Presentation of Specification to TSG

Presentation to:	**TSG RAN Meeting #19**
Document for presentation:	**TS 23.195, Version 1.0.0**
Presented for:	**Information**

Abstract of document:

The attached document defines the stage-2 description of the mechanism to provide the 3GPP network entities with UE Specific Behaviour Information (UESBI). UESBI may be used by correcting mechanisms to overcome some of the issues that have been recognized by 3GPP in TR 25.994 (Measures employed by the UMTS Radio Access Network (UTRAN) to overcome early User Equipment (UE) implementation faults), and other such documents. The description of these correcting mechanisms is out of the scope of this TS.

UESBI actually corresponds to 2 different sets of information:
- UESBI-Uu which is sent from UE to RAN using Access Stratum signalling

- UESBI-Iu which is sent by CN to UTRAN over the Iu interface and is derived from IMEISV retrieved by CN from UE.

Changes since last presentation to TSG-RAN:

This is the first presentation to TSG-RAN.

Outstanding Issues:

Work on section 6 "Operational Aspects of Handling Fault Information" is "on hold" pending the TSG plenaries making a decision on the "Iu bitmap vs IMEISV" issue.

Text for section 5.2.15 "emergency call handling" has been prepared but it has not yet been discussed within SA2.

Editor's notes, square brackets and "FFS" statements within the document indicate other outstanding issues. These include:

"Gs interface optimisation" and

the timing of the transmission of the Common ID message on the Iu interface.

3GPP TS 23.195 V1.0.0 (2003-03)

Technical Specification

3rd Generation Partnership Project;
Technical Specification Group Services and System Aspects;
Provision of UE Specific Behaviour Information to Network Entities;
(Release 5)

**GLOBAL SYSTEM FOR
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Contents

Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

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

Version x.y.z

where:

x   the first digit:

1   presented to TSG for information;

2   presented to TSG for approval;

3   or greater indicates TSG approved document under change control.

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

z   the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

This clause is optional. If it exists, it is always the second unnumbered clause.

1 Scope

The present document defines the stage-2 description of the mechanism to provide the 3GPP network entities with UE Specific Behaviour Information (UESBI). UESBI may be used by correcting mechanisms to overcome some of the issues that have been recognized by 3GPP in TR 25.994 (Measures employed by the UMTS Radio Access Network (UTRAN) to overcome early User Equipment (UE) implementation faults), and other such documents. The description of these correcting mechanisms is out of the scope of this TS.

ITU-T Recommendation I.130 [a] describes a three-stage method for characterisation of telecommunication services, and ITU-T Recommendation Q.65 [b] defines stage 2 of the method.

2 References

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

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

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

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 41.001: "GSM Release specifications".

[2] 3GPP TR 21 912 (V3.1.0): "Example 2, using fixed text".

[3] 3GPP TS 24.008: "Mobile Radio Interface Layer 3 specification; Core Network Protocols; Stage 3".

[4] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service Description; Stage 2".

[5] 3GPP TS 23.009: " Handover procedures ".

[6] 3GPP TS 25.331: "Radio Resource Control (RRC) protocol specification"

[7] 3GPP TS 44.018: "Mobile radio interface layer 3 specification, Radio Resource Control Protocol".

[8] 3GPP TS 48.008: "Mobile-services Switching Centre – Base Station System (MSC – BSS) interface; layer 3 specification".

[9] 3GPP TS 25.413: "UTRAN Iu interface RANAP signalling".

[10] 3GPP TS 23.236: "Intra Domain Connection of RAN Nodes to Multiple CN Nodes"

[11] 3GPP TS 29.060: "GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface"

Editor's note: this list is incomplete and the numbering might be incorrect.

3 Definitions, symbols and abbreviations

Delete from the above heading those words which are not applicable.

Subclause numbering depends on applicability and should be renumbered accordingly.

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply.

UE Specific Behaviour Information - Uu (UESBI-Uu): is information that is sent using Access Stratum signalling from the UE to the RAN. It can be used to derive some specific information about the UE's capabilities.

UE Specific Behaviour Information - Iu (UESBI-Iu): is information that is sent from the MSC and/or SGSN to the RAN that can be used to derive some specific information about the UE's capabilities.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

Symbol format

<symbol>   <Explanation>

3.3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

UESBI   UE Specific Behaviour Information

UESBI-Uu   UE Specific Behaviour Information - Uu

UESBI-Iu   UE Specific Behaviour Information - Iu

Editors note: It is still under discussion at 3GPP on whether UESBI sent over Iu corresponds to IMEISV or to an information element derived by mapping from the IMEISV (e.g. a Bit Map of UE Faults).

4 General Description

4.1 UESBI

Due to the potential problems that may happen in the standard or in its implementation by different types of UE, it may be needed to transfer to [the UTRAN/network entities] "information on the specific behavior of particular sets of UE" with regard to some 3GPP features. This aims at helping the infrastructure to handle UE(s) already in the field that are facing problems to support some [radio/3GPP] features. This "information on the specific behavior of particular sets of UE" is called UE Specific Behavior Information (UESBI).

UESBI actually corresponds to 2 different sets of information:
- UESBI-Uu which is sent from UE to RAN using Access Stratum signalling

- UESBI-Iu which is sent by CN to UTRAN over the Iu interface and is derived from IMEISV retrieved by CN from UE.

UESBI-Uu and UESBI-Iu may have a different nature, their contents are defined in different specifications, and have different handling within the network. Whether or not UESBI-Uu or UESBI-Iu is used to describe an inter-operability issue will be determined on a case by case basis and all uses should be documented in TRs such as 25.994 and 25.995. As a result of this process, RAN nodes should not receive conflicting information in UESBI-Uu and UESBI-Iu.

The SRNC uses both UESBI-Iu and UESBI-Uu to derive the specific behaviour of the UE.

4.2 UESBI-Uu

UESBI-Uu information is sent:

- (at RRC connection establishment from idle mode) directly by UE to Serving RNC at RRC connection establishment

- (at SRNS relocation) from Source Serving RNC to Target Serving RNC in the SRNC to SRNC transparent container carried through CN during SRNS relocation

- (at RRC connection establishment for an UE coming from another Radio Access Technology e.g. in case of 2G to 3G Hand-Over) from UE to Serving RNC via "Inter RAT Hand-Over" Information. This "Inter RAT Hand-Over Information" is sent to the source RAN (e.g. BSS), and at handover copied by the source RAN into a transparent container that is carried through the CN towards the target Serving RNC.

- (at RR connection establishment) the UE can directly send the "Inter RAT Handover Information" which contains the UESBI-Uu to the GERAN BSS. However, if control of GERAN BSS functions using the UESBI-Uu is needed, then new functionality will be required within the BSS to decode the ASN.1 PER information contained in the Inter-RAT Handover Information IE.

4.3 UESBI-Iu

The IMEISV information is retrieved from the UE and stored in the VLR and SGSN. At subsequent Iu interface connection establishment, the UESBI-Iu [derived from the IMEI-SV] is sent to the SRNC when the Iu signaling link between MSC and SRNC, or SGSN and SRNC, has been established. The UESBI-Iu is normally sent in the same procedure that currently carries the IMSI. This is summarised in figure 4.3-1.
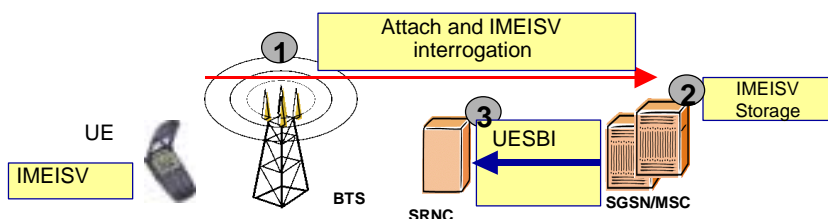

Figure 4.3-1: UESBI–Iu architecture

If the UE state is changed from RRC Connected to RRC Idle, all information derived from the received UESBI is released in the RNS. Thus if the UE state is changed afterwards back to RRC Connected the delivery of the UESBI-Iu from MSC or SGSN to SRNC shall be repeated.

4.4 UESBI-Iu on A interface

With GERAN, usage of UESBI is currently aimed to only solve issues related to CS domain GERAN to UTRAN handover. To smooth rollout of features, a Handover Reject cause is defined to provide minimal functionality (see section 5.x.y).

Whether transfer of the UESBI-Iu to the BSS is needed to permit more sophisticated functionality is FFS. While this is still undecided, signalling flows in this TS show how UESBI-Iu can be delivered to the GERAN BSS across the A interface.

[Note: Currently no study has been performed on any need to influence the GPRS Cell Change Order to UTRAN procedure.]

