SGSN is described in TS 24.011 "Short Message Service Support on Mobile Radio Interface", and is dealt with in that specification.

The network aspects of Short Message Service provision are outside the scope of the present document (i.e. the provision of network connectivity between the PLMN subsystems). There is no technical restriction within the document for the transfer of short messages between different PLMN's. Any such restriction is likely to be subject to commercial arrangements and PLMN operators must make their own provision for interworking or for preventing interworking with other PLMN's as they see fit.

The required and assumed network service offered to the higher layers is defined in the present document.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.040 |         |                |             |          |
|  | ETSI | TS 123-040          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.3.17 TS 23.041 Technical Realization of Cell Broadcast Service

The document describes the Cell Broadcast short message service (CBS) for UMTS.

For UMTS it defines the interface requirements for the Cell Broadcast Center – UMTS Radio Network System (RNS) interface and the radio interface requirements for UMTS Radio Access Networks to support CBS as specified in TS 22.003.

|      | Document No.        | Version | Status         | Issued date | Location |
|------|---------------------|---------|----------------|-------------|----------|
| ARIB | ARIB STD-T63-23.041 |         |                |             |          |
| ETSI | TS 123.041          |         | ETSI published |             |          |
| T1   |                     |         |                |             |          |

### 10.3.18 TS 23.042 Compression algorithm for SMS

The document introduces the concepts and mechanisms involved in the compression and decompression of a stream of data.

|      | Document No.        | Version | Status         | Issued date | Location |
|------|---------------------|---------|----------------|-------------|----------|
| ARIB | ARIB STD-T63-23.042 |         |                |             |          |
| ETSI | TS 123.042          |         | ETSI published |             |          |
| T1   |                     |         |                |             |          |

### 10.3.19 TS 23.054 Shared Interworking Functions - Stage 2

The document defines the stage two description of the Shared Inter Working Function (SIWF) on Global System for Mobile communications (GSM).

A stage one description does not exist because this service is not visible to the service subscribers and users. This stage two identifies the functional Capabilities and information flows needed to support the service. The signalling system protocols and switching functions needed to implement this service are defined in the relevant specifications.

Interworking with other networks (e.g. PSTN) needs the presence of specific functions associated with the MSC, known as interworking functions (IWF). The IWFs depend on the type of network with which it is desired to interconnect and the type of service desired.

A Shared Inter Working Function is a network function that may be used by any MSC in the same PLMN to provide interworking for a data/fax call. Whereas an IWF can only be used by its MSC, the SIWF can be used by several other network nodes e.g. any MSC within the same PLMN (the concept is not limited to a certain number of MSCs). SIWF is applied to data services in GSM Phase 2 and GSM Phase 2+ (as defined in GSM 02.02, GSM 02.03 and GSM 02.34).

The usage of a SIWF requires no additional manipulation at the MS.

There is an interest to have a Shared Interworking Function (SIWF) for the following reasons:

- Possibility to fabricate/obtain the specific functionality needed for data services in areas where data traffic is expected to be low;
- Handling of data calls in case of local overload of the data traffic;
- Quick introduction and roll-out of new data services.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.054         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.054(R99) |         |                |             |          |

### 10.3.20TS 23.057 Mobile Station Application Execution Environment (MExE)

The document defines the stage 2 and stage 3 description of the Mobile Station Application Execution Environment (MExE). Stage 2 identifies the functional capabilities and information flows needed to support the service described in stage 1.

The document includes information applicable to network operators, service providers and terminal, switch and database manufacturers.

The document contains the core functions for a Mobile Station Application Execution Environment (MExE), which are sufficient to provide a complete service.

MExE uses a number of technologies to realise the requirements of the stage 1 description (TS 22.057). The document describes how the service requirements are realised with the selected technologies. The Technical Specification is devised into sections each covering the aspects relating to particular MExE technologies, it is intended that this specification will evolve along with the MExE technologies. A generic section of the specification covers areas of MExE common to all technologies.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.057 |         |                |             |          |
|  | ETSI | TS 123.057          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.3.21TS 23.060 General Packet Radio Service (GPRS) Service description; Stage 2

The document defines the stage-2 service description for the packet domain, which includes the General Packet Radio Service (GPRS) in GSM and UMTS. ITU-T I.130 [12] describes a three-stage method for characterisation of telecommunication services, and ITU-T Q.65 [18] defines stage 2 of the method.

The document does not cover the Access Network functionality. GSM 03.64 contains an overall description of the GSM GPRS Access Network. TS 25.301 contains an overall description of the UMTS Terrestrial Radio Access Network.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.060         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.060(R99) |         |                |             |          |

### 10.3.22TS 23.066 Support of GSM Mobile Number Portability (MNP) stage 2

The document describes several alternatives for the realisation of Mobile Number Portability.

The document includes information applicable to network operators, service providers, switch and database manufacturers and national regulators.

It is left to operator and implementation decisions which option, or combination of options, is used, taking into account the regulatory and architectural constraints that may prevail. The possible implications of these options on internal node functions and on signalling performance are not covered in the present document.

Normative Annex A of the document describes the technical realisation of the handling of calls to ported UMTS or GSM mobile subscribers using IN technology.

Normative Annex C of the document describes the technical realisation of the handling of calls to ported UMTS or GSM mobile subscribers using Signalling Relay technology.

Normative Annex A and Normative Annex C describe alternative solutions. The network operator may choose the solution to be used in his network.

Normative Annex B of the document describes the technical realisation of the handling of non-call related SCCP signalling for ported UMTS or GSM mobile subscribers using Signalling Relay technology.

The document does not specify the porting process.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.066         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.066(R99) |         |                |             |          |

### 10.3.23 TS 23.067 Enhanced Multi-Level Precedence and Preemption Service (EMLPP) - Stage 2

The document specifies the stage 2 description of the enhanced Multi-Level Precedence and Preemption Service (eMLPP) which provides different call priorities in combination with fast call set-up and pre-emption for different applications according to TS 22.067.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.067         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.067(R99) |         |                |             |          |

### 10.3.24 TS 23.072 Call Deflection Supplementary Service - Stage 2

This Technical Specification gives the stage 2 description of the Call Deflection supplementary service.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.072         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.072(R99) |         |                |             |          |

### 10.3.25 TS 23.078 CAMEL Stage 2

The document specifies the stage 2 description for the third phase (see TS 22.078) of the Customized Applications for Mobile network Enhanced Logic (CAMEL) feature which provides the mechanisms to support services of operators which are not covered by standardized GSM services even when roaming outside the HPLMN.

The CAMEL feature is a network feature and not a supplementary service. It is a tool to help the network operator to provide the subscribers with the operator specific services even when roaming outside the HPLMN.

In this specification, the GSM Service Control Function (gsmSCF) is treated as being part of the HPLMN. The regulatory environment in some countries may require the possibility that the gsmSCF and the HPLMN are controlled by different operators, and the gsmSCF and the HPLMN are therefore distinct entities.

In the third phase the CAMEL feature supports:

- Mobile originated and forwarded calls;
- Mobile terminating calls;
- Any time interrogation;
- Active location information retrieval;
- Suppression of announcements;
- Announcements, in band user interaction;
- Charging features;
- Supplementary service invocation notifications;
- USSD interaction with the gsmSCF;
- North American carrier selection;
- Mobility Management event notifications;
- Change of Calling Line Identification Presentation Indicator for an MO call to restricted;
- SoLSA;
- Subscribed dialled services;
- Serving network dialled services;
- MO SMS;
- GPRS data transmission;
- Mobility management;
- Notification to CSE of change of subscriber data;
- Any Time Modification;
- Any Time Interrogation of subscription Information;
- T-BCSM in the VMSC and terminating AoC;
- Interworking with Location Services;
- Multiple Subscriber Profile;
- Active Location Retrieval;
- Call Gapping.

Note that CAMEL is not applicable to Emergency Setup (Tele Service 12), i.e., in case an Emergency call has been requested the gsmSSF shall not be invoked.

The mechanism described in this standard addresses especially the need for information exchange between the VPLMN or IPLMN and the HPLMN for support of operator specific services. Any user procedures for the control of operator specific services are outside the scope of this standard. Subscribers who have subscribed to operator specific services and therefore need the functional

support of the CAMEL feature shall be marked in the HPLMN and VPLMN. In case a subscriber is marked to need CAMEL support, the appropriate procedures that provide the necessary information to the VPLMN or the HPLMN are invoked. It is possible for the HPLMN to instruct the VPLMN or IPLMN to interact with a gsmSCF, which is controlled by the HPLMN.

The specification of operator specific services is outside the scope of this standard.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 123.078         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-23.078(R99) |         |                |             |          |

### 10.3.26TS 23.079 Support of Optimal Routeing - Phase 1 - Stage 2

The document specifies the technical realisation of the first phase of the network feature Support of Optimal Routeing (SOR). The first phase of SOR provides:

- As a network operator option, a method to route a call from one mobile subscriber directly to another mobile subscriber who is in the same country as the calling mobile subscriber or in the called mobile subscriber's home country, without needing to connect the call via the HPLMN of the called subscriber, even though the called mobile subscriber has roamed outside his HPLMN;
- A method to forward calls when a called mobile subscriber who has roamed outside his home country is busy, or is not reachable, or does not reply, to a forwarded-to destination in the HPLMN country of the called subscriber or the VPLMN country of the called subscriber, without needing to connect the forwarded call via the VPLMN of the called subscriber;
- A method to combine the optimal routeing described in the first bullet point above with the optimal routeing described in the second bullet point above.

Optimal Routing of a call is permitted only if all entities involved in handling the call support Optimal Routing.

Other cases of optimal routeing (e.g. calls where the calling and called subscribers are in different countries, forwarding to a mobile subscriber or multiple forwarding) will be considered for inclusion in later phases.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 123.079         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-23.079(R99) |         |                |             |          |

### 10.3.27TS 23.081 Line Identification Supplementary Services - Stage 2

The document gives the stage 2 description of the call identification supplementary services.

The group line identification supplementary services are divided into the following four supplementary services:

- Calling line identification presentation CLIP;
- Calling line identification restriction CLIR;
- Connected line identification presentation COLP;
- Connected line identification restriction COLR.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.081         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.081(R99) |         |                |             |          |

### 10.3.28TS 23.082 Call Forwarding (CF) Supplementary Services - Stage 2

The document gives the stage 2 description of the call forwarding supplementary services.

The group of supplementary services call offering supplementary services is divided into 4 different supplementary services:

- Call forwarding unconditional (CFU);
- Call forwarding on mobile subscriber busy (CFB);
- Call forwarding on no reply (CFNRy);
- Call forwarding on mobile subscriber not reachable (CFNRc).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.082         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.082(R99) |         |                |             |          |

### 10.3.29TS 23.083 Call Waiting (CW) and Call Hold (HOLD) Supplementary Service - Stage 2

The document gives the stage 2 description of the call completion supplementary services.

The group of call completion supplementary services is divided into the following two supplementary services:

- Call waiting (CW);
- Call hold (HOLD).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.083         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.083(R99) |         |                |             |          |

### 10.3.30TS 23.084 MultiParty (MPY) Supplementary Service - Stage 2

The document gives the stage 2 description of the multi party supplementary services.

Only one multi party supplementary service has been defined, this is the Multi Party (MPY) service.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.084         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.084(R99) |         |                |             |          |

### 10.3.31TS 23.085 Closed User Group (CUG) Supplementary Service - Stage 2

The document gives the stage 2 description of the closed user group supplementary service.

The community of interest supplementary service defined is:

- Closed user group (CUG).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.085         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.085(R99) |         |                |             |          |

### 10.3.32TS 23.086 Advice of Charge (AoC) Supplementary Service - Stage 2

The document gives the stage 2 description of the Advice of Charge (AoC) supplementary services.

The charging supplementary services currently defined are:

- Advice of Charge (Information) (AoCI);
- Advice of Charge (Charging) (AoCC).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.086         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.086(R99) |         |                |             |          |

### 10.3.33TS 23.087 User-to-User Signalling (UUS) - Stage 2

The document gives the stage 2 description of the User-to-User signalling supplementary services.

The User-to-user supplementary service is divided into 3 different services:

- Service 1 (UUS1)
- Service 2 (UUS2)
- Service 3 (UUS3)

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.087         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.087(R99) |         |                |             |          |

### 10.3.34TS 23.088 Call Barring (CB) Supplementary Service - Stage 2

The document gives the stage 2 description of the call barring services.

The possibility for a mobile subscriber to have certain categories of calls barred originated from or terminated at his access:

Barring of outgoing calls:

- Barring of all outgoing calls (BAOC) (Barring program 1);
- Barring of outgoing international calls (BOIC) (Barring program 2);
- Barring of outgoing international calls EXCEPT those directed to the home PLMN country (BOIC-exHC) (Barring program 3).

