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Signalling Transport Mechanism Specification for the BSS-MSC Interface

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1. Reason for changes

Only pagenumbering/layout/etc. has been changed since the previously distributed version.

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Signalling Transport Mechanism Specification for the BSS-MSC Interface

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PREFATORY NOTE

ETSI has constituted stable and consistent documents which give specifications for the implementation of the European Cellular Telecommunications System. Historically, these documents have been identified as "GSM recommendations".

Some of these recommendations may subsequently become Interim European Telecommunications Standards (I-ETSs) or European Telecommunications Standards (ETSs), whilst some continue with the status of ETSI-GSM Technical Specifications. These ETSI-GSM Technical Specifications are for editorial reasons still referred to as GSM recommendations in some current GSM documents.

The numbering and version control system is the same for ETSI-GSM Technical Specifications as for "GSM recommendations".

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0. SCOPE

This recommendation is divided split into two parts, Chapters 1-4 dealing with the MTP and chapters 5-7 dealing with the SCCP and its use.

The MTP provides a mechanism giving reliable transfer of signalling messages. Chapters 1-4 of this recommendation deals with the subset of the MTP that can be used between an BSS and an MSC, which iscompatible with a full MTP.

The SCCP is used to provide a referencing mechanism to identify a particular transaction relating to for instance a particular call. Chapters 5-7 identify the SCCP subset that should be used betweenan BSS and an MSC. The SCCP can also be used to enhance the message routing for (for instance) operations and maintenance information.

1. FIELD OF APPLICATION

1.1 This Recommendation is applicable to the signalling between radio subsystems (BSS) and mobile switching centres (MSCs) in GSM PLMNs. It provides a minimum set of MTP requirements that may be implemented at a BSS or MSC, whilst maintaining compatibility with the implementation of a full specification of the MTP.

1.2 The Recommendation defines the interface at the 64 k/bit boundary to the BSS or MSC and applies primarily for digital access arrangements, the use of analogue arrangements is a national concern.

1.3 The security of signalling links is a national concern, however it is recommended that in the case where more than one multiplex system is required and security reasons dictate the use of a multiple link linkset, then each signalling link should be assigned in a different multiplex system. It is however noted that this is of little benefit if diversity of routing of the multiplexes is not used

1.4 For initial implementations only the associated mode of signalling may be applicable at the BSS. Future evolution or economic reasons applicable to the interface may however make the use of STP working at the BSS attractive, in which case some of the simplifications in this paper will not apply.

1.5 A variety of information types may be supported by the signalling system, e.g. relating to circuit switched call control and packet communication. These are fully defined in the service series of recommendations (the GSM 02.xx series).

1.6 The CCITT recommendations concerning the MTP shall be taken as being requirements unless covered by a statement in this recommendation.

2. FUNCTIONAL CONTENT

The functional requirements are as follows:

2.1 The network call control functions are as specified in Recommendations GSM 08.08, 04.08.

2.2 The minimum set of Message Transfer Part functions are specified in Recommendations CCITT Q.702, Q.703, Q.704 and Q.707, with the qualifications specified in this Recommendation.

2.3 The additional interface functions required for the proper operation of the layer 3 control functions in combination with the Message Transfer Part functions, is specified in para 4 of this Recommendation.

2.4 For the time being the text in this recommendation is based on the Red Book version of the MTP. When AP documents are available from the CCITT it will be upgraded and based on the Blue Book. This should be noted when preparing responses to this draft recommendation.

3. MESSAGE TRANSFER PART (MTP) FUNCTIONS

3.1 General

The MTP functions as specified in Recommendations CCITT Q.702, Q.703, Q.704 and Q.707 are applicable. However, the following exceptions and modifications to those Recommendations may be applied for the MSC to BSS signalling, see para 3.2-3.4.

Some form of policing could be included at the MSC in order to ensure that no signalling messages received from the BSS can be routed further than the MSC if an administration requires. This is necessary to prevent fraudulent use of the signalling network for implementations of the GSM system. The manner in which this is achieved will be dependent on national circumstances and system implementations.

Where load sharing is used, all messages to do with a given SCCP connection should be passed down a given link.

3.2 Level 1 (Recommendation Q.702)

Q.702 fig 2

These figures should be treated as for information only. For the standard application of GSM, interface point C is appropriate.