5 Signalling Flows

5.1 UESBI-Uu Signalling Flows

5.1.1 RRC connection establishment (initial and at cell reselection towards UTRAN)

At RRC connection establishment from idle mode, UESBI-Uu information shall be sent directly by the UE to the Serving RNC. This is valid both for the cases where the UE initiates the contact with the network either from RRC idle mode or in the case of a cell reselection from GERAN to UTRAN.
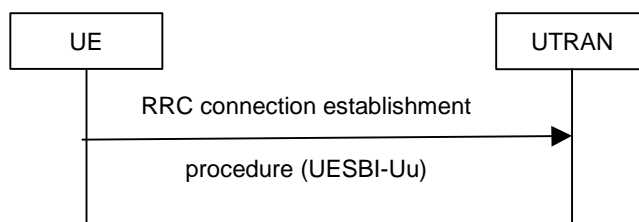
Figure 5.1.1-1: UESBI-Uu transfer at RRC Connection Establishment

The RRC Connection Establishment procedure is defined in TS 25.331 [6]
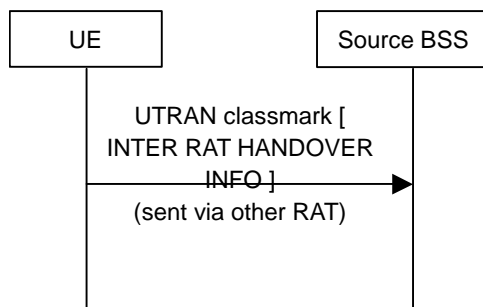
5.1.2 RR connection establishment

Figure 5.1.2-1: UESBI-Uu transfer at RRC Connection Establishment

The UE sends the "Inter RAT Handover Information" which contains the UESBI-Uu to the GERAN BSS. Whether this information is sent immediately at RR connection establishment or this is delayed until just before inter-RAT handover is performed, is controlled by the BSS. Further information is given in TS 25.331 [6] and TS 44.018 [7].

Note: if control of GERAN BSS functions using the UESBI-Uu is needed, then new functionality will be required within the BSS to decode the ASN.1 PER information contained in the Inter-RAT Handover Information IE.

5.1.3 SRNS relocation

UESBI-Uu information is sent from the Source Serving RNC to the Target Serving RNC in the Source to Target Transparent container (specified in 25.331 [6]) which is carried through the CN during SRNS relocation.

This transparent container is:

- put in the RANAP Relocation Required message sent by source SRNC to the CN,

- carried from source MSC/SGSN to target MSC/SGSN via MAP E or GTP Forward Relocation Request in the case of inter MSC/SGSN SRNS relocation

- sent by the target MSC/SGSN in the RANAP Relocation Request message sent to target SRNC.

[At SRNS relocation for a UE with active PS and CS domain Iu connections, the target RNC [may] receive[s] UESBI-Uu in the Transparent Containers sent in both Iu-ps and Iu-cs Relocation Request messages. The RNC should treat any conflict in this UESBI-Uu information in the same way that it treats any conflict between other information fields within the Transparent Containers.]

Editor's note: the intention is to not change the RNC behaviour for handling duplicated fields.

5.1.4   Inter RAT Hand-over

5.1.4.1   3G → 2G inter RAT Hand-Over

If the UE fails to support properly this kind of Hand-Over, UTRAN can detect it through UESBI information already received from UE or CN, and react accordingly (e.g. avoid this kind of Hand-Over,…).

5.1.4.2   2G → 3G inter RAT Hand-Over

UESBI-Uu information is sent from UE to Serving RNC via "Inter RAT Hand-Over" Information transfer.
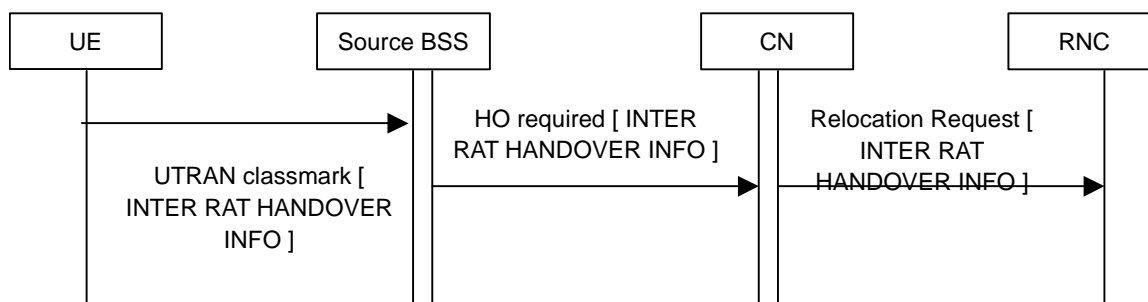

Figure 5.1.4.2-1 UESBI-Uu transfer at Inter RAT handover

The inter RAT handover information transfer procedure is used by the UE to convey RRC information needed for inter RAT handover to UTRAN. "Inter RAT Hand-Over Information" is prepared by the UE, then sent on the Radio Resource (RR) layer of the source RAT (e.g. RR for GSM) together with Radio classmark information. Further information is given in TS 25.331 [6] and TS 44.018 [7].

At 2G → 3G Hand-Over / SRNS relocation this information is transferred from source BSS to target RNC through the CN via the relevant BSS to RNC transparent containers defined in 48.008 [8] and 25.413 [9].

The target RNC shall use the UESBI-Uu to determine whether the handover can succeed.

In the case that the target RNC believes that the handover can succeed, the target RNC may use the UESBI-Uu to aid the handover procedure.

In the case that the UESBI-Uu indicates to the target RNC that the handover will fail, the target RNC shall reject the handover attempt. The target RNC shall use a specific cause value [to be defined in 48.008 and/or 25.413] that causes the source BSC to not attempt further 2G to 3G handovers for that UE, and, causes the source BSC to take appropriate actions, eg to modify the set of neighbouring cells that the UE is measuring.

This requires that the GSM BSS shall include the Response Request IE in the Handover Required message.

Note: if the UE is handed over to another BSS, then another 2G to 3G handover attempt might be made by the new BSS. Currently this is not perceived to be a problem except if an area is served by overlaid BSSs.

5.2 UESBI-Iu Signalling Flows

5.2.1 CS Attach / Normal Location Update without Gs

In order for the UESBI-Iu functionality to perform satisfactorily, the CS domain shall indicate that IMSI Attach-Detach shall be applied in both 2G and 3G cells.

When the UE sends a Location Updating Request message to the MSC/VLR, then:

a) if the Location Updating Type is set to 'IMSI attach', the MSC/VLR shall obtain the IMEISV from the UE ;

b) if the Location Updating Type is set to 'Periodic updating', the MSC/VLR need not obtain the IMEISV from the UE;

c) if the Location Updating Type is set to 'Normal Location Updating' then the MSC/VLR should obtain the IMEISV from the UE.

For case (c) above, the MSC/VLR shall obtain the IMEISV if the IMSI was not previously registered in the VLR. Optimisation of the MSC/VLR behaviour for case (c) is permitted in order to balance the signaling load caused by obtaining the IMEISV at every intra-MSC normal location update against the chances that the MSC/VLR does not discover IMEISV changes caused by the SIM being inserted into a new UE which then Location Updates to a new LA within the same MSC/VLR.

   Note 1: If any mismatch between the UE's IMEISV and the IMEISV stored in the MSC/VLR leads to the user having problems, then the problems may be cleared by the user switching the UE off and back on, forcing a CS domain IMSI Attach to occur.

   Note 2: any such optimisations should be re-evaluated if the Supercharger (see TS xy.abc [a]) or Intra Domain Connection of RAN Nodes to Multiple CN nodes ("Iu-flex", TS 23.236 [10]) features are implemented in the MSC/VLR.

The MSC/VLR can obtain the IMEISV by either the MM Identification Procedure defined in TS 24.008 [3] or by the using the Cipher Mode Control procedure defined in TS 48.008 [8].

To avoid delay caused by release and re-establishment of the RRC connection, the UE may indicate a "follow on request pending" in the Location Updating Request message as defined in 3GPP TS 24.008 [3]. In this case the Common ID message may have been sent by the MSC/VLR before the IMEISV was available to the MSC/VLR. Hence the UESBI-Iu [shall/should] be appended to the next RANAP Direct Transfer message (see TS 25.413 [9]) sent to the SRNC.

   Note 1: If the Gs interface is in use, then any "CS domain follow-on call" after a combined GPRS/IMSI attach or combined RA/LA update will appear as a new Iu interface connection in the MSC. This is handled as described in section 5.2.x below.

   Note 2: No specification for A interface based "follow on calls" is proposed. Specifically, it is not intended to append BSSMAP information elements to DTAP messages.

5.2.2 PS Attach without Gs

The procedure can be derived from section 5.2.4, Combined PS and CS attach with Gs, by omitting the signalling via the Gs interface and the CS domain internal signalling (steps 8a – 8h, 8i and 11).

5.2.3   PS inter-SGSN Routeing Area Update without Gs

The IMEI-SV [and FFS the UESBI-Iu] shall be transferred from the old SGSN to the new SGSN at inter-SGSN Routeing Area Update in the SGSN Context Response message (see TS 29.060 [11]). GTPv1 is assumed to be available in both SGSNs. The new SGSN shall transfer the UESBI-Iu to the RNC over the Iu-ps interface.

