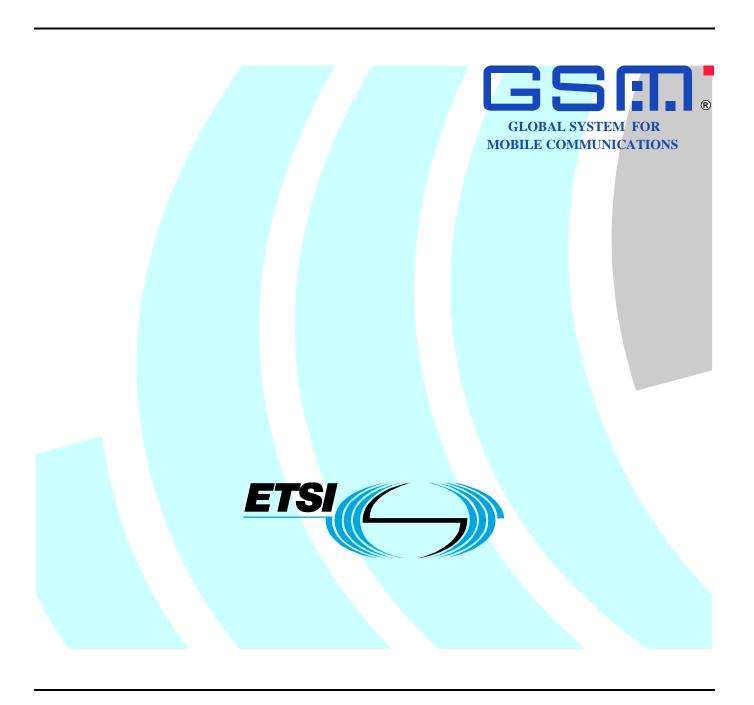# ETSI TS 100 500 V8.2.1 (2001-10)

Technical Specification

Digital cellular telecommunications system (Phase 2+); Principles of telecommunication services supported by a GSM Public Land Mobile Network (PLMN) (GSM 02.01 version 8.2.1 Release 1999)

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Special Mobile Group (SMG).

The present document defines the telecommunication services supported by a GSM PLMN within the digital cellular telecommunications system (Phase 2+).

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

Version 8.x.y

where:

8   indicates Release 1999 of GSM Phase 2+

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

y   the third digit is incremented when editorial only changes have been incorporated in the specification.

0 Scope

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

0.1 References

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

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

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

- For a non-specific reference, the latest version applies.

- For this Release 1999 document, references to GSM documents are for Release 1999 versions (version 8.x.y).

[1]   GSM 01.04: "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2]   ITU-T Recommendation I.221: "Common specific characteristics of services".

[3]   ITU-T Recommendation X.200: "Information technology - Open Systems Interconnection - Basic reference model: The basic model".

[4]   3GPP TS 22.101: "Service aspects; Service principles".

[5]   3GPP TS 22.002: "Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)".

[6]   3GPP TS 22.004: "General on supplementary services".

[7]   3GPP TS 27.001: "General on Terminal Adaptation Functions (TAF) for Mobile Stations (MS)".

[8]   3GPP TS 22.030: "Man-Machine Interface (MMI) of the User Equipment (UE)".

[9]   3GPP TS 22.081: "Line identification Suplementary Services; Stage 1".

[10]   3GPP TS 22.060: "General Packet Radio Service (GPRS); Service description; Stage 1".

[11]   GSM 02.03: "Teleservices supported by a GSM Public Land Mobile Network (PLMN)".

[12]   ITU-T Recommendation F.69: "The international telex service - Service and operational provisions of telex destination codes and telex network identification codes".

[13]   GSM 03.22: "Functions related to Mobile Station (MS) in idle mode and group receive mode".

0.2 Abbreviations

For the purposes of the present document, the abbreviations given in GSM 01.04 apply.

1 Framework for the description of telecommunication services

1.1 General

Telecommunication services supported by a GSM PLMN are the communication capabilities made available to customers by network operators. A GSM PLMN provides, in cooperation with other networks, a set of network capabilities which are defined by standardized protocols and functions and enable telecommunication services to be offered to customers.

