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Foreword

This European Telecommunication Standard (ETS) has been produced by the Special Mobile Group (SMG) Technical Committee (TC) of the European Telecommunications Standards Institute (ETSI) and is now submitted for the Public Enquiry (PE) phase of the ETSI standards approval procedure.

This ETS defines the application of the Base Station System Application Part (BSSAP) on the E-interface for the European digital cellular telecommunications system (Phase 2).

This ETS corresponds to GSM Technical Specification (GSM-TS) GSM 09.08 version 4.1.1.

Reference is made within this ETS to GSM Technical Specifications (GSM-TS) (note).

NOTE: TC-SMG has produced documents which give the technical specifications for the implementation of the European digital cellular telecommunications system. Historically, these documents have been identified as GSM Technical Specifications (GSM-TS). These TSs may have subsequently become I-ETSs (Phase 1), or ETSs (Phase 2), whilst others may become ETSI Technical Reports (ETRs). GSM-TSs are, for editorial reasons, still referred to in current GSM ETSs.

Transposition dates	
Date of adoption of this ETS:	30 July 1995
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1 Scope

This European Telecommunication Standard (ETS) describes the subset of Base Station System Application Part (BSSAP) messages and procedures, defined in TS GSM 08.06 and TS GSM 08.08, which is used on the E-interface. A general description can be found in TS GSM 03.02 and TS GSM 03.09.

For the initiation and execution of handover between MSCs a subset of BSSMAP procedures are used. For the subsequent control of resources allocated to the mobile station BSSMAP procedures are used. DTAP is used for the transfer of connection management and mobility management messages between the mobile station and the controlling MSC.

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 100): "European digital cellular telecommunications system (Phase 2); Abbreviations and acronyms".

[2] GSM 03.09 (ETS 300 527): "European digital cellular telecommunications system (Phase 2); Handover procedures".

[3] GSM 08.06 (ETS 300 589): "European digital cellular telecommunications system (Phase 2); Signalling transport mechanism specification for the Base Station System - Mobile-services Switching Centre (BSS - MSC) interface".

[4] GSM 08.08 (ETS 300 590): "European digital cellular telecommunications system (Phase 2); Mobile Switching Centre - Base Station System (MSC - BSS) interface Layer 3 specification".

[5] GSM 09.02 (ETS 300 599): "European digital cellular telecommunications system (Phase 2); Mobile Application Part (MAP) specification".

[6] GSM 09.10 (ETS 300 605): "European digital cellular telecommunications system (Phase 2); Information element mapping between Mobile Station - Base Station System and BSS – Mobile-services Switching Centre (MS - BSS - MSC) Signalling procedures and the Mobile Application Part (MAP)".

3 Definitions and abbreviations

For the purposes of this ETS the following abbreviations apply:

BSS	Base Station System
BSSAP	Base Station System Application Part
BSSMAP	Base Station System Management Application Part
CCCH	Common Control CHannel
DLCI	Data Link Connection Identifier
DTAP	Direct Transfer Application Part
MSC	Mobile-services Switching Centre
MSC-A	Mobile-services Switching Centre, Anchor (Anchor MSC)
MSC-I	Mobile-services Switching Centre, Intermediate (Intermediate MSC)
MSC-T	Mobile-services Switching Centre, Target (Target MSC)
SAPI	Service Access Point Identifier
SCCP	Signalling Connection Control Part
TCAP	Transaction Capabilities Application Part

Other abbreviation used in the GSM specifications are listed in GSM 01.04.

4 Principles for the use of BSSAP on the E-interface

4.1 General

The mechanisms for the transfer of the BSSAP messages on the E-interface is defined in TS GSM 09.02. The operation of the handover procedures between MSCs and the use of the BSSMAP messages for those procedures is described in TS GSM 03.09 and TS GSM 09.10.

In the same way as a SCCP signalling connection is used for the messages relating to one mobile station on the MSC-BSS interface a TCAP dialogue is used on the E-interface for messages relating to one mobile station. As no correspondence to the connectionless service on the MSC-BSS interface is used on the E-interface none of the global procedures (see TS GSM 08.08 subclause 3.1) are applicable.

