EUROPEAN TELECOMMUNICATION STANDARD

ETS 300 917

May 1998

Source: SMG

Reference: DE/SMG-040708Q

ICS: 33.020

Key words: Digital cellular telecommunications system, Global System for Mobile communications (GSM)

GLOBAL SYSTEM FOR
MOBILE COMMUNICATIONS

Digital cellular telecommunications system (Phase 2+); GSM Application Programming Interface (GSM-API) (GSM 07.08 version 5.2.1)

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) of the European Telecommunications Standards Institute (ETSI).

This ETS defines GSM-API, the application programming interface within the digital cellular telecommunications system.

The contents of this ETS may be subject to continuing work within SMG and may change following formal SMG approval. Should SMG modify the contents of this ETS, it will be submitted for OAP by ETSI with an identifying change of release date and an increase in version number as follows:

Version 5.x.y

where:

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

- x the second digit is incremented for all other types of changes, i.e. technical enhancements, corrections, updates, etc.

Introduction

This ETS defines GSM Application Programming Interface (GSM-API), the Application Programming Interface as an extension to ETS 300 838 (HPCI).

GSM-API can be used by PCI applications without any modification. The same existing applications can be used to transfer data inside GSM networks as well as between GSM networks and ISDNs. Thus it unifies access to digital networks from application's point of view.

GSM-API enables applications to access GSM interfaces like mobiles, adapter boards, handhelds, etc. in a straightforward manner and allows unrestricted use of their functions through a standardized software interface.

Applications which use this interface will not be affected by future expansions or hardware changes. GSM-API makes the changes transparent to applications using it. Future expansions that retain compatibility with existing software base are possible.

GSM-API provides an abstraction of GSM services and features that is independent from the network provider and from the interfaces used to connect to the network. It provides an easy-to-use interface for applications and offers a unique access to the different GSM services and features like data transfer, fax, voice, modem, short message service, SIM access, etc.

GSM-API provides the base for modular applications development in GSM network systems.

Transposition dates	
Date of adoption of this ETS:	1 May 1998
Date of latest announcement of this ETS (doa):	31 August 1998
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	28 February 1999
Date of withdrawal of any conflicting National Standard (dow):	28 February 1999

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1 Scope

This European Telecommunication Standard (ETS) defines the GSM Application Programming Interface (GSM-API) in two parts.

The first part describes, how compatibility to existing application interface ETS 300 838 [14] is covered for the GSM network. So existing PCI applications are able to be used in a GSM environment. For these applications the necessary mapping and local knowledge between application interface and network is described. The only modifications needed in ETS 300 838 [14] to fulfil this requirements are covered by changes of the parameter description. These changes of parameters are defined in clauses 4 and 5 of this ETS.

An application compliant with this ETS shall not imply compliance with ETS 300 838 (HPCI).

Clause 4 is meant to replace subclause 5.7 message parameters of ETS 300 838 [14]. which defines the parameters of the profile A of the HPCI.

NOTE 1: Clause 4is for further study.

Clause 5 replaces subclause 6.8 parameter description of ETS 300 838, which defines the parameters of the profile B of the HPCI.

The second part defines GSM specific features. New GSM-API applications need extensions to ETS 300 838 [14] which are defined in section 6 and 7of this ETS.

These sections are meant as an addition to ETS 300 838 [14]. They do not replace any clause of ETS 300 838 [14].

Clause 6 defines the extensions according to the profile A of ETS 300 838 [14].

NOTE 2: Clause 6 is for further study.

Clause 7 defines the extensions according to the profile B of ETS 300 838 [14] (bit compatible to COMMON ISDN API).

The messages and the operating system dependent part of ETS 300 838 [14] will not be changed for GSM-API.

2 Normative references

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

[1] GSM 01.04 (ETR 350): "Digital cellular telecommunications system (Phase 2+); Abbreviations and acronyms".

[2] GSM 02.04 (ETS 300 918): "Digital cellular telecommunications system (Phase 2+); General on supplementary services".

[3] GSM 02.30 (ETS 300 907): "Digital cellular telecommunications system (Phase 2+); Man-Machine Interface (MMI) of the Mobile Station (MS)".

[4] GSM 03.38 (ETS 300 900): "Digital cellular telecommunications system (Phase 2+); Alphabets and language-specific information".

[5] GSM 03.40 (ETS 300 901): "Digital cellular telecommunications system (Phase 2+); Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[6] GSM 03.41 (ETS 300 902): "Digital cellular telecommunications system (Phase 2+); Technical realization of Short Message Service Cell Broadcast (SMSCB)".

[7] GSM 04.08 (ETS 300 940): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 specification".

[8] GSM 04.11 (ETS 300 942): "Digital cellular telecommunications system (Phase 2+); Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[9] GSM 04.80 (ETS 300 950): "Digital cellular telecommunications system (Phase 2+); Mobile radio interface layer 3 supplementary services specification Formats and coding".

[10] GSM 04.90 (ETS 300 957): "Digital cellular telecommunications system; Unstructured supplementary services operation - Stage 3".

[11] GSM 05.08 (ETS 300 911): "Digital cellular telecommunications system (Phase 2+); Radiosubsystem link control".

[12] GSM 09.02 (ETS 300 974): "Digital cellular telecommunications system (Phase 2+); Mobile Application Part (MAP) specification".

[13] GSM 11.11 (ETS 300 977): "Digital cellular telecommunications system (Phase 2+); Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface".

[14] ETS 300 383 (1997): "Integrated Services Digital Network (ISDN); Harmonized Programmable Communication Interface (HPCI) for ISDN".

[15] ETS 300-102-1 (1990): "Integrated Services Digital Network (ISDN), Usernetwork interface layer 3, Specifications for basic call control".

[16] ITU-T Recommendation Q931 (1993): "Digital subscriber Signalling System No. one (DSS1) - ISDN user network interface layer 3 specification for basic call control".

[17] ISO 7776 (1986): "Information Processing systems; Data communications; High-level data link control procedures: Description of the X.25 LAPD compatible DTE data link procedures".

[18] IBM publication: "IBM Synchronous Data Link Control Concepts" (GA27-3093).

[19] ITU-T Recommendation Q921 (1993): "ISDN user network interface - Data link layer specification".

[20] ITU-T Recommendation T.30 (1993): "Procedures for document facsimile transmission in the general switched telephone Network".

[21] Request For Comment (RFC) 1661: "The Point-to-Point Protocol (PPP)".

[22] Request For Comment (RFC) 1618: "PPP over ISDN".

[23] CCITT Recommendation T.90 (1992): "Characteristics and protocols for terminals for telematic services in ISDN".

[24] ISO 8208 (1990): "Information technology: Data communications; X.25 Packet Layer Protocol for Data Terminal Equipment".

[25] ITU-T Recommendation X.213 (1992): "Information technology - Network service definition for Open Systems".

[26] ITU-T Recommendation X.400: "Reference model open System interconnection for CCITT applications".

[27] ITU-T Recommendation X.200: "Message handling system and service overview".

[28] ETS 300 097 (1992): "Integrated Services Digital Network (ISDN), Connected Line Identification Presentation (COLP) supplementary service; Digital Subscriber Signalling System No. one (DSS1) protocol part 1; Protocol implementation description".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of this ETS, the following definitions and those given in ETS 300 838 [14] apply:

Invalidate SIM File	This is a procedure to change the availability of a SIM file. With the invalidate function, the corresponding file will no longer be available. See GSM 11.11 [13].
Rehabilitate SIM File	This function will make a SIM file available for an application. See GSM 11.11 [13].
RP cause	This is an error cause used in the GSM Short Messages Service at the SMR (Short Message Relay) layer. All causes are listed in GSM 04.11 [16].

3.2 Abbreviations

For the purpose of this ETS, the following abbreviations apply:

API	Application Programming Interface
ASN1	Abstract Syntax Notation Number 1. This notation is used in different GSM services.
CAPI	COMMON-ISDN-API
CBS	Cell Broadcast Service. It is a specific GSM service used to broadcast messages to all subscribers. See GSM 03.41 [6].
DCS	Data Coding Scheme. It defines an alphabet and/or a class and/or a language for a message. It is used for the SMS and the CBS. See GSM 03.38 [4].
DTMF	Dual Tone Multi Frequency.
GSM-API	GSM Application Programming Interface.
HPCI	Harmonized Programmable Communication Interface
MI	Message Identifier. Each page of a CBS message is identified by a MI.
PIN Code	Personal Identification Number. See GSM 11.11 [13].
PLMN	Public Land Mobile Network.
PPP	Point to Point Protocol.
RLP	Radio Link Protocol.
SC	Service Centre. It is the network element which handle the SMS messages. SeeGSM 03.40 [5].
SIM	Subscriber Identity Module. See GSM 11.11 [13] for a full description of the SIM files.
SMS	Short Message Service. It is a specific GSM service used to send point to point short messages. See GSM 03.40 [5] for a complete description.
SMS Command	It is a TPDU initiated from a mobile station which invoke an operation in the service centre. See GSM 03.40 [5].
SS	Supplementary Services. All GSM supplementary services are defined in GSM 02.04 [2].
TPDU	Transfer Protocol Data Unit. It is used in the Short Messages Service. See GSM 03.40 [5].

4 Profile A compatible part of GSM-API

(replaces subclause 5.7 of ETS 300 838 [14]).

For further study.

5 Profile B compatible part of GSM-API

(replaces subclause 6.8 of ETS 300 838 [14].)

5.1 Overview

This part of GSM-API defines the parameter description which replaces subclause 6.8 of ETS 300 838 [14] (i.e. Parameter description of Profile B). This replacement is necessary to run existing COMMON-ISDN-API applications on a GSM network.

5.2 Parameter description

This subclause describes the parameters used in ETS 300 838 [14] profile B messages. Each parameter is listed with its type, possible values and reference to the messages in which the parameter appears.

Some parameter values are defined according to ETS 300 102-1 [15], Q.931 [16] or GSM 04.08 [7] and 04.11 [8]. In that case there is no private Profile B coding for these parameters. These parameters are coded as Profile B structures starting with a length octet and the remainder of the parameter being coded as defined in ETS 300 102-1 [15] / Q.931 [16] or GSM specifications from octet three onwards. References to the contents of a structure in this clause always use index 0 to identify the first octet of information, i.e. the octet following the length octet.

Parameters may not be omitted, instead an empty structure shall be used. An empty structure shall be coded as a single octet containing a value of 0.

Reserved structures shall be coded as empty structures. Reserved parameter values shall not be used by GSM-API applications. In case of COMMON-ISDN-API applications using these reserved structures respective parameter values the behaviour of GSM-API is described below.

Default values as described in the following subclause shall be implemented in Profile B. They need not be valid for external ISDN equipment; in that case the external equipment defines the default values for its usage.

Parameters may again contain parameters which are referred to as "sub parameters".

The GSM specific extensions of some of the ETS 300 838 [14] profile B parameters are mentioned in this subclause even if they are related to the GSM specific part in clause 7.

These values shall be used by either the application and the GSM-API if and only if the application has asked for GSM support as described in the clause 7.3 of this ETS.

5.2.1 Additional Info

Additional Info (struct)

The purpose of the parameter *additional info* is to exchange signalling protocol specific information of the network. Depending on the signalling protocol only relevant elements of this structure shall be used (e.g. the B channel information has to be ignored in the message DISCONNECT_REQ).