A service provision by a network operator (e.g. an Administration or an RPOA) to a subscriber of a GSM PLMN may cover the whole or only part of the means required to fully support the service. The operational and commercial features associated with the provision of the service are included in the service concept.

The service classification and description which follow are independent of different possible arrangements for the ownership and provision to the customer of the means required to support a service.

1.2 The attribute method of characterization of telecommunication services

This characterization is made by using a set of attributes. A telecommunication service attribute is a specific characteristic of that service whole values distinguish it from other telecommunication services. Particular values are assigned to each attribute when a given telecommunication service is described and defined.

A list of definitions of attributes and values used for bearer services and teleservices is contained in, respectively, annex A and annex B.

2 Description of telecommunication services by the attribute method

2.1 General

Telecommunication services are described by attributes which define service characteristics as they apply at a given reference point where the customer accesses the service. The description of a telecommunication service by the method of attributes is composed of:

-   technical attributes as seen by the customer; and

-   other attributes associated with the service provision, e.g. operational and commercial attributes.

2.2 Bearer services and teleservices

Telecommunication services are divided in two broad categories:

-   bearer services, which are telecommunication services providing the capability of transmission of signals between access points;

-   teleservices, which are telecommunication services providing the complete capability, including terminal equipment functions, for communication between users according to protocols established by agreement between network operators.

Figure 1 illustrates these definitions.

Teleservices

Bearer services

```
        ┌──────┐    ┌──────────┐   ┌──────────┐   ┌──────────┐   ┌──────┐
        │  TE  │────│ GSM PLMN │───│ Possible │───│Terminating│──│  TE  │
        └──────┘    └──────────┘   │ transit  │   │ network   │  └──────┘
                                   │ network  │   └──────────┘
                                   └──────────┘
```

TE: Terminal Equipment.

Figure 1: Bearer services and Teleservices supported by a GSM PLMN

NOTE 1: In the majority of cases, at least two networks of different types are involved in the support of a telecommunication service.

NOTE 2: Figure 1 does not preclude any routing possibility.

NOTE 3: In order to limit the complexity of the figure, only one transit network is shown.

NOTE 4: The terminating network type may include a GSM PLMN, either the originating one or another one.

2.3 Supplementary services

A supplementary service modifies or supplements a basic telecommunication service. Consequently, it cannot be offered to a customer as a stand alone service. It must be offered together or in association with a basic telecommunication service. The same supplementary service may be applicable to a number of telecommunication services.

NOTE: Supplementary services are characterized by the attribute method (see TS 22.004 [6]).

2.4 Categorisation of telecommunication services

The concepts introduced in the present document are illustrated in table1.

Table 1: Categorisation of telecommunication services

TELECOMMUNICATION SERVICES			
BEARER SERVICE		TELESERVICE	
Basic Bearer Service	Basic Bearer service + supplementary services	Basic Teleservice	Basic Teleservice + supplementary service

3.4 Virtual Home Environment

The user may be provided with a comprehensive set of services and features which have the "same look and feel" wherever they are used, this concept is called Virtual Home Environment (VHE) TS 22.101 [4]. VHE maybe supported on GSM telecommunication services and service capabilities.

GSM phase 2+ includes the standardisation of service capabilities in addition to supplementary services. Service capabilities consist of bearers and the mechanisms needed to realise services. These mechanisms include the functionality provided by various network elements, the communication between them and the storage of associated data. Mechanisms supported are e.g. Customised Application for Mobile network Enhanced Logic (CAMEL), SIM application toolkit (SAT) and Mobile Station Execution Environment (MExE). It is intended that standardised capabilities should provide a defined platform which will enable the support of speech, video, multi-media, messaging, data, other teleservices, user applications and supplementary services.

The standard shall support access to the same services and features of a user's VHE via the GSM BSS as may be available via the UMTS UTRAN, subject to the performance limitations of the GSM access network.

