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**Universal Mobile Telecommunications System (UMTS);  
LTE;  
InterWorking Function (IWF)  
between MAP based and Diameter based interfaces  
(3GPP TS 29.305 version 10.3.0 Release 10)**



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650 Route des Lucioles  
F-06921 Sophia Antipolis Cedex - FRANCE

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Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C  
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## Foreword

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## Foreword

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## Introduction

The content of this specification is a part of overall solution to meet the requirement of the interworking between EPS and the legacy system, mainly for the interfaces between S4-SGSN/MME and HSS/HLR/EIR.

---

# 1 Scope

The present document is to specify the InterWorking Function (IWF) between MAP-based Gr, Gf interfaces and Diameter-based S6a, S6d, S13, S13a interfaces.

For each IWF scenario, the present document will specify the mapping of related procedures and the corresponding parameter handling.

The present document will also specify the related mechanisms for the IWF, e.g. message routing, user data handling. The other mechanism, such as security, will also be described in this document as a part of the whole solution.

If there is no specific indication, the SGSN in the specification refers to a S4-SGSN which supports S4 interface.

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# 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 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 33.401: "3GPP System Architecture Evolution: Security Architecture".

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# 3 Definitions, symbols and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**example:** text used to clarify abstract rules by applying them literally.

## 3.2 Symbols

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

<symbol>      <Explanation>

## 3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

EPS	Evolved Packet System
IWF	Interworking Function
TAU	Tracking Area Update



## 4 Introduction (Informative)

### 4.1 General Description

The interworking scenarios in this specification are described based on interface mapping.

The stage 2 network deployments for each of the interworking scenarios are also described.

### 4.2 Scenario One: S6a/S6d - Pre Rel8 Gr interworking scenario with one IWF

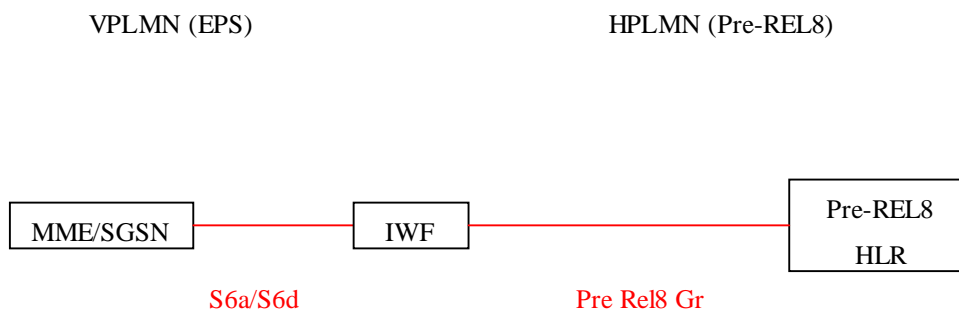
#### 4.2.1 General Description

This interworking scenario is for S6a/S6d interface based on Diameter and Pre Rel8 Gr interface based on MAP with one IWF in the path.

This IWF scenario can be an inter PLMN use case.

This IWF scenario can be an intra PLMN use case for operator to do the partly update of their legacy network.

This interworking scenario is described as below:



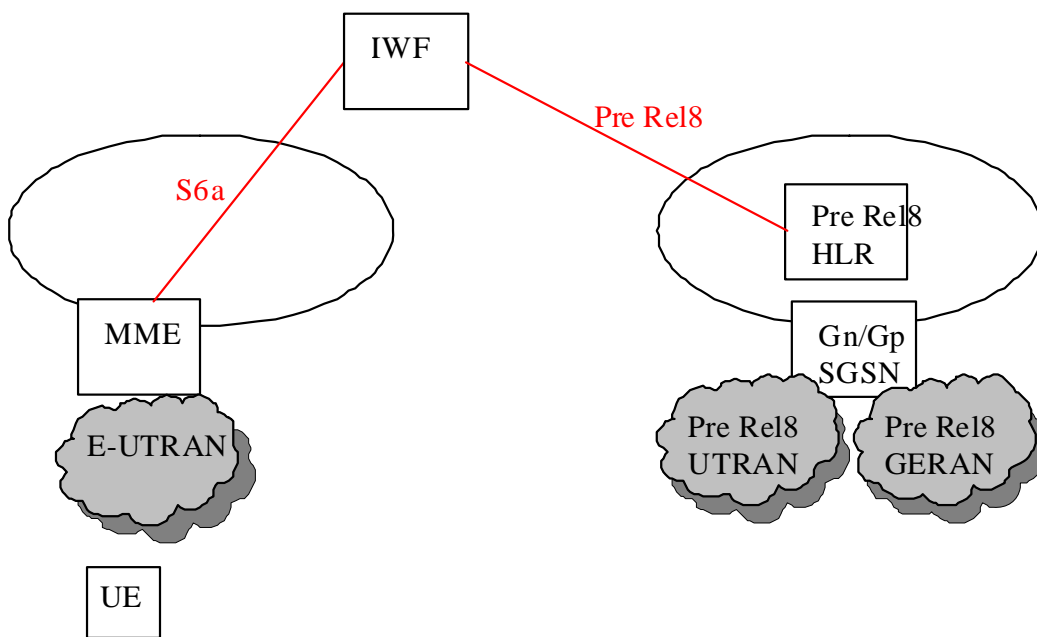
**Figure 4.2.1-1 S6a/S6d - Pre Rel8 Gr interworking scenario with one IWF**

The Pre Rel8 HLR shall be upgraded to support Rel-8 EPS security and Pre Rel8 Gr shall be upgraded to support transfer of Rel-8 security parameters..

#### 4.2.2 Network Deployments

This IWF scenario will apply the following network deployment situation:

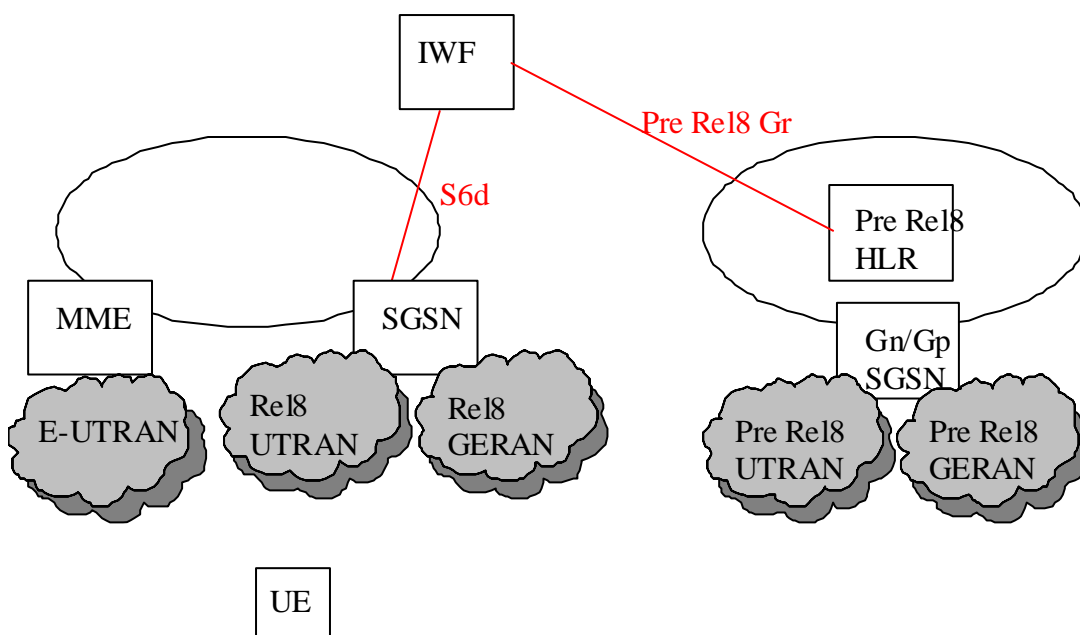
- Users of a Pre Rel8 UMTS/GPRS network access into a visited EPS with only E-UTRAN, which is described as below:



**Figure 4.2.2-1 IWF Scenario one network deployment: visited EPS with E-UTRAN only, home Pre Rel8 UMTS/GPRS only**

The subscription data for Pre Rel8 Gn/Gp SGSN is downloaded to MME. Mapping of the subscription data is done on MME. Additional security solution is needed in which the Pre Rel8 HLR can not be changed.

- Users of a Pre Rel8 UMTS/GPRS network access into a visited EPS with E-UTRAN and UTRAN/GERAN, which is described as below:



**Figure 4.2.2-2 IWF Scenario one network deployment: visited EPS with E-UTRAN and UTRAN/GERAN, home Pre Rel8 UMTS/GPRS only**

The subscription data for Pre Rel8 Gn/Gp SGSN is downloaded to SGSN. Mapping of the subscription data is done on SGSN. Security solution is not needed because the security mechanism in visited and home network is the same.

## 4.3 Scenario Two: S6a/S6d - Rel8 Gr interworking scenario with one IWF

### 4.3.1 General Description

This interworking scenario is for S6a/S6d interface based on Diameter and Rel8 Gr interface based on MAP with one IWF in the path.

This IWF scenario can be an inter PLMN use case.

This IWF scenario can be an intra PLMN use case for operator to do the partly update of their legacy network.

This interworking scenario is described as below:

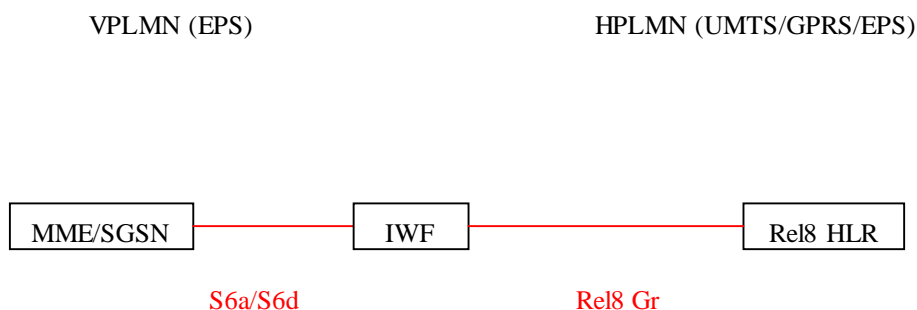
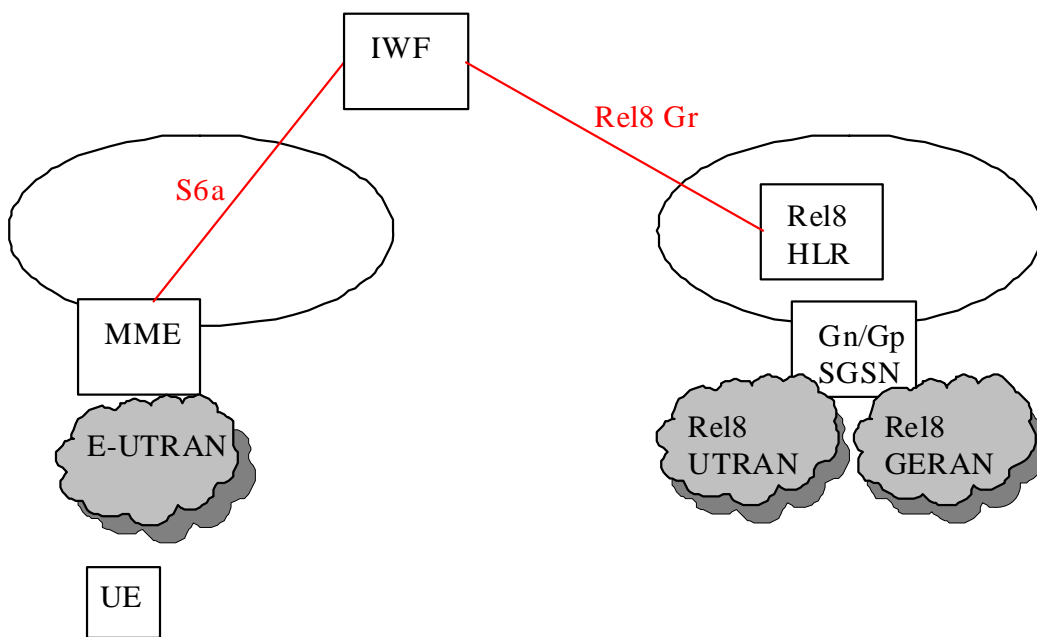


Figure 4.3.1-1 S6a/S6d - Rel8 Gr interworking scenario with one IWF

### 4.3.2 Network Deployments

This IWF scenario will apply the following network deployment situation:

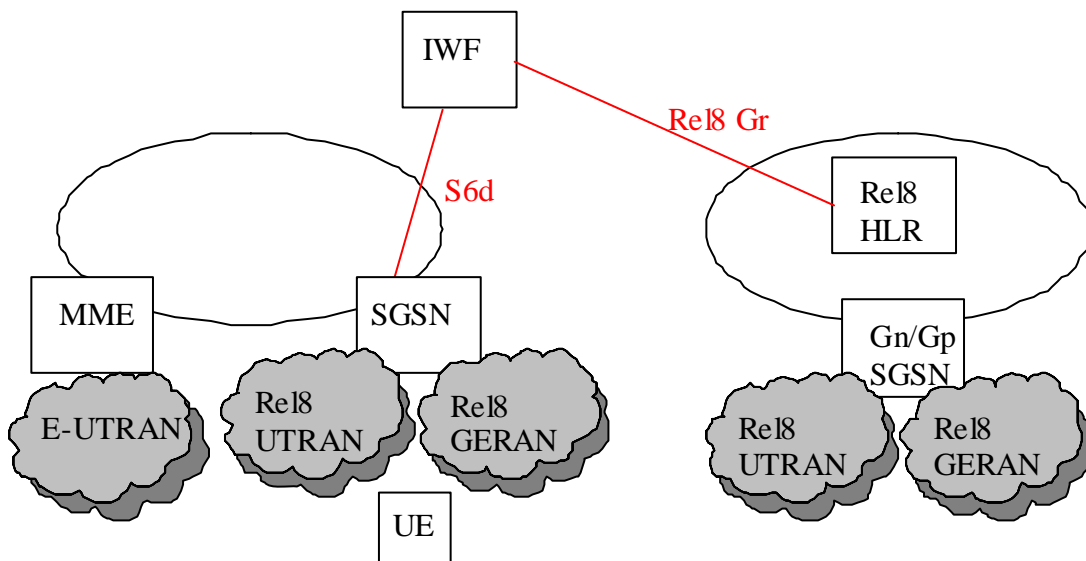
- Users of a Rel8 UMTS/GPRS network access into a visited EPS with only E-UTRAN, which is described as below:



**Figure 4.3.2-1 IWF Scenario two network deployment: visited EPS with E-UTRAN only, home Rel8 UMTS/GPRS only**

The subscription data for Rel8 Gn/Gp SGSN is downloaded to MME. Mapping of the subscription data is done on MME. Additional security solution is needed in which the Pre Rel8 HLR can be changed.

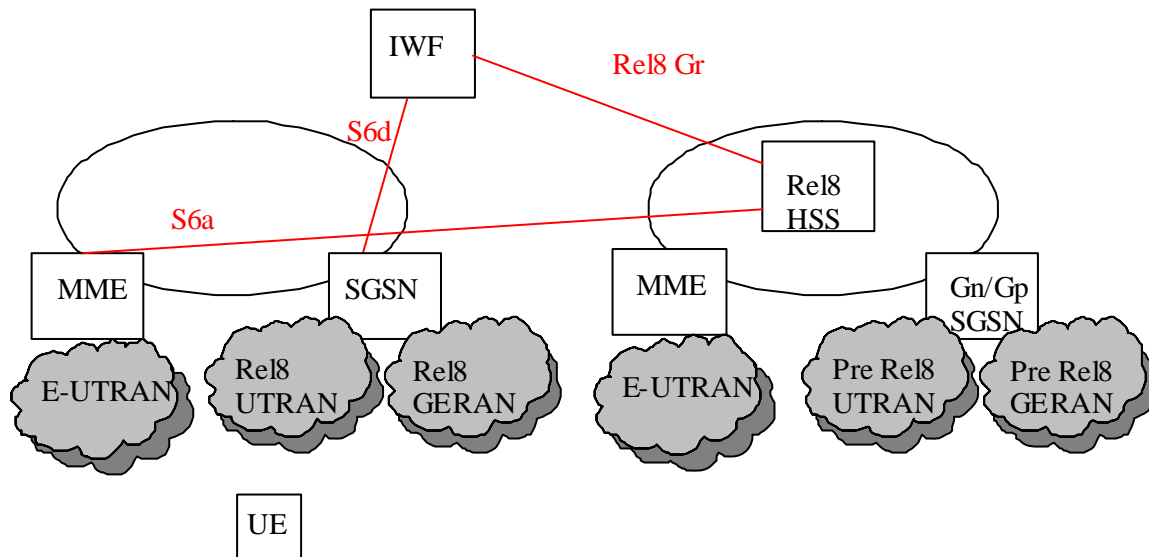
- Users of a Rel8 UMTS/GPRS network access into a visited EPS with E-UTRAN and UTRAN/GERAN, which is described as below:



**Figure 4.3.2-2 IWF Scenario two network deployment: visited EPS with E-UTRAN and UTRAN/GERAN, home Rel8 UMTS/GPRS only**

The subscription data for Rel8 Gn/Gp SGSN is downloaded to SGSN. Mapping of the subscription data is done on SGSN. Security solution is not needed because the security mechanism in visited and home network is the same.

- Users of a Pre Rel8 UMTS/GPRS/E-UTRAN network access into a visited EPS with E-UTRAN and UTRAN/GERAN, which is described as below:



**Figure 4.3.2-3 IWF Scenario two network deployment: visited EPS with E-UTRAN and UTRAN/GERAN, home EPS with E-UTRAN only and Pre Rel8 UMTS/GPRS**

The subscription data for Pre Rel8 Gn/Gp SGSN and the subscription data for MME is downloaded to SGSN. Mapping of the subscription data is done on SGSN. Security solution is not needed because the security mechanism in visited and home network is the same.

## 4.4 Scenario Three: S6a/S6d - S6a/S6d interworking scenario with two IWFs

### 4.4.1 General Description

This interworking scenario is for S6a/S6d interface based on Diameter, S6a/S6d interface based on Diameter and SS7/MAP based roaming agreement with two IWFs in the path.

With this interworking scenario, two EPS operators can reuse the SS7 based roaming agreement.

This IWF scenario can only be an inter PLMN use case in which the two IWFs are in the VPLMN and HPLMN separately.