Barring of incoming calls:

- Barring of all incoming calls (BAIC) (Barring program 1);

- Barring of incoming calls when roaming outside the home PLMN country  
(BIC-Roam) (Barring program 2).

NOTE: The call barring program "incoming calls when roaming outside the home PLMN country" (clause 2) is only relevant if as a general rule the called mobile subscriber pays the charges for the forwarded part of the call from his home PLMN country to any other country.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 123.088         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-23.088(R99) |         |                |             |          |

### 10.3.35TS 23.090 Unstructured Supplementary Service Data (USSD) - Stage 2

The document gives the stage 2 description of Unstructured Supplementary Service Data (USSD).

The unstructured supplementary service data (USSD) mechanism allows the Mobile Station (MS) user and a PLMN operator defined application to communicate in a way which is transparent to the MS and to intermediate network entities. The mechanism allows development of PLMN specific supplementary services. The following diagram shows how handling of USSD is carried out, independently of the applications.

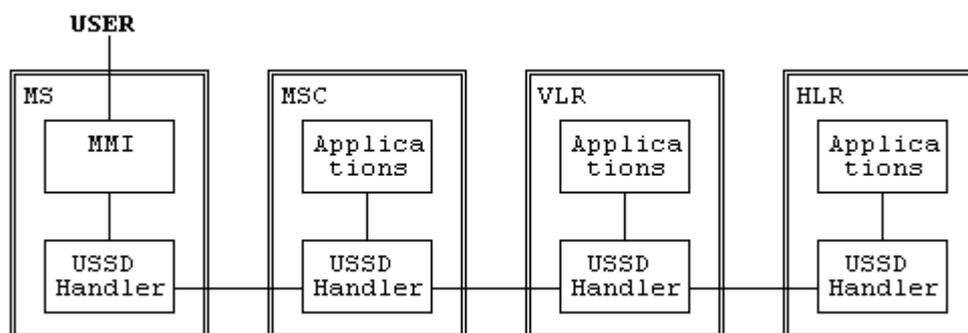


Figure 10.3.36-1/Q.REF-1

### Handling of USSD

The document defines the requirements for handling USSD at the MS and network entities. It does not include specification of particular applications, nor does it specify how a particular application is selected. Where more than one application exists at a network entity, routing of messages to the correct application is carried out by the USSD handler. The MMI for USSD is specified in TS 22.030 and TS 22.090. The alphabet indicator and the data-coding scheme are defined in TS 23.038.

USSD may be initiated by the MS user, or by the network in the following ways:

- Network initiated USSD;
- Mobile initiated USSD.

|      | Document No. | Version | Status         | Issued date | Location |
|------|--------------|---------|----------------|-------------|----------|
| ETSI | TS 123.090   |         | ETSI published |             |          |
| T1   |              |         |                |             |          |

|  |     |                    |  |  |  |  |
|--|-----|--------------------|--|--|--|--|
|  | TTC | JP-3GA-23.090(R99) |  |  |  |  |
|--|-----|--------------------|--|--|--|--|

### 10.3.36TS 23.091 Explicit Call Transfer (ECT) Supplementary Service - Stage 2

The document gives the stage 2 description of the call transfer supplementary services.

Only one call transfer supplementary service has been defined, this is the Explicit Call Transfer (ECT) supplementary service, and is described in the document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.091         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.091(R99) |         |                |             |          |

### 10.3.37TS 23.093 Call Completion to Busy Subscriber (CCBS) - Stage 2

This Technical Specification gives the stage 2 description of the Completion of Calls to Busy Subscriber (CCBS) supplementary service.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.093         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.093(R99) |         |                |             |          |

### 10.3.38TS 23.094 Follow Me Stage 2

The document specifies the stage 2 description for the Follow Me feature.

The Follow Me feature enables a mobile subscriber A to manipulate the Follow Me data of a remote party B in such a way that subsequent calls directed to remote party B will be forwarded to subscriber A.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.094         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.094(R99) |         |                |             |          |

### 10.3.39TS 23.096 Name Identification Supplementary Service - Stage 2

The document gives the stage 2 description of the Name Identification Supplementary Services.

The group of Name Identification Supplementary Services contains the following Supplementary Service:

CNAP - Calling name presentation.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.096         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.096(R99) |         |                |             |          |

### 10.3.40TS 23.097 Multiple Subscriber Profile (MSP); Stage 2

The document specifies the stage 2 description of the Multiple Subscriber Profile (MSP) Supplementary Service Phase 2. MSP Phase 2 is implemented using CAMEL Phase 3.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.097         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.097(R99) |         |                |             |          |

### 10.3.41 TS 23.101 General UMTS Architecture

This Technical Specification defines the basic physical and functional separation of UMTS. The contents of this specification are limited to those features that are common to all UMTS networks independent of their origin. It identifies and names the reference points and functional groupings appearing at this level.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.101         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.101(R99) |         |                |             |          |

### 10.3.42 TS 23.107 Quality of Service, Concept and Architecture

The document provides the framework for Quality of Service within UMTS. The main purpose is to specify the list of attributes applicable to UMTS Bearer Service and Radio Access Bearer Service, as well as describe the Quality of Service architecture to be used in UMTS networks.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.107 |         |                |             |          |
|  | ETSI | TS 123.107          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.3.43 TS 23.108 Mobile Radio Interface Layer 3 specification Core Network Protocols stage 2 (structured procedures)

The document specifies the procedures used at the radio interface (Reference Point Um, see GSM 04.02) for Call Control (CC), Mobility Management (MM), and Session Management (SM).

When the notations for "further study" or "FS" or "FFS" are present in the present document they mean that the indicated text is not a normative portion of this standard.

These procedures are defined in terms of messages exchanged over the control channels of the radio interface. The control channels are described in GSM 04.03.

The structured functions and procedures of this protocol and the relationship with other layers and entities are described in general terms in TS 24.007.

The procedures currently described in the document are for the call control of circuit-switched connections, session management for GPRS services, mobility management and radio resource management for circuit-switched and GPRS services.

TS 24.010 Contains functional procedures for support of supplementary services.

GSM 04.11 contains functional procedures for support of point-to-point short message services.

GSM 04.12 contains functional description of short message - cell broadcast.

GSM 04.60 contains procedures for radio link control and medium access control (RLC/MAC) of packet data physical channels.

GSM 04.18 contains the procedures for the RR protocol.

TS 24.008 Contains the procedures for the CN protocols.

TS 24.071 Contains functional descriptions and procedures for support of location services.

NOTE: "layer 3" includes the functions and protocols described in this Technical Specification. The terms "data link layer" and "layer 2" are used interchangeably to refer to the layer immediately below layer 3.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.108         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.108(R99) |         |                |             |          |

### 10.3.44TS 23.110 UMTS Access Stratum Services and Functions

The document specifies the services provided by the Access Stratum to the rest of the system. The adopted architecture is given by TS 23.101.

The document describes the main functions visible at the boundary between the Access Stratum and the rest of the system, it describes in general terms the information flows, both control and user data, over this boundary and relevant for the Access Stratum.

The document is the basis of the detailed specifications of the protocols which rule the information flows, both control and user data, between the Access Stratum and the parts of UMTS outside the Access Stratum, and of the detailed specifications of the UTRAN. These detailed specifications are to be found in other Technical Specifications.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.110         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.110(R99) |         |                |             |          |

### 10.3.45TS 23.116 Super Charger - Stage 2

The document specifies the stage 2 description of the Super-Charger that provides a mechanism to reduce the signalling traffic associated with mobility.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.116         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.116(R99) |         |                |             |          |

### 10.3.46TS 23.119 Gateway Location Register (GLR) - Stage2

The document gives the stage 2 description of the Gateway Location Register (GLR) within the UMTS Core Network as a means of reducing the amount of MAP signalling traffic associated with location management carried over inter-PLMN links for roaming users.

The document will be restricted of the case where the GLR supports one VPLMN only.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.119         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.119(R99) |         |                |             |          |

### 10.3.47TS 23.121 Architecture Requirements for release 99

The document covers issues related to the evolution of the GSM platform towards UMTS with the overall goal of fulfilling the UMTS service requirements, the support of the UMTS role model, support of roaming and support of new functionality, signalling systems and interfaces.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.121         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.121(R99) |         |                |             |          |

### 10.3.48TS 23.122 Non Access Stratum functions related to Mobile Station (MS) in idle mode

This 3GPP Technical Specification gives an overview of the tasks undertaken by the Core network protocols of a Mobile Station (MS) when in idle mode, that is, switched on but not having a dedicated channel allocated. It also describes the corresponding network functions. The idle mode functions are also performed by a GPRS MS as long as no dedicated channel is allocated to the MS.

This 3GPP Technical Specification outlines how the requirements of the 22 series Technical Specifications (especially TS 22.011) on idle mode operation shall be implemented. Further details are given in TS 24.008.

This 3GPP Technical Specification gives a general description of the idle mode process. The main requirements and technical solutions of those requirements are included. The processes used in idle mode are described.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.122         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.122(R99) |         |                |             |          |

### 10.3.49TS 23.127 Virtual Home Environment; Stage 2

The document specifies the stage 2 of the Virtual Home Environment and Open Service Architecture.

Virtual Home Environment (VHE) is defined as a concept for personal service environment (PSE) portability across network boundaries and between terminals. The concept of the VHE is such that users are consistently presented with the same personalised features, User Interface customisation and services in whatever network and whatever terminal (within the capabilities of the terminal and the network), wherever the user may be located. For Release 1999, e.g. CAMEL, MExE and SAT are considered the mechanisms supporting the VHE concept.

The Open Service Architecture (OSA) defines an architecture that enables operator and third party applications to make use of network functionality through an open standardised API (the OSA API). OSA provides the glue between applications and service capabilities provided by the network. In this way applications become independent from the underlying network technology. The

applications constitute the top level of the Open Service Architecture (OSA). This level is connected to the Service Capability Servers (SCSs) via the OSA API. The SCSs map the OSA API onto the underlying telecom specific protocols (e.g. MAP, CAP etc.) and are therefore hiding the network complexity from the applications.

Applications can be network/server centric applications or terminal centric applications. Terminal centric applications reside in the Mobile Station (MS). Examples are MExE and SAT applications. Network/server centric applications are outside the core network and make use of service capability features offered through the OSA API. (Note that applications may belong to the network operator domain although running outside the core network. Outside the core network means that the applications are executed in Application Servers that are physically separated from the core network entities).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.127         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.127(R99) |         |                |             |          |

### 10.3.50TS 23.135 Multicall Stage 2

The document gives the stage 2 description of the Multicall supplementary service.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 123.135         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-23.135(R99) |         |                |             |          |

### 10.3.51TS 23.140 Multimedia Messaging Service (MMS)

The document defines the stage 2 and stage 3 description of the non realtime Multimedia Messaging Service, MMS. Stage 2 identifies the functional capabilities and information flows needed to support the service described in stage 1.

The document includes information applicable to network operators, service providers and terminal, switch and database manufacturers.

The document contains the core functions for a non real-time Multimedia Messaging Service, MMS, which are sufficient to provide a basic service.

MMS uses a number of technologies to realise the requirements of the stage 1 description (TS 22.140). The document describes how the service requirements are realised with the selected technologies. As far as possible existing protocols (e.g. WAP, SMTP, ESMTP as transfer protocols; lower layers to provide push, pull, notification) and existing message formats (e.g. SMIL, MIME) shall be used for the realisation of the Multimedia Messaging Service.

This specification serves as a foundation for the development of MMS for release 99.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.140 |         |                |             |          |
|  | ETSI | TS 123.140          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.3.52TS 23.171 Functional stage 2 description of location services in UMTS

The document specifies the stage 2 of the LoCation Services (LCS) feature in UMTS, which provides the mechanisms to support mobile location services for operators, subscribers and third party service providers.

Location Services may be considered as a network provided enabling technology consisting of standardised service capabilities, which enable the provision of location applications. The application(s) may be service provider specific. The description of the numerous and varied possible location applications which are enabled by this technology are outside the scope of the document. However, clarifying examples of how the functionality being described may be used to provide specific location services may be included.

This stage 2 service description covers the LCS system functional model for the whole system, the LCS system architecture, state descriptions, message flows, etc.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-23.171 |         |                |             |          |
|  | ETSI | TS 123.171          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.4 24-Serie, Signalling protocols (User Equipment-Core Network)

#### 10.4.1 TS 24.002 GSM-UMTS Public Land Mobile Network (PLMN) Access Reference Configuration

The document describes the reference configuration for access to a PLMN.