4 Capabilities to support a telecommunication service

4.1 General

The capabilities to fully support a telecommunication service for a customer accessing a GSM PLMN include:

- network capabilities (in the GSM PLMN and in most cases in another network);

- terminal capabilities, when required;

- other service providing capabilities, when required;

- operational and commercial features associated with the service provision.

4.2 Network capabilities

Two different levels of GSM PLMN network capabilities are introduced:

- low layer capabilities, which relate to bearer services;

- high layer capabilities, which together with low layer capabilities relate to teleservices.

4.3 Terminal capabilities

Terminal capabilities are also described in terms of low layer and high layer capabilities. In the description of teleservices, the terminal capabilities, both low layer and high layer, are included in the service definition. In the case of bearer service definition, the terminal capabilities are not included but the terminal equipment must conform to the low layer capabilities of the bearer service.

4.4 Operational capabilities

The operational capabilities associated with a service offering may include capabilities for maintenance, charging, user control of service features, etc.

The use of such capabilities may involve terminal-network communication and may therefore be viewed as specific applications.

5 Characterization of telecommunication services

5.1 General

A telecommunication service supported by a GSM PLMN is characterized and described by service attributes.

There are two groups of service attributes applicable to user information flow:

- low layer attributes;

- high layer attributes.

Bearer services are characterized only by low layer attributes. Teleservices are characterized by both low layer attributes and high layer attributes.

The basic characteristics of a telecommunication service are described by the basic service attributes.

The additional characteristics associated with a supplementary service which modify or supplement a basic telecommunication service are described in TS 22.004 [6].

5.2 Bearer services supported by a GSM PLMN

Bearer services supported by a GSM PLMN provide the capability for information transfer between a GSM PLMN access point 1 or 2 and an appropriate access point in a terminating network and involve only low layer functions (i.e. relating to layers 1-3 of the OSI Reference Model).

The customer may choose any set of high layer (at least 4-7) protocols for his communication, but a GSM PLMN will not ensure compatibility at these high layers between customers.

Bearer services are characterized by a set of low layer attributes in TS 22.002 [5]. These attributes are classified into four categories:

- information transfer attributes;

- access attributes;

- interworking attributes;

- general attributes, including operational and commercial attributes.

The bearer capability defines the technical features of a bearer service as they appear to the user at the appropriate access point. For the time being, the bearer capability is characterized by information transfer, access and interworking attributes. A bearer capability is associated with every bearer service.

The bearer service provides the user with the possibility of gaining access to various forms of communication, covering for example:

- information transfer between a user in a GSM PLMN and a user in a terminating network, including the same GSM PLMN, another GSM PLMN and other types of PLMNs;

- information transfer between a user in a GSM PLMN and separate resource providing high layer functions.

5.3 Teleservices supported by a GSM PLMN

Teleservices provide the full capacity for communication by means of terminals and network functions and possibly functions provided by dedicated centres.

A teleservice supported by a GSM PLMN should use only one (or a small number of) bearer capability recommended by GSM. GSM teleservices are specified in GSM 02.03. Teleservices are characterized by a set of low layer attributes, a set of high layer attributes and operational and commercial attributes.

Low layer attributes are those used to characterize the bearer capability (see clause 5.2). High layer attributes are used in Specification GSM 02.03 to describe high layer (i.e. layer 4-7) information transfer related characteristics. They refer to functions and protocols of layers 4-7 in the ITU-T Recommendation X.200 framework which are concerned with the transfer, storage and processing of user messages (provided by a subscriber's terminal, a retrieval centre or a network service centre).

Therefore, not all attributes can be applied directly at the user to terminal interface as they represent two kinds of features, the bearer capability and the terminal features, that are not directly perceived by the user.

A teleservice provides the user with the possibility of gaining access to various forms of applications (or teleservice APPLICATIONS) covering for example:

- teleservice application involving two terminals providing compatible or identical teleservice attributes at an access point in a GSM PLMN and an access point in a terminating network;

- teleservice application involving a terminal at one access point in a GSM PLMN and a system providing high layer functions (e.g. speech storage system, message handling system) located either within the GSM PLMN or in a terminating network.