Q.702 para 1.4

The use of analogue circuits to support the signalling link is a national matter.

Q.702 para 2

A signalling rate of 64kbits/s is assumed. Lower rates (e.g. using analogue bearers) are a national concern.

Q.702 para 3

Error characteristics and availability are a national concern. Care should be taken as excessive errors could lead to inefficient use of the signalling links.

Q.702 para 5

The standard arrangement will be to derive the signalling link from a 2048 kbits/s digital path.

Q.702 para 6

Only digital signalling data links are relevant.

The use of analogue bearers to support this interface is considered a national concern. However it should be noted that there will be potential problems with the following areas:

- The signalling load may exceed that which can be carried by a single low rate analogue link, this may lead to an excessive number of signalling links and more complex changeover/changebackprocedures.

- The performance of the analogue lines used to carry the signalling link will have a major impact on the throughput of signalling information that can be achieved.

- Message delay may degrade the quality of service.

3.3 Level 2 (Recommendation Q.703)

Q.703 para 1.4

Only the basic error correction protocol is required.

Q.703 para 1.7

Only the emergency proving period and status indications should be used by the BSS.

Q.703 para 6

Not applicable, only basic error correction is required.

Q.703 para 7

In the initial alignment procedure specified in Recommendation CCITT Q.703, only the emergency proving is applicable for the BSS. Thus, in states 02 and 03 of the initial alignment procedure statusindication "N" is not sent from the BSS. The BSS should be capable of recognising status indication "N" if received in order for the alignment procedure to complete.

Q.703 para 8

The processor outage status indicator shall be recognised at the BSS and the procedures defined in Q.703 section 8 supported.

The BSS shall support the generation of the processor outage indication towards the MSC if this is appropriate.

Q.703 para 10

Only the emergency alignment procedures are required.

3.4 Level 3 (Recommendation Q.704)

Q.704 para 1.1.2.

If the BSS is only implemented as the end point of a signalling link, ie it does not support STP working, then there will be no signalling transfer point network management features which need to be considered.

Q.704 para 1.3

Signalling link management is required. Load sharing is required, and changeover/back between links within a single linkset are required.

Q.704 para 2

Since STP working is not required the discrimination and routing functions of the MTP used for GSM application can be significantly simplified.

[Since the implementation of this interface is intended only for point to point application the routing function within the MTP will be preset to select the point code appropriate to the parent MSC.]

Q.704 para 2.2 Routing label

Load sharing will be performed on BSS s with more than one signalling link by means of the signalling link selection field (SLS).

Q.704 para 2.3 Message routing function

Load sharing between linksets is not required since there will only be one linkset between BSS and MSC.

Q.704 para 2.3.5.

Either of the two methods of congestion control is acceptable. The most appropriate method is dependent on national CCITT No. 7 implementations.

Q.704 para 2.4 Message discrimination

At the BSS only messages with a correctly checking DPC will be accepted. Others will be discarded. It is recommended that discarding a message because of an incorrectly set point code causes anincident report to be generated.

At an MSC (which has the capability of acting as an STP) an administration may decide that each message received from a BSS signalling link is passed through a "screening function" that checks thatthe DPC of the message is the same as the SP code of the exchange. If that is the case, the message is sent to the normal MTP message handling functions. Otherwise, the message is discarded and anincident report is made.

The signalling point code for an BSS may be included in the national signalling point code scheme or in a separate signalling network. In the case where the signalling point code is in the nationalnetwork the MSC need have only one point code, in the case where the signalling point code is in a separate "PLMN" signalling network, the MSC will be required to have two signalling point codes, onefor each network.

Q.704 para 3.1.3 c)

There is no requirement for signalling route management.

Q.704 para 3.2.6 b) & 3.2.7 b)

There is no requirement for signalling link blocking and unblocking, initiated from a management system. Note however that receipt/removal of a Processor Outage condition will result in the signallinglink being blocked/unblocked.

Q.704 para 3.3.1.3

There is no requirement for signalling route management.

Q.704 para 3.3.2.3

There is no requirement for signalling route management.

Q.704 para 3.3.3.3

There is no requirement for signalling route management.

Q.704 para 3.3.4.3

There is no requirement for signalling route management.