The parameter has the following structure:

struct B channel information;

struct reserved, shall be ignored;

struct User user data (coded according to ETS 300 102-1 [15] / Q.931 [16]);

struct reserved, shall be ignored.

This information element appears in:

ALERT_REQ

CONNECT_REQ

CONNECT_IND

CONNECT_RESP

DISCONNECT_REQ

INFO_REQ

5.2.2 B Channel Information

B Channel Information (struct)

The purpose of the sub parameter *B channel information* is to choose between B channel data exchange, D channel data exchange or pure user-user data exchange. If this struct is empty the default value is assumed.

This sub parameter is coded as a structure, to give an easy way of extending its contents in future changes. At the moment, it is coded as a structure of two bytes length and has one element:

word Channel:

0 use B channel (default value);

1 reserved, shall be rejected;

2 reserved, shall be rejected.

This sub parameter appears in parameter:

Additional information.

5.2.3 B Protocol

B Protocol (struct)

The purpose of the parameter *B protocol* is to select and configure the B channel protocols. There is a protocol identifier and configuration information for each layer. If this struct is empty the default value is assumed.

The parameter has the following structure:

word	B1 protocol : Physical layer and framing;
word	B2 protocol : Data link layer;
word	B3 protocol : Network layer;
struct	reserved, shall be ignored;
struct	B2 configuration : Data link layer parameter;
struct	B3 configuration : Network layer parameter;

This information element appears in:

CONNECT_REQ

CONNECT_RESP

SELECT_B_PROTOCOL_REQ

5.2.4 B1 Protocol

B1 Protocol (word)

The purpose of the sub parameter *B1 protocol* is to specify the physical layer and framing used for this connection. In GSM-API following transfer modes shall be supported by the mobile station:

The following values are defined:

0	UDI mode with ISO3309 HDLC framing. This is the default B1 protocol;
1	analogue mode;
2	UDI mode without any additional framing;
3	reserved, shall be rejected;
4	fax G3 mode;
5	UDI mode with ISO3309 HDLC framing (for compatibility to existing applications);
6	analogue mode (for compatibility to existing applications).

protocol 0 and 5 shall establish an UDI connection where layer two frames additionally are encapsulated by an HDLC framing structure with byte stuffing according to ISO 3309.

This sub parameter appears in parameter:

B protocol

5.2.5 B2 Protocol

B2 Protocol (word)

The purpose of the sub parameter *B2 protocol* is to specify the data link layer used for this connection.

The following values are defined:

0 ISO 7776 [17] (X.75 SLP) This is the default B2 protocol;

1 Transparent;

2 SDLC [18];

3 LAPD according Q.921 [19] for D channel X.25;

4 T.30 [20] for fax group 3;

5 Point to Point Protocol (PPP [21] [22]);

6 Transparent (ignoring framing errors of B1 protocol).

This sub parameter appears in parameter:

B protocol

5.2.6 B3 Protocol

B3 Protocol (word)

The purpose of the sub parameter *B3 protocol* is to specify the network layer used for this connection.

The following values are defined:

0 Transparent. This is the default B3 protocol;

1 T.90NL with compatibility to T.70NL according to T.90 Appendix II [23];

2 ISO 8208 [24] (X.25 DTE-DTE);

3 X.25 DCE;

4 T.30 [20] for fax group 3.

This sub parameter appears in parameter:

B protocol

5.2.7 B1 Configuration

B1 Configuration (struct)

reserved, shall be ignored

This sub parameter appears in parameter:

B protocol

5.2.8 B2 Configuration

B2 Configuration (struct)

The purpose of the sub parameter *B2 configuration* is to offer additional configuration information for B2 protocol. It is only used for B2 protocols 0, 2 and 3. The parameter has the following structure:

byte	Address A	This parameter has different meaning and default values depending on the selected B2 protocol: ### B2 protocol 0: link Address A, default is 0x03 ### B2 protocol 2: link Address, default is 0xC1 ### B2 protocol 3: bit 0: ´0´ - automatic TEI assignment procedure shall be used. ´1´ - the TEI value shall be used as fixed TEI. In this case Bit 7 - Bit 1: TEI value
byte	Address B	This parameter has different meaning and default values depending on the selected B2 protocol: ### B2 protocol 0: link Address B, default is 0x01 ### B2 protocol 2: not applicable ### B2 protocol 3: not applicable
byte	Modulo Mode	Mode of operation: ### 8 - normal operation (Default) ### 128 - extended operation
byte	Window Size	Window size, default is 7.
struct	XID	This parameter has different meaning and default values depending on the selected B2 protocol: ### B2 protocol 0: not applicable ### B2 protocol 2: this is the content of the XID response which is sent when a XID command is received. ### B2 protocol 3: not applicable

This sub parameter appears in parameter:

B protocol

5.2.9 B3 Configuration

B3 Configuration (struct)

The purpose of the sub parameter *B3 configuration* is to offer additional configuration information for B3 protocol. Different structures of this parameter are defined, depending on the B3 protocol:

For B3 protocols 0 (transparent) this parameter does not apply (coded as an empty structure).

For B3 protocols 1, 2 and 3 (T.90NL, ISO8208, X.25 DCE) the following structure is defined:

word	LIC	Lowest incoming channel, default is 0
word	HIC	Highest incoming channel, default is 0
word	LTC	Lowest two-way channel, default is 1
word	HTC	Highest two-way channel, default is 1
word	LOC	Lowest outgoing channel, default is 0
word	HOC	Highest outgoing channel, default is 0
word	Modulo Mode	Mode of operation: ### 8 - normal operation (default) ### 128 - extended operation
word	Window Size	Used to configure non-standard defaults for the transmit and receive window size, default is 2

For B3 protocol 4 (Fax G3) the following structure is used:

word	resolution	0: standard 1: high
word	format	0: SFF (Default, description in annex B) 1: Plain FAX Format (modified Huffman coding) 2: PCX 3: DCX 4: TIFF 5: ASCII 6: Extended ANSI 7: Binary-File transfer
struct	station id	ID of the calling station. Coded in ASCII
struct	head line	Headline sent on each fax page. Coded in ASCII

This sub parameter appears in parameter:

B protocol

5.2.10 BC

BC (struct)

reserved, shall be ignored

This information element appears in:

CONNECT_IND

CONNECT_REQ

5.2.11 Called Party Number

Called Party Number (struct)

The purpose of the parameter *called party number* information element is to identify the called party of a call. The information element is coded according to ETS 300 102-1 [15] / Q.931 [16].

Byte 0	Type of number and numbering plan identification (byte 3 of the *called party number* information element, see ETS 300 102 [15]). At the calling side the value supplied by the application shall be transmitted over the network, 0x80 is the suggested default value. At the called side the value received from the network shall be passed to the application.
Bytes 1..n	Number digits of the *called party number* information element.

This information element appears in:

CONNECT_IND

CONNECT_REQ

5.2.12 Called Party Subaddress

Called Party Subaddress (struct)

The purpose of the parameter c*alled party subaddress* is to identify the subaddress of the called party of a call. The information element is coded according to ETS 300 102-1 [15] / Q.931 [16].

Byte 0	Type of subaddress At the calling side the value supplied by application shall be transmitted over the network, 0x80 is the suggested default value (NSAP according X.213 [25]). In this case, the first subaddress information octet should have the value 0x50. At the called side, the value received from the network shall be passed to the application.
Bytes 1..n	Contents of the called party subaddress information element.

This information element appears in:

CONNECT_REQ

CONNECT_IND

5.2.13 Calling Party Number

Calling Party Number (struct)

reserved, shall be ignored.

This information element appears in:

CONNECT_REQ

CONNECT_IND

LISTEN_REQ

5.2.14 Calling Party Subaddress

Calling Party Subaddress (struct)

The purpose of the parameter c*alling party subaddress* information element is to identify a subaddress associated with the origin of a call. The information element is coded according to ETS 300 102-1 [15] / Q.931 [16].

Byte 0	Type of subaddress At the calling side the value supplied by application shall be transmitted over the network, 0x80 is the suggested default value (NSAP according X.213 [25]). In this case, the first subaddress information octet should have the value 0x50. At the called side, the value received from the network shall be passed to the application.
Bytes 1..n	Contents of the calling party subaddress information element.

This information element appears in:

CONNECT_IND

CONNECT_REQ

LISTEN_REQ

5.2.15 CIP Value

CIP Value (word)

The purpose of parameter *CIP Value* is to identify a complete profile of compatibility information (*Bearer Capability*, *Low Layer Compatibility* and *High Layer Compatibility*). With this parameter standard applications are not required to do complex coding and decoding of the above mentioned information elements.

Some of the *CIP* values only define a *Bearer Capability* (*CIP* 1 to 9) and some values define a combination of *Bearer Capability* and *High Layer Compatibility* (*CIP* 16 to 34). A *Low Layer Compatibility* information element is not defined with the *CIP*. The *Low Layer Compatibility* information element may be provided by the application if necessary. The following *CIP* values are defined:

CIP value	Service	Relation to call
0		no predefined profile
1	Speech	voice call
2	unrestricted digital information	UDI call using RLP(see note)
3	restricted digital information	UDI call using RLP(see note)
4	3,1 kHz audio	voice call
5	7 kHz audio	reserved, shall be rejected
6	video	reserved, shall be rejected
7	packet mode	reserved, shall be rejected
8	56 kBit/s rate adaptation	UDI call using RLP(see note)
9	unrestricted digital information with tones/announcements	reserved, shall be rejected
10..15	reserved	
16	Telephony	Bearer Capability according to CIP 1. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification: Telephony Coding of HLC: <0x7D, 0x02, 0x91, 0x81>
17	Facsimile Group 2/3	fax G3 call
18	Facsimile Group 4 Class 1	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification: Facsimile Group 4 Class 1 Coding of HLC: <0x7D, 0x02, 0x91, 0xA1>
19	Teletex service basic and mixed mode and facsimile service Group 4 Classes II and III	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification. Teletex service and facsimile service Group 4 Coding of HLC: <0x7D, 0x02, 0x91, 0xA4>

(continued)

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CIP value	Service	Relation to call
20	Teletex service basic and processable mode	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification. Teletex service basic and processable mode Coding of HLC: <0x7D, 0x02, 0x91, 0xA8>
21	Teletex service basic mode	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification. Teletex service basic mode Coding of HLC: <0x7D, 0x02, 0x91, 0xB1>
22	International inter working for Videotex	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification. International inter working for Videotex Coding of HLC: <0x7D, 0x02, 0x91, 0xB2>
23	Telex	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification: Telex Coding of HLC: <0x7D, 0x02, 0x91, 0xB5>
24	Message Handling Systems according to X.400 [26]	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification: Message Handling Systems according X.400 Coding of HLC: <0x7D, 0x02, 0x91, 0xB8>

(continued)

(concluded)

CIP value	Service	Relation to call
25	OSI application according to X.200 [27]	Bearer Capability according to CIP 2. High Layer Compatibility: coding standard: CCITT interpretation: First characteristics identification is to be used Presentation: High layer protocol profile High layer characteristics identification: OSI application according X.200 Coding of HLC: <0x7D, 0x02, 0x91, 0xC1>
26	7 kHz Telephony	reserved, shall be rejected
27	Video Telephony, first connection	reserved, shall be rejected
28	Video Telephony, second connection	reserved, shall be rejected
32	Modem	modem call 8 data bits, no parity, 1 stop bit. Used only, if GSM services are requested.
33	Modem	modem call 7 data bits, even parity, 1 stop bit. Used only, if GSM services are requested.
34	In Call modification TS.61	use of In Call modification (TS.61 only). Used only, if GSM services are requested.