6   Provision of telecommunication services

The provision of telecommunication services implies:

- subscription of basic services and possibly subscription to supplementary services;

- registration into a service directory;

- compatibility between terminals;

- interworking capabilities.

The user's subscription to a Basic or Supplementary service is normally verified by the network prior to completion of Call Establishment and/or Supplementary Service operation. This subscription checking shall be performed in accordance with the following clauses.

6.1   Subscription checking for Basic Services

General

Subscription checking is the function/process to ascertaining whether a subscriber has the authorization to use the particular Basic Service deduced from the call set-up parameters. It is the responsibility of the HPLMN to transfer, to the VPLMN, only the subscription data corresponding to those services a given subscriber is entitled to use in that VPLMN.

For mobile originated calls, subscription checking is performed in the VLR, whilst for mobile terminated calls it is performed in either the HLR or the VLR (determined as described below). The prerequisite for executing the subscription check is a successful deduction of a Basic Service from the Compatibility Information contained in the call set up, i.e. Bearer Capability Information Element and, in some cases, also the Low Layer and High Layer Compatibility Information elements.

For mobile originated calls an MS shall indicate the requested service by appropriate compatibility information elements according to TS 27.001 [7]. This information is mapped to an individual Basic Service code (i.e. the MAP representation) by the MSC in order to be compared with the subscriber data available in the VLR.

An equivalent process is required in the HLR for mobile terminated calls, where the caller's requested service is indicated to the HLR (by the ISDN) by exhaustive compatibility information consisting of ISDN Bearer Capability Information Elements and in some cases - depending on the service requested - also of Low Layer and High layer Compatibility information elements. In case the compatibility information is not exhaustive, e.g. when the call is originated/transited by a PSTN, no GSM Basic Service can be deduced and subscription checking cannot be performed in the "normal" way. Instead, rules for the Single and Multi Numbering Schemes apply.

In the Multi Numbering Scheme the Basic Service can be deduced by information stored in the HLR against the called number and hence an implicit subscription check is performed. In the Single Numbering Scheme, the Basic Service cannot be deduced until the MS has responded to the set up and therefore the HLR cannot perform subscription check. Instead, the VLR/MSC will perform the subscription check or calls are passed "unfiltered" (as regards subscription check), at the network operators' discretion.

Bearer Services

TS 22.002 [5] lists the Bearer Services, each of them with a specific "BS number". Single services defined independent of the fixed network user rate are called General Bearer Services. These distinct [numbered] services may individually be provided to a subscriber. Whichever the subscription arrangements are, all PLMNs (MSCs, VLRs and HLRs) shall be able to allow - as regards subscription checking - the use of individually subscribed-to Basic Services, within the range of services supported by the PLMN. That is, whenever it is possible to deduce the Basic Service from a call set up, subscription check shall be performed at the granularity of that particular Basic Service or the group to which it belongs.

TeleServices

GSM 02.03 lists the TeleServices, each of them with a specific "TS number". These may be provided to subscribers individually or combined, to the operators' discretion, however TS 12 (E-calls) and 23 (CB) are not subscribable. But, as for Bearer Services, networks shall be able to handle subscription checking at the granularity of individual TeleServices.

Table 2 summarizes the basis on which a successful subscription checking will result. It also describes on which basis Supplementary Service handling for a given call set-up should be performed.

Table 2

Set Up	Subscription Check	SS handling
BS 20	BS 20	BS Group 2x
BS 30	BS 30	BS Group 3x
BS 70	BS 70	N.A.
TS 11	TS 11, TS Group 1x or TS Group All	TS Group 1x
TS 12	N.A.	
TS 21	TS 21, TS Group 2x or TS Group All	TS Group 2x
TS 22	TS 22, TS Group 2x or TS Group All	TS Group 2x
TS 23	N.A.	
TS 61	TS 61, TS Group 6x or TS Group All	TS Group 6x
TS 62	TS 61, 62, Group 6x or TS Group All	TS Group 6x
TS 91	TS 91, TS Group 9x or TS Group All	TS Group 9x
TS 92	TS 92, TS Group 9x or TS Group All	TS Group 9x

Legend:
    Set up: The Basic Service which is set up for the call.
    Subscription check: Required VLR or HLR data for successful subscription check.
    SS handling: Against which VLR or HLR data SS handling should be performed. For example; a call
    set-up indicating BS61 and Asynchronous mode should be treated for SS purposes in accordance with
    the SS-data stored against BS group 2x.		