This interworking scenario is described as below:

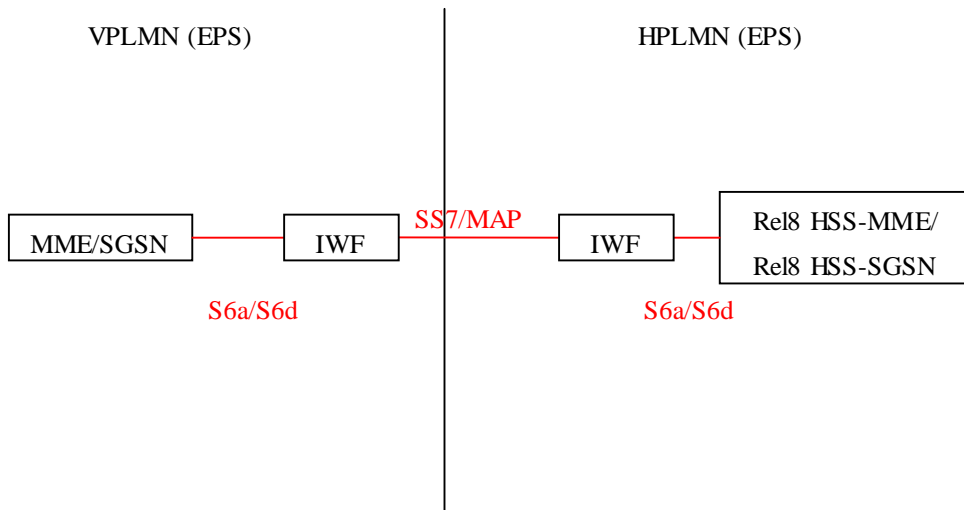


Figure 4.4.1-1 S6a/S6d - S6a/S6d interworking scenario with two IWFs

### 4.4.2 Network Deployments

This IWF scenario will apply the following network deployment situation:

- Users of a Pre Rel8 UMTS/GPRS/EPS for UTRAN/GERAN and E-UTRAN network access into a visited EPS with only E-UTRAN, which is described as below:

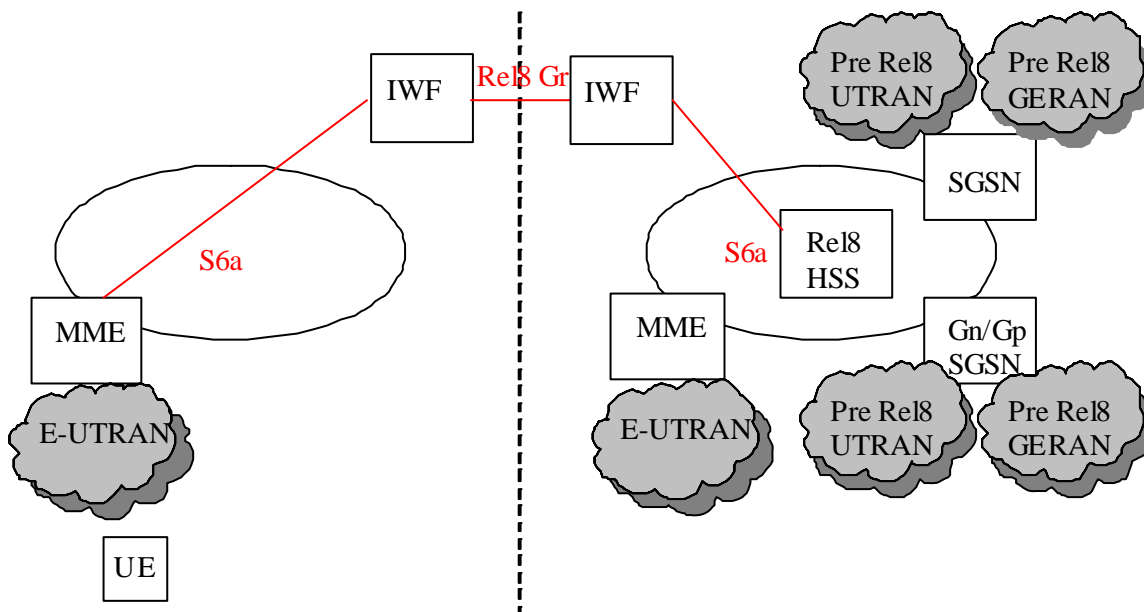
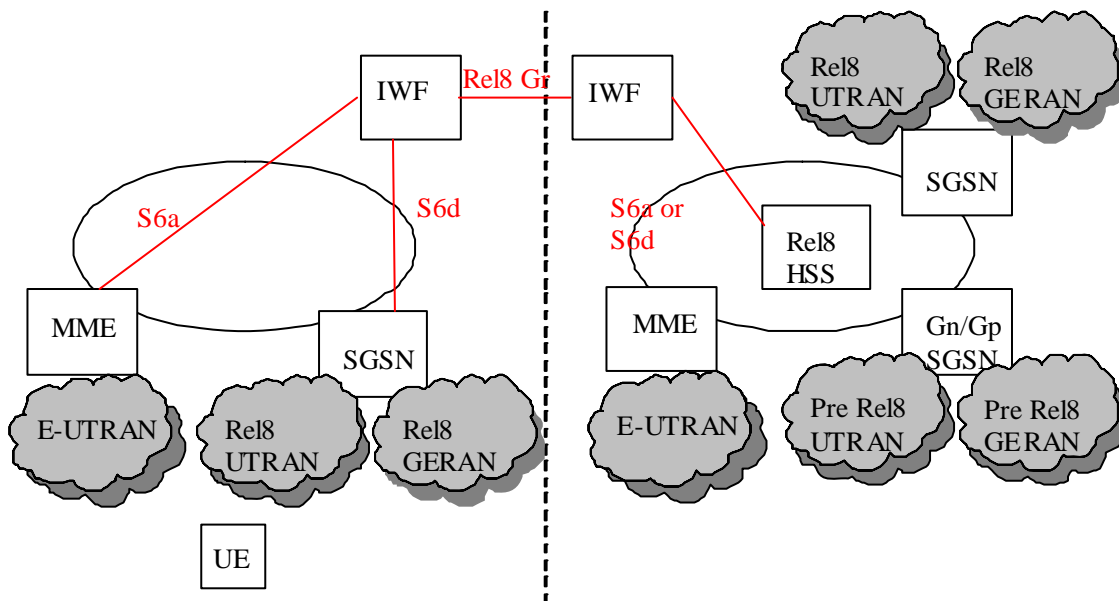


Figure 4.4.2-1 IWF Scenario three network deployment: visited EPS with E-UTRAN only, home EPS with E-UTRAN and UTRAN/GERAN and Pre Rel8 UMTS/GPRS

The subscription data for Pre Rel8 Gn/Gp SGSN, subscription data for SGSN and the subscription data for MME is downloaded to MME. MME picks up the subscription data for MME and discards the subscription data for Pre Rel8 UMTS/GPRS and the subscription data for SGSN.

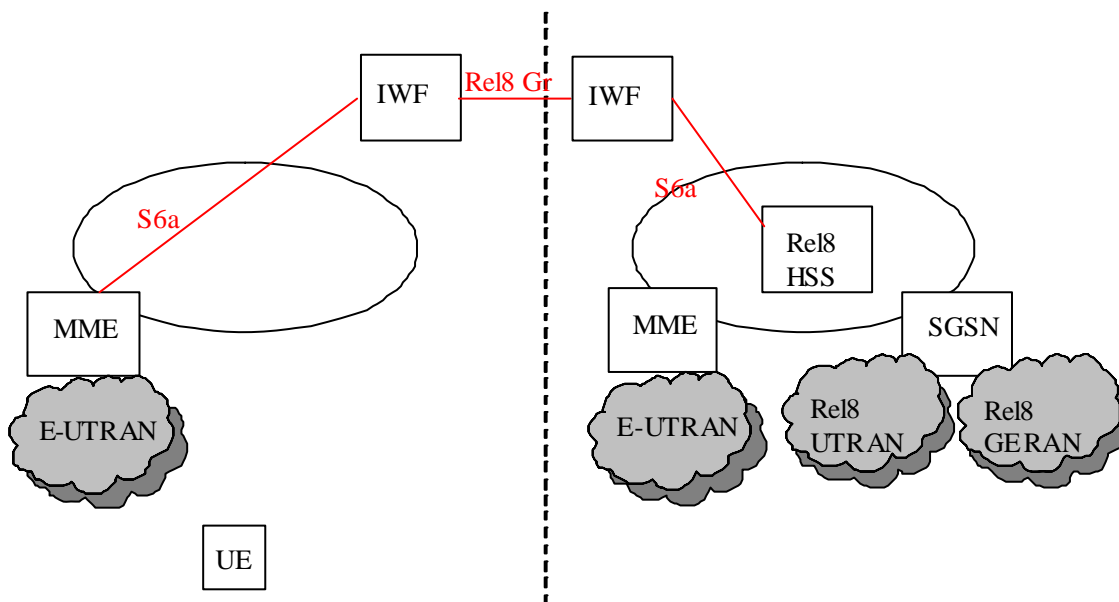
- Users of a Pre Rel8 UMTS/GPRS/EPS for UTRAN/GERAN and E-UTRAN network access into a visited EPS with E-UTRAN and UTRAN/GERAN, which is described as below:



**Figure 4.4.2-2 IWF Scenario three network deployment: visited EPS with E-UTRAN only and UTRAN/GERAN, home EPS with E-UTRAN and UTRAN/GERAN and Pre Rel8 UMTS/GPRS**

The subscription data for Pre Rel8 Gn/Gp SGSN, subscription data for SGSN and the subscription data for MME is downloaded to SGSN or MME. SGSN or MME picks up the subscription data for SGSN or MME and discards the subscription data for Pre Rel8 UMTS/GPRS and the subscription data for MME or SGSN.

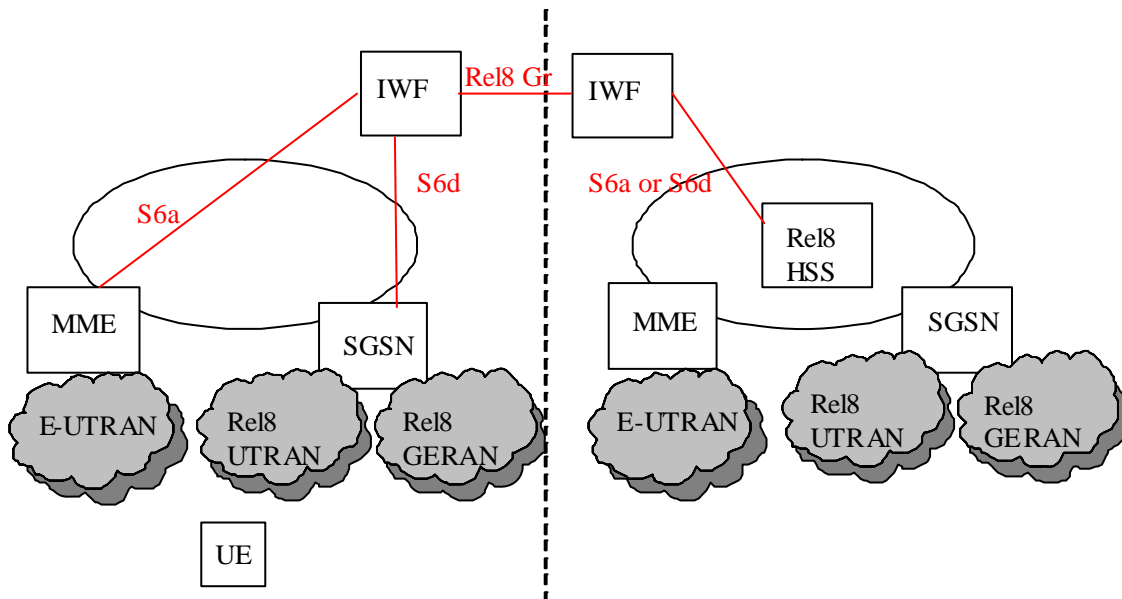
- Users of an EPS for UTRAN/GERAN and E-UTRAN network access into a visited EPS with only E-UTRAN, which is described as below:



**Figure 4.4.2-3 IWF Scenario three network deployment: visited EPS with E-UTRAN only, home EPS with E-UTRAN and UTRAN/GERAN**

The subscription data for SGSN and the subscription data for MME is downloaded to MME. MME picks up the subscription data for MME and discards the subscription data for the subscription data for SGSN.

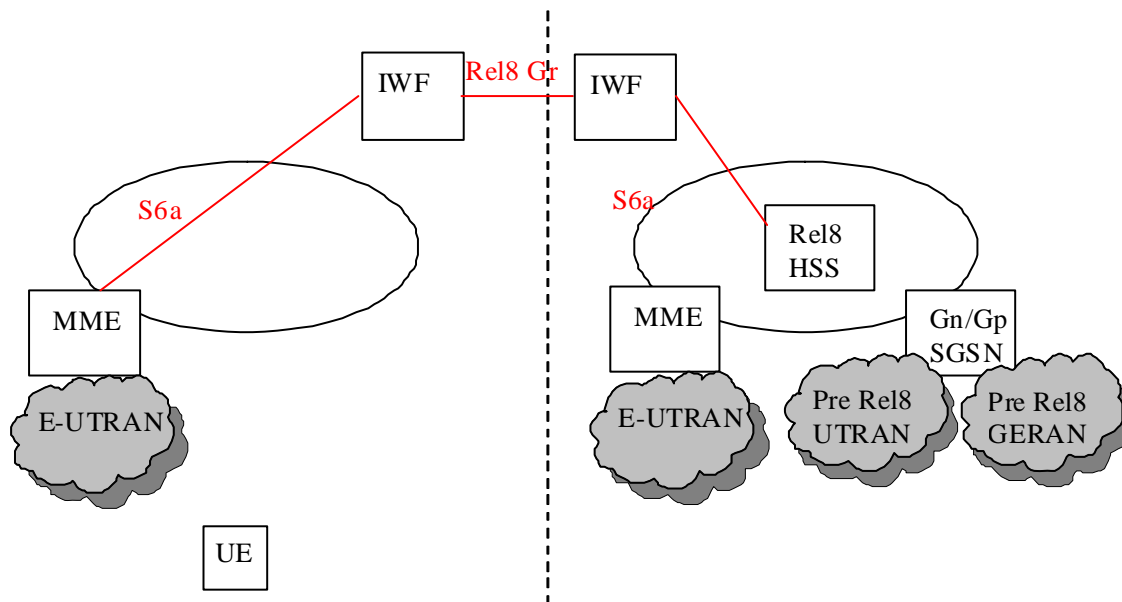
- Users of an EPS for UTRAN/GERAN and E-UTRAN network access into a visited EPS with E-UTRAN and UTRAN/GERAN, which is described as below:



**Figure 4.4.2-4 IWF Scenario three network deployment: visited EPS with E-UTRAN and UTRAN/GERAN, home EPS with E-UTRAN and UTRAN/GERAN**

The subscription data for SGSN and the subscription data for MME is downloaded to SGSN or MME. SGSN or MME picks up the subscription data for SGSN or MME and discards the subscription data for MME or SGSN.

- Users of a Pre Rel8 UMTS/GPRS/EPS for E-UTRAN only network access into a visited EPS with only E-UTRAN, which is described as below:



**Figure 4.4.2-5 IWF Scenario three network deployment: visited EPS with E-UTRAN only, home ESP with E-UTRAN only and Pre Rel8 UMTS/GPRS**

The subscription data for Pre Rel8 Gn/Gp SGSN and the subscription data for MME is downloaded to MME. MME picks up the subscription data for MME and discards the subscription data for Pre Rel8 Gn/Gp SGSN.

NOTE: This IWF scenario can not be used for interworking between two EPS network with only E-UTRAN in which there is no MAP based roaming agreement to be reused.



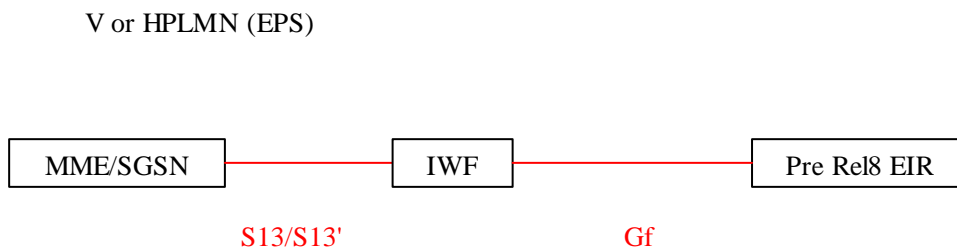
## 4.5 Scenario Four: S13/S13' - Gf interworking scenario with one IWF

### 4.5.1 General Description

This interworking scenario is for S13/S13' interface based on Diameter and Gf interface based on MAP with one IWF in the path.

This IWF scenario can only be an intra PLMN use case for operator to do the partly update of their legacy network.

This interworking scenario is described as below:

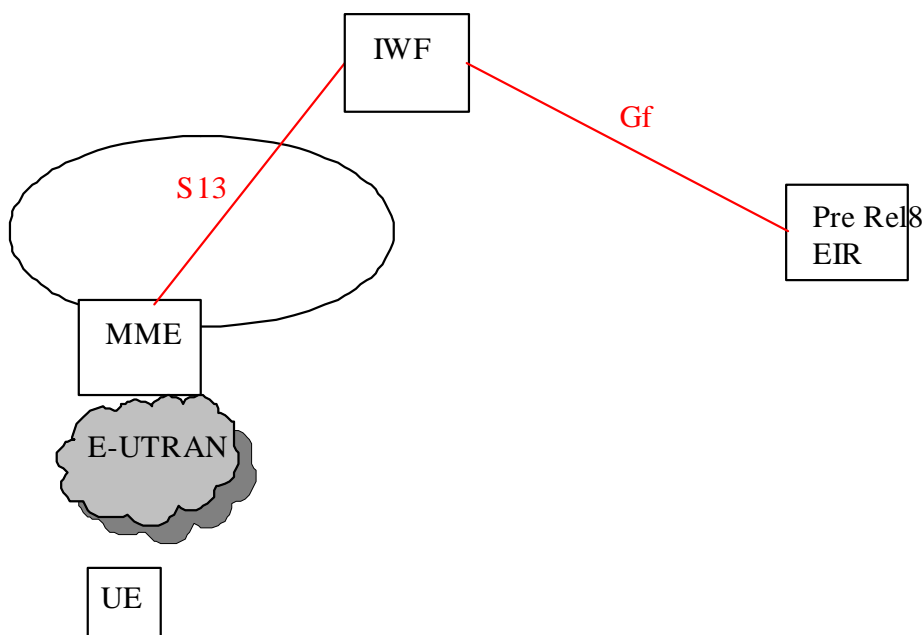


**Figure 4.5.1-1 S13/S13' - Gf interworking scenario with one IWF**

### 4.5.2 Network Deployments

This IWF scenario will apply the following network deployment situation:

- ME identity/IMEISV of a user from a Pre Rel8 UMTS/GPRS network can be checked in a visited EPS with E-UTRAN only, which is described as below:



**Figure 4.5.2-1 IWF Scenario for network deployment: UE access from EPS with E-UTRAN only**

- ME identity/IMEISV of a user from a Pre Rel8 UMTS/GPRS network can be checked in a visited EPS with E-UTRAN and UTRAN/GERAN, which is described as below:

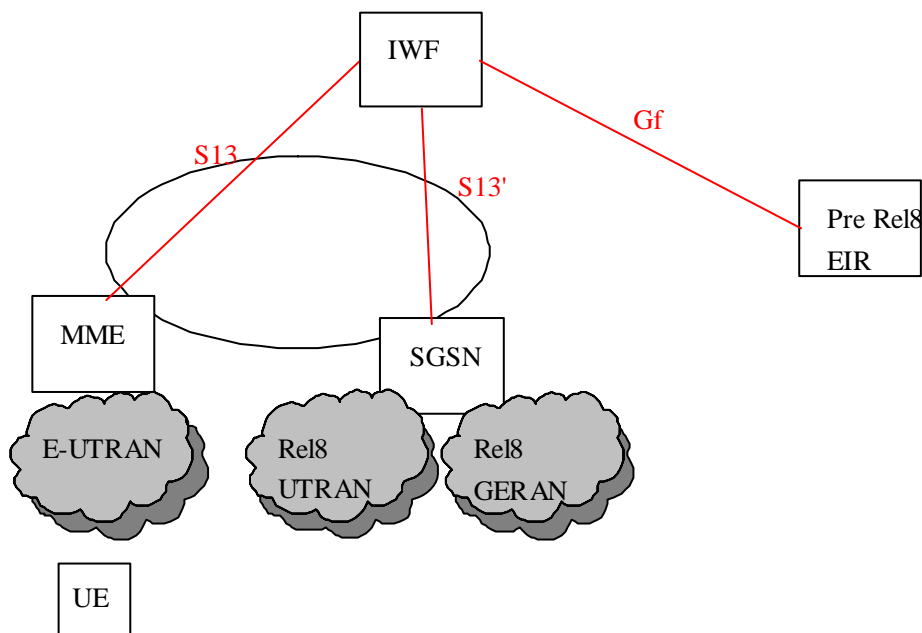


Figure 4.5.2-2 IWF Scenario for network deployment: UE access from EPS with E-UTRAN and UTRAN/GERAN

## 5 General issues

### 5.1 Message Routing Mechanism

The principles for IWF message routing are:

- For the same user, the messages shall go to and come back through the same route with the same IWF(s) for the duration of a MAP dialog.
- To ensure the correct message routing for the interworking scenarios, the IWFs in the network shall be able to map the SS7 number and the Diameter identity of the MME/SGSN 1-to-1. This may be achieved by static or dynamic configuration.
- To ensure the parallel multiple request messages can get their correct response messages, the IWFs in the network shall be able to map the MAP Dialogue Id and the Diameter Session Id 1-to-1.