A user accesses a PLMN via a number of interfaces, including the MS-BS (in A/Gb mode) and UE-UTRAN (in Iu mode) interface. The purpose of this Technical Specification is to indicate the possible access arrangements that may be used in conjunction with the MS-BS (in A/Gb mode) and UE-UTRAN (in Iu mode) interface.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.002         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.002(R99) |         |                |             |          |

#### 10.4.2 TS 24.007 Mobile Radio Interface Signalling Layer 3 - General Aspects

The document defines the principal architecture of layer 3 and its sub layers on the GSM Um interface, i.e. the interface between Mobile Station (MS) and network; for the CM sub layer, the description is restricted to paradigmatic examples, call control, supplementary services, and short message services for non-GPRS services. It also defines the basic message format and error handling applied by the layer 3 protocols.

For non-GPRS services the communication between sub layers and adjacent layers and the services provided by the sub layers are distributed by use of abstract service primitives. But only externally observable behaviour resulting from the description is normatively prescribed by the document.

For GPRS services in addition the local information transfer and stimuli sent between sub layers is informatively included within Annex C of the document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.007         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.007(R99) |         |                |             |          |

### 10.4.3 TS 24.008 Mobile Radio Interface Layer 3 specification; Core Network Protocols - Stage 3

This Technical Specification specifies the procedures used at the radio interface core network protocols within the 3<sup>rd</sup> generation mobile telecommunications system and the digital cellular telecommunications system.

It specifies the procedures used at the radio interface (Reference Point Um or Uu, see TS 24.002 or TS 23.002) for Call Control (CC), Mobility Management (MM), and Session Management (SM).

When the notations for "further study" or "FS" or "FFS" are present in this Technical Specification they mean that the indicated text is not a normative portion of this standard.

These procedures are defined in terms of messages exchanged over the control channels of the radio interface. The control channels are described in GSM 04.03 and TS 25.301.

The structured functions and procedures of this protocol and the relationship with other layers and entities are described in general terms in TS 24.007.

The procedures currently described in this Technical Specification are for the call control of circuit-switched connections, session management for GPRS services, mobility management and radio resource management for circuit-switched and GPRS services.

TS 24.011 contains functional procedures for support of supplementary services.

TS 24.012 contains functional procedures for support of point-to-point short message services.

GSM 04.12 contains functional description of short message - cell broadcast.

GSM 04.60 contains procedures for radio link control and medium access control (RLC/MAC) of packet data physical channels.

TS 24.071 contains functional descriptions and procedures for support of location services.

NOTE: "layer 3" includes the functions and protocols described in this Technical Specification. The terms "data link layer" and "layer 2" are used interchangeably to refer to the layer immediately below layer 3.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.008         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.008(R99) |         |                |             |          |

### 10.4.4 TS 24.010 Mobile Radio Interface Layer 3 - Supplementary Services Specification - General Aspects

The document gives the general aspects of the specification of supplementary services at the layer 3-radio interface.

GSM 04.8x and 04.9x-series specify the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of supplementary services. Provision and withdrawal of supplementary

services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

GSM 04.08 and GSM 04.80 specify the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and 02.9x-series.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and 03.9x-series.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.010         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.010(R99) |         |                |             |          |

#### 10.4.5 TS 24.011 Point-to-Point (PP) Short Message Service (SMS) Support on Mobile Radio Interface

The document specifies the procedures used across the mobile radio interface by the signalling layer 3 function Short Message Control (SMC) and Short Message Relay function (SM-RL) for both circuit switched in A/Gb mode and GPRS.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-24.011 |         |                |             |          |
|  | ETSI | TS 124.011          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

#### 10.4.6 TS 24.012 Short Message Service Cell Broadcast (SMSCB) Support on the Mobile Radio Interface

This Technical Specification describes how the Short Message Service Cell Broadcast (SMSCB) (Teleservice 23 as specified in GSM 02.03) is supported over the mobile radio interface.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-24.012 |         |                |             |          |
|  | ETSI | TS 124.012          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

#### 10.4.7 TS 24.022 Radio Link Protocol (RLP) for Data and Telematic Services on the (MS-BSS) Interface and the Base Station System - Mobile-services Switching Centre (BSS-MSC) Interface

The document specifies the Radio Link Protocol (RLP) for circuit switched data transmission within the GSM and UMTS PLMN. RLP covers the Layer 2 functionality of the ISO OSI Reference Model (IS 7498) [43]. It is based on ideas contained in IS 3309 [6], IS 4335 [7] and IS 7809 [8] (HDLC of ISO) as well as ITU-T X.25 [38] and Q.92x [19-22] (LAP-B and LAP-D of ITU, respectively.) RLP has been tailored to the special needs of digital radio transmission. RLP provides to its users the OSI Data Link Service (IS 8886)[9].

RLP is intended for use with non-transparent data-transfer. Protocol conversion may be provided for a variety of protocol configurations. Those foreseen immediately are:

- Character-mode protocols using start-stop transmission (IA5);
- X.25 [38] LAP-B.

For reasons of better presentation, material about protocol conversion has been placed within those Specifications concerned with the relevant Terminal Adapters, i.e. TS 27.002 for the asynchronous case and TS 27.003 for the synchronous case. Care must be taken that that material also applies to Interworking Functions; see TS 29.006 and TS 29.007.

|  |      | Document No. | Version | Status         | Issued date | Location |
|--|------|--------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.022   |         | ETSI published |             |          |
|  | T1   |              |         |                |             |          |
|  | TTC  |              |         |                |             |          |

#### 10.4.8 TS 24.030 Location Services LCS Stage 3 SS (MO-LR)

The document gives the stage 3 description of the Location Service (LCS) operations for mobile station.

The group of location services operations is divided into two different classes:

- Network initiated location services operations;
- Mobile initiated location services operations.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.030         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.030(R99) |         |                |             |          |

#### 10.4.9 TS 24.067 Enhanced Multi-Level Precedence and Pre-emption service (eMLPP) - Stage 3

The document specifies the procedures used at the radio interface (Reference point Um for GSM and Reference point Uu for UMTS as defined in TS 24.002) for normal operation, invocation, registration and interrogation of the enhanced Multi-Level Precedence and Pre-emption Service (eMLPP) supplementary service. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In TS 24.010 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

TS 24.080 specify the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in TS 22.004 and TS 22.08x and TS 22.09x -series. TS 22.067 is related specially to eMLPP.

Technical realization of supplementary services is described in TS 23.011 and TS 23.08x and TS 23.09x -series.

TS23.067 is related specially to eMLPP.

The procedures for Call Control, Mobility Management at the layer 3-radio interface are defined in TS 24.007 and TS 24.008.

The procedure for Radio Resource management at layer 3-radio interface is defined in GSM 04.18 (for GSM) and TS 25.331 (for UMTS).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.067         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.067(R99) |         |                |             |          |

#### 10.4.10TS 24.072 Call Deflection Supplementary Service - Stage 3

This Global System for Mobile communications Technical Specification specifies the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation of Call Deflection (CD) supplementary service. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.072         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.072(R99) |         |                |             |          |

#### 10.4.11TS 24.080 Mobile radio Layer 3 Supplementary Service specification - Formats and coding

The document contains the coding of information necessary for support of supplementary service operation on the mobile radio interface layer 3.

This document gives the functional definitions and contents of messages for call independent supplementary service operations. Messages necessary for support of call related supplementary service operations are defined in TS 24.008.

This document gives the general format and coding for messages used for call independent supplementary service and the format and coding of information elements used for both call related and call independent supplementary service operations.

This document gives the specification of the call related and calls independent supplementary service operations.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.080         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.080(R99) |         |                |             |          |

#### 10.4.12TS 24.081 Line Identification Supplementary Service - Stage 3

The document specifies the procedures used at the radio interface for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of line identification supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In TS 24.010 the general aspects of the specification of supplementary services at the layer 3 radio interface are given.

TS 24.080 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in TS 22.004 and TS 22.08x and TS 22.09x-series. TS 22.081 is related specially to line identification supplementary services.

Technical realization of supplementary services is described in TS 23.011 and TS 23.08x and TS 23.09x-series. TS 23.081 is related specially to line identification supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3 radio interface are defined in TS 24.007 and TS24.008.

The following supplementary services belong to the line identification supplementary services and are described in the document:

- Calling line identification presentation (CLIP);
- Calling line identification restriction (CLIR);
- Connected line identification presentation (COLP);
- Connected line identification restriction (COLR).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.081         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | LP-3GA-24.081(R99) |         |                |             |          |

### 10.4.13TS 24.082 Call Forwarding Supplementary Service - Stage 3

This document specifies the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, interrogation and network invocation of call offering supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10, the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and GSM 02.9x-series. GSM 02.82 is related specially to call offering supplementary services.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and GSM 03.9x-series. GSM 03.82 is related specially to call offering supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the call offering supplementary services and are described in the document:

- Call forwarding unconditional (CFU);
- Call forwarding on mobile subscriber busy (CFB);
- Call forwarding on no reply (CFNRy);
- Call forwarding on mobile subscriber not reachable (CFNRc).

|  |      | Document No. | Version | Status         | Issued date | Location |
|--|------|--------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.082   |         | ETSI published |             |          |

|  |     |                    |  |  |  |  |
|--|-----|--------------------|--|--|--|--|
|  | T1  |                    |  |  |  |  |
|  | TTC | JP-3GA-24.082(R99) |  |  |  |  |

**10.4.14TS 24.083 Call Waiting (CW) and Call Hold (HOLD) Supplementary Service - Stage 3**

The document specifies the procedures used at the radio interface (Reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of call completion supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and GSM 02.9x-series. GSM 02.83 is related specially to call completion supplementary services.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and GSM 03.9x-series.

GSM 03.83 is related specially to call completion supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the call completion supplementary services and are described in the document:

- Call waiting(CW);
- Call hold (HOLD).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.083         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.083(R99) |         |                |             |          |

**10.4.15TS 24.084 MultiParty (MPTY) Supplementary Service - Stage 3**

The document specifies the procedures used at the radio interface (Reference point Um as defined in GSM 04.02) for normal operation and invocation of MultiParty supplementary services.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and the GSM 02.8x and GSM 02.9x-series.

GSM 02.84 is related specially to MultiParty supplementary services.

Technical realization of supplementary services is described in GSM 03.11 and the GSM 03.8x and GSM 03.9x-series.

GSM 03.84 is related specially to MultiParty supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary service belongs to the MultiParty supplementary services and is described in the document:

- MultiParty service (MPTY).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.084         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.084(R99) |         |                |             |          |

### 10.4.16TS 24.085 Closed User Group (CUG) Supplementary Service - Stage 3

This Technical Specification (TS) for Mobile communications specifies the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of community of interest supplementary services. The provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and causes no signalling on the radio interface.

In GSM 04.10, the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and GSM 02.9x-series. GSM 02.85 is related to the community of interest supplementary services.

Technical realization of supplementary services is described in technical specifications GSM 03.11 and GSM 03.8x and 03.9x-series. GSM 03.85 is related to the community of interest supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

Signalling interworking for supplementary services between GSM 09.02 and GSM 04.08 and between GSM 09.02 and GSM 04.80 is defined in GSM 09.11.

The following supplementary services belong to the community of interest supplementary services and are described in this Technical Specification:

- Closed User Group (CUG).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.085         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.085(R99) |         |                |             |          |

### 10.4.17TS 24.086 Advice of Charge (AoC) Supplementary Service - Stage 3

The document specifies the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of charging supplementary services. The provision and withdrawal of supplementary

services is an administrative matter between the mobile subscriber and the service provider and causes no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and GSM 02.9x-series. GSM 02.24 and 02.86 are related to the charging supplementary services.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and GSM 03.9x-series. GSM 03.86 is related to the charging supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the charging supplementary services and are described in the document:

- Advice of Charge (Information) (AoCI);
- Advice of Charge (Charging) (AoCC).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.086         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.086(R99) |         |                |             |          |

#### 10.4.18 TS 24.087 User-to-User Signalling (UUS) - Stage 3

This Technical Specification gives the stage 3 descriptions of the User-to-User signalling supplementary services.

The User-to-user supplementary service is divided into 3 different services:

- Service 1 (UUS1)
- Service 2 (UUS2)
- Service 3 (UUS3)

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.087         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.087(R99) |         |                |             |          |

#### 10.4.19 TS 24.088 Call Barring (CB) Supplementary Service - Stage 3

This Technical Specification (TS) specifies the procedures used at the radio interface (reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of call barring supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04, GSM 02.8x and GSM 02.9x-series.