Q.704 para 3.3.5.2

There is no requirement for signalling route management or signalling link blocking initiated by a management system.

Q.704 para 3.3.6.2

There is no requirement for signalling route management or signalling link unblocking initiated by a management system.

Q.704 para 3.4.1

It should be noted that for point to point working, the signalling route will become unavailable when the associated link set fails.

Q.704 para 3.4.2

It should be noted that for point to point working, the signalling route will become available when the associated link set is restored.

Q.704 para 3.4.3

Not applicable.

Q.704 para 3.5.1

It should be noted that for point to point working the procedures used in connection with signalling route unavailability will be those specified for signalling route set unavailability in Q.704 para 10.2.1.

Q.704 para 3.5.2

It should be noted that for point to point interworking the procedures used in connection with signalling route availability will be those specified for signalling route set availability in Q.704 para 10.2.2.

Q.704 para 3.5.3

Not applicable.

Q.704 para 3.6.2

There are two acceptable methods of congestion control defined in Q.704, in paras 3.6.2.1 a) and b). The most appropriate method is dependent on national CCITT No. 7 implementations. Each administraition should specify its congestion threshold setting algorithm and nodal congestion abatement procedures at system procurement.

Q.704 para 3.6.5.2

The signalling-route-set-congestion-test procedure is not required.

Q.704 para 4.1.2

Signalling routes are not applicable.

Q.704 para 4.2

The normal routing situation will be that there are 1 or more signalling links available between a BSS and MSC, these will constitute a link set. They will be run in a load sharing mode and changeover, changeback procedures will be supported between these signalling links.

Q.704 para 4.3.3.

There will be no alternative linkset.

Q.704 para 4.4.3.

Not applicable.

Q.704 para 4.5.

Not applicable

Q.704 para 4.6.

Not applicable

Q.704 para 4.7

Not applicable.

Q.704 para 5 Changeover

Changeover between link sets is not applicable.

Q.704 para 6 Changeback

Changeback between link sets is not applicable.

Q.704 para 7

Forced re-routing is not applicable since there is only one signalling route existing between BSS and MSC.

Q.704 para 8

Not applicable since there is only one signalling route existing between BSS and MSC.

Q.704 para 10

It should be noted that for point to point working the signalling route set will consist of one associated signalling route only.

Q.704 para 11 Signalling link management

Only basic link management procedures are applicable.

Q.704 para 11.2.4 Link set activation

Link set normal activation defined in para 11.2.4.1 is not applicable. Link set emergency restart at the BSS is used in all cases.

Q.704 para 12.2 Transfer prohibited

The transfer prohibited function is not applicable. At the reception of a TFP message, no action should be taken at the BSS.

Q.704 para 12.3 Transfer allowed

The transfer allowed function is not applicable. At the reception of a TFA-message, no action should be taken at the BSS.

Q.704 para 12.4 Signalling-route-set-test

The signalling-route-set-test procedure is not applicable.

Q.704 para 12.5 Transfer restricted

The transfer restricted function is not applicable. At the reception of the TFR message no action is taken by the BSS.

Q.704 paras 12.6, 12.7, 12.8 Transfer controlled

The transfer controlled function is not applicable. At the reception of TFC message, no action is taken by BSS.

Q.704 para 12.9 Signalling route-set-congestion-test

The signalling route-set-congestion-test function is not applicable.

At the reception of signalling-route-set-congestion-test message no action is taken by the BSS.

Q.704 para 13.2.1

Since all messages are passed using the SCCP, the service indicator will be:

bits	D	C	B	A
	0	0	1	1

Q.704 para 13.2.2

The sub service field will always be set to indicate a national network as follows:

bits	D	C
	1	0

Q.704 para 13.3

This information for SCCP is defined in Q.713.

Q.704 para 14

The formats and codes listed are only relevant to the messages that are required, ie those not excluded in the rest of this recommendation.

3.5 Testing and Maintenance (Recommendation Q.707)

Q.707 para 2.2

The generation of a signalling link test message (SLTM) is not applicable at the BSS, however the BSS should be capable of responding with an acknowledgement message to a SLTM received at any time asspecified in Q.707 para 2.2.

4. INTERFACE FUNCTIONS

The method of interfacing to the higher layers will be by the primitives defined in Q.701 Section 8 of the Blue Book.