Editor's Note: The existing procedure described in 3GPP TS 23.060, permits the MS's identities to be transferred from the old SGSN to the new SGSN in the Container within the MM context IE (3GPP TS 29.060). This Container may contain general information elements defined in 3GPP TS 24.008, for example it may carry the IMEI and/or the IMEISV. [If the bitmap version of UESBI-Iu is to be transferred from old-SGSN to new SGSN, then a new field needs to be defined in 29.060 because "bitmap" will not be a 24.008 IE]

5.2.4   Combined PS and CS attach with Gs

Editor's note: the changes in this section are still FFS pending a decision on whether or not to optimise the Gs interface procedures.

Editor's note: with Gs, do we have to indicate "IMSI attach required"?

The Combined GPRS / IMSI Attach procedure is illustrated in Figure 5.2.4-1 (copied from 3GPP TS 23.060).
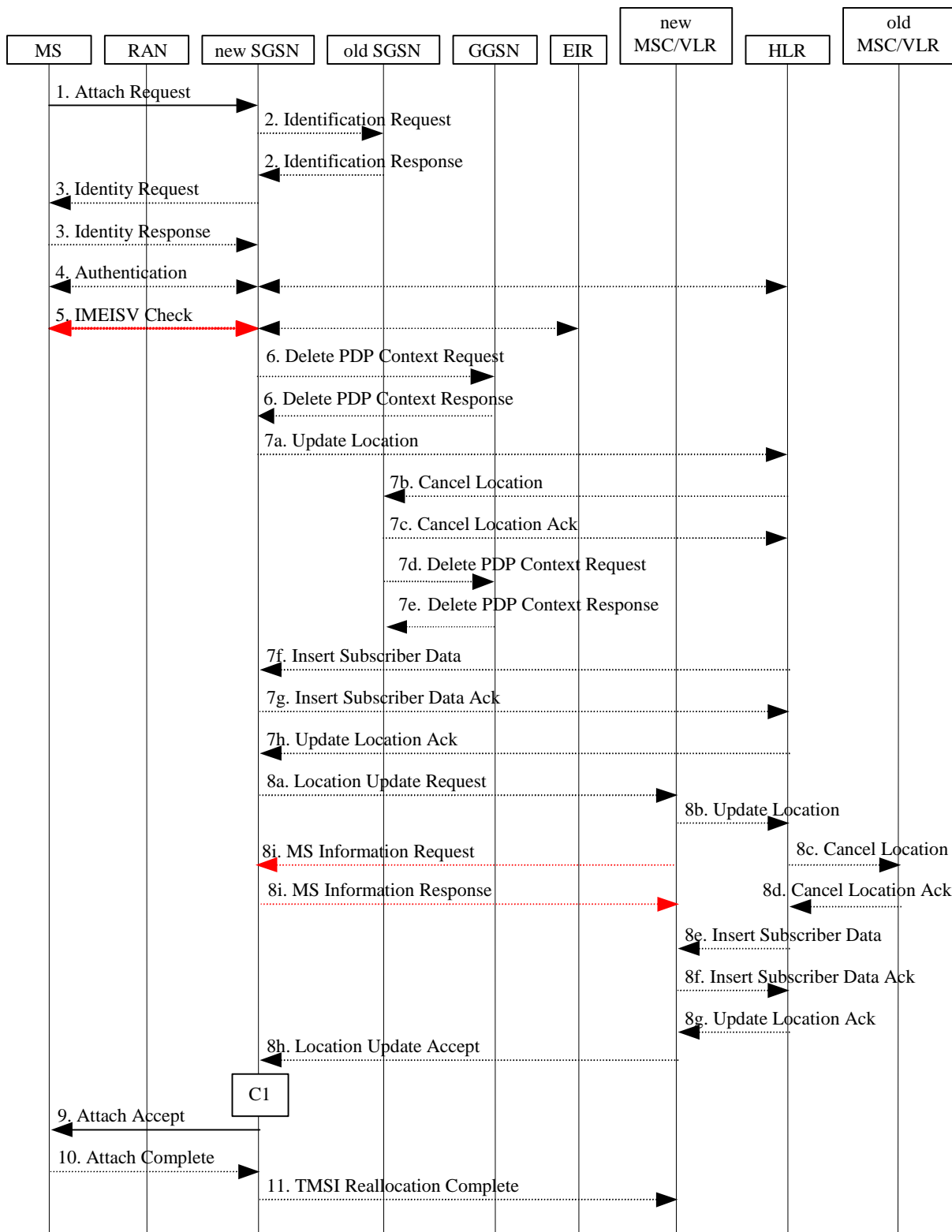
Figure 5.2.4-1: Combined GPRS / IMSI Attach Procedure

1-4)   Steps 1-4 are as described in TS 23.060.

5)   The equipment checking functions are defined in the clause "Identity Check Procedures" in 23.060. The SGSN shall obtain and store the IMEISV. Equipment checking with the EIR is optional.

The SGSN can use either the GMM Identification procedure or the GMM Authentication and Ciphering procedure to obtain the IMEISV (see TS 24.008 [3]).

6-7)   Steps 6 and 7 are as described in TS 23.060.

8) Steps 8a to 8h are as described in TS 23.060.

i) The new MSC/VLR (or current MSC/VLR, if there is no MSC/VLR change) shall request the IMEISV from the new SGSN using the MS Information Request message (see TS 29.018). The SGSN shall return the IMEISV in the MS Information Response message (see TS 29.018).

Editor's Note: An alternative solution is still being discussed in which the IMEISV and possibly UESBI-Iu is added to the Location Update Request in step 8a. This might avoid some problems with text in section 14.2 of 29.018 which limits the use of the MS information procedure during the LAU present state.

9-11) Steps 9 to 11 are as described in TS 23.060.

Editor's note: at step 9, text should probably be added to describe the use of Direct Transfer to move UESBI-Iu to the RAN to cover the "follow on case?"

5.2.5   Inter-SGSN Routeing Area Update with Gs

Editor's note: the changes in this section are still FFS pending a decision on whether or not to optimise the Gs interface procedures.

The Combined RA / LA Update (inter-SGSN) procedure is illustrated in Figure 5.2.5-1 (copied from 3GPP TS 23.060).
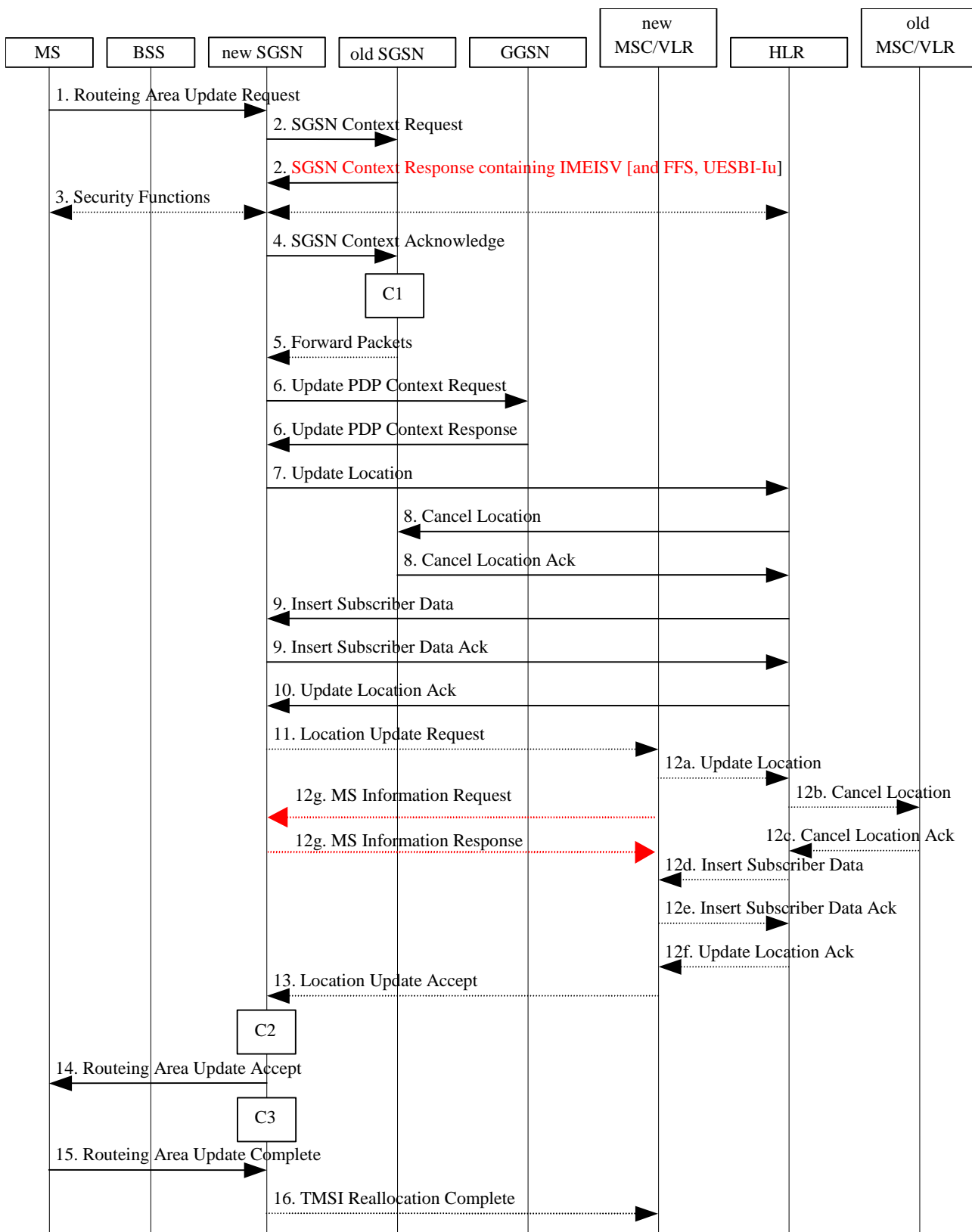

Figure 5.2.5-1: Combined RA / LA Update in the Case of Inter SGSN RA Update Procedure

1) The MS sends a Routeing Area Update Request to the new SGSN (see TS 23.060).