Technical realization of supplementary services is described in GSM 03.11, GSM 03.8x and GSM 03.9x-series.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the call restriction supplementary services and are described in this specification:

- Barring of outgoing calls:
  - Barring of all outgoing calls (BAOC)  
(Barring program 1);
  - Barring of outgoing international calls (BOIC)  
(Barring program 2);
  - Barring of outgoing international calls EXCEPT those directed to the home PLMN country  
(BOIC-exHC) (Barring program 3).
- Barring of incoming calls:
  - Barring of all incoming calls (BAIC)  
(Barring program 1);
  - Barring of incoming calls when roaming outside the home PLMN country  
(BIC-Roam) (Barring program 2).

|  |      | Document No.  | Version | Status         | Issued date | Location |
|--|------|---------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.088    |         | ETSI published |             |          |
|  | T1   |               |         |                |             |          |
|  | TTC  | JP-3GA-24.088 |         |                |             |          |

#### 10.4.20 TS 24.090 Unstructured Supplementary Service Data (USSD) - Stage 3

The document gives the stage 3 description of the Unstructured Supplementary Service Data (USSD) operations.

The group of unstructured supplementary service data operations is divided into two different classes:

- Network initiated unstructured supplementary service data operations;
- Mobile initiated unstructured supplementary service data operations.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.090         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.090(R99) |         |                |             |          |

#### 10.4.21 TS 24.091 Explicit Call Transfer (ECT) Supplementary Service - Stage 3

The document gives the stage 3 description of the call transfer supplementary services.

The document specifies the procedures used at the radio interface (Reference point Um as defined in GSM 04.02) for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of call transfer supplementary services. Provision and withdrawal of supplementary

services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04, GSM 02.8x and GSM 02.9x-series. GSM 02.91 is related specifically to call transfer supplementary services.

The technical realization of supplementary services is described in GSM 03.11, GSM 03.8x and GSM 03.9x-series. GSM 03.91 is related specifically to call transfer supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the call transfer supplementary services and are described in the document:

- Explicit Call Transfer (ECT).

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 124.091         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-24.091(R99) |         |                |             |          |

#### **10.4.22TS 24.093 Call Completion to Busy Subscriber (CCBS) - Stage 3**

The document gives the stage 3 description of the Completion of Calls to Busy Subscriber (CCBS) supplementary service. The document specifies the procedures used at the radio interface (Reference point Um as defined in GSM 04.02) for normal operation, activation, deactivation, invocation and interrogation of the completion of calls to busy subscriber supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given.

GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04, GSM 02.8x and GSM 02.9x-series. Technical specification GSM 02.93 is related specifically to the Completion of Calls to Busy Subscriber supplementary service.

The technical realization of supplementary services is described in technical specifications GSM 03.11, GSM 03.8x and 03.9x-series. GSM 03.93 is related specifically to Completion of Calls to Busy Subscriber supplementary service.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the call completion supplementary services and are described in the document:

- Completion of Calls to Busy Subscriber (CCBS).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.093         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.093(R99) |         |                |             |          |

### 10.4.23TS 24.096 Name Identification Supplementary Service - Stage 3

This Technical Specification (TS) specifies the procedures used at the radio interface for normal operation, registration, erasure, activation, deactivation, invocation and interrogation of name identification supplementary services. Provision and withdrawal of supplementary services is an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

In GSM 04.10 the general aspects of the specification of supplementary services at the layer 3-radio interface are given. GSM 04.80 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in GSM 02.04 and GSM 02.8x and 02.9x-series. GSM 02.96 is related specially to name identification supplementary services.

Technical realization of supplementary services is described in GSM 03.11 and GSM 03.8x and 03.9x-series. Technical specification GSM 03.96 is related specially to name identification supplementary services.

The procedures for Call Control, Mobility Management and Radio Resource management at the layer 3-radio interface are defined in GSM 04.07 and GSM 04.08.

The following supplementary services belong to the name identification supplementary services and are described in this Technical Specification:

- Calling name presentation (CNAP);

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.096         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.096(R99) |         |                |             |          |

### 10.4.24TS 24.135 Multicall Stage 3

The document gives the stage 3 description of the Multicall (MC) supplementary service. The document specifies the procedures used by the radio interface for normal operation, registration and interrogation of the Multicall supplementary service. Provision, withdrawal, erasure, activation and deactivation of supplementary services are an administrative matter between the mobile subscriber and the service provider and cause no signalling on the radio interface.

TS 24.010 describes the general aspects of the specification of supplementary services at the layer 3 radio interface.

TS 24.080 specifies the formats and coding for the supplementary services.

Definitions and descriptions of supplementary services are given in TS 22.004, TS 22.072, TS 22.08x, TS 22.09x-series and TS 22.135. TS 22.135 is related specifically to the Multicall supplementary service.

The technical realisation of supplementary services are described in TS 23.011, TS 23.072, TS 23.08x, 23.09x-series and TS 23.135. TS 23.135 is related specifically to the Multicall supplementary service.

The procedures for Call Control and Mobility Management at the layer 3 radio interface are defined in TS 24.007 and TS 24.008.

The following supplementary services are described in the document:

- Multicall (MC).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 124.135         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-24.135(R99) |         |                |             |          |

## 10.5 26-Serie, Codecs (speech, video, etc.)

### 10.5.1 TS 26.071 AMR speech Codec; General description

The document is an introduction to the speech processing parts of the narrowband telephony speech service employing the Adaptive Multi-Rate (AMR) speech coder. A general overview of the speech processing functions is given, with reference to the documents where each function is specified in detail.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.071 |         |                |             |          |
|  | ETSI | TS 126.071          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

### 10.5.2 TS 26.073 AMR speech Codec; C-source code

The document contains an electronic copy of the ANSI-C code for the Adaptive Multi-Rate codec. The ANSI-C code is necessary for a bit exact implementation of the Adaptive Multi Rate speech transcoder (TS 26.090), Voice Activity Detection (TS 26.094), comfort noise (TS 26.092), source controlled rate operation (TS 26.093) and example solutions for substituting and muting of lost frames (TS 26.091).

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.073 |         |                |             |          |
|  | ETSI | TS 126.073          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

### 10.5.3 TS 26.074 AMR speech Codec; Test sequences

The document specifies the digital test sequences for the adaptive multi-rate (AMR) speech codec. These sequences test for a bit exact implementation of the adaptive multi-rate speech transcoder (TS

26.090), voice activity detection (TS 26.094), comfort noise (TS 26.092), and source controlled rate operation (TS 26.093).

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.074 |         |                |             |          |
|  | ETSI | TS 126.074          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

#### 10.5.4 TS 26.090 AMR speech Codec; Transcoding Functions

This Technical Specification (TS) describes the detailed mapping from input blocks of 160 speech samples in 13-bit uniform PCM format to encoded blocks of 95, 103, 118, 134, 148, 159, 204, and 244 bits and from encoded blocks of 95, 103, 118, 134, 148, 159, 204, and 244 bits to output blocks of 160 reconstructed speech samples. The sampling rate is 8 000 samples/s leading to a bit rate for the encoded bit stream of 4.75, 5.15, 5.90, 6.70, 7.40, 7.95, 10.2 or 12.2 kbit/s. The coding scheme for the multi-rate coding modes is the so-called Algebraic Code Excited Linear Prediction Coder, hereafter referred to as ACELP. The multi-rate ACELP coder is referred to as MR-ACELP.

In the case of discrepancy between the requirements described in this TS and the fixed points computational description (ANSI-C code) of these requirements contained in TS 26.073, the description in TS 26.073 will prevail. The ANSI-C code is not described in this TS, see TS 26.073 for a description of the ANSI-C code.

The transcoding procedure specified in this TS is mandatory for systems using the AMR speech codec.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.090 |         |                |             |          |
|  | ETSI | TS 126.090          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

#### 10.5.5 TS 26.091 AMR speech Codec; Error concealment of lost frames

This specification defines an error concealment procedure, also termed frame substitution and muting procedure, which shall be used by the AMR speech codec receiving end when one or more lost speech or lost Silence Descriptor (SID) frames are received.

The requirements of this document are mandatory for implementation in all networks and User Equipment (UE)s capable of supporting the AMR speech codec. It is not mandatory to follow the bit exact implementation outlined in this document and the corresponding C source code.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.091 |         |                |             |          |
|  | ETSI | TS 126.091          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.6 TS 26.092 AMR speech Codec; comfort noise for AMR Speech Traffic Channels

This document gives the detailed requirements for the correct operation of the background acoustic noise evaluation, noise parameter encoding/decoding and comfort noise generation for the AMR speech codec during Source Controlled Rate (SCR) operation.

The requirements described in this document are mandatory for implementation in all UEs capable of supporting the AMR speech codec.

The receiver requirements are mandatory for implementation in all networks capable of supporting the AMR speech codec, the transmitter requirements only for those where downlink SCR will be used.

In case of discrepancy between the requirements described in this document and the fixed points computational description of these requirements contained in TS 26.073, the description in TS 26.073 will prevail.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.092 |         |                |             |          |
|  | ETSI | TS 126.092          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.7 TS 26.093 AMR speech Codec; Source Controlled Rate operation

This document describes the Source Controlled Rate (SCR) operation of the Adaptive Multi-Rate speech Codec in Codec Types UMTS\_AMR and GSM\_AMR for the UMTS system. The implementation of this SCR operation is mandatory in all UMTS equipment.

The structure of distributing the various functions between system entities is not mandatory for implementation, as long as the operation on the speech decoder output remains the same.

Annex A describes the Discontinuous Transmission (DTX) operation of the Adaptive Multi-Rate speech Codec in Codec Type GSM\_AMR for the GSM system. This annex is the former GSM 06.93 (release 98).

Annexes B to E describe the SCR operation of the Adaptive Multi-Rate speech Codec in Codec Types GSM\_EFR, TDMA\_EFR, TDMA\_US1 and PDC\_EFR for the UMTS system.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.093 |         |                |             |          |
|  | ETSI | TS 126.093          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.8 TS 26.094 AMR Speech Codec; Voice Activity Detector for AMR Speech Traffic Channels

This document specifies two alternatives for the Voice Activity Detector (VAD) to be used in the Discontinuous Transmission (DTX) as described in TS 26.093. Implementers of mobile station and

infrastructure equipment conforming to the AMR specifications can choose which of the two VAD options to implement. There are no interoperability factors associated with this choice.

The requirements are mandatory on any VAD to be used either in User Equipment (UE) or Base Station Systems (BSS)s that utilize the AMR speech codec.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.094 |         |                |             |          |
|  | ETSI | TS 126.094          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.9 TS 26.101 AMR speech Codec; Frame Structure

The document describes a generic frame format for the Adaptive Multi-Rate (AMR) speech codec. This format shall be used as a common reference point when interfacing speech frames between different elements of the 3G system and between different systems. Appropriate mappings to and from this generic frame format will be used within and between each system element.

Annex A describes a second frame format, which shall be used when octet alignment of AMR frames is required.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.101 |         |                |             |          |
|  | ETSI | TS 126.101          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.10 TS 26.102 AMR speech Codec; Interface to Iu and Uu

The document specifies the mapping of the AMR generic frame format (TS 26.101) to the Iu Interface (TS 25.415) and the Uu Interface.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.102 |         |                |             |          |
|  | ETSI | TS 126.102          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.11 TS 26.103 Codec lists

The Technical Specification outlines the Codec List in 3GPP including both systems, GSM and UMTS, to be used by the Bearer Independent Call Control (BICC) protocol to set up a call or modify a call in Transcoder Free Operation (TrFO).

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.103 |         |                |             |          |
|  | ETSI | TS 126.103          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.12 TS 26.104 AMR speech Codec; Floating point C-Code

This Technical Specification (TS) contains an electronic copy of the ANSI-C code for a floating-point implementation of the Adaptive Multi-Rate codec. This floating-point codec specification is mainly targeted to be used in multimedia applications such as the 3G-324M terminal specified in TS 26.110, or in packet-based (e.g., H.323 [44]) applications. The bit-exact fixed-point ANSI-C code in TS 26.073 remains the preferred implementation for all applications, but the floating-point codec may be used instead of the fixed-point codec when the implementation platform is better suited for a floating-point implementation. It has been verified that the fixed-point and floating-point codecs interoperate with each other without any artifacts.

The floating-point ANSI-C code in this specification is the only standard conforming non-bit-exact implementation of the Adaptive Multi Rate speech transcoder (TS 26.090), Voice Activity Detection (TS 26.094), comfort noise generation (TS 26.092), and source controlled rate operation (TS 26.093). The floating-point code also contains example solutions for substituting and muting of lost frames (TS 26.091).