When TS61 is requested in a call set-up and the subscription check for TS61 is negative, but a subscription check for TS62 is positive, then the call shall proceed according to the GSM 02.03 and TS 27.001 [7]. If a subscription check for both TS61 and TS62 is negative, then the call shall be released.

6.2 Subscription checking for Supplementary Services

This is described in TS 22.004 [6].

Annex A (normative):
List of definition of attributes and values used for bearer services

A.1   Information transfer attributes

A.1.1   Information transfer capability

This attribute describes the capability associated with the transfer of different types of information through a GSM PLMN and another network or through a GSM PLMN.

Values:

- unrestricted digital information;
  transfer of information sequence of bits at its specified bit rate without alteration; this implies bit sequence independence, digit sequence integrity and bit integrity.

- speech;
  digital representation of speech information and audible signalling tones of the PSTN coded.

- 3.1 kHz Ex PLMN;
  unrestricted digital information transfer within the PLMN and 3.1 kHz audio restricted within the ISDN.

- Group 3 Fax;
  transfer of Group 3 Fax information.

A.1.2   Information transfer mode

This attribute describes the operational mode of transferring (transportation and switching) through a GSM PLMN.

Values:

- circuit;

- packet.

A.1.3   Information transfer rate

This attribute describes the bit rate (circuit mode) or the throughput (packet mode). It refers to the transfer of digital information between two access points or reference points.

Values:

- appropriate bit rate, throughput rate.

A.1.4   Structure

This attribute refers to the capability of the GSM PLMN and if involved other networks to deliver information to the destination access point or reference point in a structure NOTE: This attribute has not been utilised in TS 22.002 or GSM 02.03.

Values:

- Not applicable.

A.1.5 Establishment of communication

This attribute associated with a telecommunication service describes the mode of establishment used to establish and a given communication.

In every telecommunication service communication may be between users within the GSM PLMN or between a user in the GSM PLMN and a user in another network.

Values:

- demand Mobile Originated (MO) only;

- demand Mobile Terminated (MT) only;

- demand Mobile Originated or Terminated (MO, MT).

A.1.6 Communication configuration

This attribute describes the spatial arrangement for transferring information between two or more access points. It completes the structure associated to a telecommunication services as it associates the relationship between the access points involved and the flow of information between these access points.

Values:

- point-to-point communication;
  this value applies when there are only two access points.

- multipoint communication;
  this value applies when more than two access points (1) are provided by the service. The exact characteristics of the information flows must be specified separately based on functions provided by the GSM PLMN.

  NOTE 1: The number of access points can be undefined.

- broadcast communication;
  this value applies when more than two access points (2) are provided by the service. The information flows are from a unique point (source) to the others (destination) in only one direction.

  NOTE 2: The number of destination access points can be undefined.

A.1.7 Symmetry

This attribute describes the relationship of information flow between two (or more) access points or reference points involved in a communication.

It characterizes the structure associated to a communication service.

Values:

- unidirectional;
  this value applies when the information flow is provided only in one direction.

- bidirectional symmetric;
  this value applies when the information flow characteristics provided by the service are the same between two (or more) access points or reference points in the forward and backward directions.

- bidirectional asymmetric;
  this value applies when the information flow characteristics provided by the service are different in the two directions.

A.1.8   Data compression

This attribute indicates whether use of a data compression function is desired (and accepted) between an MT and IWF.

Values:

- use of data compression requested/not requested;

- use of data compression accepted/not accepted.

A.2   Attributes describing the access at the mobile station

A.2.1   Signalling access

This attribute characterized the protocol on the signalling channel at a given access point or reference point Values:

- manual;

- appropriate V-series protocol;

- appropriate X-series protocol;

- I-series stack of signalling protocols.