The management of the terrestrial circuits between the MSCs is outside the scope of the E-interface (see TS GSM 03.09), therefore all procedures, messages and information elements relating to terrestrial circuits are also excluded from the BSSMAP procedures and messages used on the E-interface.

4.2 Transfer of DTAP and BSSMAP layer 3 messages on the E-interface

The BSSAP data which on the MSC-BSS interface is contained in the user data field of the exchanged SCCP frames (see TS GSM 08.06) is on the E-interface transferred as the contents of the signalling info in a BSS-APDU parameter as described in TS GSM 09.02.

The BSSAP data consists of a BSSAP header and a DTAP or BSSMAP layer 3 message. The BSSAP header contains, as specified in TS GSM 08.06 (subclauses 6.3.1, 6.3.2 and 6.3.3), of a discrimination parameter, possibly a Data Link Connection Identification (DLCI) parameter, and a length indicator.

4.3 Roles of MSC-A, MSC-I and MSC-T

For the description in this ETS, the MSC's functionality related to the handover between MSCs has been split into three logical parts, MSC-A, MSC-T and MSC-I. The different roles need not necessarily be performed by different MSCs.

MSC-A is the call/connection controlling part of the MSC where the call/connection was originally established and the switching point for handover between MSCs. (This corresponds to MSC-A as defined in TS GSM 03.09 and 09.02). The MSC that is the MSC-A will not be changed during the duration of a call/connection.

MSC-T is the part relating to the transitory state during the handover for the MSC to which the MS is handed over when Basic handover or Subsequent handover (see TS GSM 03.09) take place. (This corresponds, depending on the type of handover to MSC-A, MSC-B or MSC-B' in TS GSM 03.09 and 09.02)

MSC-I is the part of an MSC through which the MSC-A, via an E-interface (or an internal interface) is in contact with the mobile station. (This corresponds, depending on the type of handover to MSC-A, MSC-B or MSC-B' in TS GSM 03.09 and 09.02)

The MSC that is the MSC-A can also have the role of either the MSC-I or the MSC-T during a period of the call/connection.

The following is applicable for the involved MSCs concerning the exchange of BSSAP data on an E-interface before and after a successful inter MSC handover:

1) at Basic handover, two MSCs are involved, one MSC being MSC-A and one being MSC-T. When this handover has been performed, the two MSCs interworking on the E-interface have the roles of MSC-A and MSC-I respectively, i.e. the MSC that is the MSC-T during the handover is now the MSC-I.

2) at Subsequent handover back to MSC-A, two MSCs are involved. The MSC having the role of MSC-A has also the role of MSC-T. The other MSC involved has the role of MSC-I. When this handover has been completed, there is no exchange of BSS data on the E-interface, i.e. the MSC being the MSC-I before and during the handover is now no longer taking part.

3) at subsequent handover to an MSC not being MSC-A, three MSCs are involved. The roles of these MSCs are MSC-A, MSC-I, and MSC-T respectively. When this handover has been performed, the two MSCs interworking on an E-interface have the roles of MSC-A and MSC-I respectively, i.e. the MSC that is the MSC-T during the handover is now the MSC-I and the MSC being MSC-I during the handover is now no longer taking part.

5 Use of the BSSAP on the E-interface

DTAP is used on the E-interface for the transfer of messages between the MSC-A and the mobile station.

The dedicated BSSMAP procedures (TS GSM 08.08 subclause 3.1) used on the E-interface to some extent are:

- assignment;
- handover resource allocation;
- handover execution;
- internal handover indication;
- release due to BSS generated reasons;
- classmark handling;
- cipher mode control;
- trace invocation;
- queuing indication;
- data link control SAPI not equal to "0".

5.1 DTAP

For the exchange of the DTAP messages (TS GSM 08.08 subclause 2.2), the involved MSCs shall act according to the following:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

5.2 Assignment

The Assignment procedure (TS GSM 08.08 subclause 3.1.1) is applied on the E-interface with following conditions:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

The handling of terrestrial resources is not applicable.