The fixed-point specification in TS 26.073 shall remain the only allowed implementation for the 3G mandatory speech services and the use of the floating-point codec is strictly limited to other services.

The floating-point encoder in this specification is a non-bit-exact implementation of the fixed-point encoder producing quality indistinguishable from that of the fixed-point encoder. The decoder in this specification is functionally a bit-exact implementation of the fixed-point decoder, but the code has been optimized for speed and the standard fixed-point libraries are not used as such.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.104 |         |                |             |          |
|  | ETSI | TS 126.104          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.13 TS 26.110 Codec for Circuit switched Multimedia Telephony Service; General Description

This specification introduces the set of specifications that apply to 3G-324M multimedia terminals.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.110 |         |                |             |          |
|  | ETSI | TS 126.110          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.14 TS 26.111 Codec for Circuit switched Multimedia Telephony Service; Modifications to H.324

In ITU-T recommendation H.324 [11] with annex C describes a generic multimedia codec for use in error-prone, wireless networks. The scope of the document is the changes, deletions, and additions to those texts necessary to fully specify a multimedia codec for use in 3GPP networks. Note that this implicitly excludes the network interface and call setup procedures. Also excluded are any general introductions to the system components.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.110 |         |                |             |          |
|  | ETSI | TS 126.111          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.15 TS 26.131 Narrow Band (3,1kHz) Speech & Video Telephony Terminal Acoustic Characteristics

The document is applicable to any terminal capable of supporting narrow-band or wideband telephony, either as a stand-alone service or as the telephony component of a multimedia service. The document specifies minimum performance requirements for the acoustic characteristics of 3G terminals when used to provide narrow-band or wideband telephony.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.131 |         |                |             |          |
|  | ETSI | TS 126.131          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.5.16 TS 26.132 Narrow Band (3,1kHz) Speech & Video Telephony Terminal Acoustic Test Specification

The document is applicable to any terminal capable of supporting narrow-band or wideband telephony, either as a stand-alone service or as the telephony component of a multimedia service. The document specifies test methods to allow the minimum performance requirements for the acoustic characteristics of 3G terminals when used to provide narrow-band or wideband telephony to be assessed.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-26.132 |         |                |             |          |
|  | ETSI | TS 126.132          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

## 10.6 27-Serie, Data

### 10.6.1 TS 27.001 General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)

The document is based on the principles of terminal adaptor functions presented in the ITU-T I-series of recommendations (I.460 to I.463) [14-17].

The PLMN supports a wide range of voice and non-voice services in the same network. In order to enable non-voice traffic in the PLMN there is a need to connect various kinds of terminal equipment to the Mobile Termination (MT). The target of the present document is to outline the functions needed for the terminal adaptation.

In the TS 22.002 the bearer services are described. The general network configuration is described in TS 23.002 and the GSM PLMN access reference configuration is defined in GSM 04.02. The various connection types used in the GSM PLMN are presented in GSM 03.10. Terminology used in the present document is presented in GSM 01.04 (ETR 350), 3GPP TR 21.905 and TS 29.990. For support of data services between a PLMN and other networks see TS 29.007.

The document is valid for a 2<sup>nd</sup> generation PLMN (GSM) as well as for a 3<sup>rd</sup> generation PLMN (UMTS). If text applies only for one of these systems it is explicitly mentioned by using the terms "GSM" and "UMTS". If text applies to both of the systems, but a distinction between the ISDN/PSTN and the PLMN is necessary, the term "PLMN" is used.

Descriptions related to facsimile are not applied to UMTS.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 127.001         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-27.001(R99) |         |                |             |          |

### 10.6.2 TS 27.002 Terminal Adaptation Functions (TAF) for services using Asynchronous bearer capabilities

The document defines the interfaces and Terminal Adaptation Functions (TAF) integral to a Mobile Termination (MT) which enable the use of asynchronous bearer services in the PLMN and the attachment of asynchronous terminals to a MT (see TS 24.002 and TS 23.101).

The general aspects of Terminal Adaptation Functions are contained in TS 27.001.

The present document covers support of these services for the following interfaces and procedures:

- (i) ITU-T V.14 [26] procedures;
- (ii) ITU-T V.21 [27] DTE/DCE interface ;
- (iii) ITU-T V.22bis [29] DTE/DCE interface ;
- (iv) ITU-T V.32 [34] DTE/DCE procedures ;
- (v) ITU-T I.420 [13] S interface;
- (vi) ITU-T V.250 [36] signalling procedures.

The asynchronous data rates between the MT and the IWF are defined in TS 22.002.

Descriptions related to facsimile are not applied to UMTS.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 127.002         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-27.002(R99) |         |                |             |          |

### 10.6.3 TS 27.003 Terminal Adaptation Functions (TAF) for service using Synchronous bearer capabilities

The document defines Terminal Adaptation Functions (TAF) which are integrated in a Mobile Termination (MT) and which enable the use of synchronous bearer services in the PLMN and the attachment of Synchronous synchronous Terminals terminals to an MT (see TS 24.002). For the case where asynchronous terminals are attached to the TAF when using synchronous bearer services in the PLMN, the reader is referred to TS 27.002 for the asynchronous MT-TAF interface specifics and to the document for synchronous bearer service specifics on the TAF-IWF interface. The general aspects of Terminal Adaptation Functions are contained in specification TS 27.001. The present document covers support of synchronous data services (see TS 22.002) for the following interfaces and procedures:

- V.22 [28] DTE/DCE Interface;

- V.22 bis [29] DTE/DCE Interface;
- V.26 ter [33] DTE/DCE Interface;
- X.21 bis [37] DTE/DCE Interface;
- X.32 [39] Procedure;
- V.25 bis [31] Procedure;

LAPB is the only synchronous non-transparent protocol, which is considered in the present document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 127.003         |         | ETSI published |             |          |
|  | TI   |                    |         |                |             |          |
|  | TTC  | JP-3GA-27.003(R99) |         |                |             |          |

#### **10.6.4 TS 27.005 Use of Data Terminal Equipment – Data Circuit terminating Equipment (DTE – DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)**

This Technical Specification (TS) defines three interface protocols for control of SMS functions within a GSM/UMTS mobile telephone from a remote terminal via an asynchronous interface.

This document defines a binary protocol (“Block Mode”). The protocol includes error protection and is suitable for use where the link may not be completely reliable. It will be of particular use where control of remote devices is required. Efficient transfer of binary encoded user data is possible.

This document defines a character-based interfaced based on “AT” commands (“Text Mode”). This mode is suitable for unintelligent terminals or terminal emulators, and for application software built on command structures like those defined in V.25ter [32]. Some of the commands defined in clause 3 will also be useful for implementations of clause 2 and/or clause 4, for example enabling an indication of incoming SMS messages.

This document defines a character-based interface with hex-encoded binary transfer of message blocks (“PDU Mode”). This mode is suitable for software drivers based on AT command structures which do not understand the content of the message blocks and can only pass them between the MT and “upper level” software resident in the TE.

In all three modes, the terminal is considered to be in control for SMS/CBS transactions.

This specification considers the mobile termination to be a single entity. Other 3GPP/GSM Technical Specifications describe the split of functionality between the mobile equipment and (U)SIM.

The three “modes” referred to above, are represented in figure 10.6.4-1/Q.REF-1.

The “Block mode” is a self contained mode in its own right, and when entered, control will remain within that mode until the procedures to exit the mode are executed, after which control is returned to the V.25ter [32] “command” state or “on-line command” state.

The “Text” and “PDU” modes are not in themselves V.25ter [32] states but are simply sets of commands, which will operate in either the V.25ter [32] “command” state or “on-line command” state. The “Text” and “PDU” modes are transitory states and after each operation, control is automatically returned to the V.25ter [32] “command” state or “on-line command” state. Whilst in

the V.25ter [32] command state, the MS is available to handle incoming and outgoing calls such as Data or Facsimile.

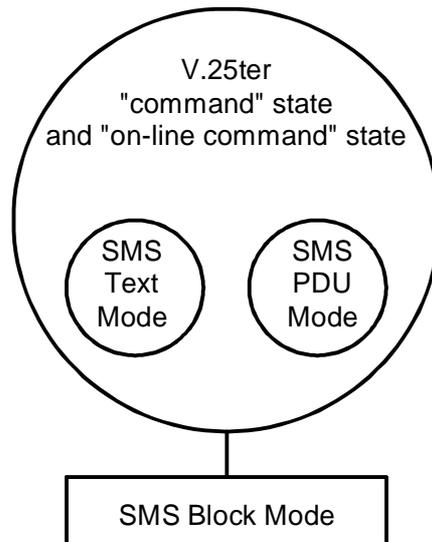


Figure 10.6.4-1/Q.REF-1

### Block, Text and PDU modes

In the "Block mode" and "PDU" mode a mobile is not permitted to modify any component of an SMS/CBS message received from the air interface or an SMS message received from a TE, before passing it on, except where TS 23.040 or TS 23.041 defines a "component modification facility" and where this "component modification facility" is supported by the mobile. In the Text Mode the mobile may be unable to display characters coded in particular coding schemes. In this case, the mobile shall behave as described in TS 23.038 and assume the coding scheme to be the GSM 7 bit default alphabet.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-27.005 |         |                |             |          |
|  | ETSI | TS 127.005          |         | ETSI published |             |          |
|  | TI   |                     |         |                |             |          |

### 10.6.5 TS 27.007 AT command set for 3G User Equipment (UE)

The document specifies a profile of AT commands and recommends that this profile be used for controlling Mobile Equipment (ME) functions and GSM/UMTS network services from a Terminal Equipment (TE) through Terminal Adaptor (TA). The command prefix +C is reserved for Digital Cellular in ITU-T Recommendation V.25ter [32]. The present document has also the syntax details used to construct these extended GSM/UMTS commands. Commands from ITU-T Recommendation V.25ter [32] and existing digital cellular standards (TIA IS-99 [40] and TIA IS-135 [41]) are used whenever applicable. Some of the new commands are defined such way that they can be easily applied to ME of networks other than GSM/UMTS. ITU-T T.31 [24] and T.32 [25] fax AT commands may be used for GSM/UMTS fax transmission from TE. GSM/UMTS Short Message Service AT commands are defined in TS 27.005. GPRS AT commands are defined in clause 10 of this specification. The present document assumes an abstract architecture comprising a

TE (e.g. a computer) and a ME interfaced by a TA (see figure 10.6.5-1/Q:REF-1). The span of control of the defined commands should allow handling any physical implementation that this abstract architecture may lead to:

- TA, ME and TE as three separate entities;
- TA integrated under the ME cover, and the TE implemented as a separate entity;
- TA integrated under the TE cover, and the ME implemented as a separate entity;
- TA and ME integrated under the TE cover as a single entity.

The commands described in the present document may be observed on the link between the TE and the TA. However, most of the commands retrieve information about the ME, not about the TA.

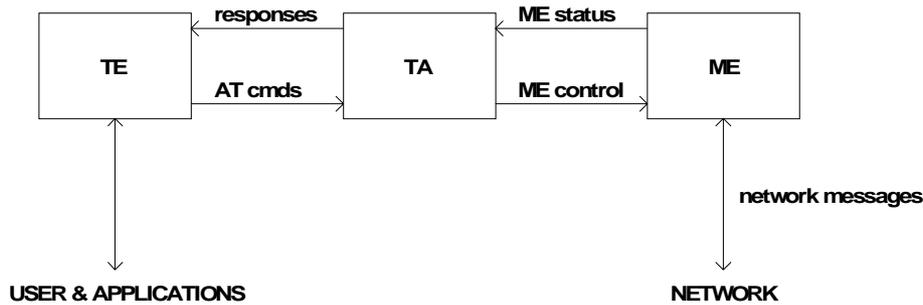


Figure 10.6.5-1/Q.REF-1

### Setup

Interface between TE and TA is intended to operate over existing serial (ITU-T Recommendation V.24 [30]) cables, infrared link, and all link types with similar behaviour. For correct operation many of the defined commands require eight bit data and therefore it is recommended that TE-TA link be set to eight-bits/ byte mode. (For infrared operation implementation refer informative references IrDA. For embedding AT commands and data during on-line data state refer TIA-617[42]/ITU-T V.80[35].) Interface between TA and ME is dependent on the interface in the ME.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-27.007 |         |                |             |          |
|  | ETSI | TS 127.007          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.6.6 TS 27.010 Terminal Equipment to User Equipment (TE-UE) multiplexer protocol User Equipment (UE)

The document is to define a multiplexing protocol between a UE and a TE. The multiplexing protocol can be used to send any data, for instance voice, SMS, USSD, fax etc.