NOTE: RLP can be disabled by manufacturer specific mechanism. User rate and other subscription dependent parameter are manufacturer dependent and not part of GSM-API. They should be configurable by manufacturer specific mechanism.

This information element appears in:

CONNECT_REQ

CONNECT_IND

5.2.16 CIP mask

CIP mask (dword)

The purpose of the parameter *CIP mask* is to select basic classes of incoming calls. The bit position within this mask identifies the related CIP value. When an incoming call is received, Profile B tries to match this incoming call to the defined CIP values (more than one value may match). A CONNECT_IND message is sent to the application when the bit position within the *CIP mask* of any matching CIP value is set to "1". The CIP value in the CONNECT_IND message is set to the highest matching CIP value.

The following rules are defined to find matching CIPs:

1) CIP values which define a Bearer Capability only (CIP 1 to CIP 9) shall generate a match with any incoming call which includes a Bearer Capability with the same information. Additional information included in the Bearer Capability information element shall be ignored. The match shall be generated regardless of any Low Layer Compatibility or High Layer Compatibility received.

2) CIP values which define a Bearer Capability and a High Layer Compatibility (CIP 16 to CIP 28) shall generate a match with any incoming call which includes a Bearer Capability and a High Layer Compatibility with the same identical information. The match shall be generated regardless of any Low Layer Compatibility received.

Bit 0 in the *CIP mask* has a special meaning. When no other matching bit is set in the *CIP mask* but the Bit 0, a CONNECT_IND is sent to the application with a CIP value of 0. In this case the application may evaluate the parameters Bearer Capability, Low Layer Compatibility and High Layer Compatibility to decide whether it is compatible to the call or not. Examples:

Service	Bits to be set in the CIP mask	
Telephony Application	1	For calls within ISDN from equipment which does not send High Layer Compatibility info.
	4	For calls from the analogue network. (not necessary in GSM-API)
	16	For call within ISDN equipment which sends High Layer Compatibility info.
Fax Group 2/3 Application	4	For calls from the analogue network. (not necessary in GSM-API)
	17	For calls within ISDN.
Non standard 64 kBit/s data applications	2	No checking of High Layer Compatibility information is provided. The application should verify that no High Layer Compatibility information is received.
Non standard 56 kBit/s data applications	8	No checking of High Layer Compatibility information is provided. The application should verify that no High Layer Compatibility information is received.
Fax Group 4 application	2	For calls from equipment which does not send High Layer Compatibility information. The application should verify that no High Layer Compatibility information is received.
	18	For call from equipment which sends High Layer Compatibility information.

This information element appears in:

LISTEN_REQ

5.2.17 Connected Number

Connected Number (struct)

The purpose of the parameter c*onnected number* information element is to indicate which number is connected to a call. The information element shall be coded according to ETS 300 097 [28].

Byte 0	Type of number and numbering plan identification (byte 3 of the connected number information element, see ETS 300 097 [28]). In the direction application to Profile B, the value supplied by the application shall be transmitted over the network, 0x00 is the suggested default value. In the direction Profile B to application, the value received from the network shall be passed to the application. The extension bit shall always be cleared.
Byte 1	Presentation and screening indicator (byte 3a of the connected number information element). In the direction application to Profile B, the value supplied by the application shall be transmitted over the network, 0x80 is the suggested default value. In the direction Profile B to application, the value received from the network shall be passed to the application. If this byte was not transmitted over the network, the controller provides the value 0x80 (user provided, not screened).
Bytes 2..n	Number digits of the connected number information element.

This information element appears in:

CONNECT_ACTIVE_IND

CONNECT_RESP

5.2.18 Connected Subaddress

Connected Subaddress (struct)

The purpose of the parameter *connected subaddress* information element is to identify the subaddress of the connected user of a call. The information element is coded according to ETS 300 097 [28].

Byte 0	Type of subaddress At the calling side the value supplied by application shall be transmitted over the network, 0x80 is the suggested default value (NSAP according X.213 [25]). In this case, the first subaddress information octet should have the value 0x50. At the called side, the value received from the network shall be passed to the application.
Bytes 1..n	Contents of the connected subaddress information element.

This information element appears in:

CONNECT_ACTIVE_IND

CONNECT_RESP

5.2.19 Controller

Controller (dword)

The purpose of the parameter *controller* is to address a hardware unit, that gives access to an ISDN at the application's disposal. A *controller* supports none, one or several physical and logical connections. The parameter *controller* is a dword (to be compatible in size with PLCI and NCCI) with the range from 1 to 127 (0 reserved). Bit 7 additionally contains the information, if the message is used for internal (0) or external (1) equipment. Controllers are numbered sequentially and can be designed to handle external equipment additional to internal functionality or exclusively provide access to external equipment. External equipment e.g. is a handset.

Definition of external equipment behaviour, e.g. B channel handling, is not covered by Profile B.

Format for controller:

0	0	0	Ext./Int.	Controller	
31	16	8	7	6	0

This information element appears in:

CONNECT_REQ

FACILITY_REQ

FACILITY_CONF

FACILITY_IND

FACILITY_RESP

LISTEN_REQ

LISTEN_CONF

MANUFACTURER_REQ

MANUFACTURER_CONF

MANUFACTURER_IND

MANUFACTURER_RESP

5.2.20 Data

Data (dword)

The purpose of the parameter *data* is to exchange a 32 bit pointer to the data area containing the information.

This information element appears in:

DATA_B3_REQ

DATA_B3_IND

5.2.21 Data Length

Data Length (word)

The purpose of the parameter *data length* is to specify the length of the data.

This information element appears in:

DATA_B3_REQ

DATA_B3_IND

5.2.22 Data Handle

Data Handle (word)

The purpose of the parameter *data handle* is to identify the data area in data exchange messages.

This information element appears in:

DATA_B3_REQ

DATA_B3_CONF

DATA_B3_IND

DATA_B3_RESP

5.2.23 Facility Selector

Facility Selector (word)

The purpose of the parameter *facility selector* is to identify the requested Profile B facility.

The defined values are:

0	reserved, shall be rejected;
1	DTMF (Dual Tone Multi Frequency);
256	GSM specific functions.

GSM specific functions identified by this facility selector are described in clause 7.

This information element appears in:

FACILITY_REQ
FACILITY_CONF

FACILITY_IND
FACILITY_RESP

5.2.24 Facility Request Parameter

Facility Request Parameter (struct)

The purpose of the parameter *facility request parameter* is to offer additional information concerning the message FACILITY_REQ.

This parameter is coded depending on *facility selector* as a structure with following elements:

Facility selector:

0 Parameter does not apply (coded as empty structure);

1 DTMF (Dual Tone Multi Frequency):

Function	word	1: Start DTMF listen on B channel data 2. Stop DTMF listen 3: Send DTMF digits 4 to n: Reserved
Tone-Duration	word	Time in ms for one digit, default is 40 ms
Gap-Duration	word	Time in ms between the digits, default is 40 ms
DTMF-Digits	struct	Characters to be sent, coded as IA5-char. "0" to "9", "*", "#", "A", "B", "C" or "D", each character generates a unique DTMF- Tone.

Sending of DTMF characters shall interrupt the transmission of DATA_B3_REQ. After DTMF generation, the data transmission shall be resumed

This information element appears in:

FACILITY_REQ

5.2.25 Facility Confirmation Parameter

Facility Confirmation Parameter (struct)

The purpose of the parameter *facility confirmation parameter* is to offer additional information concerning the message FACILITY_CONF.

This parameter is coded depending on *facility selector* as a structure with following elements:

Facility selector:

0 Parameter does not apply (coded as structure with a length of 0);

1 DTMF (Dual Tone Multi Frequency):

DTMF information	word	0: sending of DTMF info successfully initiated 1: incorrect DTMF digit 2: unknown DTMF request

This information element appears in:

FACILITY_CONF

5.2.26 Facility Indication Parameter

Facility Indication Parameter (struct)

The purpose of the parameter *facility indication parameter* is to offer additional information concerning the message FACILITY_IND.

This parameter is coded depending on *facility selector* as a structure with following elements:

Facility selector:

0 reserved

1 DTMF (Dual Tone Multi Frequency):

DTMF digits	byte array	Received characters, coded as IA5-char. "0" to "9", "*", "#", "A", "B", "C" or "D"

This information element appears in:

FACILITY_IND

5.2.27 Facility Response Parameter

Facility Response Parameter (struct)

The purpose of the parameter *facility respond parameter* is to offer additional information concerning the message FACILITY_RESP.

This parameter is coded depending on *facility selector* as a structure with following elements:

Facility selector:

0 Parameter does not apply (coded as structure with a length of 0)

1 Parameter does not apply (coded as structure with a length of 0)

This information element appears in:

FACILITY_RESP

5.2.28 Flags

Flags (word)

The purpose of the parameter *flags* is to exchange additional protocol dependent information about the data.

Bit 0	qualifier bit
Bit 1	more data bit
Bit 2	delivery confirmation bit
Bit 3	expedited data bit
Bit 15	framing error bit, data may be invalid (only with corresponding B2 protocol)

This information element appears in:

DATA_B3_REQ

DATA_B3_IND

5.2.29 HLC

HLC (struct)

reserved, shall be ignored

This information element appears in:

CONNECT_IND

CONNECT_REQ

5.2.30 Info

Info (word)

The purpose of the parameter *info* is to provide error information to the application. For each error which can be detected by the controller a unique code is defined, independent from the context of the error.