The primitives defined are:

MTP Pause indication
MTP Resume indication
MTP Status indication
MTP Transfer request
MTP Transfer indication

5. SCCP FUNCTIONS

5.1 Overview

The purpose of this section is to identify the subset of the SCCP functions which are necessary to achieve the management of the MS references in the BSS to MSC interface, and to provide addressing facilities. If this subset of SCCP functions is implemented, compatibility with a full CCITT SCCP must be maintained. Only the needs of the BSSAP are taken into account in section 5: the operations and maintenance requirements about SCCP functions are discussed in section 7.

These simplifications are applicable to the signalling between BSS and MSC in GSM PLMNs.

In order to limit the complexity of the procedures, a BSS exchanges signalling messages only with its MSC, where a protocol conversion may be needed in some cases. Therefore no SCCP translation function is required in the MSC between the national and the local MTP. The Destination Point Code and Subsystem Number allow direct routing by the local SCCP and MTP within the MSC area.

Several functions of the SCCP are not used on the MSC/BSS interface: error detection, receipt confirmation, flow control.

The segmenting/reassembling function shall be used if the total message length exceeds the maximum allowed message length that can be carried by the MTP.

Draft recommendations CCITT Q.711-Q.714 (Draft Issue 4, Input to Kyoto Dec. 87) are considered as the basis for elaboration of this document.

5.2 Primitives (Q.711)

Q.711/Table 1

Three primitives of the table 1/Q.711 are not used:

- N-EXPEDITED DATA
- N-DATA ACKNOWLEDGE
- N-RESET

Q.711/Table 2

The following parameters of the N-CONNECT primitive are not used:

- Responding address
- Receipt confirmation selection
- Expedited data selection

Q.711/Table 3

The following parameter of the N-DATA primitive is not used:

- Confirmation request

Q.711/Table 6

The following parameter of the N-DISCONNECT primitive is not used:

- Responding address

Q.711 para 2.1.2

Permanent signalling connections: not applicable

Q.711/Table 9

The primitive N-NOTICE is not used.

Q.711/Table 10

The following parameter of the N-UNITDATA is not used:

- Return option

Q.711 para 4.1.2

Functions for permanent signalling connections: not applicable

5.3 SCCP Messages (Q.712)

Q.712 para 1.4

The Data Acknowledgement (AK) message is not used.

Q.712 para 1.6

The Data Form 2 (DT2) message is not used.

Q.712 para 1.7

The Expedited Data (ED) message is not used.

Q.712 para 1.8

The Expedited Data Acknowledgement (EA) message is not used.

Q.712 para 1.10

The Protocol Data Unit Error (ERR) message is not used: the inconsistent messages of the SCCP protocol are discarded.

Q.712 para 1.13

The Reset Confirm (RSC) message is not used.

Q.712 para 1.14

The Reset Request (RSR) message is not used.

Q.712 para 1.16

The Subsystem-Out-Of-Service-Grant (SOG) message is not used.

Q.712 para 1.17

The Subsystem-Out-Of-Service-Request (SOR) message is not used.

Q.712 para 1.21

The Unitdata Service (UDTS) message is not used.

Q.712 para 2.4

The "credit" parameter field is not used for protocol class 2. However the parameter must still be included in the IT message for syntax reasons.

Q.712 para 2.7

The "error cause" parameter field is not used.

Q.712 para 2.11

The "receive sequence number" parameter is not used.

Q.712 para 2.14

The "reset cause" parameter field should not be used.

Q.712 para 2.16

The "sequencing/segmenting" parameter field is not used for protocol class 2. However the parameter must still be included in the IT message for syntax reasons.

5.4 SCCP Formats and Codes (Q.713)

Q.713 para 3.4

For point-to-point network structures (i.e. direct connections between MSC and BSS) the called party address may consist of the single element:

- sub-system number

No global title is used. The signalling point code which is coded in the MTP routing label and the subsystem number in the called party address allow the routing of the message.

Then the following encoding of the address indicator may be chosen: X1000010.

If a non point-to-point network structure is used then the global title may be required. This is a national concern.

Q.713 para 3.4.2.2

SSN values:

11111110 BSSAP
11111101 O&M

Use of alternative values is a national concern.

Q.713 para 3.4.2.3

Global title: refer to Q.713 para 3.4

Q.713 para 3.6

Protocol class: the classes 1 and 3 are not used.