5.3 Handover resource allocation

At Basic Inter-MSC Handover (TS GSM 03.09) the Handover resource allocation procedure (TS GSM 08.08 subclause 3.1.5.2) is applied on the E-interface with the following conditions:

- the MSC-A acts as the MSC;
- the MSC-T acts as the target BSS.

At Subsequent Inter-MSC Handover (TS GSM 03.09) the Handover resource allocation procedure (TS GSM 08.08 subclause 3.1.5.2) is applied on the E-interface with the following conditions:

- the MSC-I acts as the MSC;
- the MSC-T acts as the BSS;
- if the MSC that is the MSC-A is not also the MSC-T, then this MSC shall act as the target BSS towards the MSC-I and as the MSC towards the MSC-T.

The handling of terrestrial resources is not applicable.

5.4 Handover execution

For the Handover execution procedure (TS GSM 08.08 subclause 3.1.5.3) the applicable parts on the E-interface are the transfer of HANDOVER DETECT, HANDOVER COMPLETE and HANDOVER FAILURE messages at inter MSC handover. For those parts, the involved MSCs shall act according to the following:

- the MSC that is the MSC-A, acts as the MSC;
- the MSC that is the MSC-I, if it is not also the MSC-A, acts as the serving BSS;
- the MSC that is the MSC-T, if it is not also the MSC-A, acts as the target BSS.

5.5 Internal handover indication

For the Internal handover indication (TS GSM 08.08 subclause 3.1.6 and 3.1.7), the involved MSCs shall act according to the following:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

MSC internal handovers (inter-BSS and intra-BSS handover) at the MSC-I are decided and executed autonomously by that MSC together with the connected BSSs. At completion of the handover execution the MSC-I initiates the internal handover indication procedure.

5.6 Release due to BSS generated reasons

For the Release due to BSS generated reasons procedure (TS GSM 08.08 subclause 3.1.9.2) the involved MSCs shall act according to the following:

- the MSC-I acts as the BSS;
- no further action is taken by the MSC-A.

5.7 Classmark handling

For the Classmark handling (TS GSM 08.08 subclause 3.1.13), the involved MSCs shall act according to the following:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

5.8 Cipher mode control

For the Cipher mode control (TS GSM 08.08 subclause 3.1.14), the involved MSCs shall act according to the following:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

5.9 Trace invocation

For the Trace invocation (TS GSM 08.08 subclause 3.1.11), the involved MSCs shall act according to the following:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

5.10 Queuing indication

For the Queuing Indication (TS GSM 08.08 subclause 3.1.17), the involved MSCs shall act according to the following:

- at Assignment and at Basic Inter-MSC handover:

    - the MSC-A acts as the MSC;
    - the MSC-I acts as the BSS.

- at Subsequent Inter-MSC handover:

    - the MSC-I acts as the MSC;
    - the MSC-T acts as the BSS;
    - if the MSC that is the MSC-A is not also the MSC-T, then this MSC acts as the target BSS towards the MSC-I and as the MSC towards the MSC-T.

5.11 Data link control SAPI not equal to "0"

For the Data Link Control SAPI not Equal to "0" (TS GSM 08.08 subclause 3.1.18), the involved MSCs shall act according to the following:

- the MSC-A acts as the MSC;
- the MSC-I acts as the BSS.

6 BSSMAP messages transferred on the E-interface

The following BSSMAP messages, defined in TS GSM 08.08 subclause 3.2.1, are transferred on the E-interface:

	ASSIGNMENT REQUEST	(MSC-A -> MSC-I)
		Excluded information element: CIRCUIT IDENTITY CODE
	ASSIGNMENT COMPLETE	(MSC-I -> MSC-A)
		Excluded information element: CIRCUIT POOL
	ASSIGNMENT FAILURE	(MSC-I -> MSC-A)
		Excluded information elements: CIRCUIT POOL, CIRCUIT POOL LIST
*	HANDOVER REQUEST	(MSC-A -> MSC-T and MSC-I -> MSC-A)
		Excluded information element: CIRCUIT IDENTITY CODE
*	HANDOVER REQUEST ACKNOWLEDGE	(MSC-T -> MSC-A and MSC-A -> MSC-I)
		Excluded information element: CIRCUIT POOL
*	HANDOVER COMPLETE	(MSC-T -> MSC-A)
*	HANDOVER FAILURE	(MSC-T -> MSC-A and MSC-I -> MSC-A)
		Excluded information elements: CIRCUIT POOL, CIRCUIT POOL LIST
	HANDOVER PERFORMED	(MSC-I -> MSC-A)
*	HANDOVER DETECT	(MSC-T -> MSC-A)
	CLEAR REQUEST	(MSC-I -> MSC-A)
	SAPI "n" REJECT	(MSC-I -> MSC-A)
	CONFUSION	(MSC-T -> MSC-A, MSC-A -> MSC-T, MSC-I -> MSC-A and MSC-A -> MSC-I)
#	MSC INVOKE TRACE	(MSC-A -> MSC-I)
#	BSS INVOKE TRACE	(MSC-I -> MSC-A and MSC-A -> MSC-T)
	CIPHER MODE COMMAND	(MSC-A -> MSC-I)
	CIPHER MODE COMPLETE	(MSC-I -> MSC-A)
	CIPHER MODE REJECT	(MSC-I -> MSC-A)
**	QUEUING INDICATION	(MSC-T -> MSC-A, MSC-I -> MSC-A, and MSC-A -> MSC-I)
	CLASSMARK UPDATE	(MSC-I -> MSC-A and MSC-A -> MSC-T)
	CLASSMARK REQUEST	(MSC-A -> MSC-I)

All other BSSMAP messages shall be considered as non-existent on the E-interface.

Some of the messages above are qualified by *, ** or #. This signifies whether the message, when sent on the E-interface, is considered as:

- handover related message (*);
- handover related when sent as a response to HANDOVER REQUEST (**); or
- trace related message (#).

7 Exceptions for BSSMAP message contents and information element coding when transferred on the E-interface

7.1 Message contents

For the applicable BSSMAP messages transferred on the E-interface the following exceptions to the descriptions in TS GSM 08.08 subclause 3.2.1 are valid:

Assignment request message:

- excluded information element:
    - circuit identity code.
- if received, the information element shall be treated as an information element with an unrecognisable identifier.

Assignment complete message:

- excluded information element:
    - circuit pool.
- if received, the information element shall be treated as an information element with an unrecognisable identifier.

Assignment failure message:

- excluded information elements:
    - circuit pool;
    - circuit pool list.
- if received, the information element shall be treated as an information element with an unrecognisable identifier.

Handover request message:

- excluded information element:
    - circuit identity code.
- if received, the information element shall be treated as an information element with an unrecognisable identifier.

Handover request acknowledge message:

- excluded information element:
    - circuit pool.
- if received, the information element shall be treated as an information element with an unrecognisable identifier.

Handover failure message:

- excluded information elements:

  - circuit pool;
  - circuit pool list.

- if received, the information element shall be treated as an information element with an unrecognisable identifier.

7.2 Information element coding

For the applicable BSSMAP information elements transferred on the E-interface the following exceptions to the description in TS GSM 08.08 subclause 3.2.2 are valid:

Cause information element:

- excluded causes:

  - call control;
  - CCCH overload;
  - handover successful;
  - requested terrestrial resource unavailable;
  - terrestrial circuit already allocated;
  - circuit pool mismatch;
  - switch circuit pool.

  The corresponding cause values shall be considered as reserved for national use.

Cell identifier information element:

- excluded format:

  - Cell Identity.

  The corresponding cell identification discriminator value shall be considered as reserved.

8 BSSAP message error handling when transferred on the E-interface

The handling of abnormal events related to the BSSAP header (TS GSM 08.08 subclause 2.4) and the BSSMAP error handling (TS GSM 08.08 subclause 3.1.19) are applicable with exception of the following:

- the handling of faults concerning the use of SCCP is not applicable.

The BSSMAP error messages sent on the E-interface shall only be sent as response to BSSAP messages received on the same interface.

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