Profile B shall not generate other information values as defined below. In case of future extension of possible information values however an application should interpret any information value except class 0x00xx as an indication that the corresponding request was rejected from Profile B. Class 0x00xx indicates the successful handling of the corresponding request and returns additional information.

class 0x00xx: informative values (corresponding message was processed)

Value	Reason
0	request accepted
0x0001	NCPI not supported by current protocol, NCPI ignored
0x0002	flags not supported by current protocol, flags ignored
0x0003	alert already sent by another application

class 0x10xx: error information concerning CAPI_REGISTER

Value	Reason
0x1001	too many applications
0x1002	logical block size too small, shall be at least 128 bytes
0x1003	buffer exceeds 64 kByte
0x1004	message buffer size too small, shall be at least 1 024 bytes
0x1005	max. number of logical connections not supported
0x1006	reserved
0x1007	the message could not be accepted because of an internal busy condition
0x1008	OS Resource error (e.g. no memory)
0x1009	GSM-API not installed
0x100A	Controller does not support external equipment
0x100B	Controller does only support external equipment

class 0x11xx: error information concerning message exchange functions

Value	Reason
0x1101	illegal application number
0x1102	illegal command or subcommand or message length less than 12 octets
0x1103	the message could not be accepted because of a queue full condition. The error code does not imply that Profile B cannot receive messages directed to another controller, PLCI or NCCI.
0x1104	queue is empty
0x1105	queue overflow, a message was lost. This indicates a configuration error. The only recovery from this error is to perform a CAPI_RELEASE.
0x1106	unknown notification parameter
0x1107	the message could not be accepted because of an internal busy condition
0x1108	OS Resource error (e.g. no memory)
0x1109	GSM-API not installed
0x110A	Controller does not support external equipment
0x110B	Controller does only support external equipment

class 0x20xx: error information concerning resource / coding problems

Value	Reason
0x2001	message not supported in current state
0x2002	illegal Controller/PLCI/NCCI
0x2003	out of PLCI
0x2004	out of NCCI
0x2005	out of LISTEN
0x2006	out of FAX resources (protocol T.30 [20])
0x2007	illegal message parameter coding

class 0x30xx: error information concerning requested services

Value	Reason
0x3001	B1 protocol not supported
0x3002	B2 protocol not supported
0x3003	B3 protocol not supported
0x3004	B1 protocol parameter not supported
0x3005	B2 protocol parameter not supported
0x3006	B3 protocol parameter not supported
0x3007	B protocol combination not supported
0x3008	NCPI not supported
0x3009	CIP Value unknown
0x300A	flags not supported (reserved bits)
0x300B	facility not supported
0x300C	data length not supported by current protocol
0x300D	reset procedure not supported by current protocol

This information element appears in:

ALERT_CONF

CONNECT_CONF

CONNECT_B3_CONF

DATA_B3_CONF

DISCONNECT_B3_CONF

DISCONNECT_CONF

FACILITY_CONF

INFO_CONF

LISTEN_CONF

MANUFACTURER_CONF

RESET_B3_CONF

SELECT_B_PROTOCOL_CONF

5.2.31 Info Element

Info Element (struct)

The purpose of the parameter *info element* depends on the value of the parameter info number.

If the info number specifies an information element, the *info element* contains that information element with the coding as defined in ETS 300 102-1 [15] / Q.931 [16].

If the info number specifies a charging information *info element* contains a dword indicating the sum of charges accumulated by the network up to this moment.

If the info number specifies a message type the *info element* is an empty Profile B struct.

This information element appears in:

INFO_IND

5.2.32 Info Mask

Info Mask (dword)

The parameter *info mask* specifies which type of information for a physical connection or controller shall be provided by Profile B. The selected information shall be indicated within the message INFO_IND to the application. A given *info mask* (set in LISTEN_REQ) is valid until it is superseded by another LISTEN_REQ and applies to all information concerning the corresponding application. The *info mask* is coded as a bit field. A bit set to 1 means that corresponding INFO_IND messages shall be generated, a bit set to 0 means the specified information shall be suppressed. In the default *info mask* all bits are set to 0. If an application wants to change this value it shall send a LISTEN_REQ message even if it does not want to be informed about incoming calls.

As described in subsequent chapters, the ASN1 decoding for GSM Supplementary Services is done below the GSM-API. The facility information element is not presented on the interface and Bit 5 of the parameter info mask shall be reserved for ETS 300 838 [14] profile B.

Bit 0	Cause; cause information given by the net during disconnection. The parameter info element of the corresponding INFO_IND message is a Profile B struct which contains the cause information element defined in ETS 300 102-1 [15] and Q.931 [16] (both 4.5.12).
Bit 1	Date/time; date/time information indicated by the net. The parameter info element of the corresponding INFO_IND message contains the date/time information element defined in ETS 300 102-1 [15] and Q.931 [16] (both 4.6.1).
Bit 2	Display; display information to be displayed to the user. The parameter info element of the corresponding INFO_IND message contains the display information element defined in ETS 300 102-1 [15] and Q.931 [16] (both 4.5.15).

Bit 3	User-user; user-user information that is transparently carried by the net. The parameter info element of the corresponding INFO_IND message contains the user-user information element defined in ETS 300 102-1 [15] and Q.931 [16] (both 4.5.29).
Bit 4	Call progression; information referring to the progress of the call. There are five different INFO_IND messages that correspond to this information type, each with a unique info number. The first indication contains the information element progress indicator as defined in ETS 300 102-1 [15] and Q.931 [16]. The other four messages indicate the occurrence of the network events SETUP ACKNOWLEDGE, CALL PROCEEDING, ALERTING and PROGRESS. In these cases the parameter info number indicates the corresponding message type and the info element is an empty Profile B struct.
Bit 5	Reserved, shall be set to 0.
Bit 6	Charging information; connection oriented charging information provided by the net. There are two different INFO_IND messages with unique info numbe*r* values that correspond to this information type. The first one shows the sum of charging units indicated by the net up to this moment, the second the sum of charges in the national currency indicated by the net up to this moment. In both cases the parameter info element is coded as a Profile B struct containing a dword. It is highly recommended to provide only one of this two types of charging information to the user and to transform one type to the other. However, in some networks this might be impossible due to the information provided from the net. In these cases it is not defined, if the current charges are represented by only one or both or the sum of this indicated charges.
Bit 7	Called Party number; identifies the called party of a call. The parameter info element of the corresponding INFO_IND message contains the called party number information element defined in ETS 300 102-1 [15] and Q.931 [16] (both 4.5.8).
Bits 7-31	Reserved, shall be set to 0

This information element appears in:

LISTEN_REQ

5.2.33 Info Number

Info Number (word)

The purpose of the parameter *info number* specifies the coding of the parameter *info element* and the type of information which is carried by this INFO_IND message. The high byte is structured as a bit field and indicates which type of information is held in the low byte.

Bit 15	If this bit set to 1 the low byte contains a message type, if it is set to 0 the low byte represents an information element type.
Bits 14	If this bit is set to 1 the low byte indicates supplementary information not covered by network events or information elements. In this case bit 15 shall be set to 0.
Bits 13-8	Reserved, set to 0.

If bit 15 is set, the low byte containing the message type is coded according to ETS 300 102-1 [15] / Q.931 [16]. In this case the INFO_IND message indicates the occurrence of a network event according to the specified message and the parameter *info element* is an empty Profile B struct.

If bits 14 and 15 are cleared, the low byte represents an information element type coding according to ETS 300 102-1 [15] / Q.931 [16]. The parameter *info element* contains the content of the information element.

If bit 14 is set, the low byte represents supplementary information. The defined values are:

0 sum of charges in charging units. In this case the parameter *info element* contains the content of the information element.

1 sum of charges in national currency. In this case the parameter *info element* contains the content of the information element.

This information element appears in:

INFO_IND

5.2.34 LLC

LLC (struct)

The purpose of the parameter *Low Layer Compatibility (LLC)* information element is to provide a means which should be used for compatibility checking by an addressed entity (e.g. a remote user or an inter working unit or a high layer function network node addressed by the calling user). The *Low Layer Compatibility* information element is transferred transparently by ISDN between the call originating entity (e.g. the calling user) and the addressed entity. If *Low Layer Compatibility* negotiation is allowed by the network, the *Low Layer Compatibility* information element is also passed transparently from the addressed entity to the originating entity. The information element is coded according to ETS 300 102-1 [15] / Q.931 [16].

This information element appears in:

CONNECT_ACTIVE_IND

CONNECT_IND

CONNECT_REQ

CONNECT_RESP

5.2.35 Manu ID

Manu ID (dword)

The purpose of the parameter *Manu ID* is to exchange a dword inside MANUFACTURER**-**Messages which identifies the manufacturer. Every manufacturer offering MANUFACTURER-Messages should choose a unique value (e.g. shortcut of company name).

This information element appears in:

MANUFACTURER_REQ

MANUFACTURER_RESP

MANUFACTURER_CONF

MANUFACTURER_IND

5.2.36 Manufacturer Specific

Manufacturer Specific

The purpose of the parameter *manufacturer Specific* is to exchange manufacturer specific information.

This information element appears in:

MANUFACTURER_REQ

MANUFACTURER_RESP

MANUFACTURER_CONF

MANUFACTURER_IND

5.2.37 NCCI

NCCI (dword)

The purpose of the parameter *NCCI* is to identify a logical connection. The *NCCI* is given by Profile B during creation of the logical connection. Depending on the layer 3 protocol selection (e.g. ISO 8208 [24]), it is possible to have multiple *NCCIs* based on one PLCI. The *NCCI* is a dword with a range from 1 to 65535 (0 reserved), coded as described below, and includes additionally the corresponding PLCI and controller.

Format for NCCI:

NCCI		PLCI	Ext./Int.	Controller	
31	16	8	7	6	0

This information element appears in:

CONNECT_B3_ACTIVE_IND

CONNECT_B3_ACTIVE_RESP

CONNECT_B3_CONF

CONNECT_B3_IND

CONNECT_B3_RESP

DATA_B3_CONF

DATA_B3_IND

DATA_B3_REQ

DATA_B3_RESP

DISCONNECT_B3_CONF

DISCONNECT_B3_IND

DISCONNECT_B3_REQ

DISCONNECT_B3_RESP

FACILITY_REQ

FACILITY_CONF

FACILITY_IND

FACILITY_RESP

RESET_B3_CONF

RESET_B3_IND

RESET_B3_REQ

RESET_B3_RESP

5.2.38 NCPI

NCPI (struct)

The purpose of the parameter *NCPI* is to provide additional protocol specific information.

For the layer 3 protocols ISO 8208 [24] and X.25 the parameter data of structure *NCPI* are coded as follows:

Byte 0	Bit field [0]: Enable the usage of the delivery confirmation procedure in call set-up and data packets (D-Bit). [1..7]: Reserved.
Byte 1	Logical channel group number of the permanent virtual circuit (PVC) to be used. In the case of virtual calls (VC) this number shall be set to zero.
Byte 2	Logical channel number of the permanent virtual circuit (PVC) to be used. In the case of virtual calls (VC) this number shall be set to zero.
Bytes 3..n	Bytes following the packet type identifier field in the X.25 PLP packets.

For layer 3 protocol T.30 [20] (fax group 3) the parameter data of structure *NCPI* are valid only for DISCONNECT_B3_IND and coded as follows (in every other message the structure is empty):

word	Rate	actual used bit rate, coded as unsigned integer value
word	resolution	0: standard 1: high
word	format	0: SFF (Default, description in Annex A) 1: Plain FAX Format (modified Huffman coding) 2: PCX 3: DCX 4: TIFF 5: ASCII 6: Extended ANSI 7: Binary-File transfer
word	pages	number of pages, coded as unsigned integer value
struct	receive id	id of remote side

This information element appears in:

CONNECT_B3_ACTIVE_IND

CONNECT_B3_T90_ACTIVE_IND

CONNECT_B3_IND

CONNECT_B3_REQ

CONNECT_B3_RESP

DISCONNECT_B3_IND

DISCONNECT_B3_REQ

RESET_B3_REQ

RESET_B3_RESP

5.2.39 PLCI

PLCI (dword)

The purpose of the parameter *PLCI* is to describe a physical connection between two endpoints. The *PLCI* is given by Profile B during creation of the physical connection. The *PLCI* is a dword with the range from 1 to 255 (0 reserved), coded as described below, and additionally includes the controller.