Q.713 paras 3.8, 3.9, 3.10, 3.13, 3.14

Parameters not used

Q.713 paras 4.8, 4.9, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16

Messages not used

Q.713 para 5.1.1

SOR and SOG not needed.

5.5 SCCP Procedures (Q.714)

Q.714 paras 1.1.2.2, 1.1.2.4

Protocol classes 1 and 3 not used

Q.714 para 1.1.3

A signalling connection consists of a single connection section. No intermediate nodes are defined in the MSC/BSS protocol.

The use of multiple connection sections is a national concern.

Q.714 para 1.2.1 (b)

Not applicable for single connections

Q.714 para 2.1 (1.)

Global title not used for single connections

Q.714 para 2.2.1

Subsystem (SSN) only is present in the called party address for single connections.

Q.714 para 2.2.2

The addressing information may take the following form in the N-CONNECT request primitive: DPC+SSN (for single connections).

Q.714 para 2.2.2.2

No SCCP translation function is required for single connections.

Q.714 para 2.3.1 (3)

Not applicable for single connections.

Q.714 para 2.3.2 (4)

Not applicable for single connections.

Q.714 para 3.1.3

Not applicable: no protocol class and flow control negotiations

Q.714 para 3.1.5

Not applicable

Q.714 para 3.2.2

Not applicable

Q.714 para 3.3.4

Not applicable

Q.714 para 3.5.1.2

Not applicable

Q.714 para 3.5.2

Not applicable

Q.714 paras 3.6, 3.7, 3.9, 3.10

Not applicable

Q.714 para 4.2

Message return not applicable

Q.714 para 5

Only those messages and procedures relating to non-replicated subystems or nodes are required. At the BSS the concerned point will be the parent MSC. The subsystems involved are the BSSAP and the OMAP.

6. USE OF THE SCCP

The MTP and the SCCP are used to support signalling messages between the MSC and the BSS. One user function of the SCCP, called Radio Subsystem Application Part (BSSAP) is defined. The BSSAP uses onesignalling connection per active Mobile Station having one or more active transactions, for the transfer of layer 3 messages related to this transaction. The BSSAP user function is further subdividedinto two separate functions :

- The Direct Transfer Application sub-Part (DTAP) is used to transfer call control and mobility management messages to and from the MS; the layer-3 information in these messages is not interpretedby the BSS. The description of the layer 3 protocol for the MS-MSC call control and mobile management information exchange is contained in Recommendation GSM 04.08.

- The BSS Management Application sub-Part (BSSMAP) supports otherprocedures between the MSC and the BSS related to the MS (resource management, handover control), or to a cell within the BSS, or tothe whole BSS. The description of the layer 3 protocol for the BSSMAP information exchange is contained in Recommendation GSM 08.08.

Both connectionless and connection-oriented procedures are used to support the BSSMAP. Rec. GSM 08.08 explains whether connection or connectionless services should be used for each layer 3 procedure.Section 6.4 deals with the use of connectionless services of the SCCP.

A distribution function located in BSSAP, which is reflected in the protocol specification by the layer 3 header defined in section 6.3, performs the discrimination between the data related to thosetwo subparts, as illustrated in Recommendation GSM 08.08 figure 1.

This section describes the use of SCCP connections for MS transactions. Section 6.1 describes the connection establishment procedures. Section 6.2 describes the connection release procedures. Section6.3 describes the distribution between BSSMAP and DTAP messages and the data transfer over a SCCP connection.

6.1 Connection Establishment

A new connection is established when individual information related to a MS transaction has to be exchanged between BSS and MSC, and no such transaction exists between the MSC and the BSS involved.

Two connection establishment cases have to be distinguished:

i) A new transaction (e.g. Location updating, incoming or outgoing call) is initiated on the radio path : following an Access Request made by the MS on the Random Access Channel, a DCCH or a TCH has been successfully allocated and a layer-2 connection has been established on the SDCCH (resp. FACCH) channel of the allocated resource. The connection establishment is then initiated by the BSS.

ii) The MSC decides to perform an external handover to a new cell, and a new DCCH or TCH has to be reserved in the new BSS. The connection establishment is then initiated by the MSC.

The above cases are the only two cases currently identified for connection establishment. Others may emerge in the future.