The document describes the protocol, but not the commands or data transported with it.

|  |      | Document No.        | Version | Status | Issued date | Location |
|--|------|---------------------|---------|--------|-------------|----------|
|  | ARIB | ARIB STD-T63-27.010 |         |        |             |          |

|  |      |            |  |                |  |  |
|--|------|------------|--|----------------|--|--|
|  | ETSI | TS 127.010 |  | ETSI published |  |  |
|  | T1   |            |  |                |  |  |

### 10.6.7 TS 27.060 GPRS Mobile Stations supporting GPRS

The UMTS/GSM PLMN supports a wide range of voice and non-voice services in the same network. In order to enable non-voice traffic in the PLMN there is a need to connect various kinds of terminal equipments to the Mobile Station (MS). The document defines the requirements for TE-MT interworking over the R-reference point for the Packet Domain, including the protocols and signalling needed to support Packet Switched services, as defined in TS 22.060 and TS 23.060.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 127.060         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-27.060(R99) |         |                |             |          |

### 10.6.8 TS 27.103 Wide Area Network Synchronisation

This specification provides a definition of a Wide Area Synchronization protocol. The synchronization protocol is based upon IrMC level 4.

The document covers Wide Area Network Synchronization between current and future mobile communication end-user devices, desktop applications and server-based information servers. This is a living document and, as such, it will evaluate new technologies (e.g. XML) for inclusion as they become readily available.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-27.103 |         |                |             |          |
|  | ETSI | TS 127.103          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

## 10.7 29-Serie, Signalling protocols (NSS)

### 10.7.1 TS 29.002 Mobile Application Part (MAP)

It is necessary to transfer between entities of a Public Land Mobile Network (PLMN) information specific to the PLMN in order to deal with the specific behaviour of roaming Mobile Stations (MS)s. The Signalling System No. 7 specified by ITU-T is used to transfer this information.

The present document describes the requirements for the signalling system and the procedures needed at the application level in order to fulfil these signalling needs.

|  |      | Document No.       | Version | Status | Issued date | Location |
|--|------|--------------------|---------|--------|-------------|----------|
|  | ETSI |                    |         |        |             |          |
|  | T1   |                    |         |        |             |          |
|  | TTC  | JP-3GA-29.002(R99) |         |        |             |          |

### 10.7.2 TS 29.007 General requirements on Interworking between the PLMN and the ISDN or PSTN

The document identifies the Mobile-services Switching Centre/Interworking Functions (MSC/IWFs) and requirements to support interworking between:

- a) PLMN and PSTN;
- b) PLMN and ISDN;

For circuit switched services in the PLMN. It is not possible to treat ISDN and PSTN as one type of network, even when both ISDN and PSTN subscribers are served by the same exchange because of the limitations of the PSTN subscriber's access i.e. analogue connection without D-channel signalling.

Within the document, the requirements for voice and non-voice (data) calls are considered separately.

Descriptions related to facsimile are not applied to UMTS.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 129.007         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-29.007(R99) |         |                |             |          |

### 10.7.3 TS 29.010 Information Element Mapping between Mobile Station - Base Station System (MS - BSS) and Base Station System - Mobile-services Switching Centre (BSS - MCS) Signalling Procedures and the Mobile Application Part (MAP)

The scope of the document is:

- i) To provide a detailed specification for the interworking between information elements contained in layer 3 messages sent on the MS-MSC interface (Call Control and Mobility Management parts of TS 24.008) and parameters contained in MAP services sent over the MSC-VLR interface (TS 29.002) where the MSC acts as a transparent relay of information;
- ii) To provide a detailed specification for the interworking between information elements contained in BSSMAP messages sent on the BSC-MSC interface (GSM 08.08) and parameters contained in MAP services sent over the MSC-VLR interface (TS 29.002) where the MSC acts as a transparent relay of information;
- iii) To provide a detailed specification for the interworking between information elements contained in BSSMAP messages (GSM 08.08) and RANAP (25.413)
- iv) To provide a detailed specification for the interworking as in i) and ii) above when the MSC also processes the information.

Interworking for supplementary services is given in GSM 09.11. Interworking for the short message service is given in GSM 03.40 and GSM 04.11. Interworking between the call control signalling of GSM 04.08 and the PSTN/ISDN is given in GSM 09.03, GSM 09.07 and GSM 09.08. Interworking between the 'A' and 'E' interfaces for inter-MSC handover signalling is given in GSM 09.07 and 09.08.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 129.010         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-29.010(R99) |         |                |             |          |

#### 10.7.4 TS 29.011 Signalling Interworking for Supplementary Services

This Technical Specification is to provide a detailed specification for interworking between the A interface protocol and the Mobile Application Part for handling of supplementary services. The MAP interfaces of interest are the B-, C-, D- and E-interfaces.

The A-, C-, D- and E-interfaces are physical interfaces while the B-interface is an internal interface defined for modelling purposes. Information relating to the modelling interface is not normative in this specification.

Supplementary service signalling may be passed by the MSC/VLR between the A- and E-interfaces after inter-MSC handover. This procedure is transparent as far as supplementary services are concerned therefore interworking concerning this process is not described in this specification.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 129.011         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-29.011(R99) |         |                |             |          |

#### 10.7.5 TS 29.013 Signalling interworking between ISDN supplementary services Application Service Element (ASE) and Mobile Application Part (MAP) protocols

This Technical Specification is to provide a specification for interworking between the ISDN Application Service Element (ASE) protocol for supplementary services and the Mobile Application Part (MAP) protocol on MAP D-interface protocol for handling of supplementary services within the digital cellular telecommunications system (Phase 2+). This version of the specification includes the interworking for the Call Completion to Busy Subscriber (CCBS) service between the ISDN CCBS-ASE and MAP.

The MAP protocol for CCBS service is specified in TS 29.002. The ISDN CCBS-ASE protocol is specified in ETS 300 356-18 [4]. The ISDN CCBS-ASE protocol is also commonly referred to as the SSAP protocol in GSM 03.93. This specification clarifies the interworking within the HLR between these protocols for the Call Completion to Busy Subscriber (CCBS) service.

|      | Document No.       | Version | Status         | Issued date | Location |
|------|--------------------|---------|----------------|-------------|----------|
| ETSI | TS 129.013         |         | ETSI published |             |          |
| T1   |                    |         |                |             |          |
| TTC  | JP-3GA-29.013(R99) |         |                |             |          |

#### 10.7.6 TS 29.016 Serving GPRS Support Mode SGSN - Visitors Location Register (VLR); Gs Interface Network Service Specification

This document specifies or references the subset of MTP and SCCP, which is used for the reliable transport of BSSAP+ messages in the Gs interface. This document also specifies the SCCP addressing capabilities to be provided in the Gs interface.

The SCCP is used to provide message routing between the SGSN and the VLR. The SCCP routing principles specified in this Technical Specification allow connecting one SGSN to several VLR. No segmentation at SCCP level is needed on the Gs interface. Only SCCP class 0 is used on the Gs interface. This document identifies the SCCP subset that should be used between an SGSN and a VLR.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.016         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-29.016(R99) |         |                |             |          |

### 10.7.7 TS 29.018 Serving GPRS Support Mode SGSN - Visitors Location Register (VLR); Gs Interface Layer 3 Specification

The document specifies or references procedures used on the Serving GPRS Support Node (SGSN) to Visitors Location Register (VLR) interface for interoperability between GSM circuit switched services and GSM packet data services.

The document specifies the layer 3 messages and procedures on the Gs interface to allow coordination between databases and to relay certain messages related to GSM circuit switched services over the GPRS subsystem.

The functional split between VLR and SGSN is defined in TS 23.060. The required procedures between VLR and SGSN are defined in detail in the present document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.018         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-29.018(R99) |         |                |             |          |

### 10.7.8 TS 29.060 GPRS Tunnelling protocol (GTP) across the Gn and Gp interface

The document defines the second version of GTP used on:

- The Gn and Gp interfaces of the General Packet Radio Service (GPRS);
- The Iu, Gn and Gp interfaces of the UMTS system.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.060         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-29.060(R99) |         |                |             |          |

### 10.7.9 TS 29.061 General Packet Radio Service (GPRS); Interworking between the Public Land Mobile Network (PLMN) supporting GPRS and Packet

The document defines the requirements for Packet Domain interworking between a:

- a) PLMN and PDN;
- b) PLMN and PLMN.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.061         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-29.061(R99) |         |                |             |          |

### 10.7.10 TS 29.078 CAMEL; Stage 3

The document specifies the CAMEL Application Part (CAP) supporting the third phase of the network feature Customized Applications for Mobile network Enhanced Logic. CAP is based on a

sub-set of the ETSI Core INAP CS-2 as specified by EN 301 140-1 [5]. Descriptions and definitions provided by EN 301 140-1 [5] are directly referenced by this standard in case no additions or clarifications are needed for the use in the CAP.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.078         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-29.078(R99) |         |                |             |          |

### 10.7.11TS 29.108 Application of the Radio Access Network Application Part (RANAP) on the E-interface

The document describes the subset of Radio Access Network Application Part (RANAP) messages and procedures, defined in TS 25.413, which is used on the E-interface. A general description can be found in TS 23.002 and TS 23.009.

For the initiation and execution of relocation of SRNS (relocation for short, throughout the whole document) between MSCs a subset of RANAP procedures are used. For the subsequent control of resources allocated to the User Equipment (UE) RANAP procedures are used. The Direct Transfer Elementary Procedure (EP) of RANAP is used for the transfer of connection management and mobility management messages between the UE and the controlling 3G\_MSC.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.108         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-29.108(R99) |         |                |             |          |

### 10.7.12TS 29.119 GPRS Tunnelling Protocol (GTP) specification for Gateway Location Register (GLR)

The document describes the signalling requirements and procedures used at network elements related to the GLR for GTP within the 3GPP system at the application level.

The document gives the description of the systems needed only in the network utilising GLR as the delta document against TS 29.060.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.119         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | TD-3GA-29.119(R99) |         |                |             |          |

### 10.7.13TS 29.120 Mobile Application Part (MAP) specification for Gateway Location Register (GLR); stage 3

The document describes the signalling requirements and procedures used at network elements related to the GLR for MAP within the 3GPP system at the application level.

The document gives the description of the systems needed only in the network utilising GLR as the delta document against TS 29.002.

|  |      | Document No. | Version | Status         | Issued date | Location |
|--|------|--------------|---------|----------------|-------------|----------|
|  | ETSI | TS 129.120   |         | ETSI published |             |          |

|  |     |                    |  |  |  |  |
|--|-----|--------------------|--|--|--|--|
|  | T1  |                    |  |  |  |  |
|  | TTC | TD-3GA-29.120(R99) |  |  |  |  |

### 10.7.14TS 29.198 Open Services Architecture API part 1

This document specifies the stage 3 of the Open Service Architecture (OSA) Application Programming Interface (API). The concepts and the functional architecture of the Open Service Architecture (API) are described by TS 23.127. This document describes the stage 3 specification of the Open Service Architecture API.

The Open Service Architecture defines an architecture that enables service providers to make use of network functionality through an open standardised interface, i.e. the OSA API. The network functionality is describes as Service Capability Servers. Within the OSA concepts the following Service Capability Servers are identified:

- CAMEL Service Environment (see in TS 23.078)
- WAP execution platform (i.e. WAP Gateway & WAP Push Proxy)
- Home Location Register (HLR)

The stage 3 documentation of the OSA R'99 API consists of two parts:

- **The API specification (Part 1).**  
This is a normative stage 3 specification of the capabilities of the OSA R'99 API and describes the OSA API interface classes, containing class diagrams (see section 6), state transition diagrams (see section 7), data type definitions (section 8), and the IDLs (see section 9).
- **The Mapping specification of the OSA R'99 API and the network protocols (Part2).**  
This is an informative specification to provide an example how the OSA API can be mapped on the network protocols (i.e. MAP, CAP and WAP). It is an informative document, since this mapping is considered as implementation/vendor dependent. On the other hand this mapping will provide potential service designers with a better understanding of the relationship of the OSA API interface classes and the behaviour of the network associated to these interface classes.

The OSA API Stage 3 activity is performed jointly with ETSI SPAN3's Service Provider Access Requirements activity. The contents of this document is related to the jointly owned 3GPP & ETSI document referred as the API Master document, which contains the API interface descriptions that are common and differentiated between ETSI & 3GPP.

|      | Document No.       | Version | Status | Issued date | Location |
|------|--------------------|---------|--------|-------------|----------|
| ETSI |                    |         |        |             |          |
| T1   |                    |         |        |             |          |
| TTC  | JP-3GA-29.198(R99) |         |        |             |          |

## 10.8 31-Serie, UIM User Identity Module

### 10.8.1 TS 31.101 UICC-terminal interface; Physical and logical characteristics

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

The document specifies:

- The requirements for the physical characteristics of the UICC;
- The electrical interface between the UICC and the Terminal;
- The initial communication establishment and the transport protocols;
- The model which serves as a basis for the logical structure of the UICC;
- The communication commands and the procedures;
- The application independent files and protocols.