Format for PLCI:

0	0	PLCI	Ext./Int.	Controller	
31	16	8	7	6	0

This information element appears in:

ALERT_REQ

ALERT_CONF

CONNECT_CONF

CONNECT_IND

CONNECT_RESP

CONNECT_ACTIVE_IND

CONNECT_ACTIVE_RESP

CONNECT_B3_REQ

DISCONNECT_REQ

DISCONNECT_CONF

DISCONNECT_IND

DISCONNECT_RESP

FACILITY_REQ

FACILITY_CONF

FACILITY_IND

FACILITY_RESP

INFO_REQ

INFO_CONF

INFO_IND

INFO_RESP

SELECT_B_PROTOCOL_REQ

SELECT_B_PROTOCOL_CONF

5.2.40 Reason

Reason (word)

The purpose of the parameter *reason* is to provide error information to the application regarding the clearing of a physical connection . The defined values are:

0	normal clearing, no cause available;
0x3301	protocol error layer 1;
0x3302	protocol error layer 2;
0x3303	protocol error layer 3;
0x3304	another application got that call (see LISTEN_REQ);
0x34xx	disconnect cause from the network according to ETS 300 102-1 [15] / Q.931 [16]. In the field "xx" the cause value received within a cause information element (octet 4) from the network is indicated;
0x8xxx	GSM-API specific reason. Used only, if GSM services are requested;
0x81xx	GSM specific local reason;
0x8101	no radio coverage (no service possible);
0x82xx	GSM reject cause from the network according to GSM 04.08 [7]. In the field "xx" the reject cause value received within a reject cause information element from the network is indicated;
0x83xx	GSM cause from the network according to GSM 04,08 [7]. In the field "xx" the cause value received within a cause information element (octet 4) from the network is indicated;
0x84xx	RP cause from the network according to GSM 04.11[8]. In the field "xx" the cause value received within a RP cause information element from the network is indicated.

This information element appears in:

DISCONNECT_IND

5.2.41 Reason_B3

Reason_B3 (word)

The purpose of the parameter *reason* is to provide error information to the application regarding the clearing of a logical connection . The defined values are:

protocol independent:

0	normal clearing, no cause available;
0x3301	protocol error layer 1 (broken line or B channel removed by signalling protocol);
0x3302	protocol error layer 2;
0x3303	protocol error layer 3.

T.30 [20] specific reasons:

0x3311	connecting not successful (remote station is no fax G3 machine);
0x3312	connecting not successful (training error);

0x3313	disconnected before transfer (remote station does not support transfer mode, e.g. resolution);
0x3314	disconnected during transfer (remote abort);
0x3315	disconnected during transfer (remote procedure error (e.g. unsuccessful repetition of T.30 [20] commands);
0x3316	disconnected during transfer (local tx data underrun);
0x3317	disconnected during transfer (local rx data overflow);
0x3318	disconnected during transfer (local abort);
0x3319	illegal parameter coding (e.g. SFF coding error).

5.2.42 Reject

Reject (word)

The purpose of the parameter *reject* is to define the action of Profile B for incoming calls.

The defined values are

0	Accept the call;
1	Ignore the call;
2	reject call, normal call clearing;
3	reject call, user busy;
4	reject call, requested circuit/channel not available;
5	reject call, facility rejected;
6	reject call, channel unacceptable;
7	reject call, incompatible destination;
8	reject call, destination out of order;
0x8xxx	GSM-API specific reason. Used only, if GSM services are requested;
0x83xx	GSM cause from the network according to GSM 04.08 [7]. In the field "xx" the cause value received within a cause information element (octet 4) from the network is indicated;
0x84xx	RP cause from the network according to GSM 04.11 [8]. In the field "xx" the cause value received within a RP cause information element from the network is indicated.

This information element appears in:

CONNECT_B3_RESP

CONNECT_RESP

6 GSM specific part of GSM-API (addition to ETS 300 838profile A)

For further study.

7 GSM specific part of GSM-API (addition to ETS 300 838profile B)

7.1 Overview

Clause 5 of this ETS contains the description of the part of GSM-API, which is compatible to ETS 300 838 [14] Profile B (COMMON-ISDN-API). Following this approach, existing applications of this ETS are able to be used in a GSM environment.

However, to use GSM specific features new GSM-API applications need extensions to ETS 300 838 [14] Profile B.

These extensions and how they are enabled is described in this subclause.

NOTE: This clause does not replace any clause of ETS 300 838 [14].

7.2 GSM specific functionality

The following GSM specific functionality is offered by GSM-API:

Registration of GSM support:

Support of GSM Tele and Bearer Services:

- Modem (usage of modem of the Inter Working Function);
- Telephony;
- Alternate speech fax (TS 61);
- Emergency Calls.

Control of Short Message Service (SMS) and Cell Broadcast Service (CBS).

In Call Modification

Access to SIM functions and SIM Data (Telephone Book, Short Message Storage ...)

Security Functions of the SIM (Enter the Code of PIN (CHV1, CHV2 and unblocking Key))

Network Management (PLMN Management): Getting information of available Networks), setting the mode of registration to a network (automatic mode or manual registration on a selected PLMN)

Control of GSM Supplementary Services

GSM specific indications (RX level/quality, service state, SIM presence)

7.3 Extension mechanism

The extension of ETS 300 838 [14] profile B is done in two ways:

1) Some of the existing parameters of ETS 300 838 [14] profile B are extended by GSM specific values. These extensions are described in the subclause 5.1 of this ETS.

2) The FACILITY mechanism of ETS 300 838 [14] profile B will be used to extend this (ISDN-) API to GSM-API. The new *facility selector* 256 is introduced to extend Profile B and new functions are defined for this facility selector. Thus existing applications will be able to run on top of GSM networks, but can easily be enhanced to support new GSM-API functionality. New GSM-API applications can use the full advantage of GSM-API based on ETS 300 838 [14] profile B (COMMON-ISDN-API).

   The generic facility mechanism of ETS 300 838 [14] profile B consists of the messages FACILITY_REQ, FACILITY_CONF, FACILITY_IND and FACILITY_RESP. Each message includes a facility identifier called *facility selector* as well as *function* specific parameters. The message FACILITY_CONF includes additionally the parameter *info*.

Both, the new values and the new facility selector shall be used by either the application and the GSM-API if and only if the application has asked for GSM support as described below.

7.4 Registration of GSM support

A function for the FACILITY mechanism of ETS 300 838 [14] profile B is defined to register GSM support:

1 Register GSM support

The facility message parameter for this function are described below.

7.4.1 Register GSM support facility message parameter

Register GSM support

The application uses this message to enable GSM functionality. The parameter "GSM Services" is a bit field, which is used to select the GSM services. If a GSM service is selected, the application has to be able to handle the asynchronous events, coming from the network side.

The following rules apply to this function:

1) If an application once has registered GSM support, there is no mechanism to de-register the support except the application logs of from GSM-API as defined in the operating system dependent part of ETS 300 838 [14] profile B.

2) The bit for the GSM service "*SIM access*" should be used, if the application is intended to work with the SIM card only. The radio part of the mobile may be enabled in this case to save power.

3) The GSM Service "*SIM access*" will automatically be supported when any of the other GSM services is requested

4) The GSM Services "*Short Message Received Indication"* and "*Transfer of received Short Message to the application"* are alternative. If both services are selected, the service "*Transfer of received Short Message to the application"* applies.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	1
GSM Service	word	Bit field, coding as follows: [0]: enable "*GSM calls"* [1]: enable "*Short Message Received Indication*" [2]: enable "*Transfer of received Short Message to the application"* [3]: enable "*Cell Broadcast Service"* [4]: enable "*GSM Supplementary Services"* [5]: enable "*SIM access"* [6]: enable "*Service State indication"* [7]: enable "*SIM presence indication"* [8]: enable „*Short Message Received Acknowledge“* [9 to 15]: reserved

The supported services are indicated with the bit field parameter GSM Services.

The parameter *MS capabilities* contains additional information about the MS capabilities.

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	1
GSM services	word	Bit field, coding as follows: [0]: "*GSM call*s" are enabled [1]: "*"Short Message Received indication"* is enabled [2]: "*Transfer of received Short Message to the application"* is enabled [3]: "*Cell Broadcast Service"* is enabled [4]: "*GSM Supplementary Services"* are enabled [5]: "*SIM access"* is enabled [6]: "*Service State indication"* is enabled [7]: "*SIM Presence Indication"* is enabled [8]: „*Short Message Received Acknowledge“* is enabled [9 to 15]: reserved
MS capabilities	struct	This parameter contains the following subparameters: word maximum length of the CBS message identifier list. This parameter is only valid, if the GSM support "enable Cell Broadcast service.

7.5 Support of GSM Tele and Bearer Services

New CIP values are defined to handle the following tele/bearer services

- modem calls (control of the modem of the Inter Working Function);
- Support of Telephony;
- Support of TS 61(Alternate Speech Fax);

These new values are defined in subclause 5.1.1.4.

7.5.1 Emergency Calls

According to GSM 02.30 [3], a GSM emergency call will be set up if the parameter *Called Party Number* of the CONNECT_REQ message is equal to "112".

7.6 Basic GSM functions

Basic Functions defined for GSM-API (Facility selector 256):

1 Register GSM Support (as described above);

2 Send Short Message;

3 Receive Short Message;

4 Receive Cell Broadcast Message;

5 In Call Modification;

6 Read SIM Data;

7 Update SIM Data;

8 Invalidate SIM File;

9 Rehabilitate SIM File;

10 Get SIM File Status;

11 Handle PIN code;

12 Get available PLMNs;

13 Set PLMN mode;

14 - 255 reserved for basic GSM functions.

The facility message parameter for these basic functions are described in the following subclauses.

7.6.1 Facility message parameter

7.6.1.1 Send Short Messages

Send Short Messages

The application uses this message to send a TPDU, which contains a Short Message (SMS-SUBMIT-REQUEST) or a SMS-COMMAND. The destined Service Centre is defined by the Service Centre Address.

The TP Message Reference of the Short Message which is placed within the TPDU is handled by GSM-API. To handle subsequent messages related to the delivered Short Message, this reference is given to the application within the Confirmation.

The result of the delivery is indicated by the parameter *Reason* of the subsequent FACILITY_IND (function = 2).

Reason = 0: Sending the Short Message/SMS Command has been successful

Reason = 0x81xx: Sending the Short Message/SMS Command has been unsuccessful because of a GSM specific local reason given in the field "xx"

Reason = 0x84xx Sending the Short Message/SMS Command has been unsuccessful because of a network related error. The cause value (RP-cause according to GSM 04.11 [8]) is given in the field "xx"

In case of a successful submission, the service centre might provide the SMS-SUBMIT-REPORT RP-ACK according to GSM 03.40 [5]. This will be presented in the parameter *SMS-Data* of the FACILITY_IND (function = 2).

In case of an unsuccessful submission, the service centre might provide the TP-Failure Cause according to GSM 03.40 [5]. This will be presented in the parameter *SMS-Data* of the FACILITY_IND (function = 2).

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	2
SMS Data	struct	The parameter has the following structure: struct: TS Service Centre Address coded according to GSM 04.11 [8] TPDU: The TPDU is coded as an array of octets. (Note 1)

NOTE 1: The length of the TPDU can be calculated as:

Length of struct "SMS Data" - (Length of struct "TS Service Centre Address" + 1)

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	2
TP Message Reference	word	Coded according to GSM 03.40 [5]

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	2
TP Message Reference	word	Coded according to GSM 03.40 [5]
Reason	word	0 successful delivery 0x81xx: unsuccessful delivery local reason presented in "xx" 0x84xx unsuccessful delivery RP cause according to GSM 04.11 [8] is given in "xx"
SMS Data	struct	This optional parameter contains the following information if it is provided by the service centre: In case of a successful submission the SMS-SUBMIT-REPORT RP-ACK according to GSM 03.40 [5]. In case of an unsuccessful submit the TP-Failure Cause according to GSM 03.40 [5].