The overall message routing mechanism for the scenario is described as below:

1. The MME/SGSN may not be able to identify whether there is an IWF or not on the route to an HSS. The routing of the first message from the MME/SGSN to the IWF/HSS is the same as for a normal Diameter message routing. If the MME/SGSN knows the address/name of the IWF/HSS for a certain user, both the Destination-Realm and Destination-Host AVPs shall be present in the request. Otherwise, only the Destination-Realm AVP shall be present and the command shall be routed to the next Diameter node based on the Diameter routing table in the client.

When the MME/SGSN receives an answer message from the IWF/HSS, it should store the identity of the IWF/HSS for each IMSI for future reference to be able to send messages for the same IMSI.

2. The IWF shall assign an SS7 number for the Diameter node MME/SGSN and shall assign a Diameter identity for the SS7 node HSS. This may be achieved by static configuration or dynamic assignment when the first signalling exchange occurs between the Diameter/SS7 nodes and the IWF. The IWF shall maintain a mapping table (address mapping table) for the assignment relationship.

When a Diameter message reaches the IWF to set up a new Diameter session, the IWF(s) shall allocate a MAP Dialogue Id for the Diameter session. The IWF(s) shall maintain a mapping table (session mapping table) between the MAP Dialogue Id and the Diameter Session Id.

The IWF shall then process messages as described below:

- a. When the IWF receives a Diameter message from a Diameter node, it shall map the Diameter message to a MAP message. It shall obtain a MAP Dialogue Id from the Diameter Session Id in the received message according to the session mapping table. The IWF shall obtain the source/destination SS7 Number from the source/destination Diameter Identity in the received message according to the address mapping table.
  - b. When the IWF receives an SS7 message from an SS7 node, it shall map the MAP message to a Diameter message. It shall obtain the Diameter Session Id from the MAP Dialogue Id in the received message according to the session mapping table. The IWF shall obtain the source/destination Diameter Identity from the source/destination SS7 Number in the received message according to the address mapping table.
3. When the HSS/HLR receives the first message from IWF/SGSN, the HSS/HLR shall record the SS7 number of the source for future message handling.

## 5.2 Void

## 5.3 Security Consideration for IWF

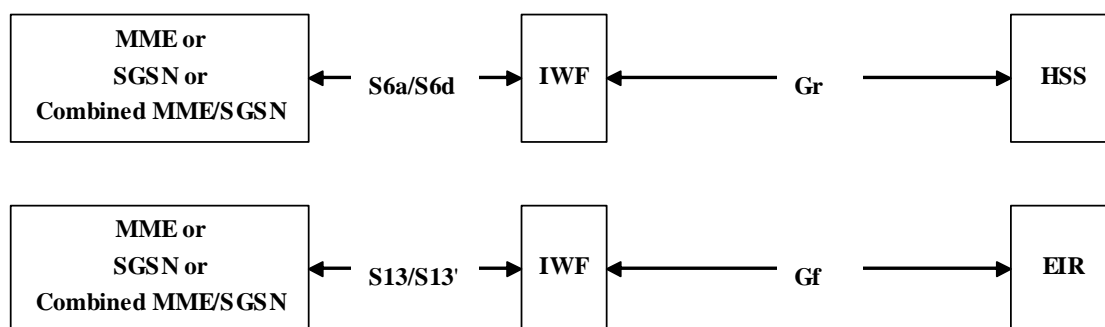
To support the full EPS-AKA security level for the related IWF scenarios, the Pre Rel8 HLR shall be upgraded so that E-UTRAN authentication vector requests from nodes serving E-UTRAN can be identified. The detailed mechanism is described in 3GPP TS 33.401 [2].

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# 6 The Interworking Scenarios

## 6.1 One IWF scenario

In this scenario, one IWF is located between MME or SGSN or combined MME/SGSN and HSS or one IWF is located between MME and EIR, as illustrated in figure 6.1-1:

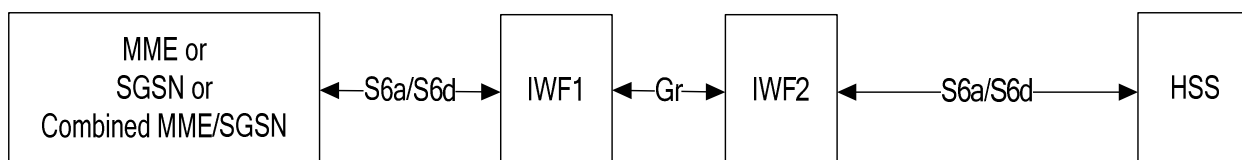


**Figure 6.1.-1: One IWF scenarios**

The IWF needs not to be aware whether its connection via Gr is to an HSS or to a second IWF (see Two IWF scenario).

## 6.2 Two IWF scenario

In this scenario, two IWFs are located between MME or SGSN or combined MME/SGSN and HSS, as illustrated in figure 6.2-1:



**Figure 6.2-1: Two IWFs scenario**

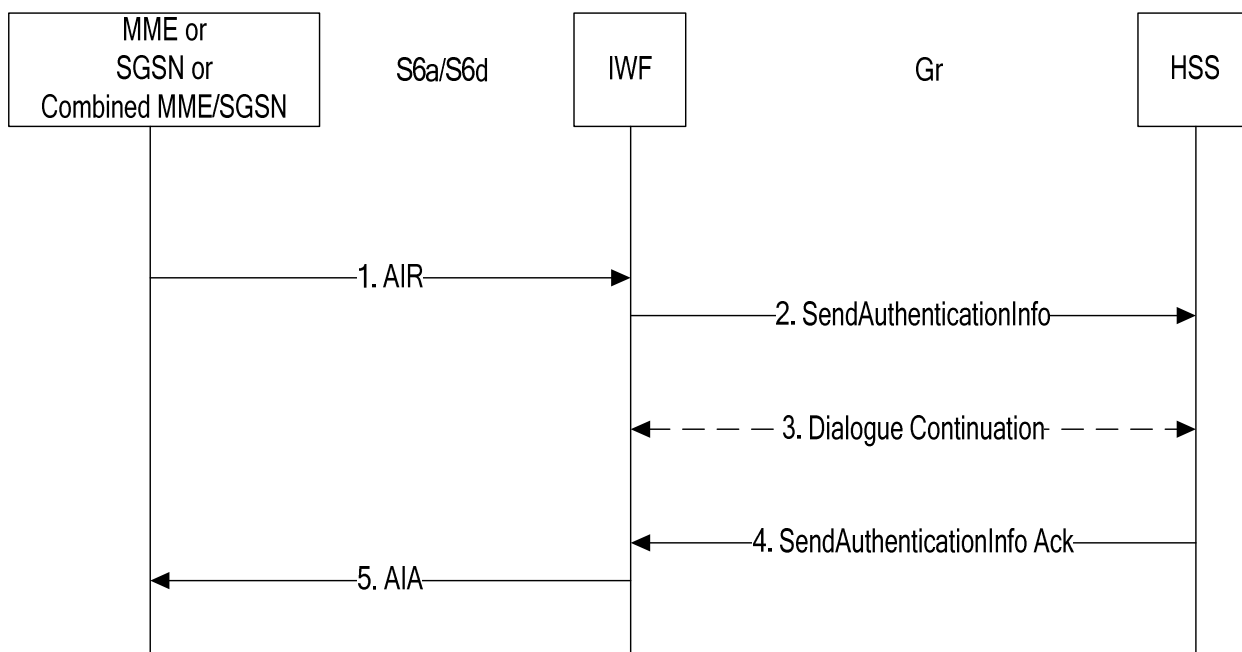
The IWF1 is located in the VPLMN. IWF2 is located in the HPLMN. The IWF1 needs not to be aware whether its connection via Gr is to an IWF or to an HSS (see One IWF scenario).

## 7 The Mapping of the Procedures

### 7.1 Authentication Information Retrieval

#### 7.1.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.1.1-1:

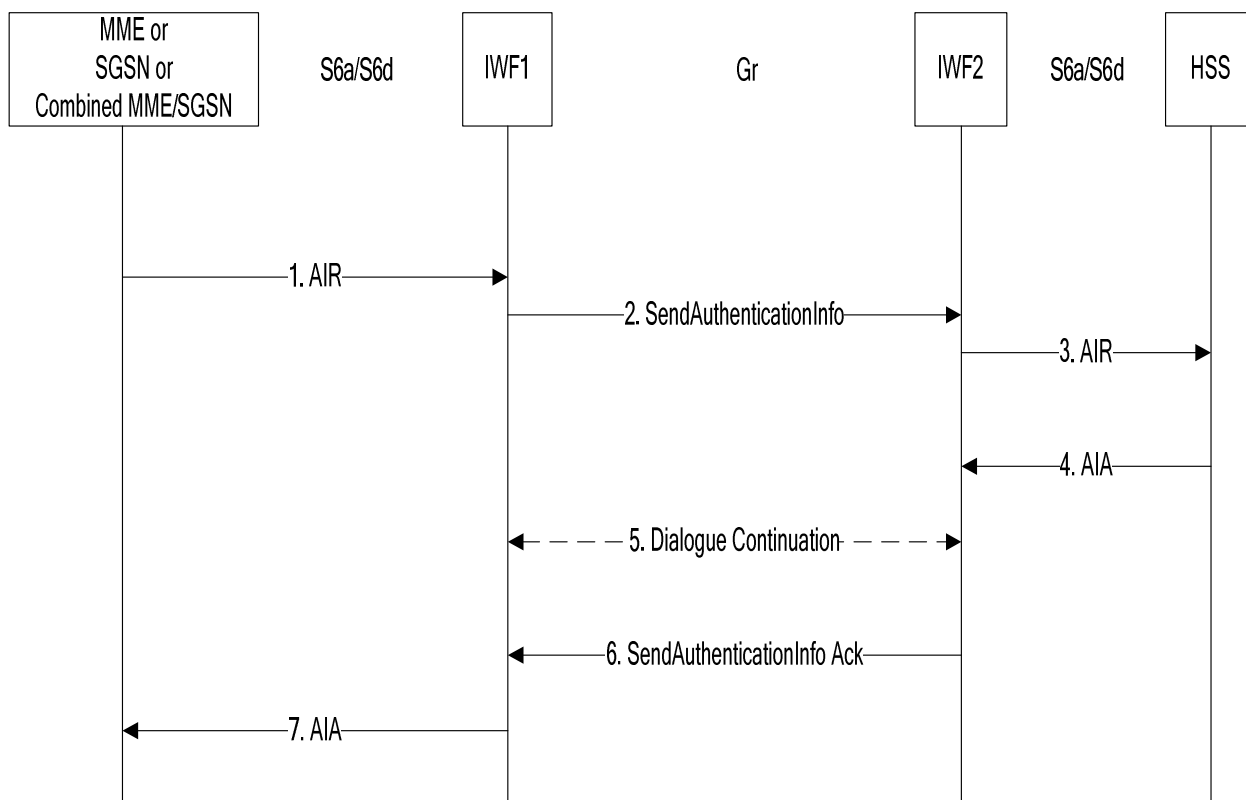


**Figure 7.1.1-1: Mapping of Authentication Info Retrieval Procedure for scenario with one IWF**

1. The IWF receives an AIR message from the MME, SGSN or combined MME/SGSN.
2. The IWF opens a MAP v3 dialogue towards the HSS by sending SendAuthenticationInfo.
3. The HSS may initiate MAP version fallback and/or send partial results. The IWF performs the version fallback and/or stores the partial results. If EPS-Vectors are requested for immediate use, version fallback is not applicable;
4. The HSS closes the MAP dialogue by sending the (final) SendAuthenticationInfo Ack to the IWF.
5. The IWF uses the information received from the HSS to construct an AIA which is sent to the MME, SGSN, or combined MME/SGSN.

## 7.1.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.1.2-1:



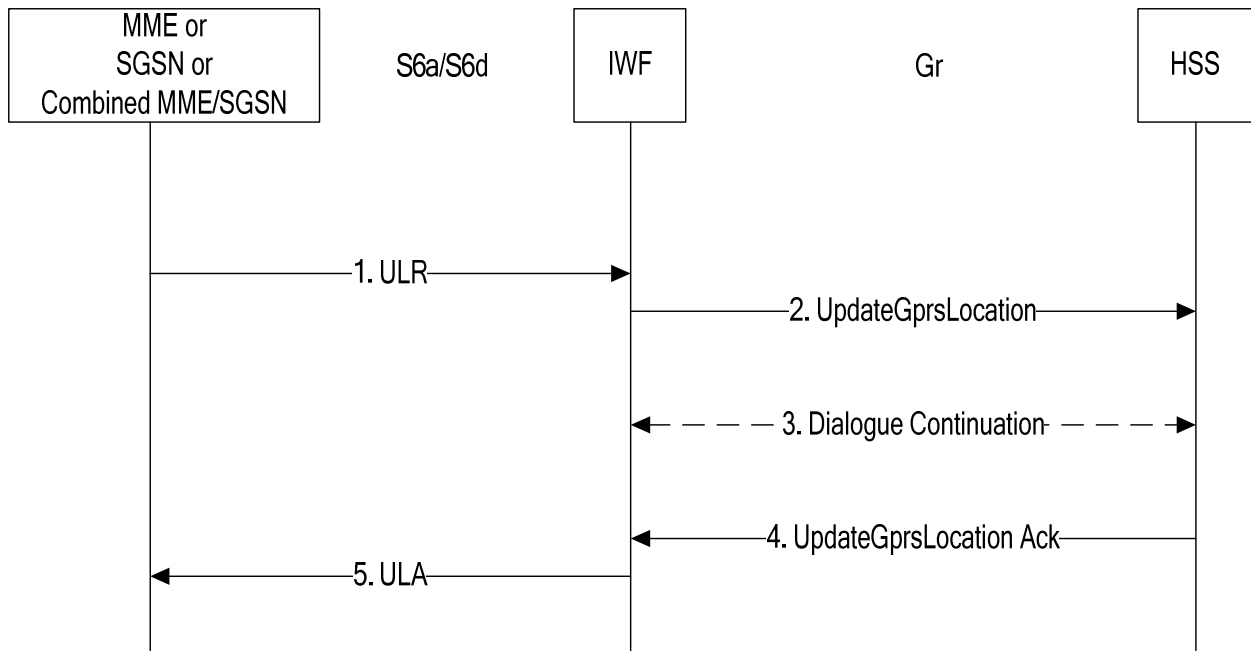
**Figure 7.1.2-1: Mapping of Authentication Info Retrieval Procedure for scenario with two IWFs**

1. The IWF1 receives an AIR message from the MME, SGSN or combined MME/SGSN.
2. The IWF1 opens a MAP v3 dialogue towards IWF2 by sending SendAuthenticationInfo.
3. The IWF2 constructs an AIR message and sends it to the HSS.
4. The IWF2 receives AIA from the HSS.
5. If segmentation is required, the IWF2 sends partial results to the IWF1 which stores the partial results.
6. The IWF2 closes the MAP dialogue by sending the (final) SendAuthenticationInfo Ack to IWF1.
7. The IWF1 uses the information received from the IWF2 to construct an AIA which is sent to the MME, SGSN, or combined MME/SGSN.

## 7.2 Update Location

### 7.2.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.2.1-1:



**Figure 7.2.1-1: Mapping of Update Location Procedure for scenario with one IWF**

1. The IWF receives an ULR message from the MME, SGSN or combined MME/SGSN.
2. The IWF shall open a MAP v3 dialogue towards the HSS by sending UpdateGprsLocation.
3. Depending on "skip subscriber data" indication received in the ULR (bullet 1 above) and hence sent as per bullet 2 in the UpdateGprsLocation, the HSS may continue the MAP dialogue by sending one or several InsertSubscriberData messages (in acknowledgement mode or in burst mode) to the IWF. The IWF then temporarily stores the received data and sends InsertSubscriberData Ack messages to the HSS.

Note that the HSS may send InsertSubscriberData messages although a "skip subscriber data" indication was present. In this case InsertSubscriberData messages received from the HSS shall be acknowledged but need not be stored in the IWF.

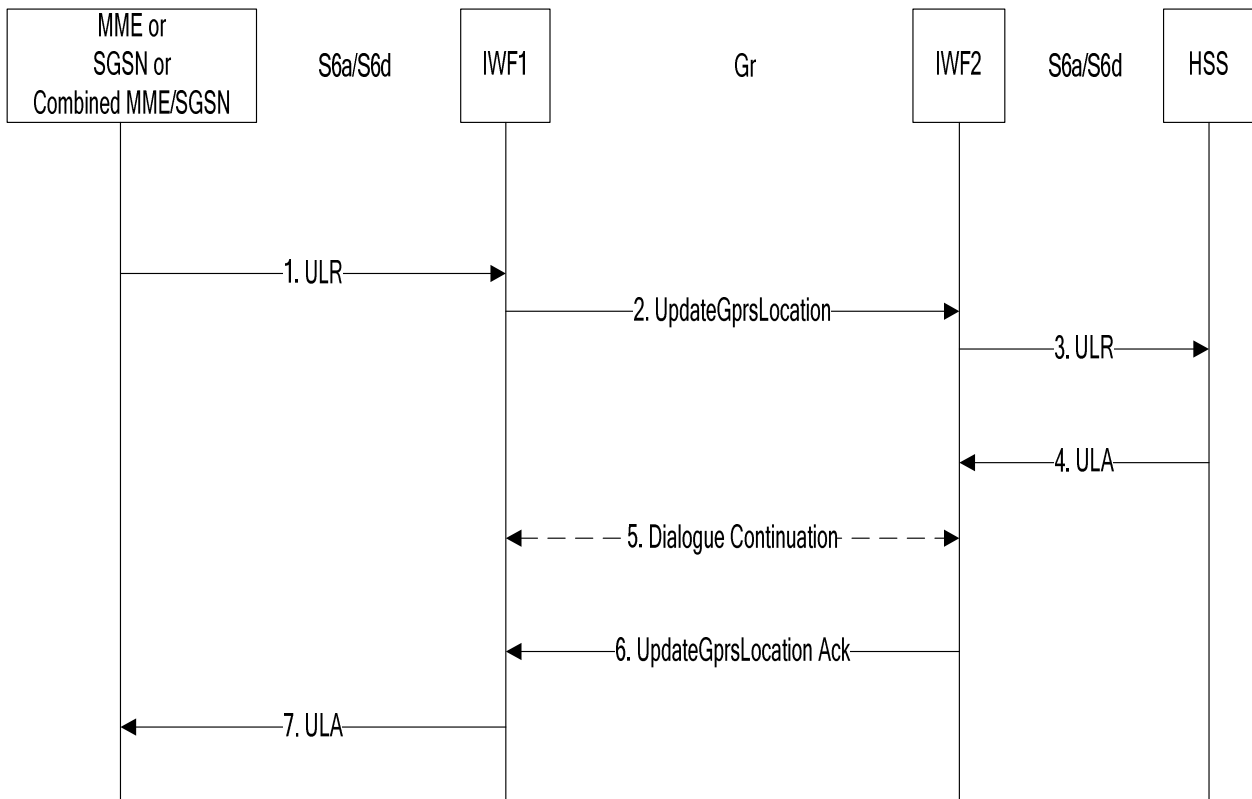
When sending InsertSubscriberData Ack messages to the HSS the IWF shall mirror back any services requested by the HSS (within the InsertSubscriberData message) but not supported by the MME or SGSN or combined MME/SGSN (as indicated in 1.ULR). The IWF shall reject a MAP ActivateTraceMode message received from the HSS by returning ActivateTraceMode Error (facilityNotSupported).