A.2.2   Information access

A.2.2.1   Rate

This attribute describes either the bit rate (circuit mode including transparent access to a PSPDN) or variable bit rate (packet mode) used to transfer the user information at a given access point or reference point (access point 1 or 2 at the MS in figure 2/GSM 02.01).

Values:

- appropriate bit rate;

- variable bit rate.

A.2.2.2   Interface

This attribute describes the interface according to the protocol used to transfer user information at a given access point or reference.

Values:

- appropriate V-series DTE/DCE interface;

- appropriate X-series interface;

- S interface;

- analogue 4-Wire interface.

A.3   Interworking attribute

A.3.1   Type of terminating network

Communication can be established between a MS in a GSM PLMN (originating network) and a terminal in a network (terminating network) including the same GSM PLMN or another GSM PLMN. The attribute designates the terminating network.

NOTE 1: The terms "originating" and "terminating" do not indicate the direction of communication establishment.

NOTE 2: This attribute does not reflect whether there is none, one or several transit networks between the originating and terminating networks.

Values:

-   PSTN;

-   ISDN;

-   PSPDN;

-   PDN;

-   GSM PLMN;

-   Direct access networks.

A.3.2   Terminal to terminating network interface

This attribute describes the interface between a terminal equipment and the terminating network.

Values:

-   appropriate V-series (DTE/DCE) interface;

-   appropriate X-series interface;

-   analogue 2 resp. 4 wire interface;

-   S interface (D+B+B).

A.4   General attributes

A.4.1   Supplementary services provided

This attribute refers to the supplementary services to a given telecommunication service.

Values:

-   appropriate supplementary services.

A.4.2   Quality of service

The Bearer Services use the Quality of Service attribute to indicate one of the following values:

- transparent;
  service characterized by constant throughput, constant transit delay and variable error rate.

- non-transparent;
  service characterized by an improved error rate with variable transit delay and throughput.

A.4.3   Commercial and operational

A.4.4   Service interworking

Annex B (normative):
List of definitions of attributes and values used for teleservices

B.1 High layer attributes

B.1.1 Type of user information

This attribute describes the type of information which the communication offered to the user by the teleservice is based on.

Values:

- speech;

- short message;

- facsimile.

B.1.2 Layer 4 protocol functions

B.1.3 Layer 5 protocol functions

B.1.4 Layer 6 protocol functions

B.1.5 Layer 7 protocol functions

B.2 Low layer attribute (bearer capabilities)

The low layer attributes describe the bearer capabilities which support the teleservice. These low layer attributes and their values are the same as presented in Annex A: List of definitions of attributes and values used for bearer services.

B.3 General attributes

The general attributes are the same as presented in Annex A: List of definitions and values used for bearer services.

Annex C (normative):
Definition of "busy" in a GSM PLMN

C.1   Scope

This annex describes the conditions under which a given mobile subscriber (station) is considered as "busy". In general, this occurs whenever the resources associated with that MS (and needed to successfully complete the call) exist but are not available for that call. The description is based on the busy definition in the ISDN (ITU-T Recommendation I.221).

In addition, the operation of some Supplementary Services occurs when certain of these resources are busy. Therefore, these "resources busy" are also described herein.

This annex does not cover the cases, when network resources not associated with a given destination are unavailable, or when such resources are out-of-service or otherwise non-functional.

C.2   Network Determined User Busy (NDUB) condition

This condition occurs, when a call is about to be offered, if the information (i.e. traffic) channel (Bm or Lm) is busy and the maximum number of total calls has been reached (see NOTE).

This condition also occurs, when a call is about to be offered and an already on-going call attempt (incoming or outgoing) is in the establishing phase, i.e. not yet active.

When NDUB condition occurs, the PLMN will clear the call and indicate "busy" back towards the calling subscriber (see also clause 4).

> NOTE: The value of the maximum number of calls is 1 for the basic call. When the supplementary service "Call Waiting" is applicable the value is n+1 where n is the maximum number of calls that can be waiting.