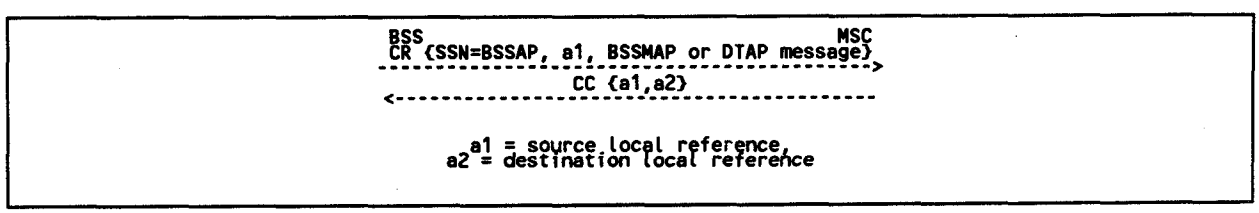


Figure 1/08.06
SET-UP OF SCCP CONNECTIONSON THE FIRST BSS/MSC INTERFACE

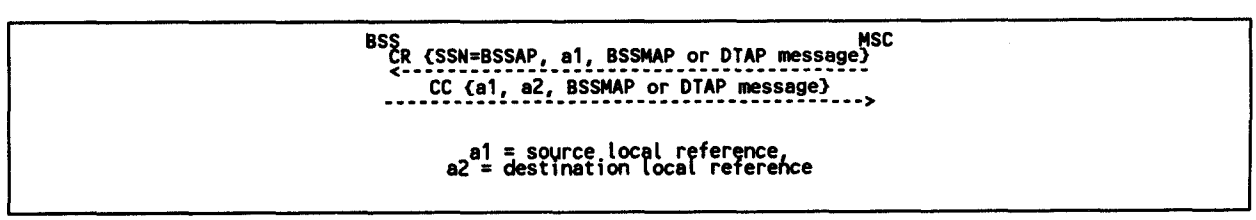


Figure 2/08.06
SET-UP OF SCCP CONNECTIONS ON A NEW BSS/MSC (HANDOVER) INTERFACE

6.1.1 Establishment procedure in case I)

In case 1), the connection establishment is performed at the reception by the BSS of the first layer-3 message from the MS (piggybacked on the SABM frame). This message (LOCATION UPDATING REQUEST,CM-SERVICE REQUEST, CM REESTABLISHMENT REQUEST or PAGING RESPONSE) which contains the identity of the MS (TMSI or IMSI) is transferred to the MSC together with the Location Area Code (LAC) and the cell number, in a BSSMAP message (COMPLETE L3 INFORMATION) included in the user data field of the SCCP Connection Request message (see figure 1). The exact coding of the BSSMAP message is specified in Recommendation 08.08.

At the reception of the Connection Request message, the MSC may check, based on the received indentity, whether another association already exists for the same MS. If it is the case, the connection establishment is refused. If that is not the case, a Connection Confirm message is sent back to the BSS. This message may optionally contain a BSSMAP or DTAP message in the user data field.

The procedures in case of connection establishment failure are specified in Recommendation GSM 08.08.

6.1.2 Establishment procedure in case II)

In this case, the connection establishment is undertaken by the MSC as soon as the MSC decides to perform an external handover to a new cell.

A Connection Request message is sent to the BSS. The user data field of this message may contain the BSSMAP Handover Request message (see fig.2). However, it is preferable to transfer the layer 3 messages in the user data field of the Connection Request in order to complete the establishment of the relation between the radio channel requested and the

SCCP connection as soon as possible. The exact structure of the user data field is explained in 6.3.

When receiving the Connection Request message, the BSS performs the necessary checking and reserves, in the successful case, a radio channel for the requested handover. A Connection Confirm message is also returned to the MSC and may contain the BSSMAP Handover Request Acknowledge message in the user data field.

The procedures in case of connection establishment failure are specified in Recommendation GGM 08.08.

6.2 Connection Release

This procedure is always initiated at the MSC side.

A connection is released when the MSC realizes that a given signalling connection is no longer required. That may occur, in normal cases :

- at the end of a transaction (call, location updating...);
- after completion of a successful external handover:
- the connection with the old BSS is released.