If the IWF received a MAP ActivateTraceMode message from the HSS, the IWF needs to store the received trace data. Based upon support of tracing (as indicated the ULR received in bullet 1 above), the MME/SGSN sends an ActivateTraceMode Result (positive Ack) or Error FacilityNotSupported (negative Ack) to the HSS.

4. The HSS shall close the MAP dialogue by sending UpdateGprsLocation Ack to the IWF.
5. The IWF shall use the information received from the HSS to construct an ULA which is sent to the MME, SGSN, or combined MME/SGSN.

## 7.2.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.2.2-1:



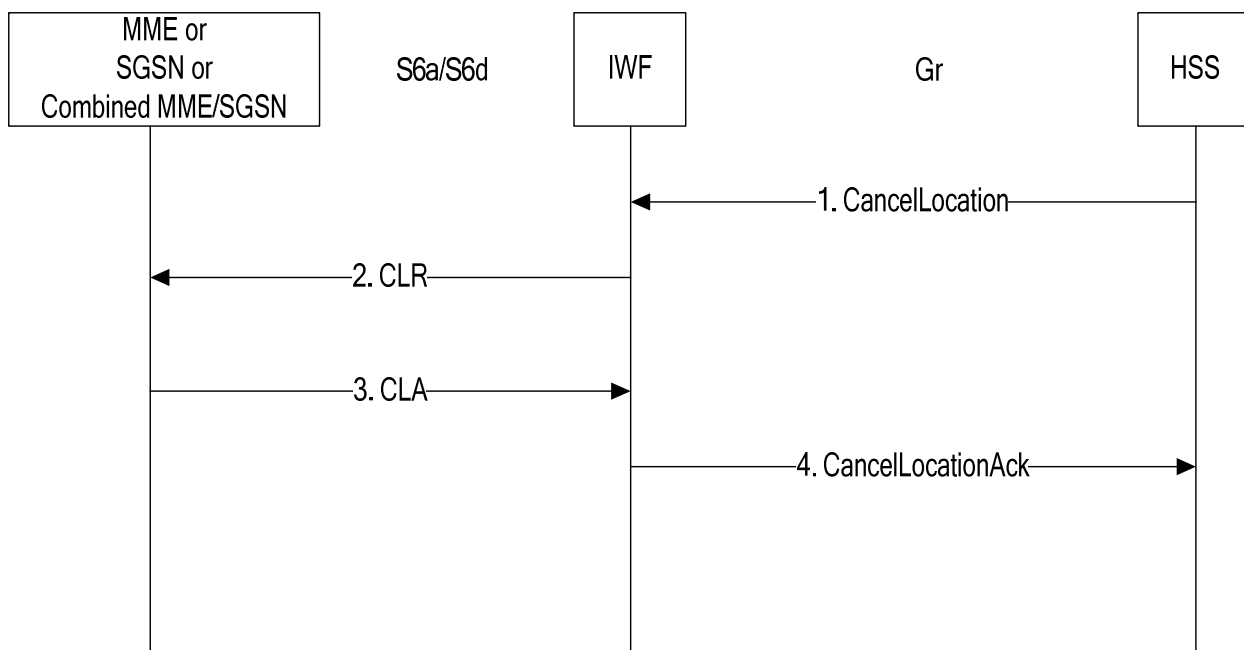
**Figure 7.2.2-1: Mapping of Update Location Procedure for scenario with two IWFs**

1. The IWF1 receives an ULR message from the MME, SGSN or combined MME/SGSN.
2. The IWF1 shall open a MAP v3 dialogue towards IWF2 by sending UpdateGprsLocation.
3. The IWF2 shall construct a ULR message and shall send it to the HSS.
4. The IWF2 receives ULA from the HSS.
5. If subscriber data is included in the ULA(as per bullet 4), the IWF2 shall send one or several InsertSubscriberData messages (in acknowledgement mode or in burst mode) to the IWF1. IWF1 then temporarily stores the received data and sends InsertSubscriberData Ack messages to the IWF2. If trace data is included in the ULA (bullet 4. above) , the IWF2 sends an ActivateTraceMode message to the IWF1, which sends an ActivateTraceMode Ack message to the IWF2.
6. The IWF2 shall close the MAP dialogue by sending UpdateGprsLocation Ack to IWF1.
7. The IWF1 shall use the information received from the IWF2 to construct an ULA which shall be sent to the MME, SGSN, or combined MME/SGSN.

## 7.3 Cancel Location

### 7.3.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.3.1-1:



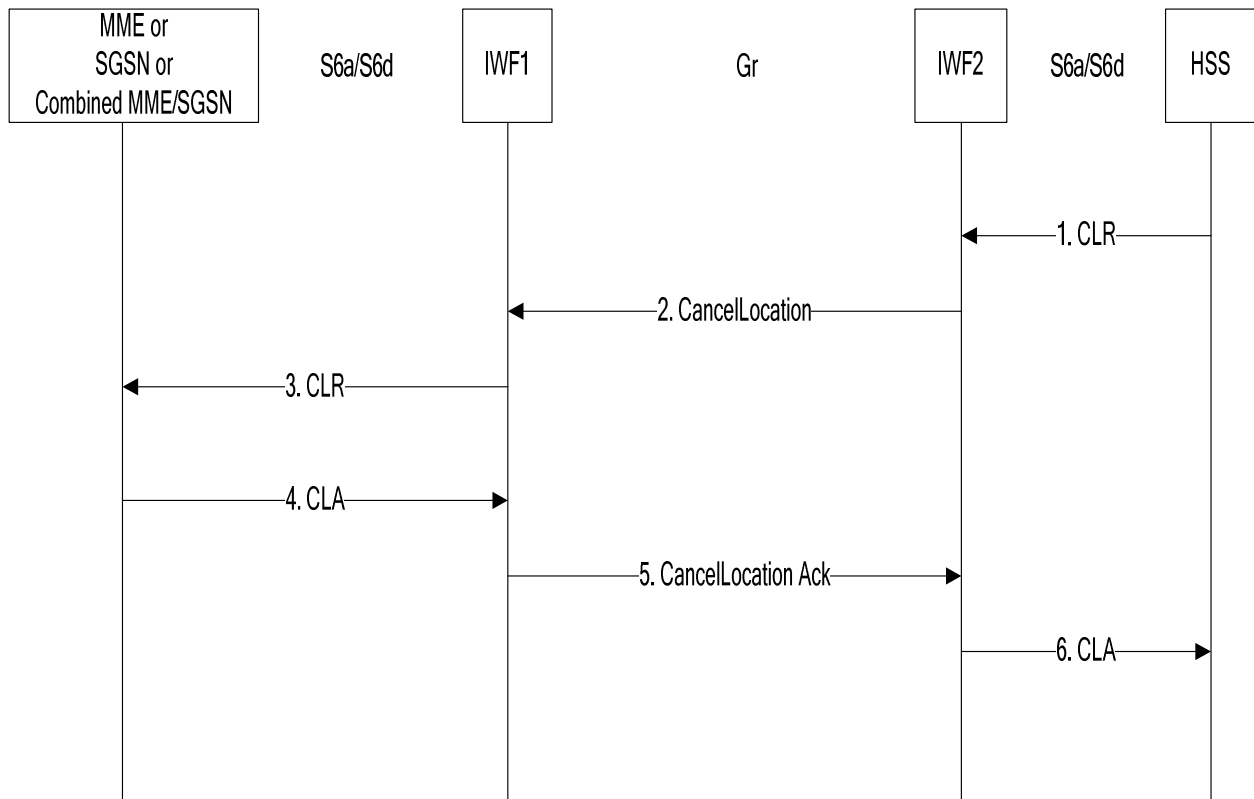
**Figure 7.3.1-1: Mapping of Cancel Location Procedure for scenario with one IWF**

1. The IWF receives a CancelLocation MAP v3 message from the HSS (the IWF shall reject CancelLocation messages in version <3 and shall initiate version fallback when receiving CancelLocation messages in versions >3; not shown in figure 7.3.1-1).
2. The IWF sends CLR to the MME or SGSN or combined MME/SGSN.
3. The IWF receives CLA.
4. The IWF closes the MAP dialogue with the HSS by sending CancelLocation Ack.

## 7.3.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.3.2-1:





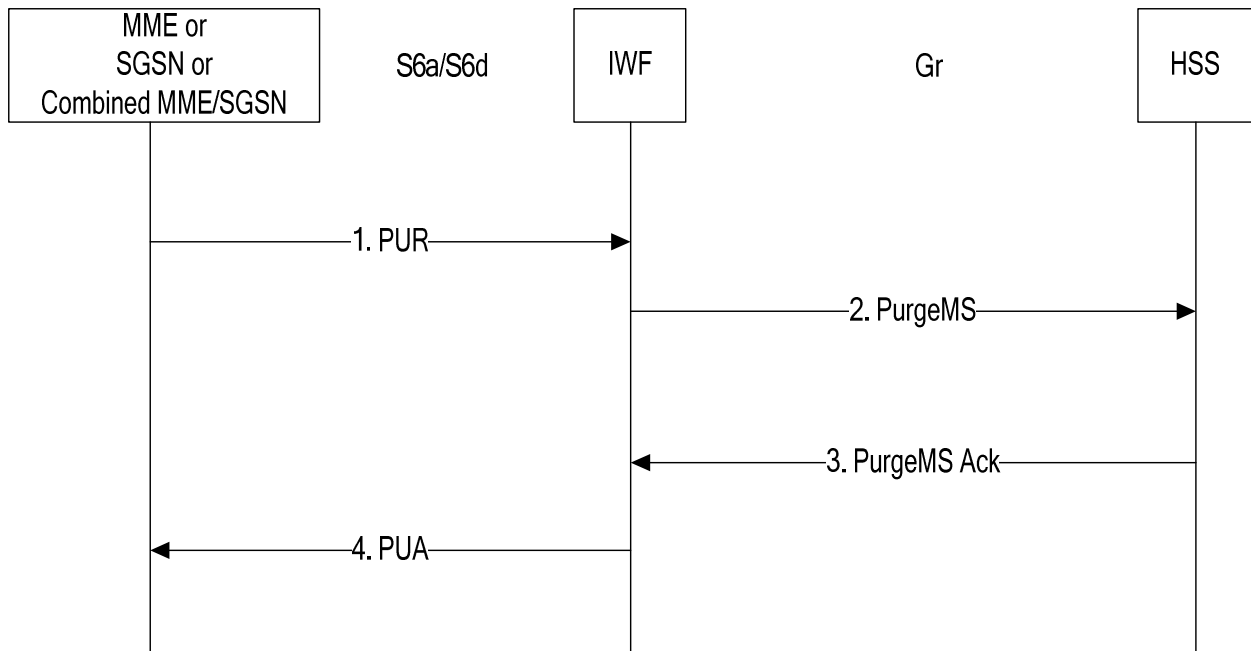
**Figure 7.3.2-1: Mapping of Cancel Location Procedure for scenario with two IWFs**

1. The IWF2 receives a CLR message from the HSS.
2. The IWF2 opens a MAP v3 dialogue towards IWF1 by sending CancelLocation.
3. The IWF1 constructs a CLR message and sends it to the MME, SGSN, or combined MME/SGSN.
4. The IWF1 receives CLA from the MME, SGSN or combined MME/SGSN.
5. The IWF1 closes the MAP dialogue with the IWF2 by sending CancelLocation Ack.
6. The IWF2 sends CLA to the HSS.

## 7.4 Purge

### 7.4.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.4.1-1:

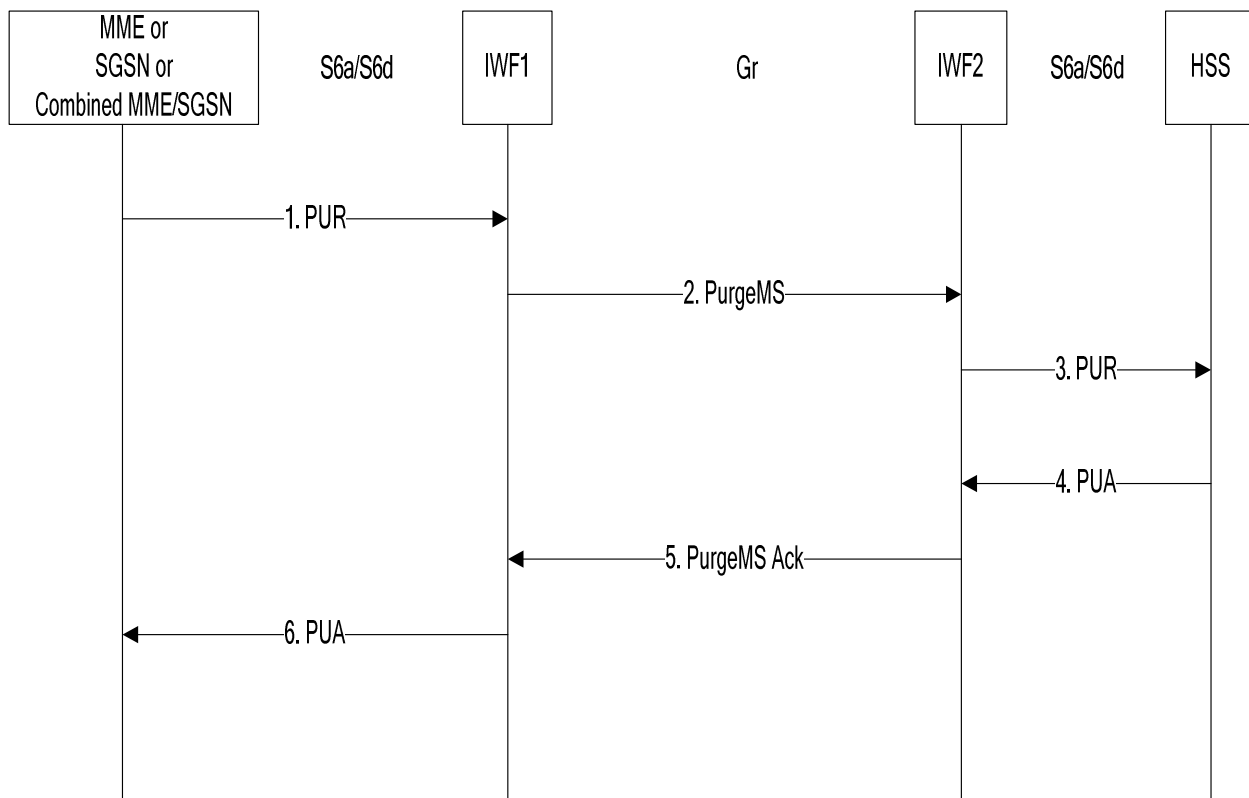


**Figure 7.4.1-1: Mapping of Purge Procedure for scenario with one IWF**

1. The IWF receives a PUR message from the MME, SGSN, or combined MME/SGSN.
2. The IWF opens a MAP v3 dialogue towards the HSS by sending PurgeMS.
3. The IWF receives PurgeMS Ack from the HSS.
4. The IWF sends PUA to the MME, SGSN, or combined MME/SGSN.

## 7.4.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.4.2-1:



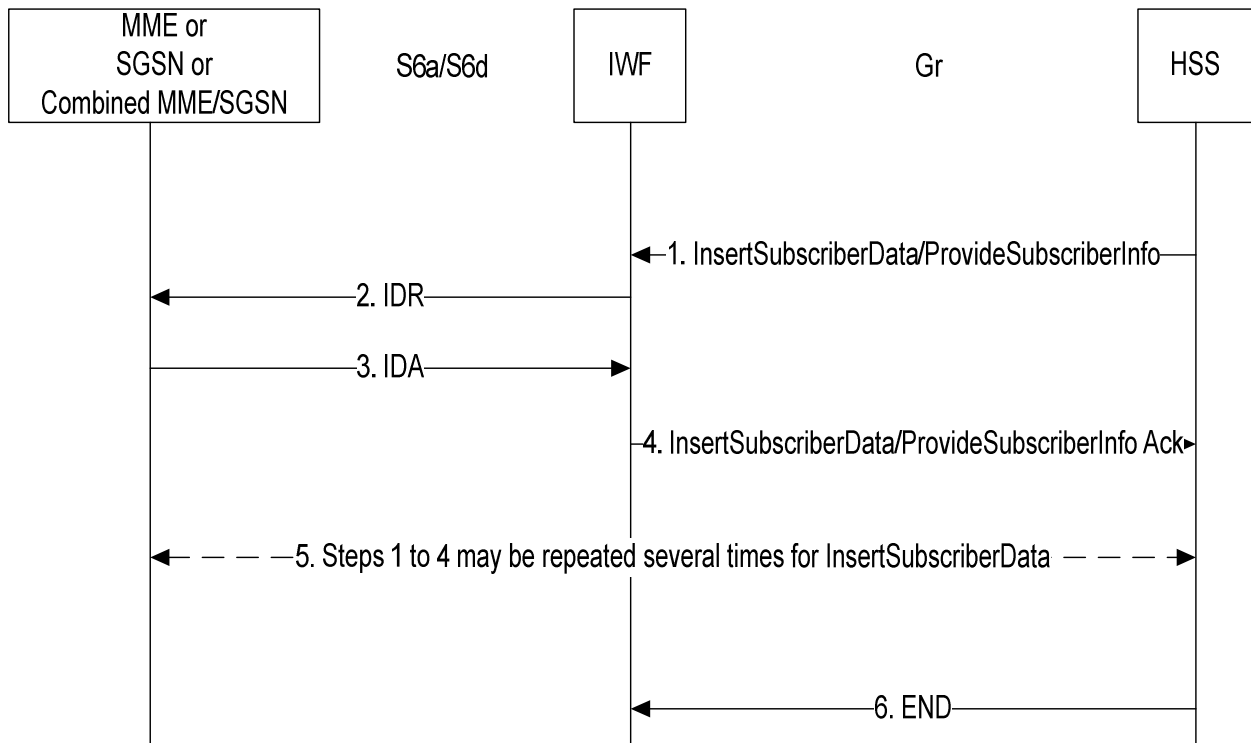
**Figure 7.4.2-1: Mapping of Purge Procedure for scenario with two IWFs**

1. The IWF1 receives a PUR message from the MME, SGSN, or combined MME/SGSN.
2. The IWF1 opens a MAP v3 dialogue towards IWF2 by sending PurgeMS.
3. The IWF2 constructs a PUR message and sends it to the HSS.
4. The IWF2 receives PUA from the HSS.
5. The IWF2 closes the MAP dialogue with the IWF1 by sending PurgeMS Ack.
6. The IWF1 sends PUA to the MME, SGSN, or combined MME/SGSN.