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

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-31.101 |         |                |             |          |
|  | ETSI | TS 131.101          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.8.2 TS 31.102 Characteristics of the USIM Application

The document defines the USIM application for 3G-telecom network operation.

The document specifies:

- Specific command parameters;
- File structures;
- Contents of EFs (Elementary Files);
- Security functions;
- Application protocol to be used on the interface between UICC (USIM) and ME.

This is to ensure interoperability between a USIM and an ME independently of the respective manufacturers, card issuer or operator.

The document does not define any aspects related to the administrative management phase of the USIM. Any internal technical realisation of either the USIM or the ME is only specified where these are reflected over the interface. The document does not specify any of the security algorithms, which may be used.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-31-102 |         |                |             |          |
|  | ETSI | TS 131.102          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.8.3 TS 31.110 Numbering system for telecommunication IC card applications

The document describes the numbering system for Application IDentifiers (AID) for 3G telecommunication Integrated Circuits (IC) card applications.

The numbering system described in the document provides a means for an application and related services offered by a provider to identify if a given card contains the elements required by its application and related services.

An AID is used to address an application in the card. It consists of a Registered application provider Identifier (RID) and a Proprietary application Identifier eXtension (PIX).

The document describes the coding of the PIX.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-31.110 |         |                |             |          |
|  | ETSI | TS 131.110          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

#### 10.8.4 TS 31.111 USIM Application Toolkit (USAT)

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

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

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

The present document defines:

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

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

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-31.111 |         |                |             |          |
|  | ETSI | TS 131.111          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

#### 10.8.5 TS 31.120 Terminal tests for the UICC Interface; part 1

The document specifies the interface test for the Terminal / UICC.

The document specifies the tests of:

- Physical characteristics of the UICC;
- The electrical interface between the UICC and the Terminal;
- The initial communication establishment and the transport protocols;
- The application independent procedures.

|  |      | Document No.          | Version | Status         | Issued date | Location |
|--|------|-----------------------|---------|----------------|-------------|----------|
|  | ARIB | (ARIB STD-T63-31.120) |         |                |             |          |
|  | ETSI | TS 131.120            |         | ETSI published |             |          |
|  | T1   |                       |         |                |             |          |

### 10.8.6 TS 31.121 Terminal tests for the UICC Interface; part 2

The document provides the UICC (Universal IC Card)-Terminal Interface Conformance Test Specification between the 3<sup>rd</sup> Generation Terminal and USIM (Universal Subscriber Identity Module) as an application on the UICC and the Terminal for 3G-telecom network operation:

- The default setting of the USIM;
- The applicability of each test case;
- The test configurations;
- The conformance requirement and reference to the core specifications;
- The test purposes; and

a brief description of the test procedure and the specific acceptance criteria.

|      | Document No.          | Version | Status         | Issued date | Location |
|------|-----------------------|---------|----------------|-------------|----------|
| ARIB | (ARIB STD-T63-31.121) |         |                |             |          |
| ETSI | TS 131.121            |         | ETSI published |             |          |
| T1   |                       |         |                |             |          |

### 10.8.7 TS 31.122 UICC Test Specification

The document provides the Conformance Test Specification for a Universal IC Card (UICC) defined in TS 31.101 with Universal Subscriber Identity Module (USIM) defined in TS 31.102.

|      | Document No.          | Version | Status | Issued date | Location |
|------|-----------------------|---------|--------|-------------|----------|
| ARIB | (ARIB STD-T63-31.122) |         |        |             |          |
| ETSI |                       |         |        |             |          |
| T1   |                       |         |        |             |          |
| TTC  |                       |         |        |             |          |

## 10.9 32-Serie, Operation and Maintenance

### 10.9.1 TS 32.005 Telecommunications Management; Charging and billing; 3G call and event data for the Circuit Switched (CS) domain

The document is concerned with the administration of subscriber related event and call data. This includes both the collection of call data from, and the distribution of tariff data to, the Network Elements.

The subscriber (IMSI) and mobile equipment (IMEI) related call and event data collected is employed by a number of management activities including billing & accounting, statistical analysis and customer care.

The tariff data in the Network Elements is required to support the supplementary service "Advice of Charge".

The aim of the document is to describe both the network management functions required and the data involved.

|      | Document No. | Version | Status         | Issued date | Location |
|------|--------------|---------|----------------|-------------|----------|
| ETSI | TS 132.005   |         | ETSI published |             |          |

|  |     |                    |  |  |  |  |
|--|-----|--------------------|--|--|--|--|
|  | T1  |                    |  |  |  |  |
|  | TTC | JP-3GA-32.005(R99) |  |  |  |  |

### 10.9.2 TS 32.015 Telecommunications Management; Charging and billing; 3G call and event data for the Packet Switched (PS) domain

The GSM and UMTS PLMN support a range of packet-based services in the same network. In order to enable operators the ability to provide a commercially viable service there is a need to provide charging functions. The document describes the functionality of charging, which includes the General Packet Radio Service (GPRS) in GSM and UMTS, as defined in TS 22.060 and TS 23.060 (packet based services).

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.015         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-32.015(R99) |         |                |             |          |

### 10.9.3 TS 32.101 3G Telecom Management principles and high level requirements

The document establishes and defines the management principles and high-level requirements for the management of UMTS.

In particular, the document identifies the requirements for:

- The upper level of a UMTS Management System;
- The reference model, showing the elements the UMTS Management System interacts with;
- The network operator processes needed to run, operate and maintain a UMTS network;
- The functional architecture of the UMTS Management System;
- The principles to be applied to UMTS Management Interfaces;
- The methodology to be followed in further steps of the UMTS Management Specifications.

The document does not provide physical architectures of the UMTS Management System. These aspects are defined and discussed in more detail in TS 32.102.

This document is applicable to all further 3GPP specifications regarding the Network Management of UMTS.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.101         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-32.101(R99) |         |                |             |          |

### 10.9.4 TS 32.102 3G Telecom Management Architecture

The document identifies identify and standardises the most important and strategic contexts in the physical architecture for the management of UMTS. It serves as a framework to help define a telecom management physical architecture for a planned UMTS and to adopt standards and provide products that are easy to integrate.

The document is applicable to all further Technical Specifications regarding the Telecom Management of UMTS.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.102         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-32.102(R99) |         |                |             |          |

### 10.9.5 TS 32.104 3G Performance Management

The document describes the requirements for the management of performance measurements and the collection of performance measurement data across a 3G network. It defines the administration of measurement schedules by the Network Element Manager (EM), the generation of measurement results in the Network Elements (NEs) and the transfer of these results to one or more Operations Systems, i.e. EM(s) and/or Network Manager(s) (NM(s)).

The basic Performance Management concept that the document is built upon is described. The requirements how an EM administers the performance measurements and how the results can be collected are defined in detail. The file format for the bulk transfer of performance measurement results to the NM is specified, the file transfer procedure utilised on that interface is described. A set of measurements available for collection by NEs is described; effort has been made to ensure consistency in the definition of measurements between different NEs.

The following is beyond the scope of the document, and therefore the document does not describe:

- The formal definition of the interface that the EM uses to administer performance measurements in the NEs;
- The formal definition of the interface that the EM uses to collect measurement results from the NEs;
- How the data, once accumulated and collected, could or should be processed, stored, or presented to an end user;
- The information which may be obtained through the collection and processing of call or event related records which have been produced by the NEs primarily for the purpose of raising bills and other charges.

The management requirements have been derived from existing telecommunications operations experience. The management definitions were then derived from other standardisation work so as to minimise the re-invention factor. References are given as appropriate.

The objectives of this standardisation are:

- To provide the descriptions for a standard set of measurements;
- To produce a common description of the management technique for measurement administration and result accumulation; and
- To define a method for the bulk transmission of measurement results across a management interface.

The definition of the standard measurements is intended to result in comparability of measurement data produced in a multi-vendor 3G networks, for those measurement types that can be standardised across all vendors' implementations.

As far as possible, existing standardisation in the area of Performance Management has been re-used and enhanced where particular requirements, peculiar to the mobile telephony environment, have been recognised.

The document considers all the above aspects of Performance Management for a 3G network and its NEs defined in the 3G core Technical Specifications. However, only those aspects which are specific to a 3G system and particular to 3G-network operation are included in the document.

|  |      | Document No.       | Version | Status         | Issued date | Location |
|--|------|--------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.104         |         | ETSI published |             |          |
|  | T1   |                    |         |                |             |          |
|  | TTC  | JP-3GA-32.104(R99) |         |                |             |          |

### 10.9.6 TS 32.106-1 Telecommunication Management; Configuration Management; Part 1: 3G configuration management; Concept and requirements

The document describes the Configuration Management (CM) aspects of managing a 3G network. This is described from the management perspective in TS 32.101 and TS 32.102.

The document defines a set of controls to be employed to effect set-up and changes to a 3G network in such a way that operational capability and Quality Of Service (QOS), network integrity and system inter working are ensured. In this way, the present document describes the interface definition and behaviour for the management of relevant 3G NEs in the context of the described management environment. The context is described for both the management system (OS) and Network Element (NE) functionality.

This document contains the specific definitions for the standardised N interface, which are necessary to follow for compliance to this specification.

The Itf-N for CM is built up by a number of Integration Reference Points (IRPs) and a related Name Convention, which realise the functional capabilities over this interface. The basic structure of the IRPs is defined in TS 32.101 and TS 32.102. For CM, a number of IRPs (and the Name Convention) are defined herein, used by this as well as by other specifications for Telecom Management produced by 3GPP. All these are included in Parts 2 through 8 of the document as follows:

- Notification IRP Information Service Version 1: 32.106 Part 2
- Notification IRP CORBA Solution Set Version 1:1: 32.106 Part 3
- Notification IRP CMIP Solution Set Version 1:1 32.106 Part 4
- Basic Configuration Management IRP Information Model (including NRM) Version 1: 32.106 Part 5
- Basic Configuration Management IRP CORBA Solution Set Version 1:1: 32.106 Part 6
- Basic Configuration Management IRP CMIP Solution Set Version 1:1: 32.106 Part 7
- Name Convention for Managed Objects: 32.106 Part 8

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-1         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-1(R99) |         |                |             |          |

**10.9.7 TS 32.106-2 Telecommunication Management; Configuration Management; Part 2: Notification Integration Reference Point; Information Service version 1**

Network Elements (NEs) under management generate events to inform event receivers about occurrences within the network that may be of interest to event receivers. There are a number of categories of events. Alarm, as specified in Alarm IRP: Information Service TS 32.111-2, is one member of this category.

The purpose of Notification IRP is to define an interface through which an IRPManager (typically a network management system) can subscribe to IRPAgent (typically an Element Manager (EM) or a NE) for receiving network events. It also specifies attributes carried in the network events. These attributes are common among all event categories. Attributes that are specific to a particular event category are not part of the present document. For example, *perceivedSeverity* is an attribute specific for alarm event category. This attribute is not defined the document but in Alarm IRP TS 32.111-2.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-2         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-2(R99) |         |                |             |          |

**10.9.8 TS 32.106-3 Telecommunication Management; Configuration Management; Part 3: Notification Integration Reference Point; CORBA solution set version 1:1**

The document specifies the Common Object Request Broker Architecture (CORBA) Solution Set (SS) for the IRP whose semantics is specified in Notification IRP: Information Service (TS 32.106-2).

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-3         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-3(R99) |         |                |             |          |

**10.9.9 TS 32.106-4 Telecommunication Management; Configuration Management; Part 4: Notification Integration Reference Point: CMIP Solution Set Version 1:1**

The document specifies the Common Management Information Protocol (CMIP) Solution Set (SS) for the Notification Integration Reference Point (IRP): Information Service defined in TS 32.106-2. This document contains:

- An introduction to some concepts that are the base for some specific aspects of the CMIP interfaces.
- The GDMO definitions for the Alarm Management over the CMIP interfaces
- The ASN.1 definitions supporting the GDMO definitions.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-4         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-4(R99) |         |                |             |          |

**10.9.10TS 32.106-5 Telecommunication Management; Configuration Management; Part 5:  
Basic Configuration Management IRP information model (including NRM) version 1**

The document (Basic Configuration Management (CM) IRP: Information Model) defines an Integration Reference Point (IRP) through which an 'IRPAgent' (typically an Element Manager or Network Element) can communicate basic Configuration Management related information to one or several 'IRPManagers' (typically Network Managers). This version of the IRP is mainly intended for "passive management" of high-level network configuration and status information as required by a Network Manager.