2) The new SGSN sends SGSN Context Request to the old SGSN and the old SGSN returns the SGSN Context Response message (see TS 23.060).

The IMEI-SV [and FFS the UESBI-Iu] shall be transferred from the old SGSN to the new SGSN at inter-SGSN Routeing Area Update in the SGSN Context Response message (see TS 29.060 [11]). GTPv1 is assumed to be available in both SGSNs. The new SGSN shall transfer the UESBI-Iu to the RNC over the Iu-ps interface.

Editor's Note: The existing procedure described in 3GPP TS 23.060, permits the MS's identities to be transferred from the old SGSN to the new SGSN in the Container within the MM context IE (3GPP TS 29.060). This Container may contain general information elements defined in 3GPP TS 24.008, for example it may carry the IMEI and/or the IMEISV. [If the bitmap version of UESBI-Iu is to be transferred from old-SGSN to new SGSN, then a new field needs to be defined in 29.060 because "bitmap" will not be a 24.008 IE]

Editor's Note: still need to cover the case of old SGSN not being upgraded to send the UESBI-Iu to new SGSN. This kind of rollout problem needs to be addressed in other areas as well.

3 -11) Steps 3 to 11 are as described in TS 23.060.

Editor's note: at step 9, text should probably be added to describe the use of Direct Transfer to move UESBI-Iu to the RAN to cover the "follow on case?"

12) Steps 12a to 12f are as described in TS 23.060.

g) The new MSC/VLR (or current MSC/VLR, if there is no MSC/VLR change) shall request the IMEISV from the new SGSN using the MS Information Request message (see TS 29.018). The SGSN shall return the IMEISV in the MS Information Response message (see TS 29.018).

Editor's Note: An alternative solution is still being discussed in which the IMEISV and possibly UESBI-Iu is added to the Location Update Request in step 11. This might avoid some problems with text in section 14.2 of 29.018 which limits the use of the MS information procedure during the LAU present state.

13-16) Steps 13 to 16 are as described in TS 23.060.

5.2.6 CS attach when already PS attached and Gs present

The procedure described in 5.2.5 is applicable (in most cases without the SGSN change). Whether the MSC changes or not, the MSC shall perform the MS Information Request to get the IMEISV from the SGSN.

Editor's Note: An alternative solution is still being discussed in which the IMEISV and possibly UESBI-Iu is added to the Location Update Request in step 11. This might avoid some problems with text in section 14.2 of 29.018 which limits the use of the MS information procedure during the LAU present state.

5.2.7 CS domain, transfer of UESBI-Iu to RAN

5.2.7.1 MS Initiated Iu-cs and A Interface Connection Establishment Procedure

Editor's note: it is FFS whether the Common ID message should be sent before or after the security functions or whether the relative timing of these 2 functions does not matter. Current opinion is that it probably goes afterwards, but does this allow for treatment of problems with UTRAN security functions?

This section describes how this functionality can be made to operate on both the Iu-cs and A interfaces. Whether the A interface functionality will actually be needed is for further study.
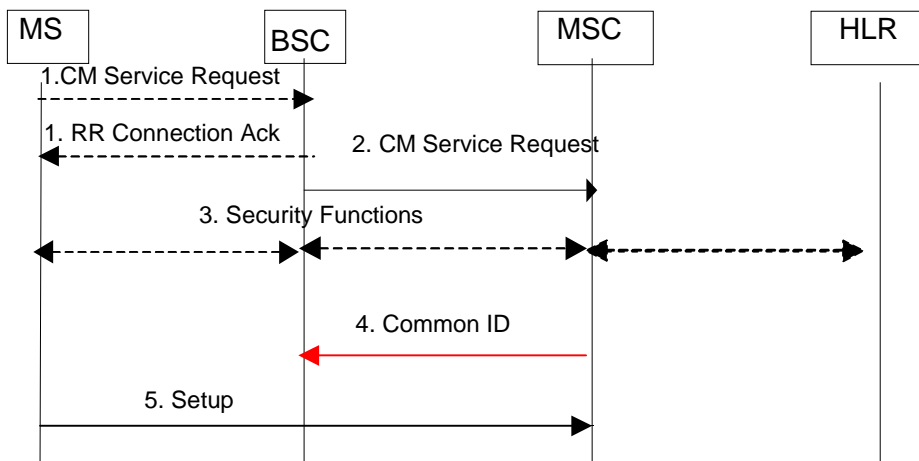
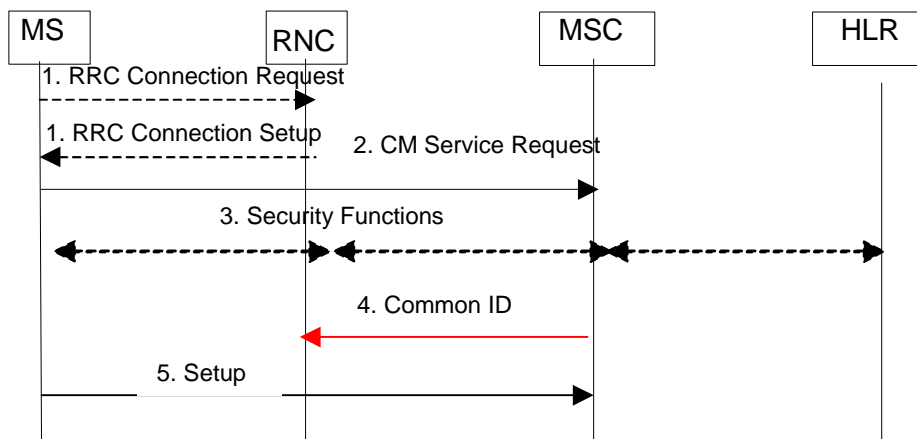**Figure 5.2.7.1-1: MS Initiated Call in GSM**

Figure 5.2.7.1-2: MS Initiated Call in UMTS

1) In GSM, the UE establishes an RR connection by sending the first MM message (eg CM Service Request) to the BSS.

   In UMTS, the UE establishes an RRC connection (assuming that one does not already exist for PS services).

2) In GSM the BSS sends the first MM message to the MSC.

   In UMTS, the UE sends the first MM message (eg CM Service Request) to the MSC.

3) In UMTS, the security procedures are performed.

   In GSM, either the security procedures are performed or a CM Service Accept message is sent to the mobile.

4) As soon as possible, the MSC shall send the UESBI-Iu in the Common ID message to the BSS/RNC.

5) The first CM layer message (eg Setup or Register) is sent by the UE to the MSC.

5.2.7.2   Network Initiated Iu-cs and A interface Connection Establishment

Editor's note: it is FFS whether the Common ID message should be sent before or after the security functions or whether the relative timing of these 2 functions does not matter. Current opinion is that it probably goes afterwards, but does this allow for treatment of problems with UTRAN security functions?