## 7.5 Insert Subscriber Data

### 7.5.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.5.1-1:



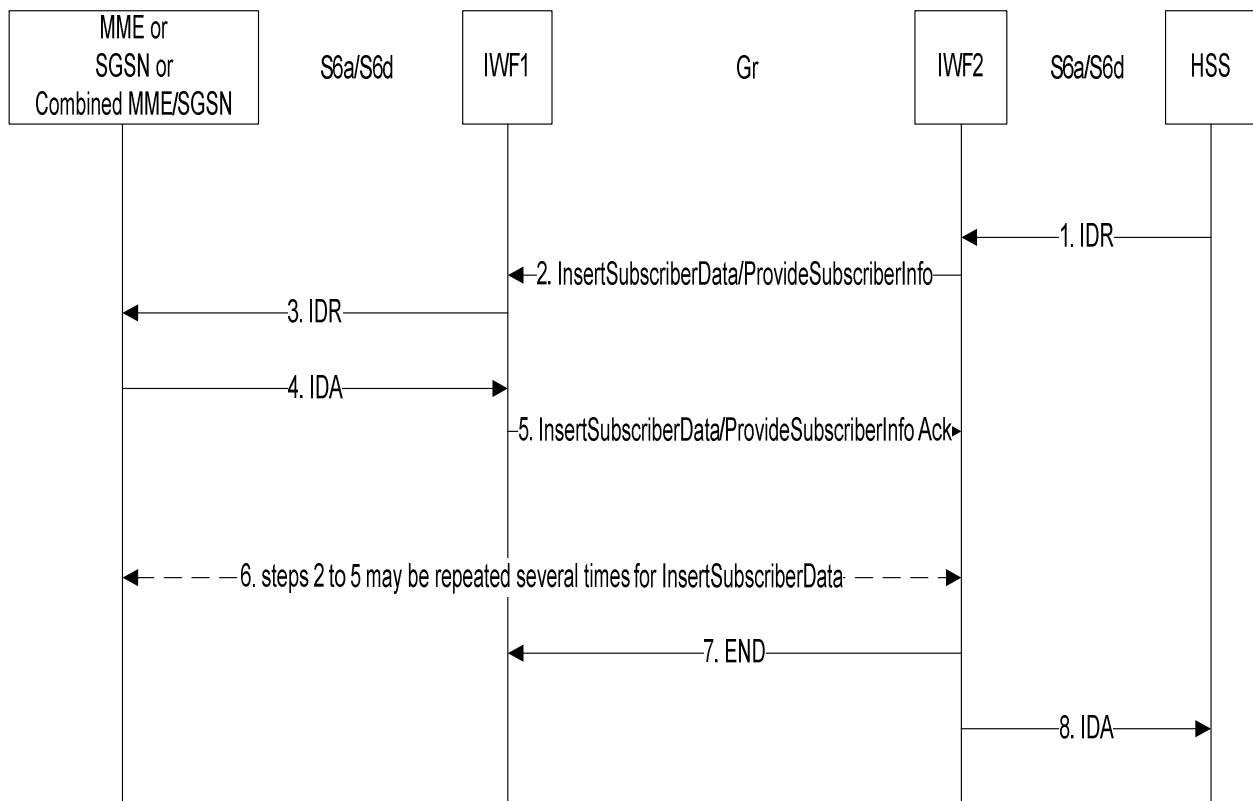
**Figure 7.5.1-1: Mapping of Insert Subscriber Data Procedure for scenario with one IWF**

1. The IWF receives an (stand alone) InsertSubscriberData or ProvideSubscriberInfo message from the HSS.
2. The IWF constructs an IDR message and sends it to the MME, SGSN, or combined MME/SGSN.
3. The IWF receives IDA from the MME, SGSN, or combined MME/SGSN.
4. The IWF sends InsertSubscriberData or ProvideSubscriberInfo Ack to the HSS.
5. Steps 1 to 4 may be repeated several times for InsertSubscriberData. The repetition may be in burst mode or in acknowledge mode.
6. The HSS closes the MAP dialogue.

**NOTE:** In a mapping procedure, the IWF correlates the MAP Dialogue ID of the MAP request message and the Diameter Session-ID of the mapped Diameter request message which is to be used in the subsequent mapping from Diameter Answer message to corresponding MAP Ack message.

## 7.5.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.5.2-1:



**Figure 7.5.2-1: Mapping of Insert Subscriber Data Procedure for scenario with two IWFs**

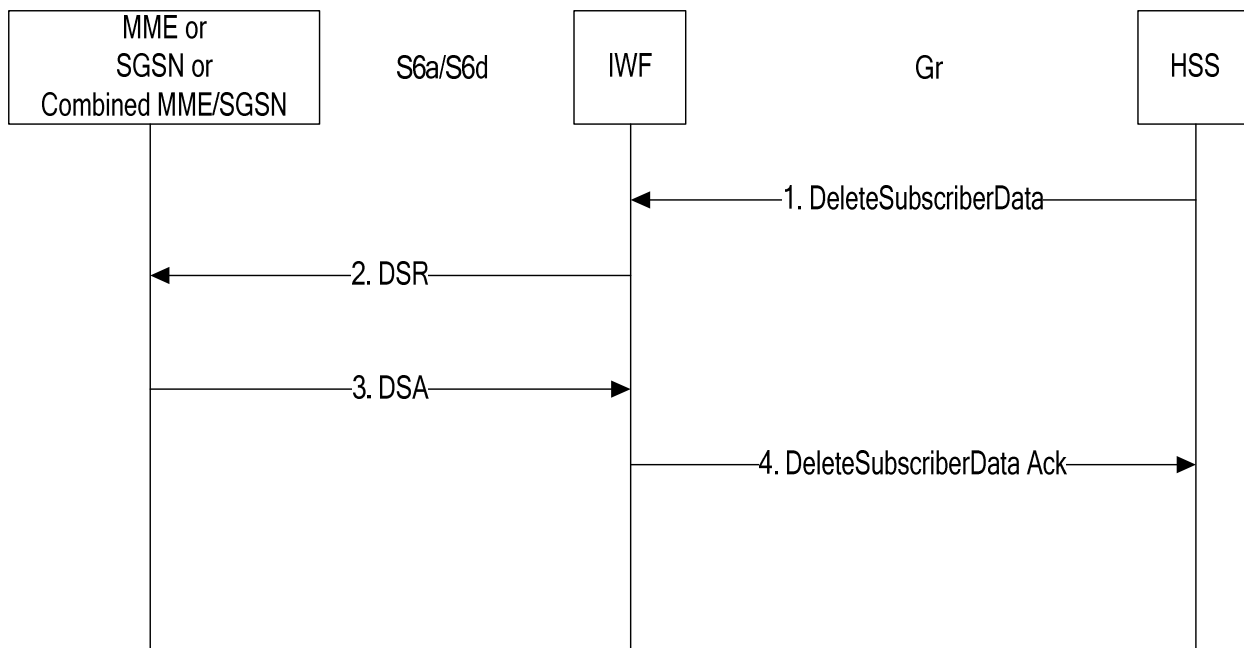
1. The IWF2 receives a IDR message from the HSS.
2. The IWF2 opens a MAP v3 dialogue towards IWF1 by sending InsertSubscriberData (if the IDR-Flags AVP within the IDR is not present or the "UE Reachability Request" flag was set in the IDR-Flags AVP within the IDR) or ProvideSubscriberInfo in other cases. If segmentation of the data (on MAP level) is required the IWF2 temporarily stores the data that could not be sent in this step.
3. The IWF1 constructs a IDR message and sends it to the MME, SGSN, or combined MME/SGSN.
4. The IWF1 receives IDA from the MME, SGSN, or combined MME/SGSN.
5. The IWF1 sends InsertSubscriberData or ProvideSubscriberInfo Ack to IWF2.
6. If segmentation is required for InsertSubscriberData, steps 2 to 5 are be repeated until all data are sent. Repetition may be in burst mode or in acknowledge mode.
7. IWF2 closes the MAP dialogue with IWF1.
8. IWF2 sends IDA to the HSS.

**NOTE:** In a mapping procedure, the IWFs correlates the MAP Dialogue ID of the MAP request message and the Diameter Session-ID of the mapped Diameter request message which is to be used in the subsequent mapping from Diameter Answer message to corresponding MAP Ack message or vice versa.

## 7.6 Delete Subscriber Data

### 7.6.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.6.1-1:

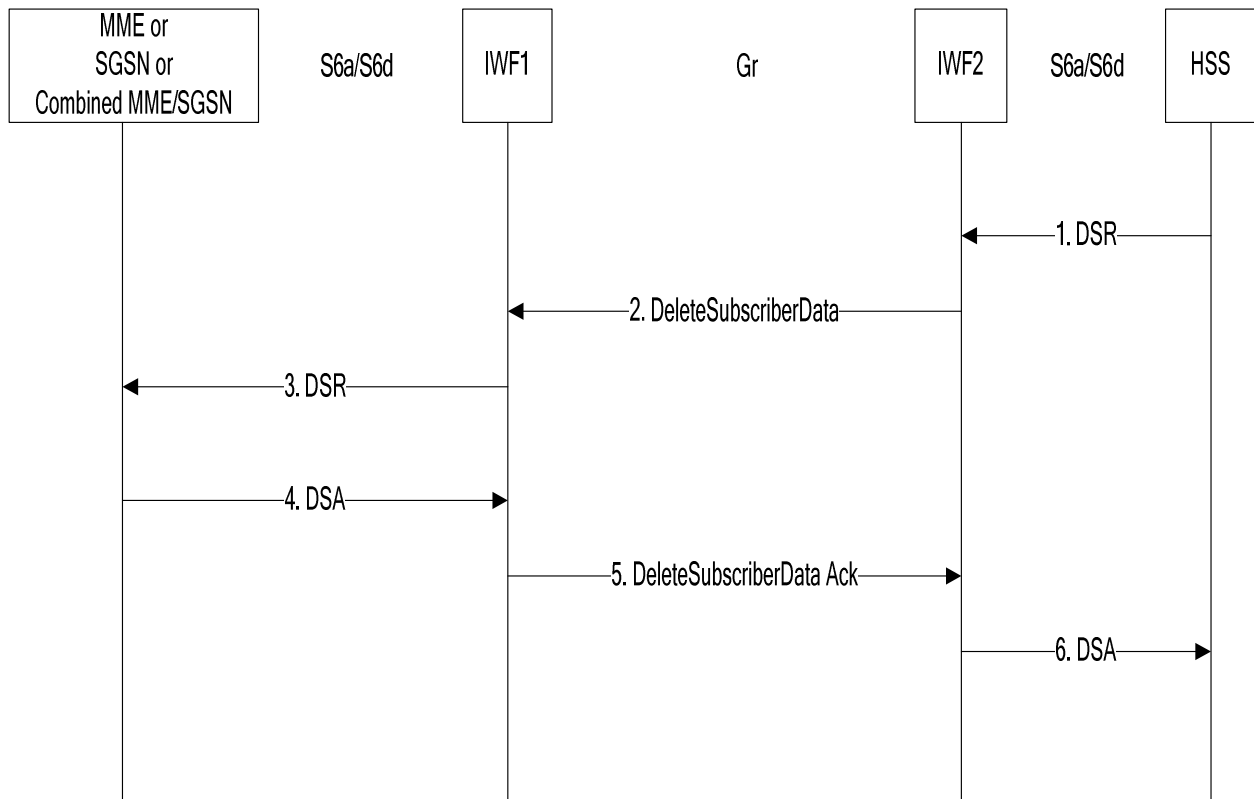


**Figure 7.6.1-1: Mapping of Delete Subscriber Data Procedure for scenario with one IWF**

1. The IWF receives a DeleteSubscriberData MAP v3 message from the HSS (the IWF shall reject DeleteSubscriberData messages in version <3 and shall initiate version fallback when receiving DeleteSubscriberData messages in versions >3; not shown in figure 7.6.1-1).
2. The IWF sends DSR to the MME or SGSN or combined MME/SGSN.
3. The IWF receives DSA.
4. The IWF closes the MAP dialogue with the HSS by sending DeleteSubscriberData Ack.

## 7.6.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.6.2-1:



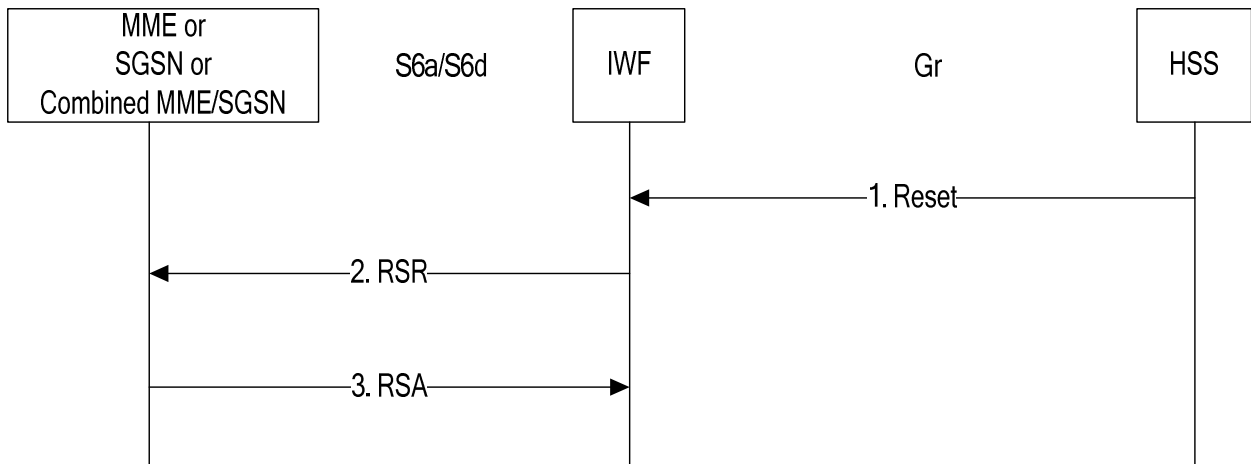
**Figure 7.6.2-1: Mapping of Delete Subscriber Data Procedure for scenario with two IWFs**

1. The IWF2 receives a DSR message from the HSS.
2. The IWF2 opens a MAP v3 dialogue towards IWF1 by sending DeleteSubscriberData.
3. The IWF1 constructs a DSR message and sends it to the MME, SGSN, or combined MME/SGSN.
4. The IWF1 receives DSA from the MME, SGSN or combined MME/SGSN.
5. The IWF1 closes the MAP dialogue with the IWF2 by sending DeleteSubscriberData Ack.
6. The IWF2 sends DSA to the HSS.

## 7.7 Reset

### 7.7.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.7.1-1:

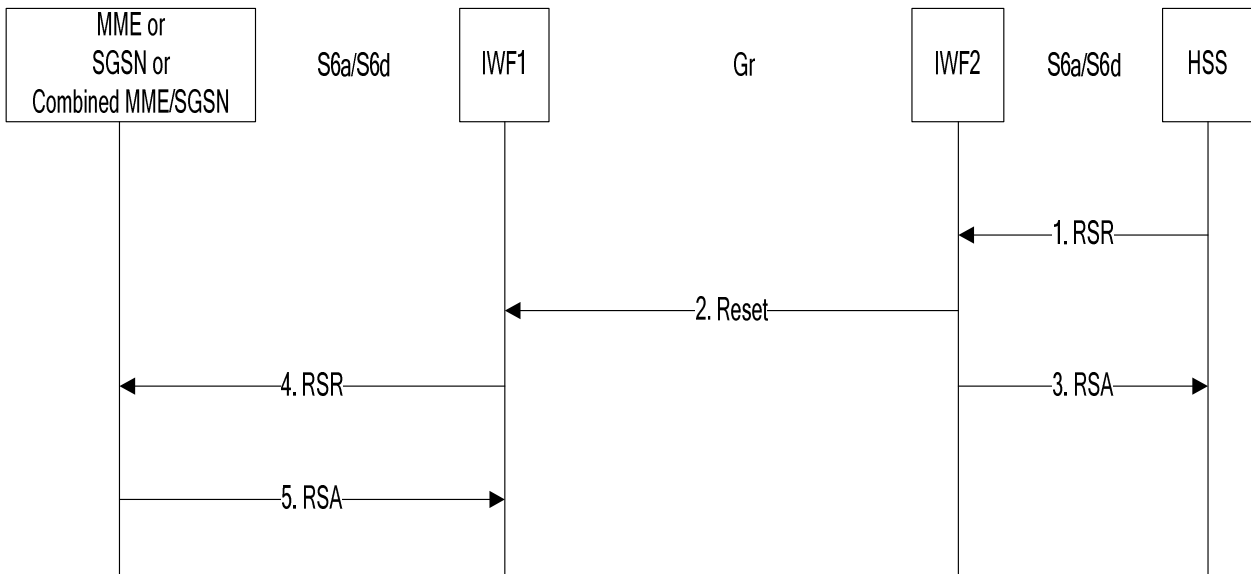


**Figure 7.7.1-1: Mapping of Reset Procedure for scenario with one IWF**

1. The IWF receives a Reset MAP v1 or v2 message from the HSS.
2. The IWF sends RSR to the MME or SGSN or combined MME/SGSN.
3. The IWF receives RSA.

### 7.7.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.7.2-1:



**Figure 7.7.2-1: Mapping of Reset Procedure for scenario with two IWFs**

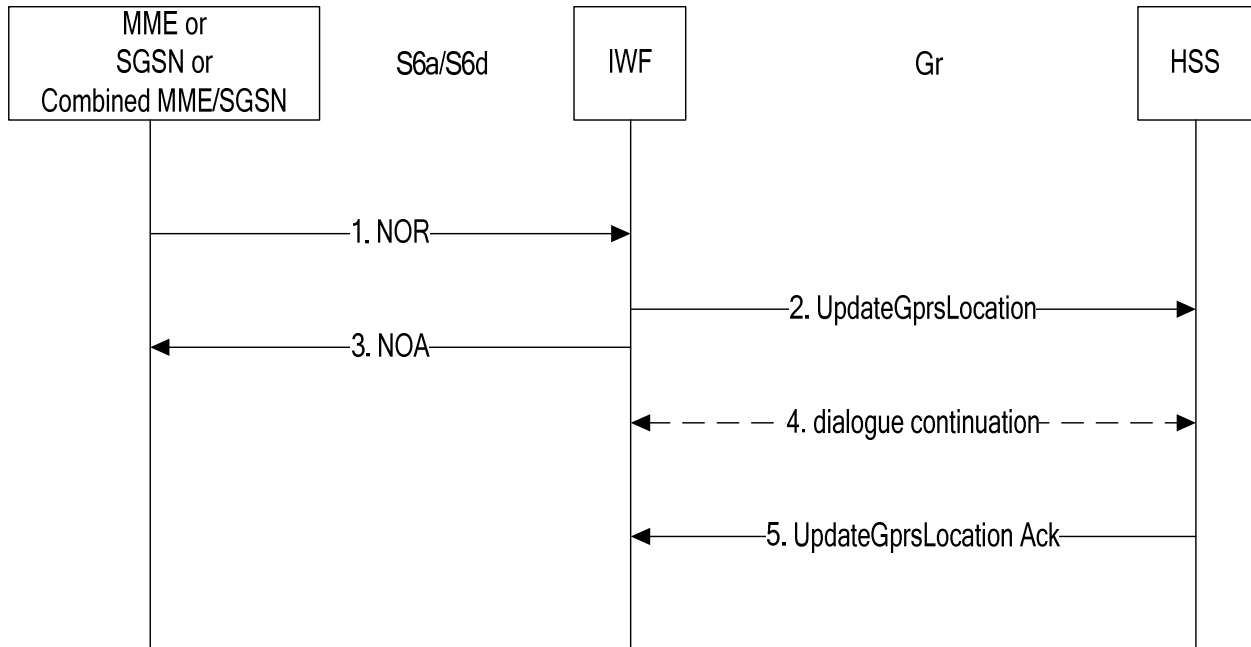
1. The IWF2 receives a RSR message from the HSS.
2. The IWF2 opens a MAP v1 or v2 (vendor option) dialogue towards IWF1 by sending Reset.
3. The IWF2 sends RSA to the HSS.
4. The IWF1 constructs a RSR message and sends it to the MME, SGSN, or combined MME/SGSN.
5. The IWF1 receives RSA from the MME, SGSN or combined MME/SGSN.