The MSC sends a SCCP released message. The user data field of this message is optional and may contain a transparent layer-3 message to the MS or be empty. Thestructure of the user data field, if any, is explained in section 6.3.

When receiving this message, the BSS releases all the radio resources allocated to the relevant MS, if there are still any left, and sends a SCCP Release Complete back to the MSC.

Abnormal cases : a connection failure may be detected by the connection supervision service provided by SCCP. The procedures in that case are specified in Recommendation GSM 08.08.

6.3 Transfer of DTAP and BSSMAP Data

The DTAP and BSSMAP Layer 3 messages between the MSC and the BSS are contained in the user data field of the exchanged SCCP frames. This field is optional for the Connection Request (CR) (except forBSS originated connections, see below; Connection Confirm (CC) and Released (RLSD) frames; the use of this field in such frames in the various establishment and release cases, which allows to gain indelay and efficiency, is described in sections 6.2 and 6.3. The user data field is a mandatory parameter of the Data frames (DT), which always contain either a DTAP or a BSSMAP message.

6.3.1 Distribution Function

The distribution of messages between the BSSMAP and DTAP functions and the distribution/multiplexing of DTAP messages to/from the various radio link layer 2 access points are performed in an intermediate layer of protocol between SCCP and Layer 3 later referred as the distribution sublayer.

The protocol for this sublayer simply consists of the management of a one or two octet Distribution Data Unit. Each SCCP User Data field necessarily contains such a distribution Data Unit as anheader, followed by the actual Layer 3 BSSMAP or DTAP message.

6.3.2 Transfer of DTAP Messages

The DTAP function is in charge of transferring layer 3 messages from the MS (resp from the MSC) to the MSC (resp to the MS) without any analysis of the message contents. The interworking between thelayer 2 protocol on the radio side and signalling system 7 at the landside is based on the use of individual SCCP connections for each MS and on the distribution function.

The structure of the user data field is given in figure 3. The user data field contains a distribution data unit, a length indicator, and the actual layer 3 message.

The Distribution Data Unit consists of two parameters: the Discrimination parameter and the Data Link Connection Identification (DLCI) parameter.

The Discrimination parameter, which is set to the "Transparent" value, is coded on one octet, as follows :

8	7	6	5	4	3	2	1
0	0	0	0	0	0	0	D

The discrimination bit D is set to the "Transparent" value 1.

The DLCI parameter is used for MSC to BSS messages to indicate the type of data link connection to be used over the radio interface. In the direction BSS to MSC the DLCI parameter is used to indicate the type of originating data link connection over the radio interface. The DLCI parameter is coded in one octet, as follows :

8	7	6	5	4	3	2	1
C2	C1	0	0	0	S3	S2	S1

C2 C1 represents the radio channel identification
C2=0; C1=0 represents the fACCH or the sDCCH;
C2=0; C1=1 represents the sACCH; other values are reserved.

S3 S2 S1 represents the SAPI value used on the radio link, which coding is specified in Recommendation GSM 04.06.

Bits 4, 5 and 6 are spare.

The length indicator is coded in one octet, and is the binary representation of the number of octets of the subsequent layer 3 message parameter.

The coding of the DTAP layer 3 messages is specified in Recommendation GSM 04.08.

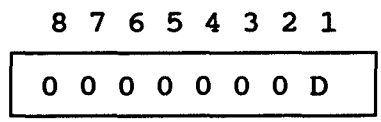
6.3.3 Transfer of BSSMAP Messages

The transfer of BSSMAP messages over a SCCP connection allows the BSSMAP functions in both the MSC and the BSS to identify to which particular Mobile Station association the exchanged message (e.g.assign, handover request, etc..) applies.

The structure of the user data field is given in figure 3. The user data field contains a distribution data unit, a length indicator, and the actual layer 3 message.

The Distribution Data Unit only consists of the Discrimination parameter, which is set to the "Not Transparent" value.

This parameter is coded on one octet, as follows :



The discrimination bit D is set to the "Not Transparent" value 0.

The length indicator is coded in one octet, and is the binary representation of the number of octets of the subsequent layer 3 message parameter.

The coding of the BSSMAP layer 3 messages is specified in Recommendation GSM 08.08.

6.4 Connectionless Services

Some BSSMAP procedures described in Recommendation GSM 08.08 use the connectionless services of the SCCP.