This section describes how this functionality can be made to operate on both the Iu-cs and A interfaces. Whether the A interface functionality will actually be needed is for further study.
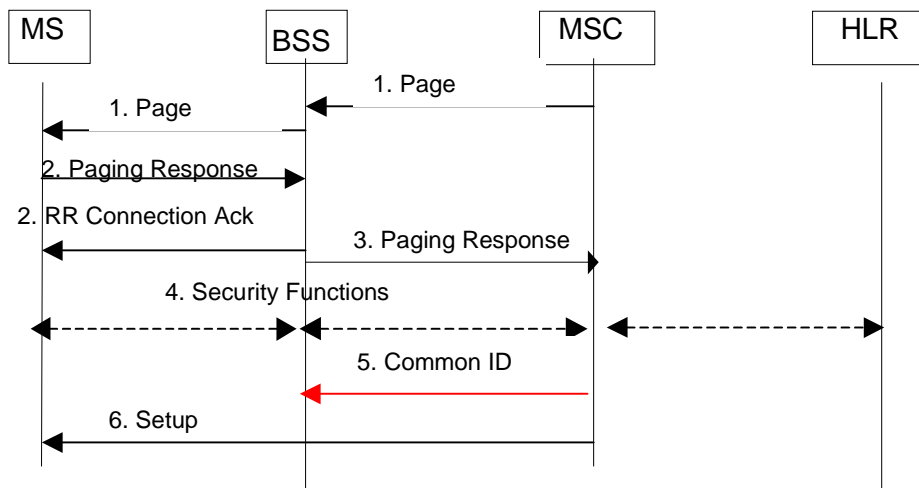
Figure 5.2.7.2-1: Network Initiated A Interface Connection Establishment (GSM)
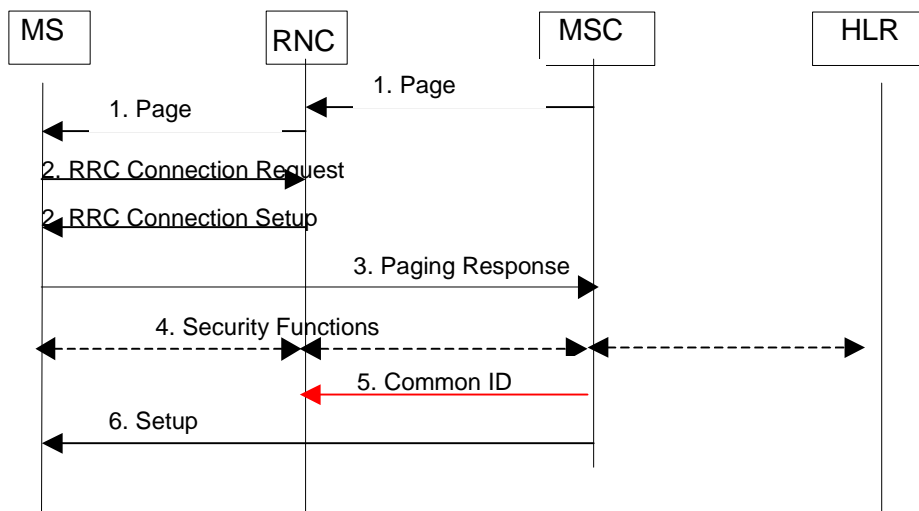

Figure 5.2.7.2-2: Network Initiated Iu-cs Interface Connection Establishment

1) The MSC receives some stimulus that causes it to page the BSS/RNC. The BSS/RNC then pages the mobile.

2) In GSM, the UE sends the Paging Response to the BSC and the RR connection is established.

   In UMTS, the UE establishes the RRC Connection (assuming that one does not already exist for PS services)

3) In GSM, the BSS sends the Paging Response message to the MSC.

   In UMTS, the UE sends the Paging Response message to the MSC.

4) The security procedures are performed.

5) As soon as possible, the MSC shall send the UESBI-Iu in the Common ID message to the BSS/RNC.

6) Typically the first CM layer message (eg Setup or Register) is sent by the MSC to the UE.

5.2.8 Void

5.2.9 Void

5.2.10 PS domain transfer of UESBI-Iu to RNC

5.2.10.1 MS Initiated Service Request Procedure

Editor's note: it is FFS whether the Common ID message should be sent before or after the security functions or whether the relative timing of these 2 functions does not matter. Current opinion is that it probably goes afterwards, but does this allow for treatment of problems with UTRAN security functions?
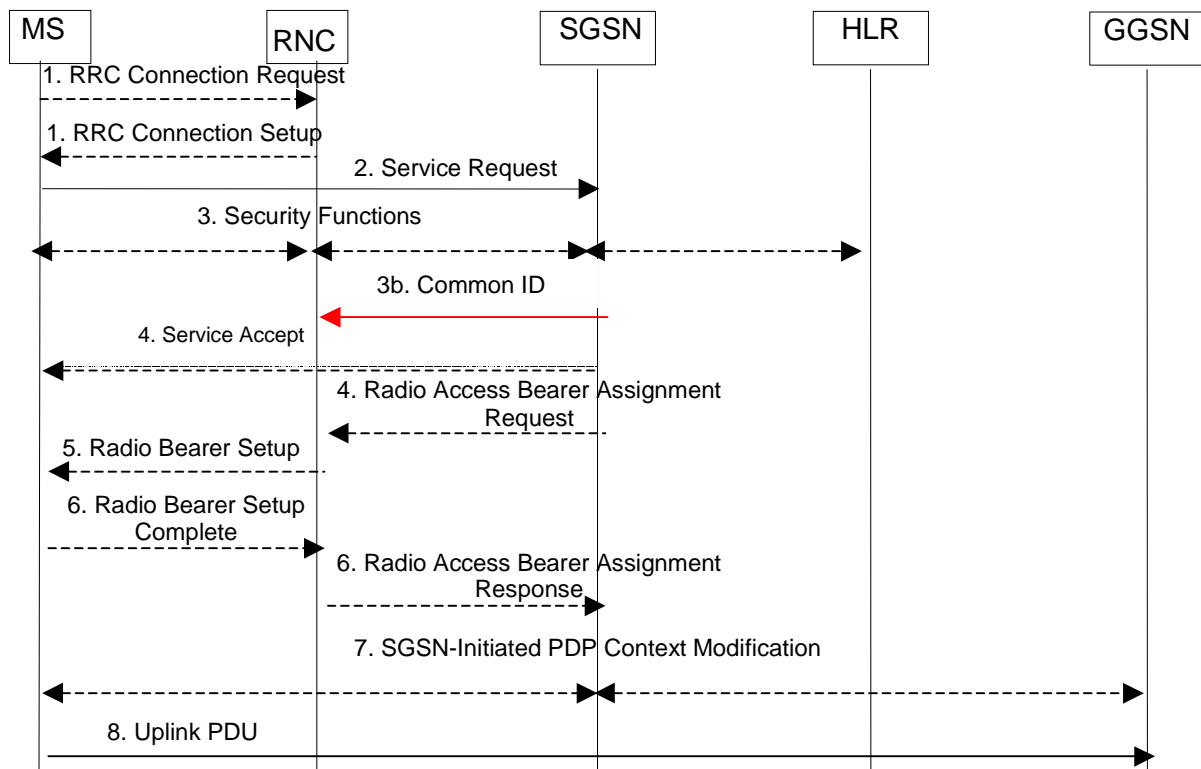

Figure 5.2.10.1-1: MS Initiated Service Request Procedure

1) The MS establishes an RRC connection (assuming that none exists for CS traffic).

2) The MS sends a Service Request (P-TMSI, RAI, CKSN, Service Type) message to the SGSN. Service Type specifies the requested service. Service Type indicates one of the following: Data or Signalling.

3) Upon receipt of the Service Request message, the SGSN may perform the authentication procedure.

3b) As soon as possible, the SGSN shall send the UESBI-Iu in the Common ID message to the RNC.

4-8) Steps 4 to 8 are as described in TS 23.060.

5.2.10.2 Network Initiated Service Request Procedure

Editor's note: it is FFS whether the Common ID message should be sent before or after the security functions or whether the relative timing of these 2 functions does not matter. Current opinion is that it probably goes afterwards, but does this allow for treatment of problems with UTRAN security functions?
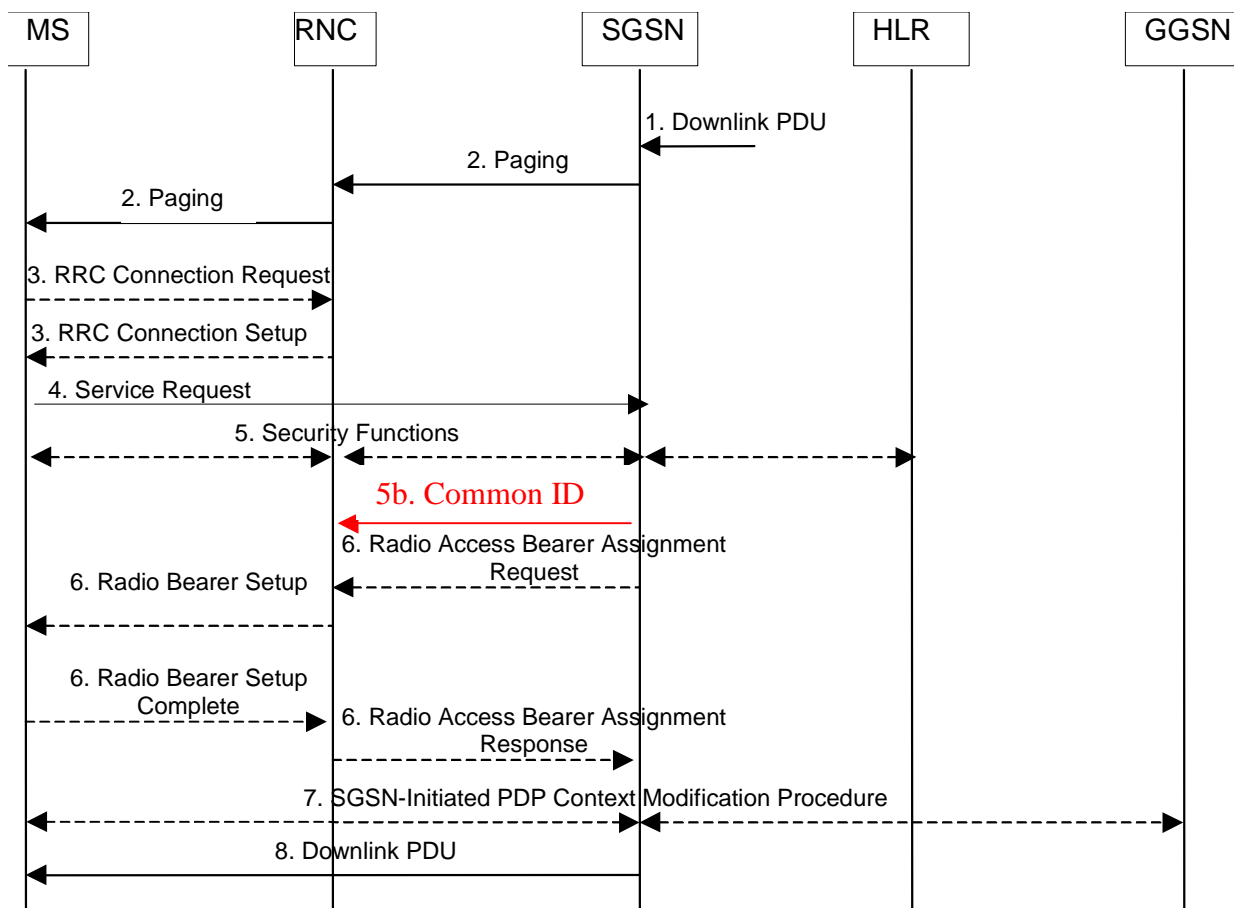
Figure 5.2.10.2-1: Network Initiated Service Request Procedure