## 7.8 Notification

### 7.8.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.8.1-1:

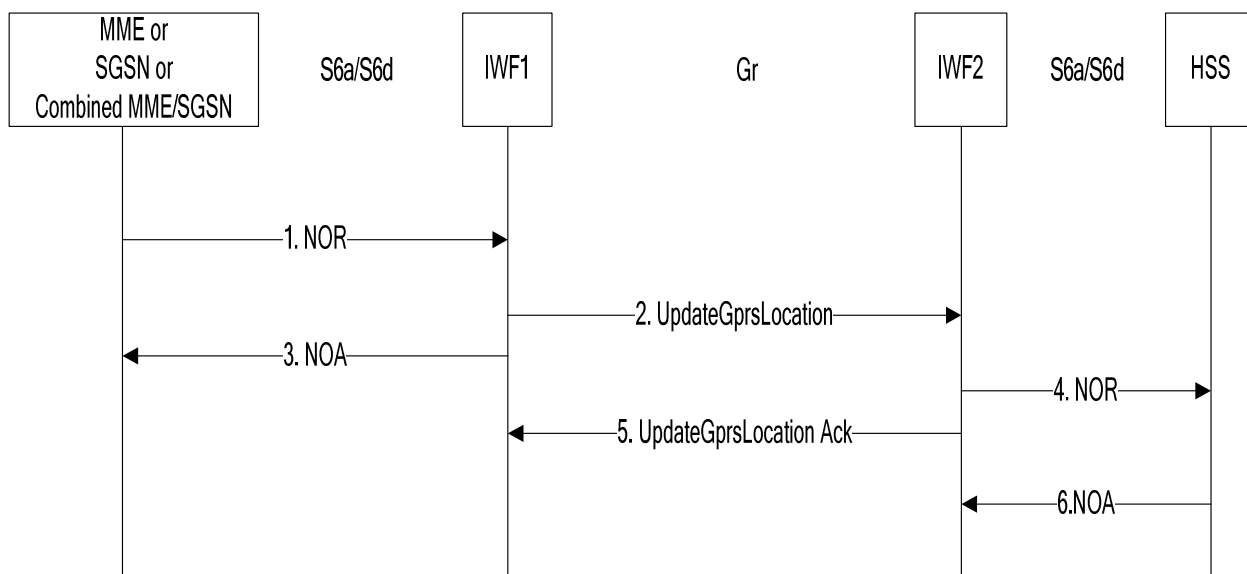


**Figure 7.8.1-1: Mapping of Notification Procedure for scenario with one IWF**

1. The IWF receives a NOR message from the MME, SGSN, or combined MME/SGSN.
2. The IWF sends UpdateGprsLocation or ReadyForSM to the HSS.
3. The IWF sends NOA to the MME, SGSN, or combined MME/SGSN.
4. The HSS (if it does not support the "skip subscriber data" indication) may continue the MAP dialogue by sending InsertSubscriberData messages which are positively acknowledged and discarded by the IWF.
5. The HSS closes the MAP dialogue by sending UpdateGprsLocation Ack or ReadyForSM Ack.

### 7.8.2 Two IWFs Scenario

The mapping of procedures for this scenario is shown in figure 7.8.2-1:



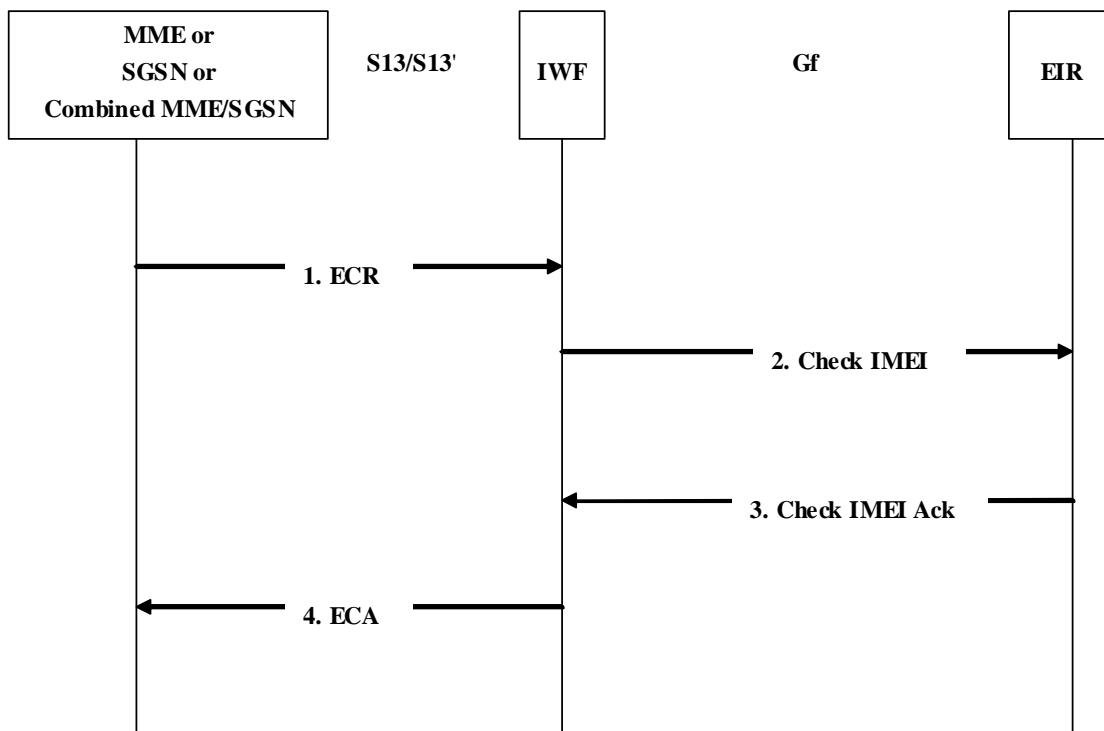
**Figure 7.8.2-1: Mapping of Notification Procedure for scenario with two IWFs**

1. The IWF1 receives a NOR message from the MME, SGSN, or combined MME/SGSN.
2. The IWF1 sends UpdateGprsLocation or ReadyForSM to the IWF2.
3. The IWF1 sends NOA to the MME, SGSN, or combined MME/SGSN.
4. The IWF2 sends NOR to the HSS.
5. The IWF2 closes the MAP dialogue with IWF1 by sending UpdateGprsLocation Ack or ReadyForSM Ack.
6. The IWF2 receives NOA from the HSS.

## 7.9 IMEI Check

### 7.9.1 One IWF Scenario

The mapping of procedures for this scenario is shown in figure 7.9.1-1:



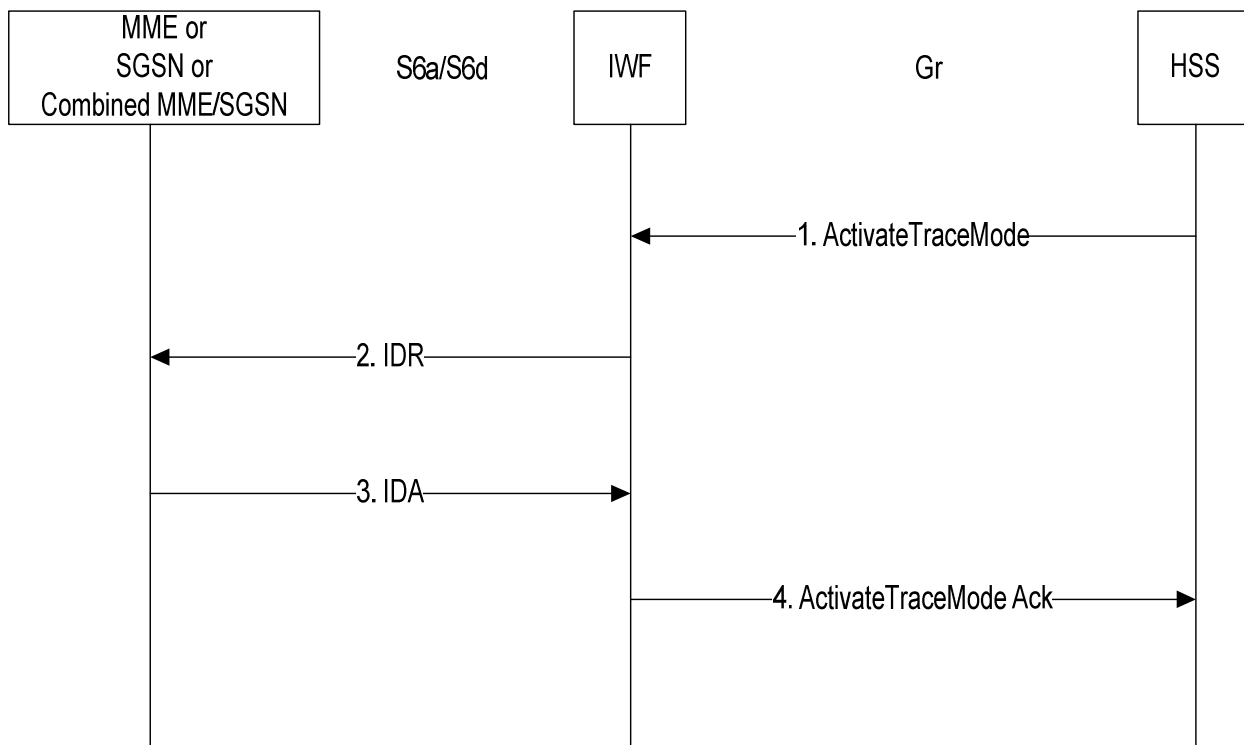
**Figure 7.9.1-1: Mapping of IMEI Check Procedure with one IWF**

1. The IWF receives an ECR message from the MME/SGSN.
2. The IWF sends Check IMEI to the EIR.
3. The IWF receives Check IMEI Ack from the EIR.
4. The IWF sends ECA to the MME/SGSN.

## 7.10 Trace Activation

### 7.10.1 One IWF Scenario

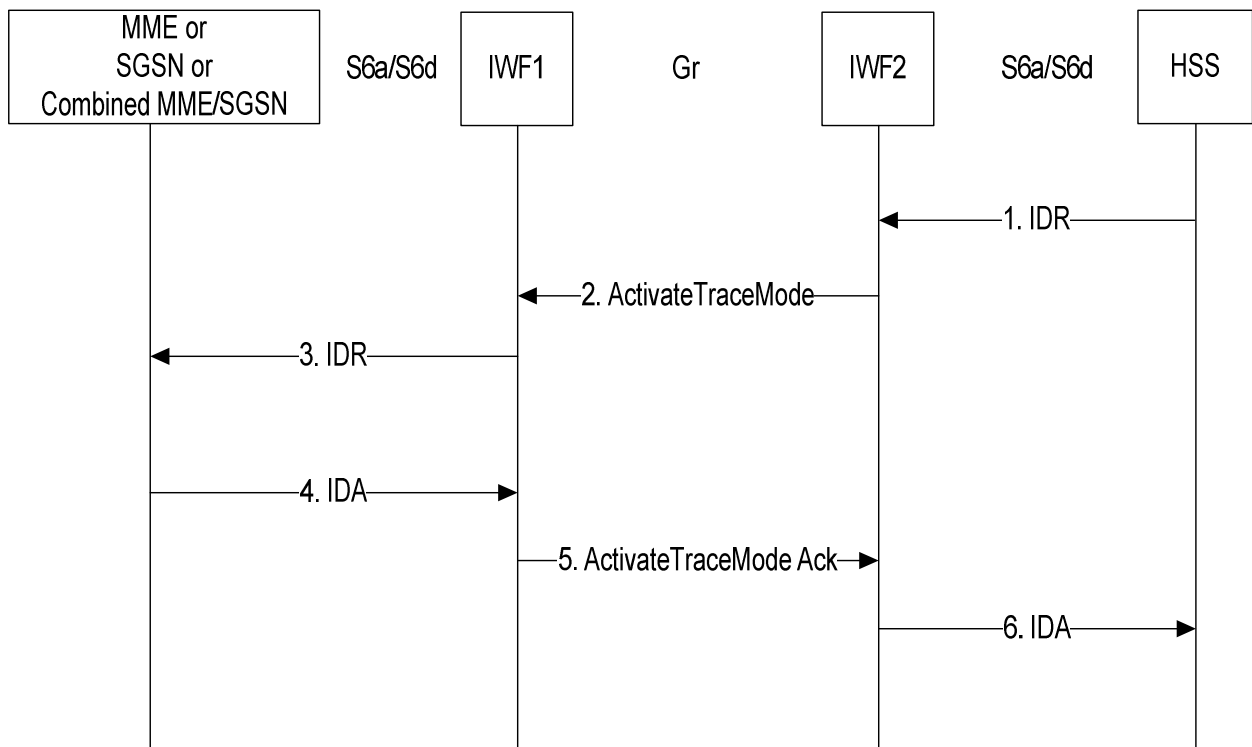
The mapping of procedures for this scenario is shown in figure 7.10.1-1:



**Figure 7.10.1-1: Mapping of Trace Activation Procedure for scenario with one IWF**

1. The IWF receives an ActivateTraceMode message from the HSS.
2. The IWF shall construct an IDR message and send it to the MME, SGSN, or combined MME/SGSN.
3. The IWF receives IDA from the MME, SGSN, or combined MME/SGSN.
4. The IWF shall send an ActivateTraceMode Ack to the HSS.

### 7.10.2 Two IWFs Scenario



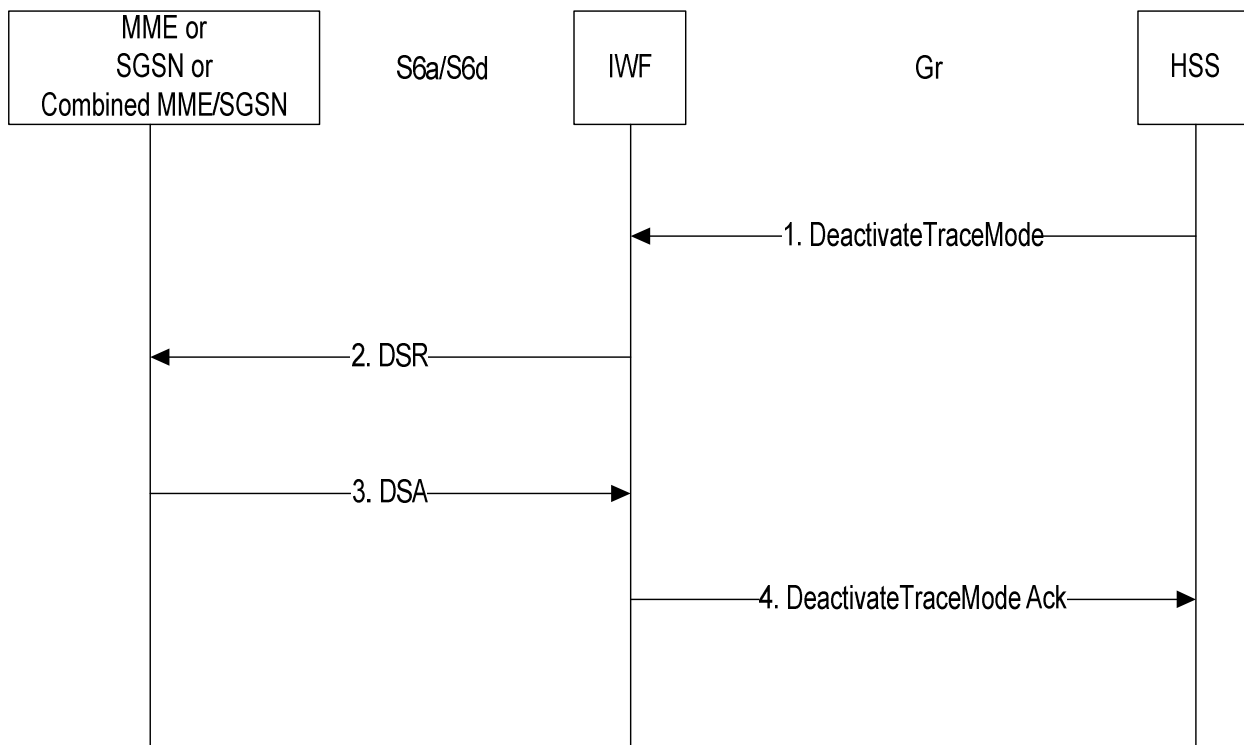
**Figure 7.10.2-1: Mapping of Trace Activation Procedure for scenario with two IWFs**

1. The IWF2 receives an IDR message from the HSS.
2. If the IWF2 finds that Trace Data is included in the IDR, it shall open a MAP v3 dialogue towards IWF1 by sending ActivateTraceMode.
3. The IWF1 shall construct an IDR message and shall send it to the MME, SGSN, or combined MME/SGSN.
4. The IWF1 receives IDA from the MME, SGSN, or combined MME/SGSN.
5. The IWF1 shall send an ActivateTraceMode Ack to IWF2.
6. IWF2 shall send an IDA to the HSS.

## 7.11 Trace Deactivation

### 7.11.1 One IWF Scenario

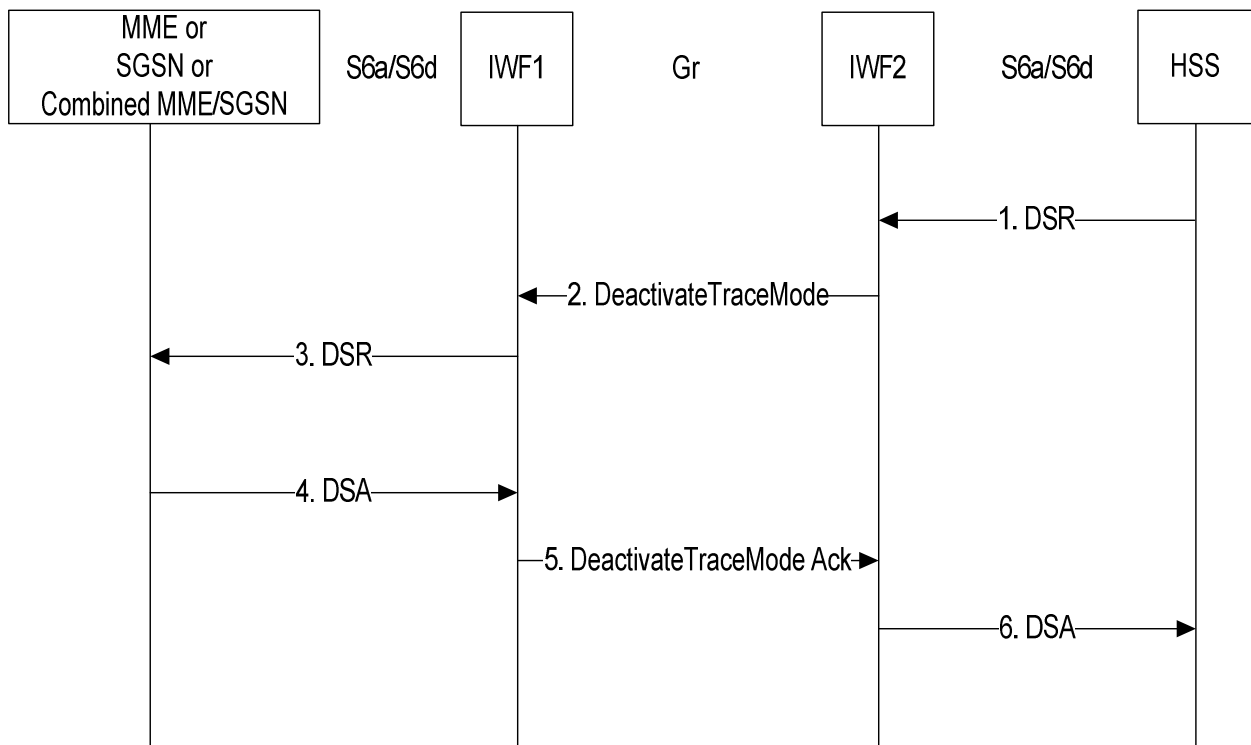
The mapping of procedures for this scenario is shown in figure 7.11.1-1:



**Figure 7.11.1-1: Mapping of Trace Deactivation Procedure for scenario with one IWF**

1. The IWF receives a DeactivateTraceMode message from the HSS.
2. The IWF shall construct a DSR message and shall send it to the MME, SGSN, or the combined MME/SGSN.
3. The IWF receives DSA from the MME, SGSN, or combined MME/SGSN.
4. The IWF shall send a DeactivateTraceMode Ack to the HSS.