The document is divided in three main parts:

1. Specifies a generic IRP Information Service with operations and notifications to be used by an 'IRPManager' to retrieve information on managed objects maintained by an 'IRPAgent'.
2. Specifies a generic Network Resource Model, NRM (also referred to as a Management Information Model – MIM) with definitions of Managed Object Classes.
3. Defines the UMTS management NRM by reusing this generic model either by direct reuse or sub-classing.

The Configuration Management (CM) area is very large. The intention is to split the specification of the related interfaces in several IRPs. In addition to the subject IRP, it is expected that IRPs will be defined for functional areas like Security management, Software management, Network & Service provisioning, etc. An important aspect of such a split is that the Network Resource Models (NRMs) defined in different IRPs are consistent. The Basic CM IRP here provides a base for all CM-related resource modelling.

To summarize, the Basic CM IRP has three main purposes:

- (1) To define an interface for retrieval of Configuration Management information,
- (2) To define a generic Network Resource Model that constitutes a base from which other (more specialized) resource models can inherit, and
- (3) To define the applied UMTS management Network Resource Model

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-5         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-5(R99) |         |                |             |          |

**10.9.11TS 32.106-6 Telecommunication Management; Configuration Management; Part 6:  
Basic Configuration Management IRP CORBA solution set version 1:1**

The purpose of this *Basic Configuration Management (CM) IRP: Information Service CORBA Solution Set* is to define the mapping of the IRP information model (see TS 32.106-5) to the protocol specific details necessary for implementation of this IRP in a CORBA/IDL environment.

The document does not describe any Network Resource Model (NRM) – this is described in TS 32.106-5. Please note that TS 32.106-5 defines an *IRP Information Model*, which comprises both an IS and NRM definition.

|  |      | Document No. | Version | Status         | Issued date | Location |
|--|------|--------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-6 |         | ETSI published |             |          |
|  | T1   |              |         |                |             |          |

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|--|-----|----------------------|--|--|--|--|
|  | TTC | JP-3GA-32.106-6(R99) |  |  |  |  |
|--|-----|----------------------|--|--|--|--|

**10.9.12TS 32.106-7 Telecommunication Management; Configuration Management; Part 7: Basic Configuration Management IRP CMIP solution set version 1:1**

The document defines a CMIP Solution Set for the Basic CM IRP introduced in TS 32.106-5. The version of this CMIP Solution Set is 1:1, where the first “1” means that it corresponds to the Information Model version 1, and the second “1” means that it is the first CMIP Solution Set corresponding to Information Model version 1.

This document maps the protocol- and technology-independent operations, parameters, notifications and the Network Resource Model specified in the Basic CM IRP Information Model (Chapter 6 of TS 32.106-5) onto the corresponding CMIP/CMISE equivalences. The important technical aspects specific to this CMIP Solution Set are also described there. The GDMO definitions are introduced. This document also contains the ASN.1 definitions related to the GDMO definitions.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106.7         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-7(R99) |         |                |             |          |

**10.9.13TS 32.106-8 Telecommunication Management; Configuration Management; Part 8: Name convention for Managed Objects**

A more detailed background and introduction of the IRP concept is given in TS 32.101 and TS 32.102.

To perform network management tasks, co-operating applications require identical interpretation of names assigned to network resources under management. Such names are required to be unambiguous as well. The present document recommends one name convention for network resources under management in the IRP context.

To facilitate integration of network management information obtained via multiple IRPs of different technologies such as CMIP and CORBA, identical network resource name semantics must be conveyed in all IRPs. The document specifies one such name convention.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.106-8         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.106-8(R99) |         |                |             |          |

**10.9.14TS 32.111-1 Telecommunication Management; Fault Management; Part 1: 3G fault management requirements**

The document specifies the overall requirements for 3G Fault Management (FM) as it applies to the Network Elements (NE), Element Manger (EM) and Network Manager (NM).

This document defines the FM concept and functional requirements for the detection of faults and the generation, collection and presentation of alarms, operational state data and test results across 3G systems. These functions are described on a non-formal level since the formal standardisation of

these functions across the different vendors' equipment is not required. The functional areas specified in the present document cover:

- Fault surveillance and detection in the NEs;
- Notification of alarms (including alarm cease) and operational state changes;
- Retrieval of current alarms from the NEs;
- Fault isolation and defence mechanisms in the NEs;
- Alarm filtering
- Management of alarm severity levels;
- Alarm and operational state data presentation and analysis at the Operations System (OS);
- Retention of alarm and operational state data in the NEs and the OS; and
- The management of tests.

Any (re)configuration activity exerted from the EM as a consequence of faults will not be subject of the present document; these are described in TS 32.106.

This document also defines the functional requirements for the standard Itf-N, for the purpose of Fault Management of 3G networks, as seen from the Network Manager (NM). The Itf-N is fully standardised so as to connect systems of any vendor to the NM via this interface.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.111-1         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.111-1(R99) |         |                |             |          |

### **10.9.15TS 32.111-2 Telecommunication Management; Fault Management; Part 2: Alarm Integration Reference Point: Information Service**

The document (TS 32.111 Part-2) defines the Alarm Integration Reference Point (IRP) Information Service (IS), which addresses the alarm surveillance aspects of Fault Management (FM), applied to the N Interface between EM-NM and NE-NM.

The purpose of the Alarm IRP is to define an interface through which a "system" (typically a Network Element Manager or a Network Element) can communicate alarm information for its managed objects to one or several Manager Systems (typically Network Management Systems).

The Alarm IRP IS defines the semantics of alarms and the interactions visible across the reference point in a protocol neutral way. It defines the semantics of the operations and notifications visible in the IRP. It does not define the syntax or encoding of the operations, notifications and their parameters.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.111-2         |         | ETSI published |             |          |
|  | T1   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.111-2(R99) |         |                |             |          |

**10.9.16 TS 32.111-3 Telecommunication Management; Fault Management; Part 3: Alarm Integration Reference Point: CORBA solution set version 1:1**

The document specifies the CORBA Solution Set (SS) for the IRP whose semantics is specified in Alarm IRP: Information Service (IS) (TS 32.111-2).

This document provides key architectural features supporting the SS. Defines the mapping of operations, notification, parameters and attributes defined in IS to their SS equivalents. Defines the usage of OMG CORBA Structured Event to carry information defined in notifications carrying alarm information. The document also describes the notification interface containing the push method. Annex A contains the IDL specification.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.111-3         |         | ETSI published |             |          |
|  | TI   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.111-3(R99) |         |                |             |          |

**10.9.17 TS 32.111-4 Telecommunication Management; Fault Management; Part 4: Alarm Integration Reference Point: CMIP solution set**

The document (TS 32.111 Part-4) defines the alarm integration reference point for the CMIP solution set. This document contains:

- An introduction to some basic concepts of the CMIP interfaces.
- The GDMO definitions for the Alarm Management over the CMIP interfaces.
- The ASN.1 definitions supporting the GDMO definitions.

|  |      | Document No.         | Version | Status         | Issued date | Location |
|--|------|----------------------|---------|----------------|-------------|----------|
|  | ETSI | TS 132.111-4         |         | ETSI published |             |          |
|  | TI   |                      |         |                |             |          |
|  | TTC  | JP-3GA-32.111-4(R99) |         |                |             |          |

**10.10 33-Serie, Security Aspects**

**10.10.1 TS 33.102 Security Architecture**

This specification defines the security architecture, i.e., the security features and the security mechanisms, for the third generation mobile telecommunication system.

A security feature is a service capability that meets one or several security requirements. The complete set of security features address the security requirements as they are defined in "3G Security: Threats and Requirements" (TS 21.133) and implement the security objectives and principles described in TS 33.120. A security mechanism is an element that is used to realise a security feature. All security features and security mechanisms taken together form the security architecture.

An example of a security feature is user data confidentiality. A security mechanism that may be used to implement that feature is a stream cipher using a derived cipher key.

This specification defines 3G security procedures performed within 3G capable networks (R99+), i.e. intra-UMTS and UMTS-GSM. As an example, UMTS authentication is applicable to UMTS

radio access as well as GSM radio access provided that the serving network node and the MS are UMTS capable.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-33.102 |         |                |             |          |
|  | ETSI | TS 133.102          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.10.2TS 33.103 Security Integration Guidelines

This technical specification defines how elements of the 3G-security architecture are to be integrated into the following entities of the system architecture.

- Home Environment Authentication Centre (HE/AuC)
- Serving Network Visited Location Register (VLR/SGSN)
- Radio Network Controller (RNC)
- Mobile station User Identity Module (UIM)
- Mobile Equipment (ME)

This specification is derived from 3G "Security architecture" TS 33.102.

The structure of this technical specification is a series of tables, which describe the security information and cryptographic functions to be stored in the above entities of the 3G systems.

For security information, this is in terms of multiplicity, lifetime, parameter length and whether mandatory or optional.

For the cryptographic functions, the tables also include an indication of whether the implementation needs to be standardised or can be proprietary.

The equivalent information for the alternative Temporary Key proposal is included in an appendix to this document.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-33.103 |         |                |             |          |
|  | ETSI | TS 133.103          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

### 10.10.3TS 33.105 Cryptographic Algorithm requirements

This specification constitutes requirements specification for the security functions, which may be used to provide the network access security features defined in TS 33.102.

The specification covers the intended use of the functions, the technical requirements on the functions and the requirements as regards standardization.

For those functions that require standardization, it also covers the intended use of the algorithm specification, the requirements on test data, and quality assurance requirements on both the algorithm and its documentation.

|  |      | Document No.        | Version | Status | Issued date | Location |
|--|------|---------------------|---------|--------|-------------|----------|
|  | ARIB | ARIB STD-T63-33.105 |         |        |             |          |

|  |      |            |  |                |  |  |
|--|------|------------|--|----------------|--|--|
|  | ETSI | TS 133.105 |  | ETSI published |  |  |
|  | T1   |            |  |                |  |  |

#### 10.10.4TS 33.106 Lawful interception requirements

The document provides basic interception requirements within a Third Generation Mobile Communication System (3GMS).

The specification describes the service requirements from a Law Enforcement point of view only. The aim of this document is to define a 3GMS interception system that supports a number of regional interception regulations, but these regulations are not repeated here as they vary. Regional interception requirements shall rely on this specification to derive such information, as they require.

These interception requirements shall be used to derive specific network requirements.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-33.106 |         |                |             |          |
|  | ETSI | TS 133.106          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

#### 10.10.5TS 33.107 Lawful interception architecture and functions

The document describes the architecture and functional requirements within a Third Generation Mobile Communication System (3GMS).

The specification shows the service requirements from a Law Enforcement point of view only. The aim of this document is to define a 3GMS interception system that supports a number of regional interception regulations, but these regulations are not repeated here as they vary. Regional interception requirements shall be met in using specific (regional) mediation functions allowing only required information to be transported.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-33.107 |         |                |             |          |
|  | ETSI | TS 133.107          |         | ETSI published |             |          |
|  | T1   |                     |         |                |             |          |

#### 10.10.6TS 33.120 Security Objectives and Principles

The document gives the objectives and principles of 3GPP security.

The principles state what is to be provided by 3G securities as compared to the security of second-generation systems. The principles will also ensure that 3G securities can secure the new services and new service environments offered by 3G systems.

The objectives give general, high level requirements for 3GPP security, which will be expanded upon in TS 21.133.

The priorities for the implementation of 3GPP security are also given.

|  |      | Document No.        | Version | Status         | Issued date | Location |
|--|------|---------------------|---------|----------------|-------------|----------|
|  | ARIB | ARIB STD-T63-33.120 |         |                |             |          |
|  | ETSI | TS 133.120          |         | ETSI published |             |          |

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|--|----|--|--|--|--|--|
|  | T1 |  |  |  |  |  |
|--|----|--|--|--|--|--|

**History**

| Version | Date       | Comments   |
|---------|------------|--|
| 1.0     | 2001-02-13 | Mark up version, initial draft   |
| 1.1     | 2001-02-14 | Clean version, initial draft   |
| 2.0     | 2001-04-23 | Mark up version after the telephone conference 2001-04-18                          |
| 3.0     | 2001-05-10 | Mark up version after the SSG meeting 7 <sup>th</sup> to 11 <sup>th</sup> May 2001 |
| 3.1     | 2001-05-10 | Clean version after the SSG meeting 7 <sup>th</sup> to 11 <sup>th</sup> May 2001   |

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