1-4) Steps 1 to 4 are as described in TS 23.060.

The MS sends a Service Request (P-TMSI, RAI, CKSN, Service Type) message to the SGSN. Service Type specifies Paging Response.

5) Upon receipt of the Service Request message, the SGSN may perform the authentication procedure.

5b) As soon as possible, the SGSN shall send the UESBI-Iu in the Common ID message to the RNC.

6-8) Steps 6 to 8 are as described in TS 23.060.

5.2.10a RNC handling of UESBI-Iu received from both MSC and SGSN

The RNC may receive UESBI-Iu on both Iu-cs and Iu-ps interfaces. The RNC should use the UESBI-Iu that has been received most recently.

5.2.11 Intra and Inter-MSC Handover GSM to UMTS

For the intra-3G_MSC GSM to UMTS handover procedure described in 3GPP TS 23.009 [5], the UESBI-Iu shall be sent from the 3G_MSC to the target RNS in the Iu Relocation Request message.

The Basic Inter-MSC Handover GSM to UMTS is illustrated in Figure **5.2.11-1** (copied from 3GPP TS 23.009).
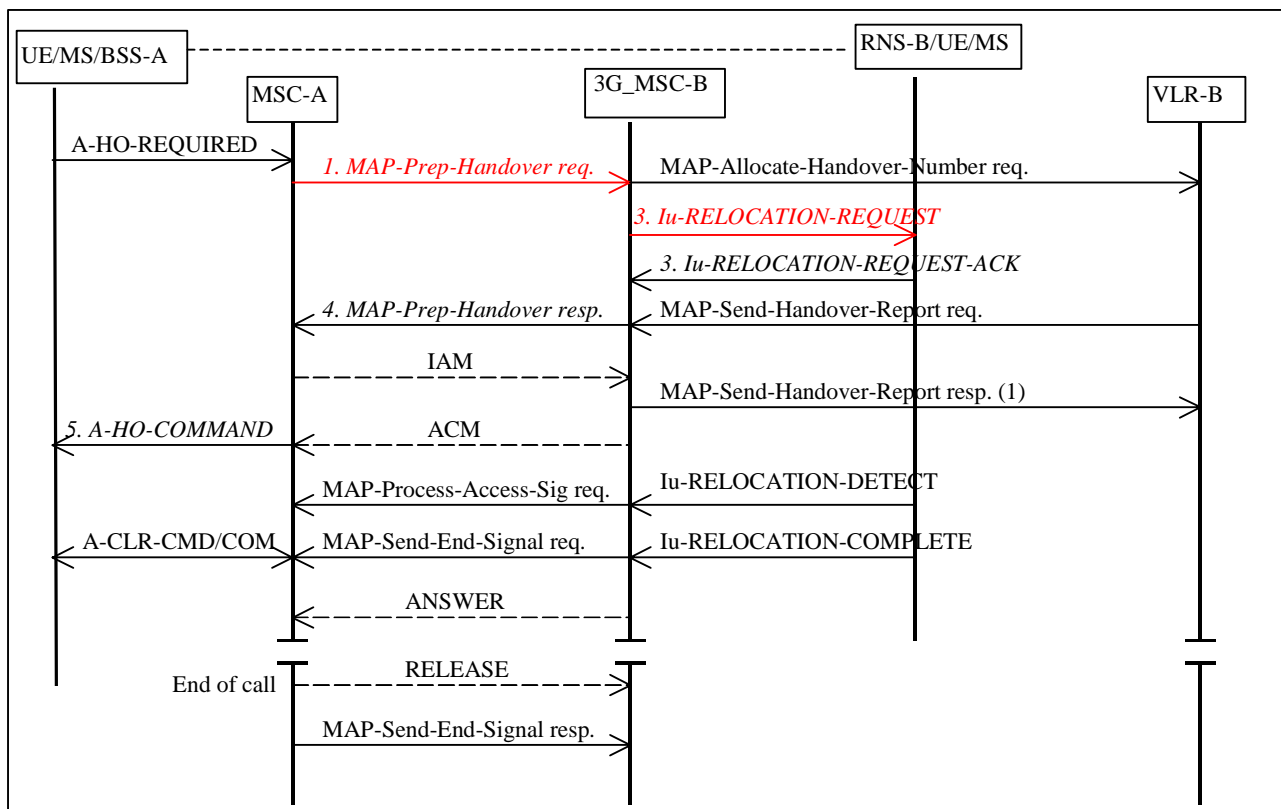
Figure 5.2.11. GSM to UMTS inter-MSC handover

GSM to UMTS handover is initiated as described in 3GPP TS 23.009 [5].

1 The UESBI-Iu shall be sent by MSC_A to 3G_MSC-B [as a field within the AN-APDU parameter in the MAP_Prepare_Handover-request message.] [If MSC-A is a 2G-MSC then it might not be able to send the bitmap form of UESBI-Iu to MSC-B, in which case MSC-A shall send IMEI-SV to MSC-B and MSC-B shall convert it to the bitmap.]

2 3G_MSC-B shall store the UESBI-Iu in case it is needed for a later inter RNC[/BSS] intra MSC-B handover .

3 [Because the UESBI-Iu was in the AN-APDU] 3G_MSC-B sends the UESBI-Iu in the Iu-RELOCATION-REQUEST message sent to the target RNC.

The rest of the steps are as described in 3GPP TS 23.009 [5].

For Subsequent Inter-MSC handover, MSC-A shall transfer the UESBI-Iu to [MSC-B'].

5.2.12 Inter-MSC Handover GSM to GSM

In the Basic inter-MSC handover procedure (GSM to GSM) described in 3GPP TS 23.009 [5], UESBI-Iu shall be transferred from MSC-A to MSC-B. This is because UESBI-Iu may be needed in the case that there is a later inter-system handover from GSM to UMTS under MSC-B.