## 7.11.2 Two IWFs Scenario



**Figure 7.11.2-1: Mapping of Trace Deactivation Procedure for scenario with two IWFs**

1. The IWF2 receives a DSR message from the HSS.
2. If the IWF2 finds that a Trace Data Withdrawal indication is included in the DSR, it shall open a MAP v3 dialogue towards IWF1 by sending DeactivateTraceMode.
3. The IWF1 shall construct a DSR message and shall send it to the MME, SGSN, or the combined MME/SGSN.
4. The IWF1 receives DSA from the MME, SGSN, or combined MME/SGSN.
5. The IWF1 shall send a DeactivateTraceMode Ack to the IWF2.
6. The IWF2 shall send a DSA to the HSS.

## 8 The Mapping of the Parameters

### 8.1 Mapping of Parameters for the Authentication Info Retrieval Procedure

#### 8.1.1 AIR mapping to SendAuthenticationInfoArg (v3)

When the IWF needs to construct a MAP-SendAuthenticationInfo message as a result of receiving an AIR command (see sections 7.1.1 step 2, and 7.1.2 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of SendAuthenticationInfoArg as described below:

**imsi** in SendAuthenticationInfoArg shall be populated with the value of the User-Name AVP received within AIR.

If AIR contains a Requested-EUTRAN-Authentication-Info AVP but does not contain a Requested-UTRAN-GERAN-Authentication-Info AVP:

**numberOfRequestedVectors** in SendAuthenticationInfoArg shall be populated with the value of the Number-Of-Requested-Vectors AVP received within the Requested-EUTRAN-Authentication-Info AVP received within AIR.

If AIR contains a Requested-UTRAN-GERAN-Authentication-Info AVP but does not contain a Requested-EUTRAN-Authentication-Info AVP:

**numberOfRequestedVectors** in SendAuthenticationInfoArg shall be populated with the value of the Number-Of-Requested-Vectors AVP received within the Requested-UTRAN-GERAN-Authentication-Info AVP received within AIR.

If AIR contains a Requested-EUTRAN-Authentication-Info AVP and a Requested-UTRAN-GERAN-Authentication-Info AVP, and the Immediate-Response-Preferred AVP is present within the Requested-EUTRAN-Authentication-Info AVP:

**numberOfRequestedVectors** in SendAuthenticationInfoArg shall be populated with the value of the Number-Of-Requested-Vectors AVP received within the Requested-EUTRAN-Authentication-Info AVP received within AIR.

If AIR contains a Requested-EUTRAN-Authentication-Info AVP and a Requested-UTRAN-GERAN-Authentication-Info AVP, and the Immediate-Response-Preferred AVP is not present within the Requested-EUTRAN-Authentication-Info AVP:

**numberOfRequestedVectors** in SendAuthenticationInfoArg shall be populated with the value of the Number-Of-Requested-Vectors AVP received within the Requested-UTRAN-GERAN-Authentication-Info AVP received within AIR.

**segmentationProhibited** shall be absent in SentAuthenticationInfoArg.

If AIR contains a Requested-EUTRAN-Authentication-Info AVP but does not contain a Requested-UTRAN-GERAN-Authentication-Info AVP:

**immediateResponsePreferred** in SendAuthenticationInfoArg shall be present if and only if the Immediate-Response-Preferred AVP is present within the Requested-EUTRAN-Authentication-Info AVP within AIR.

If AIR contains a Requested-UTRAN-GERAN-Authentication-Info AVP but does not contain a Requested-EUTRAN-Authentication-Info AVP:

**immediateResponsePreferred** in SendAuthenticationInfoArg shall be present if and only if the Immediate-Response-Preferred AVP is present within the Requested-UTRAN-GERAN-Authentication-Info AVP within AIR.

If AIR contains a Requested-EUTRAN-Authentication-Info AVP and a Requested-UTRAN-GERAN-Authentication-Info AVP:

**immediateResponsePreferred** in SendAuthenticationInfoArg shall be present if and only if the Immediate-Response-Preferred AVP is present within the Requested-UTRAN-GERAN-Authentication-Info AVP or within the Requested-EUTRAN-Authentication-Info AVP within AIR.

**re-synchronisationInfo** in SendAuthenticationInfoArg shall be present if and only if a Re-synchronization-Info AVP is present within the Requested-EUTRAN-Authentication-Info AVP or within the Requested-UTRAN-GERAN-Authentication-Info AVP within AIR.

**extensionContainer** in SendAuthenticationInfoArg shall be absent.

**requestingNodeType** in SendAuthenticationInfoArg shall be present and shall be populated with the value "mme" if a Requested-EUTRAN-Authentication-Info AVP and no Requested-UTRAN-GERAN-Authentication-Info AVP was present within AIR;

"sgsn" if a Requested-UTRAN-GERAN-Authentication-Info AVP and no Requested EUTRAN-Authentication-Info AVP was present within AIR;

"mme-sgsn" if both a Requested-EUTRAN-Authentication-Info AVP and a Requested-UTRAN-GERAN-Authentication-Info AVP were present within AIR .

**requestingPLMN-Id** in SendAuthenticationInfoArg shall be present and shall be populated with the value received within the Visited-PLMN-ID AVP within AIR.

**numberOfRequestedAdditional-Vectors** in SendAuthenticationInfoArg shall be present if and only if both a Requested-EUTRAN-Authentication-Info AVP and a Requested-UTRAN-GERAN-Authentication-Info AVP are present within AIR. If present, the parameter shall be populated with the value received in the Number-Of-Requested-



Vectors AVP within the Requested-EUTRAN-Authentication-Info (if the Immediate-Response-Preferred AVP is absent within Requested-EUTRAN-Authentication-Info AVP within AIR) or with the value received in the Number-Of-Requested-Vectors AVP within the Requested-UTRAN-GERAN-Authentication-Info AVP (otherwise).

**additionalVectorsAreForEPS** shall be present in SendAuthenticationInfoArg if and only if a Requested-EUTRAN-Authentication-Info AVP and a Requested-UTRAN-GERAN-Authentication-Info AVP are present within AIR and the Immediate-Response-Preferred AVP is absent in the Requested-EUTRAN-Authentication-Info AVP.

### 8.1.2 AIR mapping to SendAuthenticationInfoArg (v2)

When the IWF needs to construct a MAP-SendAuthenticationInfo message in MAP AC version 2 as a result of MAP version negotiation (see sections 7.1.1 step 3), the IWF shall open a MAP dialogue in application context version 2 and populate sub-parameters of SendAuthenticationInfoArg as described below:

**imsi** in SendAuthenticationInfoArg shall be populated with the value of the User-Name AVP received within AIR.

### 8.1.3 AIR mapping to SendParametersArg (v1)

When the IWF needs to construct a MAP-SendParameters message in MAP AC version 1 as a result of MAP version negotiation (see section 7.1.1 step 3), the IWF shall open a MAP dialogue in application context version 1 and populate sub-parameters of SendParametersArg as described below:

**subscriberId** in SendParametersArg shall take the imsi alternative; imsi shall be populated with the value of the User-Name AVP received within AIR.

**requestedParameterList** in SendParametersArg shall contain one RequestParameter which contains the value of "requestAuthenticationSet".

### 8.1.4 SendAuthenticationInfoRes / Error (v3) mapping to AIA

When the IWF needs to construct an AIA command as a result of receiving a SendAuthenticationInfo Ack/Error message in MAP version 3 (see sections 7.1.1 step 5, and 7.1.2 step 7), the IWF shall populate AVPs of AIA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if a SendAuthenticationInfoRes parameter was received in a TCAP ResultLast component;
- DIAMETER\_ERROR\_USER\_UNKNOWN if an error of unknownSubscriber without a diagnostic parameter or with a diagnostic parameter of imsiUnknown was received;
- DIAMETER\_ERROR\_UNKNOWN\_SUBSCRIPTION if an error unknownSubscriber with a diagnostic parameter of gprs-eps-SubscriptionUnknown was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Supported-Features** AVP shall be absent.

**Authentication-Info** AVP shall be present if authenticationSetList or eps-AuthenticationSetList is present in the received SendAuthenticationInfoRes. If present, the AVP shall contain EPS-Vector AVPs and/or either UTRAN-Vector AVPs or GERAN-Vector AVPs as mapped from received EPC-AVs and/or either AuthenticationQuintuplets or AuthenticationTriplets respectively.

### 8.1.5 SendAuthenticationInfoRes / Error (v2) mapping to AIA

When the IWF needs to construct an AIA command as a result of receiving a SendAuthenticationInfo Ack/Error message in MAP version 2 (see sections 7.1.1 step 5), the IWF shall populate AVPs of AIA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if aSendAuthenticationInfoRes parameter was received in a TCAP ResultLast component;
- DIAMETER\_ERROR\_USER\_UNKNOWN if an error of unknownSubscriber without a diagnostic parameter or with a diagnostic parameter of imsiUnknown was received;
- DIAMETER\_ERROR\_UNKNOWN\_SUBSCRIPTION if an error unknownSubscriber with a diagnostic parameter of gprsSubscriptionUnknown was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Supported-Features** AVP shall be absent.

**Authentication-Info** AVP shall be present if authenticationSetList is present in the received SendAuthenticationInfoRes. If present, the AVP shall contain GERAN-Vector AVPs as mapped from received AuthenticationTriplets.

### 8.1.6 SendParameterList / Error (v1) mapping to AIA

When the IWF needs to construct an AIA command as a result of receiving a SendParameters Ack/Error message in MAP version 1 (see sections 7.1.1 step 5), the IWF shall populate AVPs of AIA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if a SentParameterList parameter was received in a TCAP ResultLast component;
- DIAMETER\_ERROR\_USER\_UNKNOWN if an error of unknownSubscriber was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Supported-Features** AVP shall be absent.

**Authentication-Info** AVP shall be present if sentParameterList is present in the received TCAP ResultLast component. If present, the AVP shall contain GERAN-Vector AVPs as mapped from received AuthenticationTriplets.

### 8.1.7 SendAuthenticationInfoArg (v3) mapping to AIR

When the IWF needs to construct an AIR command as a result of receiving a SendAuthenticationInfo message in MAP version 3 (see sections 7.1.2 step 3), the IWF shall populate AVPs of AIR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of SendAuthenticationInfoArg.

**Supported-Features** AVP shall be absent.

**Requested-EUTRAN-Authentication-Info** AVP shall be present if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme" or "mme-sgsn".

**Number-Of-Requested-Vectors** AVP within Requested-EUTRAN-Authentication-Info AVP (if present) shall be populated with

- a) the value received within the numberOfRequestedVectors parameter of SendAuthenticationInfoArg if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme";
- b) the value received within the numberOfRequestedVectors parameter of SendAuthenticationInfoArg if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme-sgsn" and the additionalVectorsAreForEPS parameter is absent from SendAuthenticationInfoArg;

- c) the value received within the numberOfRequestedAdditional-Vectors parameter of SendAuthenticationInfoArg if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme-sgsn" and the additionalVectorsAreForEPS parameter is present within SendAuthenticationInfoArg.

**Immediate-Response-Preferred** AVP within Requested-EUTRAN-Authentication-Info AVP (if present) shall be present if:

- a) requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme" and immediateResponsePreferred parameter is present in SendAuthenticationInfoArg, or
- b) requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme-sgsn" and additionalVectorsAreForEPS parameter is absent from SendAuthenticationInfoArg and immediateResponsePreferred is present within SendAuthenticationInfoArg.

**Re-synchronization-Info** AVP within Requested-EUTRAN-Authentication-Info AVP (if present) shall be populated with the value received in the re-synchronizationInfo parameter within SendAuthenticationInfoArg.

**Requested-UTRAN-GERAN-Authentication-Info** AVP shall be present if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "sgsn" or "mme-sgsn".

**Number-Of-Requested-Vectors** AVP within Requested-UTRAN-GERAN-Authentication-Info AVP (if present) shall be populated with:

- a) the value received within the numberOfRequestedVectors parameter of SendAuthenticationInfoArg if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "sgsn";
- b) the value received within the numberOfRequestedVectors parameter of SendAuthenticationInfoArg if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme-sgsn" and the additionalVectorsAreForEPS parameter is present within SendAuthenticationInfoArg;
- c) the value received within the numberOfRequestedAdditional-Vectors parameter of SendAuthenticationInfoArg if requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme-sgsn" and the additionalVectorsAreForEPS parameter is absent from SendAuthenticationInfoArg.

**Immediate-Response-Preferred** AVP within Requested-UTRAN-GERAN-Authentication-Info AVP (if present) shall be present if

- a) requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "sgsn" and immediateResponsePreferred parameter is present in SendAuthenticationInfoArg, or
- b) requestingNodeType parameter within SendAuthenticationInfoArg takes the value of "mme-sgsn" and additionalVectorsAreForEPS parameter is present from SendAuthenticationInfoArg and immediateResponsePreferred is present within SendAuthenticationInfoArg.

**Re-synchronization-Info** AVP within Requested-EUTRAN-Authentication-Info AVP (if present) shall be populated with the value received in the re-synchronizationInfo parameter within SendAuthenticationInfoArg.

**Visited-PLMN-Id** AVP shall be populated with the value of the requestingPLMN-Id parameter received within SendAuthenticationInfoArg.

**RequestingNodeType** AVP shall be populated with the value of the requestingNodeType parameter received within SendAuthenticationInfoArg.

### 8.1.8 AIA mapping to SendAuthenticationInfoRes/Error (v3)

When the IWF needs to construct a MAP SendAuthenticationInfo Ack message (v3) as a result of receiving an AIA command (see sections 7.1.2 steps 5 and 6), the IWF shall construct partial result messages (if segmentation is required) and a final result message or an error message (if the Result-Code AVP within AIA takes a value different from "success"). Sub-parameters of SendAuthenticationInfoRes shall be populated as described below:

**authenticationSetList** within SendAuthenticationInfoRes shall be present if UTRAN-Vector AVP or GERAN-Vector AVP is present in Authentication-Info AVP within AIA. If so the parameter shall be populated with the value received within the UTRAN-Vector AVP or GERAN-Vector AVP (whichever is present).

**eps-AuthenticationSetList** within SendAuthenticationInfoRes shall be present if EPS-Vector AVP is present in Authentication-Info AVP within AIA. If so the parameter shall be populated with the values received within the EPS-Vector AVP.

An error of **unknownSubscriber** with unknownSubscriberParam containing a unknownSubscriberDiagnostic of "imsiUnknown" shall be sent if the received AIA command contains an Experimental-Result AVP with a value of "User Unknown".

An error of **unknownSubscriber** with unknownSubscriberParam containing a unknownSubscriberDiagnostic of "gprs-epsSubscriptionUnknown" shall be sent if the received AIA command contains an Experimental-Result AVP with a value of "Unknown EPS Subscription".

Other values within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

## 8.2 Mapping of Parameters for the Update Location Procedure

### 8.2.1 ULR mapping to UpdateGprsLocationArg

When the IWF needs to construct a MAP-UpdateGprsLocation message as a result of receiving an ULR command (see sections 7.2.1 step 2, and 7.2.2 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of UpdateGprsLocationArg as described below:

**imsi** in UpdateGprsLocationArg shall be populated with the value of the User-Name AVP received within ULR.

**sgsn-Number** in UpdateGprsLocationArg shall be populated with the value of the SGSN.Number AVP if present within ULR, otherwise it shall be populated with a value locally assigned to the IWF and consistent with SS7 routing principles.

**sgsn-Address** in UpdateGprsLocationArg shall be populated with the IP-address of the source node sending the ULR command.

**extensionContainer** in UpdateGprsLocationArg shall be absent.

**sgsn-Capability** in UpdateGprsLocationArg shall be populated as follows:

- solsaSupportIndicator shall be absent;
- extensionContainer shall be absent;
- superChargerSupportedInServingNetworkEntity shall be absent;
- gprsEnhancementSupportIndicator shall be present;
- supportedCamelPhases shall be absent or shall indicate no support of any CAMEL phase;
- supportedLCS-CapabilitySet shall be absent or shall indicate no support of any LCS capability set;
- offeredCamel4CSIs shall be absent;
- smsCallBarringSupportIndicator shall be absent;
- supportedRAT-TypesIndicator shall be present and populated with the value received within the RAT-Type AVP in the received ULR;
- supportedFeatures shall be present if a SupportedFeature AVP was present in the received ULR which indicated support of odbs and regsubs.

**informPreviousNetworkEntity** in UpdateGprsLocationArg shall be absent;

**ps-LCS-NotSupportedByUE** in UpdateGprsLocationArg shall be absent

**v-gmlc-Address** in UpdateGprsLocationArg shall be absent.

**add-info** in UpdateGprsLocationArg shall be present if a Terminal-Information AVP was present in the received ULR. If present the parameter shall be populated with the received IMEI and software version; skipSubscriberDataUpdate in add-info shall be absent.

**eps-info** in UpdateGprsLocationArg shall be present.

- if the S6a/S6d indicator within the ULR-Flags AVP was set, the parameter shall contain isr-Information with updateLocation indication, and if a Single-Registration-Indication was present in the received ULR-Flags AVP then the isr-Information shall also contain a cancelSGSN indication, and if an InitialAttachIndicator was present in the received ULR-Flags AVP then the isr-Information shall also contain initialAttachIndicator;
- if the S6a/S6d indicator within the ULR-Flags was not set, the parameter shall contain isr-Information with updateLocation indication, and if an InitialAttachIndicator was present within the ULR-Flags AVP, the parameter shall contain isr-Information with initialAttachIndicator.

**servicingNodeTypeInfo** in UpdateGprsLocationArg shall be present if the S6a/S6d-Indicator was present in the ULR-Flags AVP within the received ULR.

**skipSubscriberData Update** in UpdateGprsLocationArg shall be present if a skip subscriber data indication was received within the ULR-Flags within ULR.

**usedRAT-Type** in UpdateGprsLocationArg shall be populated with the value received within the RAT-Type AVP within ULR.

**gprsSubscriptionDataNotNeeded** in UpdateGprsLocationArg shall be present if bit 3 (GPRS-Subscription-Data-Indicator) was not set in the ULR-Flags AVP received within ULR.

**nodeTypeInfo** in UpdateGprsLocationArg shall be present if bit 4 (Node-Type-Indicator) was set in the ULR-Flags AVP received within ULR.

**areaRestricted** in UpdateGprsLocationArg shall be absent.

**ue-reachableIndicator** in UpdateGprsLocationArg shall be absent.

**ue-srvcc-Capability** in UpdateGprsLocationArg shall be present if a UE-SRVCC-Capability AVP was present in the received ULR. If present the parameter shall be populated with the received ue-srvcc-Capability.

## 8.2.2

### UpdateGprsLocationRes/Error/InsertSubscriberDataArg/ActivateTraceModeArg mapping to ULA

When the IWF needs to construct an ULA command as a result of receiving an UpdateGprsLocation Ack/Error message (see sections 7.2.1 step 5, and 7.2.2 step 7), the IWF shall populate AVPs of ULA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if an UpdateGprsLocationRes parameter was received in a TCAP ResultLast component;
- DIAMETER\_ERROR\_USER\_UNKNOWN if an error of unknownSubscriber without a diagnostic parameter or with a diagnostic parameter of imsiUnknown was received;
- DIAMETER\_ERROR\_UNKNOWN\_SUBSCRIPTION if an error of unknownSubscriber with a diagnostic parameter of gprs-eps-SubscriptionUnknown was received;
- DIAMETER\_ERROR\_RAT\_NOT\_ALLOWED if an error of roamingNotAllowed with a roamingNotAllowedParam containing an additionalRoamingNotAllowedCause of "supportedRAT-TypesNotAllowed" was received;
- DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED if an error of roamingNotAllowed without "supportedRAT-TypesNotAllowed" was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Supported-Features** AVP shall be absent.