C.3   User Determined User Busy (UDUB) condition

This condition occurs when a call is offered to a Mobile Station and the MS responds "user busy" because the subscribers resources (terminal or person using them) are busy. Then the PLMN will clear the call with the indication "busy" back towards the calling subscriber (see also clause 4).

C.4   Mobile subscriber busy

A mobile subscriber is considered to be busy if either a "Network Determined User Busy" or a "User Determined User Busy" condition occurs.

Some supplementary services (e.g. Call Forwarding on Busy) may cause the call not to be cleared when a busy condition occurs.

Annex D (normative):
Call setup procedures

D.1   Scope

This annex specifies the service requirements for call setup, both Mobile originated and mobile terminated, in a GSM network, including the establishment of radio contact.

For GPRS see TS 22.060 [10].

D.2   Mobile Originated Call Setup

When an MS wishes to start a call and there is no existing radio connection, it requests a signalling channel. When such a signalling channel has been allocated to the MS, the MS can transfer the call setup information.

A traffic channel may be allocated at any time before the network informs the MS that the remote user has answered.

For a call to be set up, certain information needs to be sent by the MS to the network, defining the call. This information may be provided as default by the MS, it may be derived from the SIM or be entered by the user either directly into the MS or from a DTE by using the DTE/DCE Interface.

The following information is sent. Where necessary, default values will generally be inserted by the MS if not directly specified by the user. The GSM Teleservice Emergency Calls are set up using a special procedure not using the fields described in this clause (except for the Bearer Capability.

D.2.1   Called Party Address

This is the address of the called party using the TON/NPI specified below. In the case of Dedicated PAD or Packet Access, if NPI is set to PNP, the called party address field may be used to specify the profile to be used. In that case, the address of the called DTE will be given in-band as the second part of two-stage call set-up.

D.2.2   Calling/Called Party Sub-address

This is the sub-address of the calling/called party, in order to provide interworking with ISDN. This is described in more detail in ETS 300 059. Support and use of these fields are optional.

D.2.3   Type of Number

This indicates the format of the called party address. The selection procedure is given in TS 22.030 [8]. The following Types of Number are commonly used:

-    International Format;

-    Open Format ("Unknown");

-    Dedicated PAD/Packet Access.

D.2.4   Number Plan Indicator

This indicates the number plan of the called party address. Either of the following number plans may be the "default", depending on the contents of the Called Party Address (TS 22.030 [8]):

-    ISDN/Telephony E.164;

- Unknown.

Alternatively, one of these number plans may be specified if appropriate:

- Data network X.121;

- Telex network F.69;

- National Numbering Plan;

- Private Numbering Plan.

D.2.5 Bearer Capability

This is used to define the type of call to be set up (telephony, data, rate etc.) For most applications, the MS will use a set of default conditions, generally on the assumption of a telephony call, unless otherwise set. These may be overridden by the user (or DTE via the DTE/DCE Interface) if desired except for the determination of the channel mode (full or half rate, speech codec conversion).

The MS shall indicate to the network its channel mode capability in terms of the data channels and the speech codec versions supported.

The network decides which mode to use on the basis of the requested bearer or teleservice, the available network resources and the channel mode capability of the MS:

For the "alternate" and "followed-by" services, the same principle applies (with the exception of TS61, where a Full Rate or an Enhanced Full Rate channel shall be provided).

Lower Layer Compatibility and Higher Layer Compatibility Information Elements may also be included.

D.2.6 Calling Line Indication Restriction Override

If the user wishes to override the calling line identification restriction, he may indicate this on a per-call basis as described in TS 22.030 [8] and TS 22.081 [9].

D.2.7 Action of the Network on Call Setup

On receipt of the call setup message, the network shall attempt to connect the call. However, if insufficient information has been provided by the MS to indicate the exact Bearer Capability requirements (e.g. due to missing or optional values or for rate adaptation for data), the network may insert the missing information, if this is possible, and the call setup shall proceed using the new information. If the call setup is unsuccessful, the network shall notify the MS of the cause.