The Inter-MSC Handover GSM to GSM is illustrated in Figure **5.2.12-1** (copied from 3GPP TS 23.009).
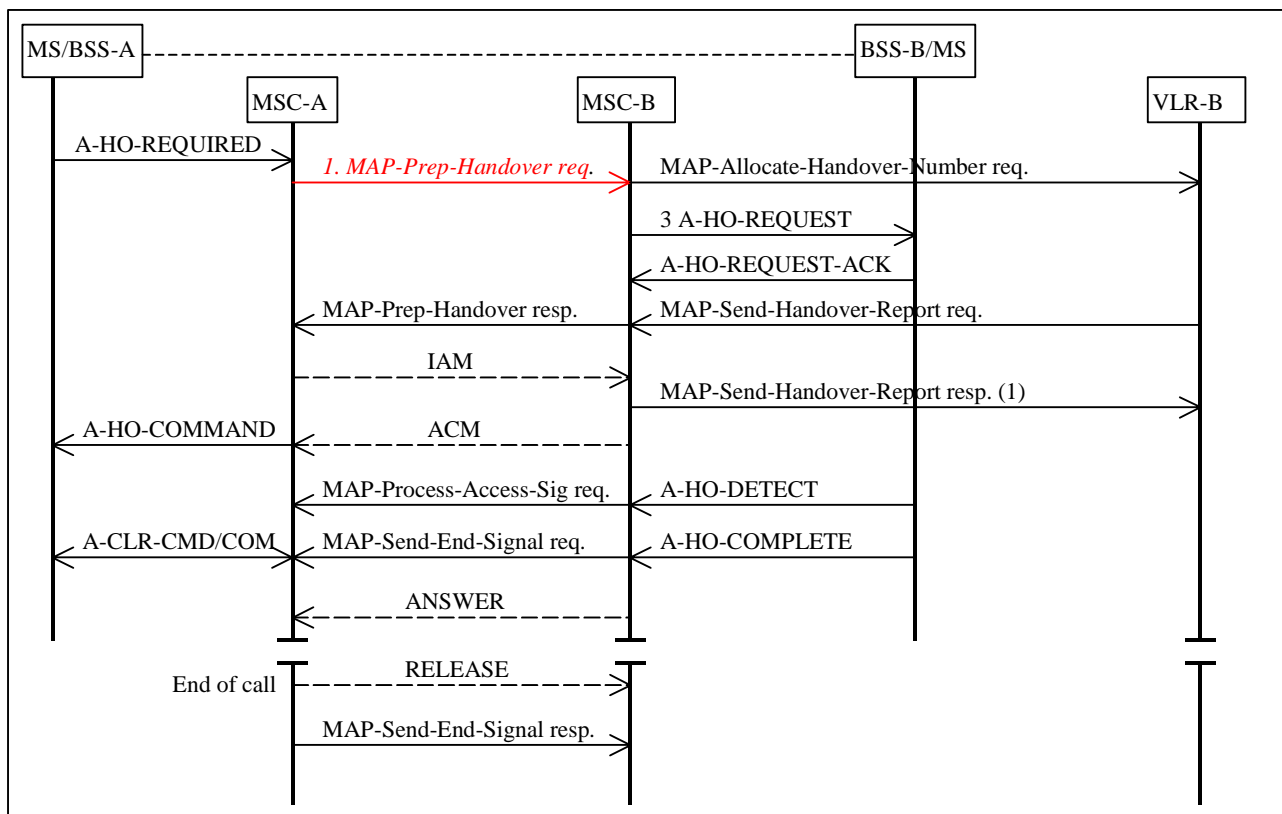
Figure 5.2.12-1. GSM to GSM inter-MSC handover

Inter-MSC GSM to GSM handover is initiated as described in 3GPP TS 23.009 [5].

1   In MAP-Prep-Handover req. message, MSC-A shall include UESBI-Iu information as [both a field within the AN-APDU parameter (*this is FFS depending on A i/f support *)] and as a separate "UESBI-Iu" parameter. [If MSC-A is a 2G-MSC then it might not be able to send the bitmap form of UESBI-Iu to MSC-B, in which case MSC-A shall send IMEI-SV to MSC-B and MSC-B shall convert it to the bitmap.]

2   MSC-B shall store the "UESBI-Iu" parameter in case it is needed for a later inter RNC[/BSS] intra MSC-B handover.

[3   It is FFS if MSC-B sends the UESBI-Iu to the BSS in the Handover Request message]

The rest of the steps are as described in 3GPP TS 23.009 [5].

For Subsequent Inter-MSC handover, MSC-A shall transfer the UESBI-Iu to [MSC-B'], if available in the MSC-A.

5.2.13   Inter-MSC Handover UMTS to GSM

In the Basic inter-MSC handover procedure (UMTS to GSM) described in 3GPP TS 23.009 [5], UESBI-Iu shall be transferred from MSC-A to MSC-B. This is because UESBI-Iu may be needed in the case that there is a later inter-system handover from GSM to UMTS under MSC-B.

The Inter-MSC Handover UMTS to GSM is illustrated in Figure **5.2.13-1** (copied from 3GPP TS 23.009).
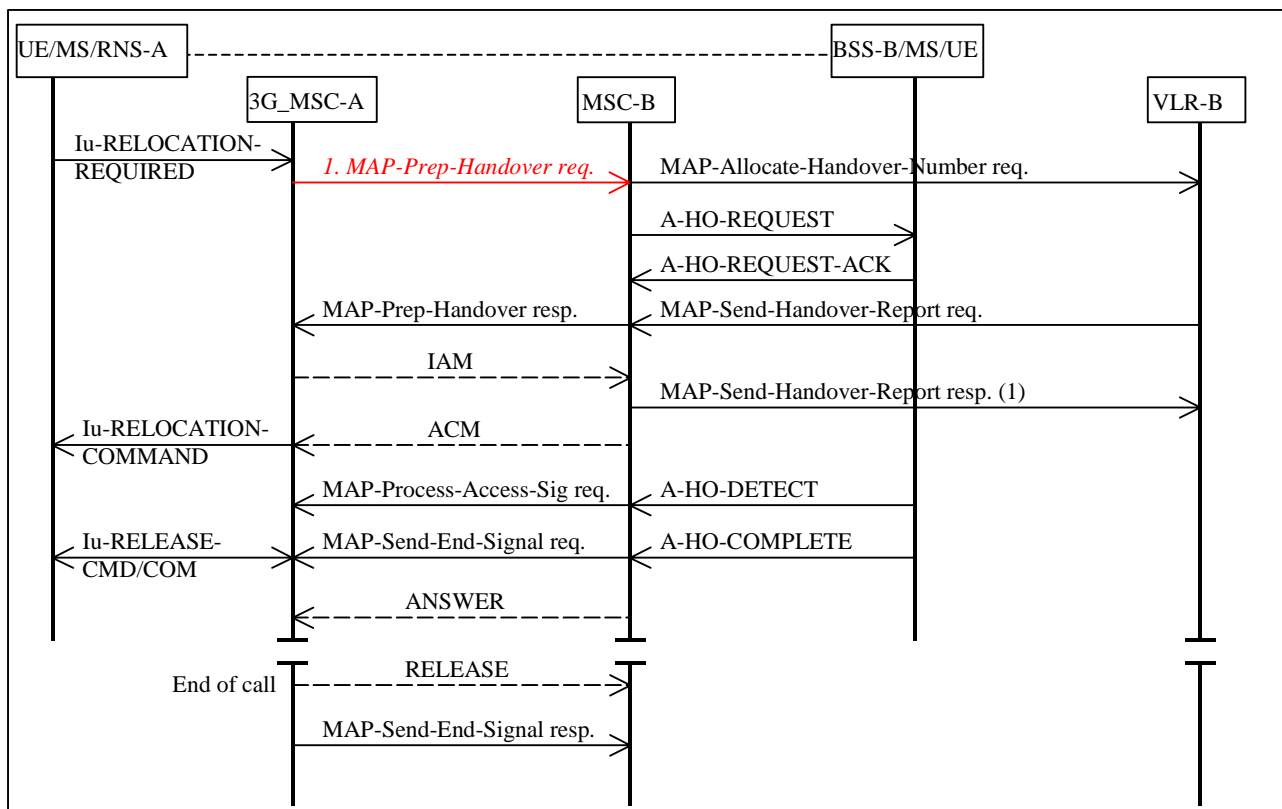
Figure 5.2.13-,. UMTS to GSM inter-MSC handover

UMTS to GSM handover is initiated as described in 3GPP TS 23.009 [5].

1. In MAP-Prep-Handover req. message, MSC-A shall include UESBI-Iu information [as both a field within the AN-APDU parameter and] as a separate "UESBI-Iu" parameter.

2. MSC-B shall store the "UESBI-Iu" parameter in case it is needed for a later inter RNC[/BSS] intra MSC-B handover.

[3 It is FFS if MSC-B sends the UESBI-Iu to the BSS in the Handover Request message]

The rest of the steps are as described in 3GPP TS 23.009 [5].

For Subsequent Inter-MSC handover, MSC-A shall transfer the UESBI-Iu to [MSC-B'].

5.2.14   Intra and Inter-MSC Relocation UMTS to UMTS

For the intra-3G_MSC SRNS relocation procedure described in 3GPP TS 23.009 [5], the 3G_MSC shall send the UESBI-Iu to the target RNS in the Iu Relocation Request message.