The structure of the user data field of the unitdata message (UDT) is given in figure 3. The user data field contains a distribution data unit, a length indicator, and the actual layer 3 message.

The Distribution Data Unit only consists of the Discrimination parameter, which is set to the "Not Transparent" value.

This parameter is coded on one octet, as follows :

8	7	6	5	4	3	2	1
0	0	0	0	0	0	0	D

The discrimination bit D is set to the "Not Transparent" value 0.

The length indicator is coded in one octet, and is the binary representation of the number of octets of the subsequent layer 3 message parameter.

The coding of the BSSMAP layer 3 messages is specified in Recommendation GSM 08.08.

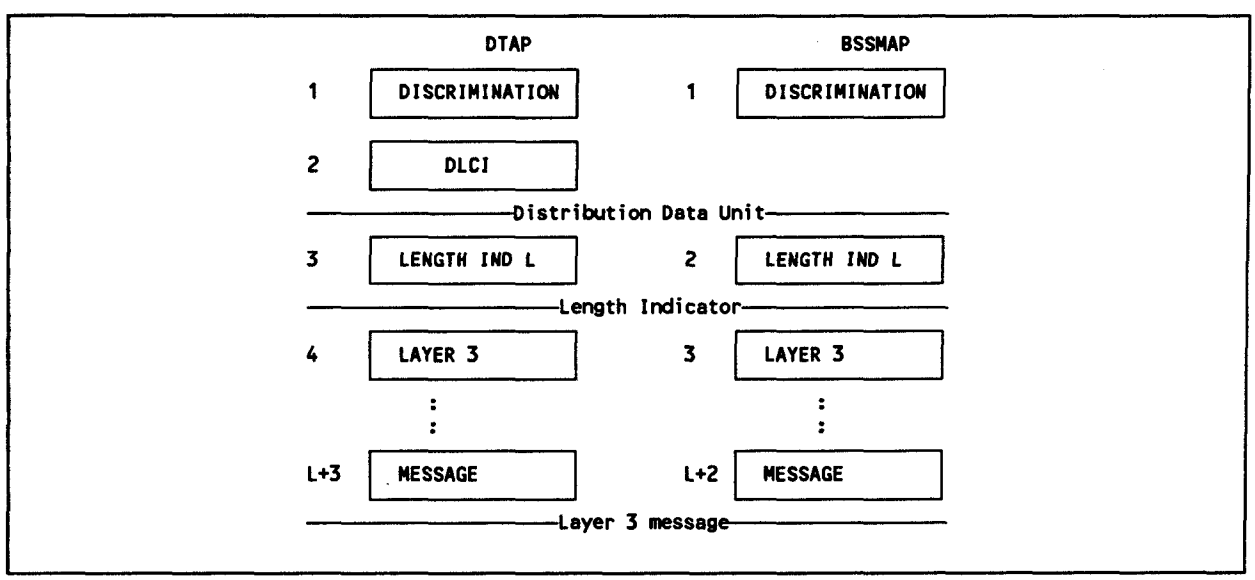


Figure 3/08.06
Structure of the User Data Field

7. USE OF THE SCCP FOR OPERATIONS AND MAINTENANCE

O&M messages have to be passed between the O&M functions and the BSS.

If the O&M functions use the MSC-BSS interface to transport messages to the BSS, then the SCCP of No.7 should be used.

X25 may also be used for the transfer of O&M messages between BSS and OMC, this is not further considered in this recommendation.

7.1 Connectionless Service

The connectionless service of the SCCP is supported at the BSS for management purposes and can be used for the transport of O&M information. Addressing should be decided by the operator and manufacturer (eg by E164 number, this may require additional addressing capability at the BSS).

Further information is given concerning the coding of the higher levels of the O&M information in the GSM 12 series of recommendations.

7.2 Connection Oriented Services

Connection oriented services are also supported by the BSS for management and call control. Connection oriented services can also be used for the transport of O&M information. In order to set up the connection additional addressing capability may be required at the BSS. To use a signalling connection between the BSS and the OMC via the MSC requires the same BSSOMAP-SCCP interface at both the BSS and the OMC.

7.3 BSS Failure

If a system failure at the BSS occurs then sufficient MTP functions to allow message transmission and reception should be maintained.