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	2

7.6.1.2 Receive Short Message

Receive Short Message

This Message is used to handle delivered short messages and SMS-STATUS-REPORTS.

If the application has selected the GSM service "*Short Message Received Indication"*, only the class and the storage location of the message will be indicated.

If the application has enabled the GSM service "*Transfer of received Short Message to the application"*, the indication will additionally contain the SMS data.

NOTE 1: The content of a class 0 Short Message and a SMS-STATUS-REPORT will always be forwarded to the application, if either of the above mentioned GSM services is selected.

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	3
SMS storage	struct	octet 0: Bit mask to monitor memory status [0]: SIM storage full. If this bit is set, the SIM storage is full or not available [1]: Manufacturer specific storage full If this bit is set, the manufacturer specific storage is full or not available octet 1: This octet describes the handling of the received short message. 0 rejected because SIM SMS storage full 1 rejected because memory capacity exceeded 2 not stored (class 0 Short Message) 3 stored on the SIM the record number in which the Short Message is stored is given in the subsequent octet. (record numb according to GSM 11.11 [13]) 4 stored manufacturer specific the location of the storage is given in the subsequent octets
SMS data	struct	Contains: struct: TS Service Centre Address coded according to GSM 04.11 [8] TPDU: The TPDU is coded as an array of octets. (Note 1)

NOTE 2: The length of the TPDU can be calculated as:

Length of struct "SMS Data" - (Length of struct "TS Service Centre Address" + 1)

If the application has selected the GSM service "*Short Message Received Acknowledge"*, the FACILITY_RESP (function = 3) will trigger the SMS-DELIVER-REPORT to be sent to the service centre. In this case the application has to take care not to delay the response for longer then the RP-ACK time-out, as specified in GSM 04.08 [7]. The application might include the SMS-DELIVER-REPORT RP-ACK in the parameter SMS-Data of the FACILITY_RESP (function = 3).

If the application has not selected the GSM service "*Short Message Received Acknowledge"*, the SMS-DELIVER-REPORT will be handled below the GSM-API. The parameter SMS-Data shall be coded as an empty struct in this case.

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	3
SMS-Data	struct	This optional parameter might be used by the application to send the SMS-DELIVER-REPORT RP-ACK to the service centre, if the GSM service "*Short Message Received Acknowledge"* has been selected.

7.6.1.3 Receive Cell Broadcast Messages

Cell Broadcast Messages

These message are used to handle the Cell Broadcast service.

With the request, the application can restrict the receipt of Cell Broadcast messages to a limited number of Message Identifiers (parameter *MI list*) or/and Data coding schemes (parameter *DCS list*).

The indication is sent for each page of a Cell Broadcast Message. The message identifiers and the data coding scheme are coded according to GSM 03.38 [4]

The maximum length of the list of Message Identifiers is manufacturer specific. It will be given in the confirmation message of the request for GSM support.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	4
MI list	struct	word: 1. Message identifier : word: n. Message identifier
DCS list	struct	octet: 1. data coding scheme : octet: n. data coding scheme

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	4

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	4
CBS data	struct	Contains one page of CB message coded according to GSM 03.41 [6]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	4

7.6.1.4 In Call Modification

In Call Modification

The application uses this message to send a Modify to the network. The CIP value is used, to create the GSM HLC and BC to be sent to the Network. The CIP value can be 16(Telephony) or 17(Fax).

The In Call Modification Indication can be initiated by:

- The result of a modify request, which can be a modify complete (Reason = 0) or a modify reject (Reason = GSM specific cause), or

- A modify initiated by the network (Reason = 0).

The In Call Modification Response contains:

- A local response to a modify complete or modify reject coming from the network (Rejection = 0, CIP=0, LLC=empty struct);

- A modify complete (Rejection = 0) or a modify reject (Rejection = GSM specific cause) as a response to a modify previously sent by the network.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	5
CIP Value	word	Compatibility Information Profile
LLC	struct	Low Layer Compatibility
Reverse Call Setup	struct	optional octet, coded according to GSM 04.08 [7]

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	5

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	5
Reason	word	GSM specific reason
CIP Value	word	Compatibility Information Profile
LLC	struct	Low Layer Compatibility
Reverse Call Setup	struct	optional octet, coded according to GSM 04.08 [7]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	5
Reject	word	GSM specific reject
CIP Value	word	Compatibility Information Profile
LLC	struct	Low Layer Compatibility

NOTE: In case of a successful In Call Modification, the application shall use the Profile B message SELECT_B_PROTOCOL_REQ to change the B protocol after receiving the indication (in both cases mobile originated/terminated modify before sending the response.

7.6.1.5 Read SIM Data

Read SIM Data

The SIM data consists of transparent, linear fixed and cyclic files. GSM-API offers a similar way to access all these types of files. Within the request, the application gives the identifier of the file. An immediate local confirmation is given and the result is sent within one or several indications. This indication contains the data of the requested file or an error cause given by the SIM. (e.g. "no CHV initialized" or "pattern not found".).

In case of a linear fixed or cyclic file, the application has two choices to read.

1) If the parameter *read criterium* is empty (empty struct), the whole file is read.
As the result each record is sent in one indication. The *SIM More Data* identifier is 0 for the last indication (no more data is sent).

2) The application may give the *record number* in the parameter *read criterium*.
The *record number* is coded in one byte, 1 ≤ *record number* ≤ 255 (according to GSM 11.11 [13]).

In this case the requested record is sent in one indication and the *SIM More Data* identifier is 0.

In case of a linear fixed file the application has a third choice to read, by giving a *pattern* in the parameter *read criterium*. The *pattern* is coded as a sequence of bytes with maximum length = 16 as defined in GSM 11.11 [13]. GSM-API will send one indication per record which starts with the *pattern*. The last indication is identified by the *SIM More Data* identifier = 0. If no record is found, this is treated like an error given by the SIM as described above.

In cases of a linear fixed or cyclic file, the resulting indication contains the *record number* of the read record.

In case of a transparent file the whole data of the file is given within one indication. The parameter *read criterium* has no meaning and shall be coded as an empty struct. The parameter *record number* of the indication shall be "0" in case of a transparent file.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	6
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF_ID	word	elementary file, according to GSM 11.11 [13]
read criterium	struct	1. case empty struct => read all records of a file 2. case Byte 0 = 1 read one record given by the *record number* Byte 1: 1 ≤ *record number* ≤ 255 3. case Byte 0 = 2 read records which starts with *pattern* Byte 1 1 ≤ length of *pattern* ≤ 16 Byte2 *pattern* : Byte n

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	6
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	6
SIM_SW1	word	first status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_SW2	word	second status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]
SIM More Data	word	0: no more data available all other values: next data will follow
record number	word	1. linear fixed or cyclic file the parameter contains in the low byte the number of the read record 2. transparent file record number = "0"
SIM Data	struct	

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	6

7.6.1.6 Update SIM Data

Update SIM Data

Using these messages, an application can update all types if files, (transparent linear fixed or cyclic files) of the SIM.

In case of a linear fixed file, the application sends one request per record. The request contains the *record number* which may vary from 1 to 255 (according to GSM 11.11 [13]). When a sequence of records of a linear fixed file is updated (e.g. the whole file is updated), the application should update the records in order of the record number to make an optimized update possible.

In case of a transparent- or a cyclic file, the *record number* shall be "0".

For each request, the application receives a local confirmation and an indication which contains the result given by the SIM. The application has to wait for this indication before it will sent new data to the SIM (next record or new file).

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	7
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]
record number	word	1. linear fixed of cyclic file the parameter contains in the low byte the number of the record 2. transparent file record number = "0"
SIM Data	struct	

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	7
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	7
SIM_SW1	word	first status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_SW2	word	second status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	7

7.6.1.7 Invalidate SIM file

Invalidate SIM file

These messages are used to invalidate a file of the SIM according to GSM 11.11 [13]. After the request, the application receives a local confirmation. The result of the SIM is given in the subsequent indication for this function.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	8
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF_ID	word	elementary file, according to GSM 11.11 [13]

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	8
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	8
SIM_SW1	word	first status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_SW2	word	second status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	8

7.6.1.8 Rehabilitate SIM file

Rehabilitate SIM file

These messages are used to rehabilitate a file of the SIM according to GSM 11.11 [13]. After the request, the application receives a local confirmation. The result of the SIM is given in the subsequent indication for this function.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	9
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF_ID	word	elementary file, according to GSM 11.11 [13]

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	9
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	9
SIM_SW1	word	first status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_SW2	word	second status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	word	elementary file, according to GSM 11.11 [13]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	9

7.6.1.9 Get SIM File Status

Get SIM File Status

These messages are used to get the status and additional information of a file.

If the status of a dedicated file or of the main file is requested, the parameter *SIM_EF_ID* is empty.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	10
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF_ID	struct	This parameter contains the following subparameter: word elementary file identifier according to GSM 11.11 [13]

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	10
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	struct	This parameter contains the following subparameter: word elementary file identifier according to GSM 11.11 [13]

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	10
SIM_SW1	word	first status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_SW2	word	second status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_DF ID	word	directory, according to GSM 11.11 [13]
SIM_EF ID	struct	This parameter contains the following subparameter: word elementary file identifier according to GSM 11.11 [13]
status info	struct	This parameter contains the status information as defined in GSM 11.11 [13]
length of alpha identifier	struct	This optional parameter contains the length of the alpha identifier which is according to GSM 11.11 [13] defined for some elementary files.

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	10

7.6.1.10 Handle PIN code

Handle PIN code

The request to handle the PIN code offers different operations. For each operation, dependent of the value of parameter *SIM PINOperation* the other parameter have different meaning (all coded according to GSM 11.11 [13]):

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	11
SIM PINOperation	word	1..8, see below
SIM PINCode	struct	see below
SIM PINCodeAdd	struct	see below

SIM PINOperation	SIM PINCode:	SIM PINCodeAdd:
1: verify CHV1	CHV1	not used
2: verify CHV2	CHV2	not used
3: change CHV1	old CHV1	new CHV1
4: change CHV2	old CHV2	new CHV2
5: disable CHV1	CHV1	not used
6: enable CHV1	CHV1	not used
7: unblock CHV1	unblock CHV	new CHV1
8: unblock CHV2	unblock CHV	new CHV2

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	11

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	11
SIM_SW1	word	first status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]
SIM_SW2	word	second status word, given by the SIM as a response to a command. High byte: 0 low byte: according to GSM 11.11 [13]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	11

7.6.1.11 Get available PLMNs

Get available PLMNs

With these messages the application requests a list of currently available GSM networks (PLMNs). For each PLMN additional information is given (if the PLMN is forbidden, allowed or if it is the PLMN the MS is currently registered on).