D.3 Mobile Terminated Call Setup

Using the procedures described in GSM 02.11, the network knows the location area where the MS is positioned. If the MS is not already in two way radio communication with the network, the network pages the MS. Upon receiving its page message, the MS establishes communication with the selected cell (see GSM 03.22). The network then allocates a channel which is used for signalling and sends call setup information to the MS.

A traffic channel may be allocated at any instant until just after the call is answered by the MS.

The network indicates to the MS that it wishes to offer the MS a call. This notification includes the proposed bearer capability information, where available (see clause D.2.5).

D.3.1   Bearer Type

If the calling party specifies the required bearer capability this shall be used for the call setup attempt. If the calling party does not specify the required bearer capability (e.g. because the call originated in the PSTN), the network shall attempt to determine the bearer capability to be used as described below.

The network may use a multi-numbering scheme to define the bearer capability by the MSISDN. In a multi-numbering scheme several MSISDNs are associated with one IMSI. Each MSISDN is used for a different bearer capability. If the network uses a multi-numbering scheme and the calling party has not specified the required bearer capability then the network shall use the bearer capability associated with the called party MSISDN.

The network may use a single-numbering scheme, in which one MSISDN is associated with each IMSI. If the network uses a single-numbering scheme and the calling party has not specified the required service then the network shall omit the bearer capability information.

D.3.2   Response of the MS

On receipt of the call setup request from the network, the MS shall check that it is able to support the type of call requested and that it is not User Determined User Busy (see annex C). The MS then alerts the user.

If the MS is unable to support the type of call requested, or the information is incomplete, the MS shall, if possible and not restricted by requirements in other ETSs, reply to the network proposing an alternative set of parameters, indicating those that are different from those proposed by the network. The network then either accepts this new proposal or terminates the call attempt.

D.3.3   Description of Call Re-establishment

Call re-establishment allows the mobile station to attempt to reconnect a call following the loss of radio coverage between the MS and the network while a call is in progress. Call re-establishment may be initiated by the MS when it detects this situation, if supported in the network.

Call re-establishment is mandatory in the ME and optional in the network.

Annex E (informative): Change history

Change history					
SMG No.	**TDoc. No.**	**CR. No.**	**Clause affected**	**New version**	**Subject/Comments**
SMG#16	605/95	A003	A.1.8	5.0.0	Data compression
SMG#17	52/96	A004r1	Table 2	5.1.0	Addition of handling for VBS and VCGS
SMG#20	577/96 609/96	A005 A006	D.2, D.2.5 6.1, Table 2	5.2.0	Updating to account for EFR codec channels General Bearer Services
SMG#24		A007	Table 2	5.3.0	Correct Table to reflect text in 6.1 i.e. the subscription of a General Bearer Service comprises the subscription to all individual single services of its group.
SMG#24		A008	2.2 and Table2	5.3.0	Editorial clean-up of the spec
SMG#26	98-0316	A009	Table 2	5.4.0	Subscriptions to the Phase 2 bearer services All_data_CDA & Bearer Service XX should not include subscription to the phase 2+ bearer services.
SMG#27>				6.0.0	Specification upgrade to Release 1997 version 6.0.0
SMG#28	99-031	A011	Clause 3.4 added	8.0.0	VHE is supported in GSM, as well. Reference and description were added. Note from Secretary: CR was not explicit on whether the VHE clause replaces all of clause 3 or is added as a new sub-clause. The latter approach was chosen! RTarazi
SMG#28	99-031	A013	6, Annex A, D	8.0.0	Addition of Supplementary Code for GPRS.
SMG#29	P-99-368	A014r1	6, A.3.1	8.1.0	Current data services have been criticised as over engineered and complex. In order to simplify things, individual BSs are deleted. Also some not utilised interworking scenarios are deleted.
SMG#29	P-99-368	A015r1	2, 3, 5, A	8.1.0	Terminal reference model has been deleted, because it's outdated.
SMG#29	P-99-373	A019	5, 6, A, B	8.1.0	This CR contains editorial updates for all releases
SMG#30	P-99-647	A014	Various	8.2.0	Correction of references.
				8.2.1	Editorial

History

Document history		
V8.2.1	October 2001	Publication