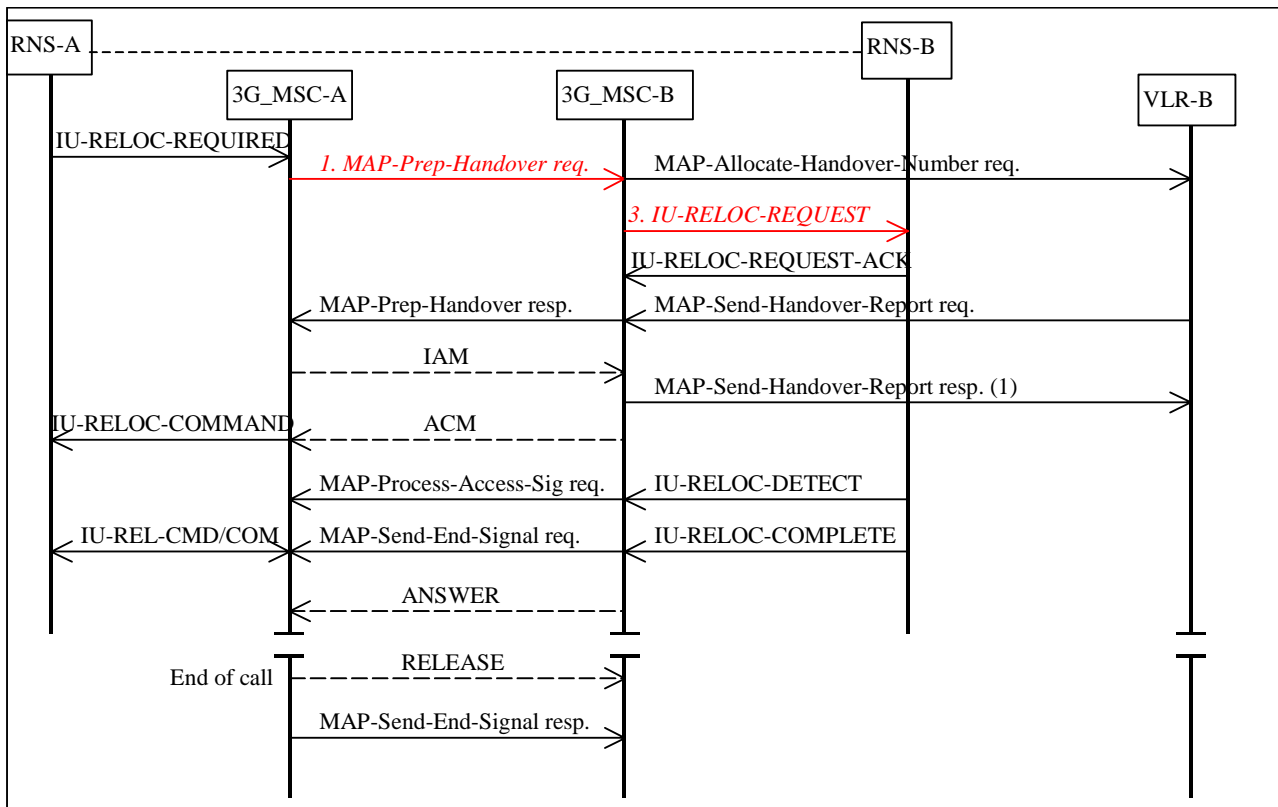The Inter-MSC SRNS relocation procedure is illustrated in Figure **5.2.14-1** (copied from 3GPP TS 23.009).

Figure 5.2.14-1. Inter-MSC relocation

Inter-MSC relocation is initiated as described in 3GPP TS 23.009 [5].

1. 3G_MSC-A sends a MAP-PREPARE-HANDOVER request to 3G_MSC-B including a complete IU-RELOC-REQUEST message. The IU-RELOC-REQUEST message is carried in the AN-APDU parameter. [The UESBI-Iu shall be part of the information within the Iu Relocation Request message/AN-APDU parameter.]

2. [MSC-B shall extract the "UESBI-Iu" from the AN-APDU and store it in case it is needed for a later inter RNC[/BSS] intra MSC-B handover.]

Editor's note: is it easier to just always include an extra UESBI-Iu parameter?

3. MSC-B shall send the UESBI-Iu to the target RNC in the Iu-RELOCATION-REQUEST message.

The rest of the steps are as described in 3GPP TS 23.009 [5].

For Subsequent Inter-MSC handover, MSC-A shall transfer the UESBI-Iu to [MSC-B'].

5.2.14a   Intra and Inter SGSN Relocation (UMTS to UMTS)

For the intra SGSN SRNS relocation procedure, the SGSN shall send the UESBI-Iu to the target RNS in the Iu Relocation Request message. The Inter-SGSN relocation is illustrated in Figure **5.2.14-2** (copied from 3GPP TS 23.060).
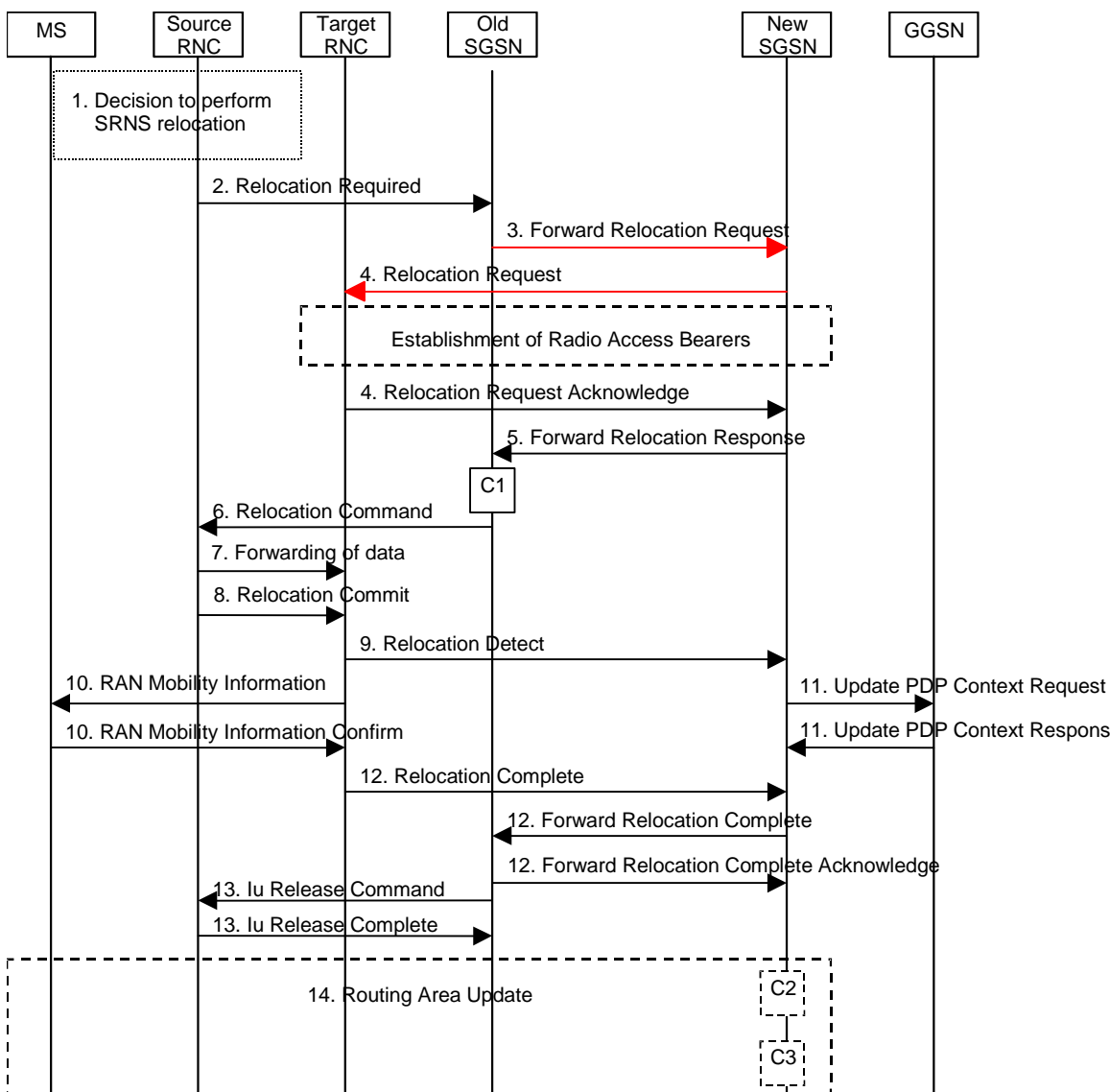
Figure 5.2.14-2. Inter-SGSN relocation

Inter-SGSN relocation is initiated as described in 3GPP TS 23.060 [4].

3 In case of inter-SGSN SRNS relocation, the old SGSN initiates the relocation resource allocation procedure by sending a Forward Relocation Request message to the new SGSN. The old SGSN shall include the IMEISV [and possibly the UESBI-Iu] in the Forward Relocation Request message.

4 The new SGSN [shall use the IMEISV to obtain the UESBI-Iu and then the new SGSN] shall send the UESBI-IU in the Relocation Request message to the target RNC.

At point 14, Inter-SGSN Routing Area Update is performed as described in chapter 5.2.3.

The rest of the steps are as described in 3GPP TS 23.060 [4].

5.2.15   Emergency call handling

Attached Mobile with (U)SIM
(U)SIMless mobile
Non-attached Mobile with (U)SIM

6 Operational Aspects of Handling Fault Information

eg in the case UESBI is a mapping from IMEISV, how to get the "TAC+SV to UESBI-Iu mapping" information into both SGSN and MSC. .

Annex <A> (normative): <Normative annex title>

Annex <B> (informative): <Informative annex title>

Annexes are labeled A, B, C, etc. and designated either "normative" or "informative" depending on their content (informative annexes do not comprise requirements for the implementation of the specification).

Annex <X> (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New