In case of a rejection of the available PLMN request, this will be indicated in parameter *Reason* of the corresponding Indication.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	12

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	12

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	12
Reason	word	GSM specific reason
PLMN List	struct	4 octets, may be repeated. Octet 0: Bit field, coded as follows: [0]: PLMN is allowed [1]: PLMN is the PLMN, which the MS is actually registered on [2-15]: reserved Octet 1..3: PLMN coded according to GSM 04.08 [7]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	12

7.6.1.12 Set PLMN Mode

Set PLMN Mode

The application uses this message to select the mode of registration to a network. If the PLMN is not given, automatic mode is selected. In this case, the MS tries to register:

1) to the home PLMN. If this is not possible;

2) to one of the selected PLMN (given on the SIM). If this is not possible;

3) to another available PLMN.

If the NEW_PLMN is present, the MS is in manual mode. It tries only to register to the given PLMN. The default mode is not part of this specification.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	13
New PLMN	struct	PLMN coded according to GSM 04.08 [7], or empty struct

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	13

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	13
Reason	word	GSM specific reason
New PLMN	struct	PLMN coded according to GSM 04.08 [7]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	13

7.7 GSM Supplementary Service functions

This subclause describes the extension of ETS 300 838 [14] profile B (COMMON-ISDN-API) to control GSM Supplementary Services.

The ASN1 coder/decoder is placed below the GSM-API.

7.7.1 Overview

The extension for GSM Supplementary services offers the control of call independent and call related supplementary services. Only one SS transaction can take place in each direction at the same time. Whenever an application will try to start a second Mobile Originated SS transaction, it will be rejected with the info value = 0x1107 "internal busy condition". Thus no transaction identifier is needed.

Functions defined for GSM-API (Facility selector 256) GSM Supplementary Services:

256 Restrict SS information;

257 Mobile originated SS transaction;

258 Clear Mobile originated SS transaction;

259 Receive SS message;

260 Call Hold;

261 Call Retrieve;

262 Call Ussd;

263 Receive Call related Facility;

264 - 511 reserved for GSM Supplementary Services functions;

7.7.2 Enable GSM Supplementary Service Functionality

The Facility messages to "Register GSM Support are used to enable GSM supplementary services.

7.7.3 GSM Supplementary Services Parameters

The following subclauses describe parameters, which are used in the Facility messages for GSM Supplementary Services.

7.7.3.1 ss_operation

ss_operation (word)

This parameter describes the content of the GSM Supplementary Services related Facility messages or the *Info Element* parameter in case of a GSM facility.

Defined values of ss_operation are:

0 Used if a Release Complete message which terminates the SS transaction is received from the network without any additional information like a cause or a facility.

0x43xx GSM cause from the network according to GSM 04.08 [7]. In the field "xx" the cause value received within the cause information element (octet 4) from the network is indicated.

0xA1xx Invoke message
In the field "xx" the ss_operation_code according to GSM 04.80 [9] is indicated;

0xA2xx Return Result message
In the field "xx" the ss_operation_code according to GSM 04.80 [9] is indicated;

0xA3xx Return Error message
In the field "xx" the ss_error_code according to GSM 04.80 [9] is indicated;

0x80xx Reject (general problem) message
In the field "xx" the ss_general_problem_code according to GSM 04.80 [9] is indicated;

0x81xx Reject (invoke problem) message
In the field "xx" the ss_invoke_problem_code according to GSM 04.80 [9] is indicated;

0x82xx Reject (return result problem) message
In the field "xx" the ss_return_resutl_problem_code according to GSM 04.80 [9] is indicated;

0x83xx Reject (return_error_problem) message
In the field "xx" the ss_return_error_problem_code according to GSM 04.80 [9] is indicated.

7.7.3.2 Forwarding Feature

Forwarding Feature (struct)

The *forwarding feature* contains an optional basic_service_code, optional ss_status, optional forw_to_num, optional forw_to_subadr and optional no_reply_cond_time.

It appears in the forw_feat_list parameter of the FACILITY_CONF message (function 257 Mobile Originated SS transaction).

Forwarding Feature Parameter:			
basic_service_ code	struct	Byte 0 Byte 1	code_flag = 0 => teleservice = 1 => bearer service service code (acc. to GSM 09.02 [12])
ss_status	struct	Byte 0	SS status (acc. to GSM 09.02 [12])
forw_to_num	struct	contains the *forwarded to number* parameter coded as an ISDN-Address String according to GSM 09.02 [12]	
forw_to_subaddr	struct	contains the *forwarded to subaddress* parameter coded as an ISDN-Subaddress String according to GSM 09.02 [12]	
no_reply_cond_ time	struct	Byte 0	no *reply condition time* parameter according to GSM 09.02 [12] (integer value from 5 .. 30) coded in one Octet.

7.7.4 Facility message parameter

7.7.4.1 Restrict SS Information

Restrict SS Information

This message is sent from the application to the protocol to restrict SS-related information from the protocol to the application.

If the protocol receives from the network information related to Basic Service Codes of the last request to restrict SS information , (e.g. "forw_feat" in the "forw_feat_list") then this information will be included in the messages described below.

Every new message overrides the last selections.

If no request for SS information restriction was sent or no Basic Service Code is specified (empty basic_service_code_list) then all information will be given to the application.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	256
basic_service_ code_list	struct	contains *n* ($n \geq 0$) basic service codes 1. service code (if $n > 0$): Byte 0 code_flag = 0 => teleservice = 1 => bearer service Byte 1 service code (acc. to GSM 09.02 [12]) : *n*. service code: Byte 2 x (*n* - 1) code_flag Byte 2 x *n* - 1 service code

Facility Confirmation Parameter:		
Facility selector	word	**256**: GSM Support
Function	word	**256**

7.7.4.2 Mobile Originated SS Transaction

Mobile Originated SS Transaction

These messages are used to start and end a Mobile originated SS transaction.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	257
ss_ussd_string	struct	
ss_ussd_coding_ scheme	struct	Byte 0 CellBroadcastDataCodingScheme as defined in GSM 03.38 [4]

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	257

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	257
ss_operation	word	
ss_code	struct	Byte 0 SS code (acc. to GSM 09.02 [12])
basic_service_ code	struct	Byte 0 code_flag = 0 => teleservice = 1 => bearer service Byte 1 service code (acc. to GSM 09.02 [12])
ss_status	struct	Byte 0 SS status (acc. to GSM 09.02 [12])
ss_ussd_coding_ scheme	struct	Byte 0 CellBroadcastDataCodingScheme as defined in GSM 03.38 [4]
ss_ussd_string	struct	
clir_restr_opt	struct	Byte 0 = 0 => permanent = 1 => temporary default restriction = 2 => temporary default allowed
override_ category	struct	Byte 0 = 0 => override enable = 1 => override disable
forw_feat_list	struct	contains a list of forwarding features Byte 0 *n* = number of forwarding features (if any) struct 1. forwarding feature : struct *n*. forwarding feature
call_barring_ cause	struct	Byte 0 = 0 => barring service active = 1 => operator barring
pw_reg_fail_ cause	struct	Byte 0 = 0 => undetermined = 1 => invalid format = 2=> new password mismatch

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	257

7.7.4.3 Clear Mobile Originated SS Transaction

Clear Mobile Originated SS Transaction

These messages are used to clear a Mobile originated SS transaction.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	258

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	258

7.7.4.4 Receive SS Message

Receive SS Message

These messages are used to handle:

1) The spontaneous reception of an incoming SS transaction (Forward check indication).

2) The message transfer for unstructured SS data.

Facility Indication Parameter:			
Facility selector	word	256: GSM Support	
Function	word	259	
ss_operation	word		
ss_code	struct	Byte 0	SS code (acc. to GSM 09.02 [12])
ss_status	struct	Byte 0	SS status (acc. to GSM 09.02 [12])
notification	struct	Byte 0	SS Notification (acc. to GSM 04.80 [9])
		Byte 1	SS Indication mask. Bit field coded as follows:
		[0]:	call waiting
		[1]:	call on hold
		[2]:	call is retrieved
		[3]:	MPTY
		[4]:	CLIR Suppression rejected
		[5]:	call Activation (only phase 1)
		[6]:	Erasure (only phase 1)
		[7]:	not used
ss_ussd_coding_ scheme	struct	Byte 0	CellBroadcastDataCodingScheme as defined in GSM 03.38 [4]
ss_ussd_string	struct		

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	259

7.7.4.5 Call Hold

Call Hold

These messages are used to handle the call related part of the Call Hold Supplementary service. The PLCI of the FACILITY messages describes the identifier of the call, which will be put on "Hold".

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	260

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	260

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	260
Reason	word	0: successful request for Call Hold 0x83xx: request for Call Hold rejected. The field "xx" contains the cause coded according to GSM 04.08 [7]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	260

7.7.4.6 Call Retrieve

Call Retrieve

These messages are used to handle the call related part of the Call Retrieve Supplementary service. The PLCI of the FACILITY messages describes the identifier of the call, which will be retrieved.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	261

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	261

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	261
Reason	word	0: successful request for Call Retrieve 0x83xx request for Call Retrieve rejected, The field "xx" contains the cause coded according to GSM 04.08 [7]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	261

7.7.4.7 Call Related Ussd

Call Related Ussd

These messages are used to handle the Call Related Ussd Supplementary service. The PLCI of the FACILITY_REQ/CONF/IND/RESP messages describes the identifier of the call.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	262
ss_ussd_string	struct	

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	262

7.7.4.8 Receive Call Related Facility

Receive Call Related Facility

These messages are used to receive the information of a call related facility. The related call is identified by the PLCI of the FACILITY_IND and FACILITY_RESP message.

Facility Indication Parameter:			
Facility selector	word	256: GSM support	
Function	word	263	
ss_operation	word		
ss_code	struct	Byte 0	SS code (acc. to GSM 09.02 [12])
ss_status	struct	Byte 0	SS status (acc. to GSM 09.02 [12])
notification	struct	Byte 0	SS Notification (acc. to GSM 04.80 [9])
		Byte 1	SS Indication mask. Bit field coded as follows:
		[0]:	call waiting
		[1]:	call on hold
		[2]:	call is retrieved
		[3]:	MPTY
		[4]:	CLIR Suppression rejected
		[5]:	call Activation (only phase 1)
		[6]:	Erasure (only phase 1)
		[7]:	not used
ss_ussd_string	struct		

Facility Response Parameter:		
Facility selector	word	256: GSM support
Function	word	263

7.8 Extended GSM functionality

This subclause defines additional functions for GSM-API (Facility selector 256):

512 Get Service State;

513 Get RX Level and RX Quality;

514 Get SIM Presence Info;

515 - ... reserved.

7.8.1 Facility Message parameter

7.8.1.1 Get Service State

Get Service State

These messages are used, to get information of the current Service State. An application may use the request of this function to ask for the information.

If the application asked for the GSM service "*enable Service State indication*", the indication of this function will be sent whenever the Service State changes.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	512

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	512

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	512
Diagnostic	word	0 no diagnostic 0x8101 no network 0x82xx reject cause from network according to GSM 04.08 [7]. In the field "xx" the reject cause value is coded.
Service status	word	0 no service 1 attempt to camp 2 emergency calls only 3 attempt to register 4 normal service
Roam status	word	This parameter is only valid, if the Service Status is "normal service" 0 the current PLMN is the Home PLMN 1 the current PLMN is a visited PLMN
PLMN	struct	If the Service Status is "normal service" this parameter contains the current PLMN according to GSM 04.08 [7]. In any other service status it is coded as an empty structure.

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	512

7.8.1.2 RX Level and RX Quality

RX Level and RX Quality

These messages are used, to get information of the current receiving field strength and receiving quality.

An application can only request for this information. An automatic indication is not defined.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	513

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	513

Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	513
RX level	word	RX level according to GSM 05.08 [11]
RX quality	word	RX quality according to GSM 05.08 [11]

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	513

7.8.1.3 Get SIM Present Info

Get SIM Presence Info

These messages are used, to get information if the SIM card is physically present and ready for access. An application may use the request of this function to ask for the information.

If the application asked for the GSM service "*enable SIM presence indication*", the indication of this function will be sent whenever the criterium changes.

Facility Request Parameter:		
Facility selector	word	256: GSM Support
Function	word	514

Facility Confirmation Parameter:		
Facility selector	word	256: GSM Support
Function	word	54

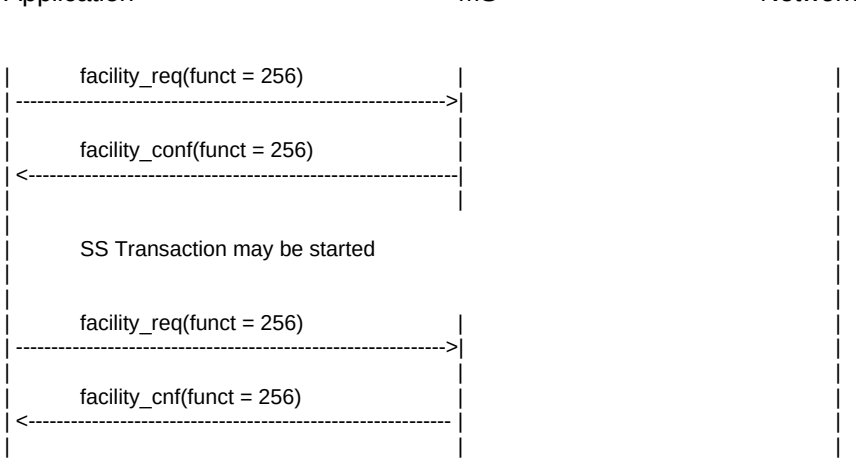
Facility Indication Parameter:		
Facility selector	word	256: GSM Support
Function	word	514
SIM present	word	0 SIM is not present 1 SIM is present and accessible

Facility Response Parameter:		
Facility selector	word	256: GSM Support
Function	word	54

Annex A (informative): GSM Supplementary Services Message flow

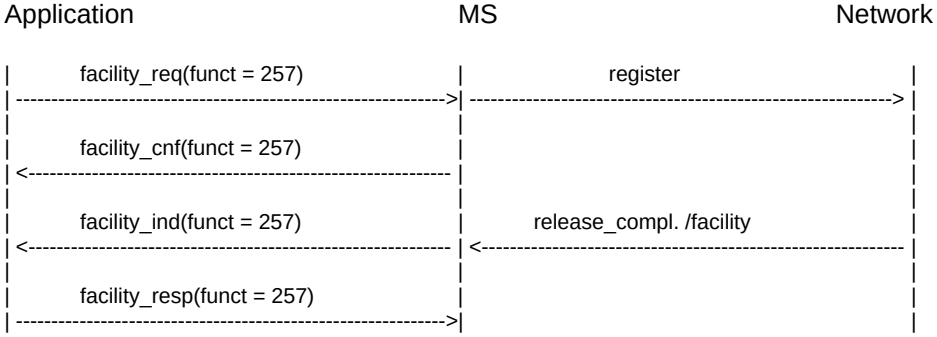
A.1 Restrict SS information

This Message Flow chart describes the flow for restriction of SS information.



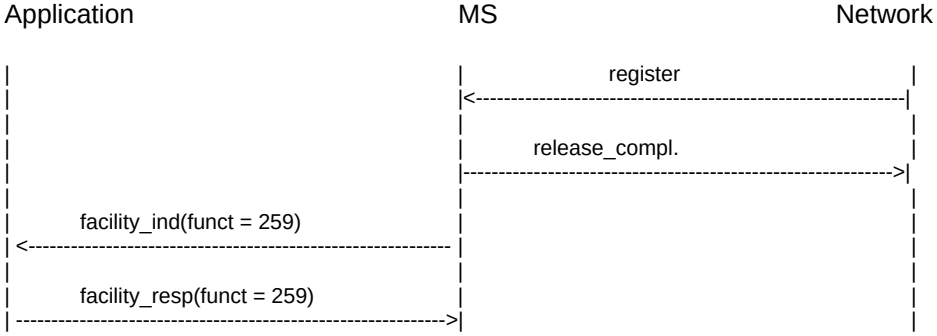
A.2 Mobile Originated SS transaction

This Message Flow chart describes the flow of GSM-API and GSM layer 3 messages according to the GSM 04.80 [9] series as used for CF, CB etc.



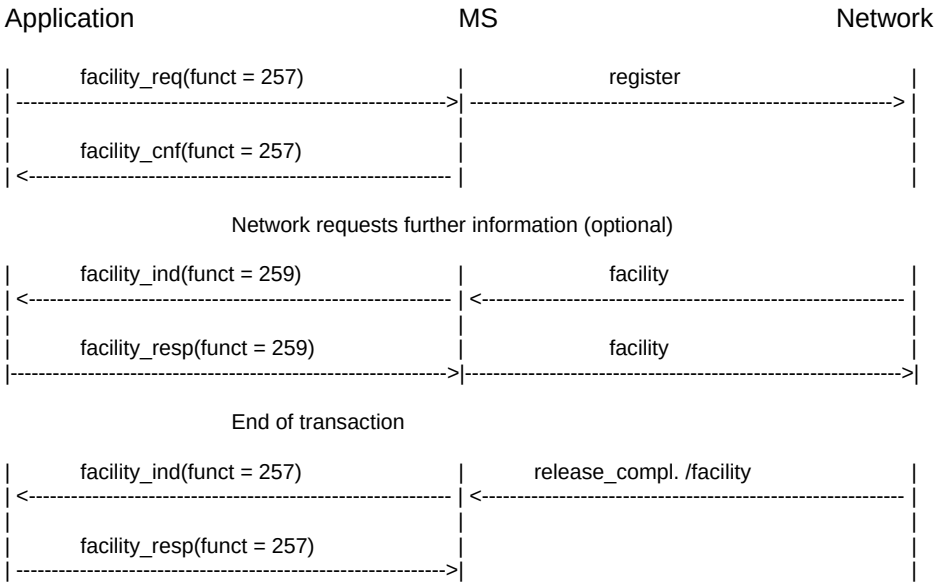
A.3 Receive SS Message (Forward Check Indication)

This Message Flow Chart describes the spontaneous incoming SS message for Forward Check. The applications response is local.



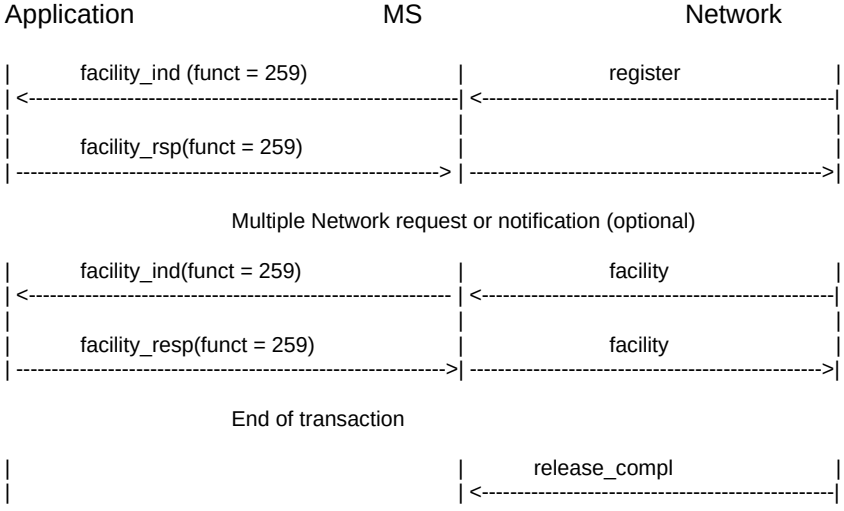
A.4 Mobile originated USSD

This Message Flow Chart describes the Message Flow for mobile originated USSD according to GSM 04.90 [10].

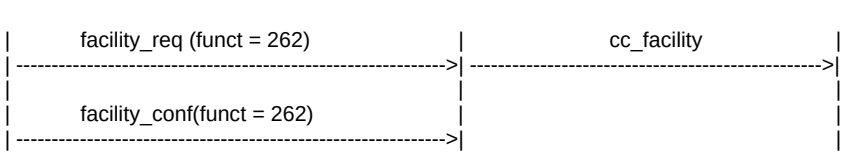


A.5 Mobile terminated USSD

This Message Flow Chart describes the message flow for mobile terminated USSD according to GSM 04.90 [10].

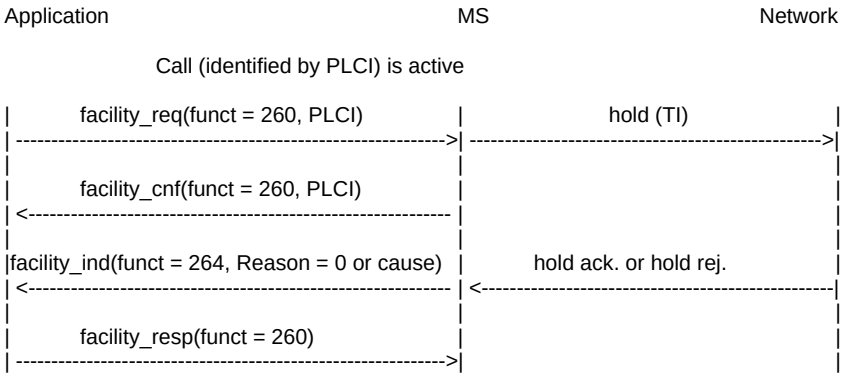


A.6 Call related USSD

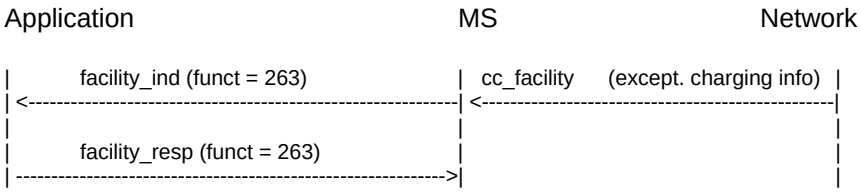


A.7 Call hold

This Message Flow chart describes the flow for call hold. The flow for call retrieve is equivalent.



A.8 Receiving a Call related Facility



Annex B (informative): Change history

SMG	SPEC	PHA	CR	VERS	NEW_VE	SUBJECT
S20	07.08	2+	NEW	2.0.0	5.0.0	GSM API
s21	07.08	2+	A001	5.0.0	5.1.0	GSM API RP-Ack PDU
s24	07.08	R96	A002	5.1.0	5.2.0	Correction of references

History

Document history			
December 1996	Public Enquiry	PE 119:	1996-12-02 to 1997-03-28
February 1998	Vote	V 9817:	1998-02-24 to 1998-04-24
May 1998	First Edition		

ISBN 2-7437-2178-2
Dépôt légal : Mai 1998