**ULA-Flags** AVP: Flags shall be set as follows:

- **SeparationIndication** shall be set to 1 if the sgsn-mmeSeparationSupported parameter was present within UpdateGprsLocationRes; otherwise shall be set to 0.

**Subscription-Data** AVP shall be present if MAP InsertSubscriberData messages have been received from the HSS and a "skip-subscriber-Data" indication was not present in the received ULR command or a MAP ActivateTraceMode message has been received from the HSS. If present the AVP shall be populated as follows:

**Subscriber status** AVP shall be present if a subscriberStatus parameter was present in a received SubscriberData parameter within InsertSubscriberDataArg. If so, values shall be mapped appropriately.

**MSISDN** AVP shall be present if an msisdn parameter was present in a received SubscriberData parameter within InsertSubscriberDataArg.

**STN-SR** AVP shall be present if an stn-sr parameter was present in a received EPS-SubscriptionData parameter within InsertSubscriberDataArg.

**Network-Access-Mode** AVP shall be present if a networkAccessMode parameter was present within InsertSubscriberDataArg.

**Operator-Determined-Barring** AVP shall be present if an odb-GeneralData parameter was present within an odb-Data parameter within a SubscriberData parameter within InsertSubscriberDataArg.

**HPLMN-ODB** AVP shall be present if an odb-HPLMN-Data parameter was present within an odb-Data parameter within a SubscriberData parameter within InsertSubscriberDataArg.

**Regional-Subscription-Zone-Code** AVPs shall be present if ZoneCodes were present within an regionalSubscriptionData parameter within a SubscriberData parameter within InsertSubscriberDataArg.

**Access-Restriction-Data** AVP shall be present if an accessRestrictionData parameter was present within InsertSubscriberDataArg and/or a ho-to-non-3GPP-Access-Not-Allowed parameter was present in an eps-SubscriptionData parameter within InsertSubscriberDataArg.

**APN-OI-Replacement** AVP shall be present if an apn-oi-Replacement parameter was present within an eps-SubscriptionData parameter within InsertSubscriberDataArg.

**3GPP-Charging-Characteristics** AVP shall be present if a chargingCharacteristics parameter was present within InsertSubscriberDataArg.

**AMBR** AVP shall be present if an ambr parameter was present within an eps-SubscriptionData parameter within InsertSubscriberDataArg.

**APN-Configuration-Profile** AVP shall be present if an apn-ConfigurationProfile parameter was present within an eps-SubscriptionData parameter within InsertSubscriberDataArg.

**RAT-Frequency-Selection-Priority-ID** AVP shall be present if a rfsp-id parameter was present within an eps-SubscriptionData parameter within InsertSubscriberDataArg.

- **Trace-Data** AVP shall be present if a MAP ActivateTraceMode message has been received from the HSS. Sub-AVPs in Trace-Data AVP shall be populated as follows:
  - **Trace-Reference** AVP shall be present and populated with the values received within the traceReference and traceReference2 parameters within ActivateTraceModeArg.
  - **Trace-Depth-List** AVP shall be present if a Trace-DepthList parameter was present within ActivateTraceModeArg.
  - **Trace-NE-Type-List** AVP shall be present if a TraceNE-TypeList parameter was present within ActivateTraceModeArg.

- **Trace-Depth-List** AVP shall be present if a TraceDepthList parameter was present within ActivateTraceModeArg.
- **Trace-Interface-List** AVP shall be present if a TraceInterfaceList parameter was present within ActivateTraceModeArg.
- **Trace-Event-List** AVP shall be present if a TraceEventList parameter was present within ActivateTraceModeArg.
- **OMC-Id** AVP shall be present if a OMC-Id parameter was present within ActivateTraceModeArg.
- **Trace-Collection-Entity** AVP shall be present if a TraceCollectionEntity parameter was present within ActivateTraceModeArg.
- **MDT-Configuration** AVP shall be present if a MDT-Configuration parameter was present within ActivateTraceModeArg.

**GPRS-Subscription-Data** AVP shall be present if a gprsSubscriptionData parameter was present within InsertSubscriberDataArg.

**LCS-Info** AVP shall be present if a LCS Information parameter was present within InsertSubscriberDataArg.

**CSG-Subscription-Data** AVPs shall be populated with information received within the csg-SubscriptionDataList parameter within InsertSubscriberDataArg.

**Roaming-Restricted-Due-To-Unsupported-Feature** AVP shall be present and set to "Roaming-Restricted-Due-To-Unsupported-Feature (0)" if the parameter roamingRestrictedInSgsnDueToUnsupportedFeature was present within InsertSubscriberDataArg. Otherwise shall be absent.

**Teleservice-List** AVP shall be present if a Teleservice List parameter was present within InsertSubscriberDataArg.

**Call-Barring-Infor-List** AVP shall be present if a Call Barring Information List parameter was present within InsertSubscriberDataArg.

**MDT-User-Consent** AVP shall be present if a MDT User Consent parameter was present within InsertSubscriberDataArg.

### 8.2.3 UpdateGprsLocationArg mapping to ULR

When the IWF needs to construct an ULR command as a result of receiving an UpdateGprsLocation message without a pdn-gw-update parameter within eps-info and without an isr-Information parameter within eps-info not indicating updateLocation or without a skipSubscriberDataUpdate parameter within add-info (see section 7.2.2 step 3), the IWF shall populate AVPs of ULR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of UpdateGprsLocationArg.

**Supported-Features** AVP shall be populated with a value mapped from received parameter supportedFeatures within sgsn-Capability.

**Terminal-Information** AVP shall be present if an add-info parameter was received within UpdateGprsLocationArg. If present the received value of the imeisv parameter shall be mapped onto IMEI and (if present) Software Version.

**RAT-Type** AVP shall be populated with the value received within the usedRAT-Type parameter of UpdateGprsLocationArg

**ULR-Flags** AVP: Flags shall be set as follows:

**Single-Registration-Indication** shall be set to 1 if the ISR-Information parameter within the EPS-Info parameter within UpdateGprsLocationArg is present and indicates "cancelSGSN"; otherwise shall be set to 0.

- **S6a/S6d-Indicator** shall be set to 1 if the servingNodeTypeIndicator parameter was present in UpdateGprsLocationArg; otherwise shall be set to 0.

- **Skip Subscriber Data** shall be set to 1 if a skipSubscriberData parameter was present in UpdateGprsLocationArg; otherwise shall be set to 0.
- **GPRS-Subscription-Data-Indicator** shall be set to 1 if the "GPRS Subscription Data not needed Indicator" was absent from UpdateGprsLocationArg; otherwise shall be set to 0.
- **Node-Type-Indicator** shall be set to 1 if the "Node-Type Indicator" was present in UpdateGprsLocationArg; otherwise shall be set to 0.
- **Initial-Attach-Indicator** shall be set to 1 if the initialAttachIndicator parameter within the ISR-Information parameter within the EPS-Info parameter within UpdateGprsLocationArg is present; otherwise shall be set to 0.

**Visited-PLMN-Id** AVP shall be populated with a value derived from the sgsn-Number parameter received within UpdateGprsLocationArg.

**SGSN-Number** AVP shall be populated with the value received within the SGSN Number parameter of UpdateGprsLocationArg.

**UE-SRVCC-Capability** AVP shall be present if a ue-srvcc-Capability parameter was present in UpdateGprsLocationArg. If present the AVP shall be populated with the received ue-srvcc-Capability parameter.

#### 8.2.4 ULA mapping to InsertSubscriberDataArg/ ActivateTraceModeArg/UpdateGprsLocationRes/Error

When the IWF needs to construct a MAP InsertSubscriberData messages and/or a MAP- ActivateTraceMode message and/or a MAP-UpdateGprsLocation Ack message, as a result of receiving an ULA command (see sections 7.2.2 steps 5 and 6), the IWF shall populate sub-parameters of InsertSubscriberDataArg, ActivateTraceModeArg and UpdateGprsLocationRes/Error as described below:

##### **InsertSubscriberDataArg:**

**imsi** in InsertSubscriberDataArg shall be absent.

**msisdn** in InsertSubscriberDataArg shall be populated with the value received within the MSISDN AVP within the Subscription-Data AVP within ULA.

**category** in InsertSubscriberDataArg shall be absent.

**subscriberStatus** in InsertSubscriberDataArg shall be populated with the value received within the Subscriber-Status AVP within the Subscription-Data AVP within ULA.

**bearerServiceList** in InsertSubscriberDataArg shall be absent.

**teleserviceList** in InsertSubscriberDataArg shall be absent

**provisionedSS** in InsertSubscriberDataArg shall be absent.

**odb-Data** in InsertSubscriberDataArg shall be populated with the value received within the Operator-Determined-Barring AVP and HPLMN-ODB AVP AVP within the Subscription-Data AVP within ULA.

**roamingRestrictedDueToUnsupportedFeature** in InsertSubscriberDataArg shall be absent.

**regionalSubscriptionData** in InsertSubscriberDataArg shall be populated with the value received within the Regional-Subscription-Zone-Code AVPs within the Subscription-Data AVP within ULA.

**vbsSubscriptionData** in InsertSubscriberDataArg shall be absent.

**vgcsSubscriptionData** in InsertSubscriberDataArg shall be absent

**vlrCamelsubscriptionInfo** in InsertSubscriberDataArg shall be absent.

**naea-PreferredCI** in InsertSubscriberDataArg shall be absent.



**gprsSubscriptionData** in InsertSubscriberDataArg shall be populated with GPRS-Subscription Data received within the Subscription-Data AVP within ULA.

**roamingRestrictedInSgsnDueToUnsupportedFeature** in InsertSubscriberDataArg shall be present if a Roaming-Restricted-Due-To-Unsupported-Feature AVP Subscription-Data AVP within ULA.

**networkAccessMode** in InsertSubscriberDataArg shall be populated with the value received within the Network-Access-Mode AVP within the Subscription-Data AVP within ULA.

**lsaInformation** in InsertSubscriberDataArg shall be absent.

**lmu-Indicator** in InsertSubscriberDataArg shall be absent

**lcsInformation** in InsertSubscriberDataArg shall be absent.

**istAlertTimer** in InsertSubscriberDataArg shall be absent.

**superChargerSupportedInHLR** in InsertSubscriberDataArg shall be absent.

**mc-SS-Info** in InsertSubscriberDataArg shall be absent.

**cs-AllocationRetentionPriority** in InsertSubscriberDataArg shall be absent.

**sgsn-CAMEL-SubscriptionInfo** in InsertSubscriberDataArg shall be absent.

**chargingCharacteristics** in InsertSubscriberDataArg shall be populated with the value received within the 3GPP-Charging-Characteristics AVP within the Subscription-Data AVP within ULA.

**accessRestrictionData** in InsertSubscriberDataArg shall be populated with the value received within the Access-Restriction-Data AVP within the Subscription-Data AVP within ULA.

**ics-Indicator** in InsertSubscriberDataArg shall be absent.

**LCS Information** in InsertSubscriberDataArg shall be populated with the value received within the LCS-Info AVP within the Subscription-Data AVP within ULA.

**Teleservice List** in InsertSubscriberDataArg shall be populated with the value received within the Teleservice-List AVP within the Subscription-Data AVP within ULA.

**Call Barring Information List** in InsertSubscriberDataArg shall be populated with the value received within the Call-Barring-Info-List AVP within the Subscription-Data AVP within ULA.

Sub-parameters of **eps-SubscriptionData** in InsertSubscriberDataArg shall be populated as follows:

**apn-oi-Replacement** shall be populated with the value received in the APN-OI-Replacement AVP within the Subscription-Data AVP within ULA.

**rfsp-id** shall be populated with the value received within the RAT-Frequency-Selection-Priority-ID AVP within the Subscription-Data AVP within ULA.

**ambr** shall be populated with the value received within the AMBR AVP within the Subscription-Data AVP within ULA.

**apn-ConfigurationProfile** shall be populated with the value received within the APN-Configuration-Profile AVP within the Subscription-Data AVP within ULA.

**stn-sr** shall be populated with the value received within the STN-SR AVP within the Subscription-Data AVP within ULA.

**csg-SubscriptionDataList** shall be populated with values received within CSG-Subscription-Data AVPs within the Subscription-Data AVP within ULA.

**ue-ReachabilityRequestIndicator** shall be absent.

**mdtUserConsent** shall be populated with the value received within MDT-User-Consent AVP within the Subscription-Data AVP within ULA.

**ActivateTraceModeArg:**

**imsi** in ActivateTraceModeArg shall be absent.

**TraceReference** shall be populated with the value of Trace-ID part of the Trace-Reference AVP received within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**TraceType** shall be present with any value.

**TraceReference2** shall be populated with the value of MCC+MNC part of the Trace-Reference AVP received within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**TraceDepthList** shall be populated with the value received in the Trace-Depth-List AVP within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**TraceNE-TypeList** shall be populated with the value received in the Trace-NE-Type-List AVP within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**TraceInterfaceList** shall be populated with the value received in the Trace-Interface-List AVP within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**TraceEventList** shall be populated with the value received in the Trace-Event-List AVP within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**Omc-Id** shall be populated with the value received in the OMC-Id AVP within the Trace-Data AVP within the Subscription-Data AVP within ULA.

**TraceCollectionEntity** shall be populated with the address received within the Trace-Collection-Entity AVP within the Subscription-Data AVP within ULA.

**UpdateGprsLocationRes:**

**hlr-Number** in UpdateGprsLocationRes shall be populated with a value locally assigned to the IWF and consistent with SS7 routing principles.

**extensionContainer** in UpdateGprsLocationRes shall be absent.

**add-Capability** in UpdateGprsLocationRes shall be present.

**sgsn-mmeSeparationSupported** in UpdateGprsLocationRes shall be present if the Separation Indication within the ULA-Flags AVP was set to 1 within ULA.

**MDT-Configuration** shall be populated with the value received within the MDT-Configuration AVP within the Subscription-Data AVP within ULA.

**UpdateGprsLocation Error:**

An error of **unknownSubscriber** with unknownSubscriberParam containing a unknownSubscriberDiagnostic of "imsiUnknown" shall be sent if the received ULA command contains an Experimental-Result AVP with a value of "User Unknown".

An error of **unknownSubscriber** with unknownSubscriberParam containing a unknownSubscriberDiagnostic of "gprs-epsSubscriptionUnknown" shall be sent if the received ULA command contains an Experimental-Result AVP with a value of "Unknown EPS Subscription".

Other values within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

## 8.3 Mapping of Parameters for the Cancel Location Procedure

### 8.3.1 CancelLocationArg mapping to CLR

When the IWF needs to construct a CLR command as a result of receiving a MAP-CancelLocation message (see sections 7.3.1 step 2, and 7.3.2 step 3), the the IWF shall populate AVPs of CLR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the imsi value received within the identity parameter of CancelLocationArg.

**Supported-Features** AVP shall be absent.

**CancellationType** AVP shall contain the value MME\_UPDATE\_PROCEDURE if the parameter CancellationType within CancelLocationArg was set to updateProcedure and typeOfUpdate within CancelLocationArg was set to mme-change; the AVP shall contain the value SGSN\_UPDATE\_PROCEDURE if the parameter CancellationType within CancelLocationArg was set to updateProcedure and typeOfUpdate within CancelLocationArg was set to sgsn-change; the AVP shall contain the value SUBSCRIPTION\_WITHDRAWAL if the parameter CancellationType within CancelLocationArg was set to subscriptionWithdraw; the AVP shall contain the value UPDATE\_PROCEDURE\_IWF if the parameter CancellationType within CancelLocationArg was set to updateProcedure and typeOfUpdate within CancelLocationArg was absent; the AVP shall contain the value INITIAL\_ATTACH\_PROCEDURE if the parameter CancellationType within CancelLocationArg was set to InitialAttachProcedure.

**CLR-Flags** AVP: Flags shall be set as follows:

- **S6a/S6d-Indicator** shall be set to 1 if the TypeOfUpdate parameter was present in CancelLocationArg and indicates "mme-change"; it shall be set to 0 if the TypeOfUpdate parameter was present in CancelLocationArg and indicates "sgsn-change".

### 8.3.2 CLA mapping to CancelLocationRes/Error

When the IWF needs to construct MAP-CancelLocation Ack message as a result of receiving an CLA command (see sections 7.3.1 step 4 and 7.3.2.step 5), the IWF shall populate sub-parameters of CancelLocationRes/Error as described below:

#### **CancelLocationRes:**

**extensionContainer** in CancelLocationRes shall be absent.

#### **CancelLocation Error:**

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

### 8.3.3 CLR mapping to CancelLocationArg

When the IWF needs to construct a MAP-CancelLocation message as a result of receiving an CLR command (see sections 7.3.2 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of CancelLocationArg as described below:

**identity** in CancelLocationArg shall be populated with the imsi value of the User-Name AVP received within CLR.

**cancellationType** in CancelLocationArg shall contain a value of updateProcedure if the Cancellation-Type AVP received in CLR contains the value MME\_UPDATE\_PROCEDURE or SGSN\_UPDATE\_PROCEDURE. The parameter shall contain a value of subscriptionWithdraw if the Cancellation-Type AVP received in CLR contains the value SUBSCRIPTION\_WITHDRAWAL. The parameter shall contain a value of InitialAttachProcedure if the Cancellation-Type AVP received in CLR contains the value INITIAL\_ATTACH\_PROCEDURE.

**extensionContainer** in CancelLocationArg shall be absent.

**typeOfUpdate** in CancelLocationArg shall be set to sgsn-change if SGSN\_UPDATE\_PROCEDURE was received in the Cancellation-Type AVP within CLR, or INITIAL\_ATTACH\_PROCEDURE was received in the Cancellation-Type AVP within CLR and the S6a/S6d-Indicator flag was cleared in the CLR-Flags AVP within the received CLR. It shall be set to mme-change if MME\_UPDATE\_PROCEDURE was received in Cancellation-Type AVP within CLR, or if INITIAL\_ATTACH\_PROCEDURE was received in the Cancellation-Type AVP within CLR and the S6a/S6d-Indicator flag was set in the CLR-Flags AVP within the received CLR. Otherwise it shall be absent.

### 8.3.4 CancelLocationRes / Error mapping to CLA

When the IWF needs to construct an CLA command as a result of receiving a CancelLocation Ack/Error message (see sections 7.3.2 step 6), the IWF shall populate AVPs of CLA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if a CancelLocationRes parameter was received in a TCAP ResultLast component;
- an appropriate DIAMETER base protocol result code otherwise.

**Supported-Features** AVP shall be absent.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

## 8.4 Mapping of Parameters for the Purge Procedure

### 8.4.1 PUR mapping to PurgeMS-Arg

When the IWF needs to construct a MAP-PurgeMS message as a result of receiving an PUR command (see sections 7.4.1 step 2 and 7.4.2. step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of PurgeMS-Arg as described below:

**imsi** in PurgeMS-Arg shall be populated with the imsi value of the User-Name AVP received within PUR.

**vlr-Number** in PurgeMS-Arg shall be absent.

**sgsn-Number** in PurgeMS-Arg shall be populated with a value locally assigned to the IWF and consistent with SS7 routing principles.

**extensionContainer** in PurgeMS-Arg shall be absent.

### 8.4.2 PurgeMS-Res / Error mapping to PUA

When the IWF needs to construct an PUA command as a result of receiving a PurgeMS Ack/Error message (see sections 7.4.1 step 4 and 7.4.2. step 6), the IWF shall populate AVPs of PUA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if a PurgeMS-Res parameter was received in a TCAP ResultLast component;
- DIAMETER\_ERROR\_USER\_UNKNOWN if an error of unknownSubscriber without a diagnostic parameter or with a diagnostic parameter of imsiUnknown or gprs-eps-SubscriptionUnknown was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**PUA-Flags** AVP: Flags shall be set as follows:

- **Freeze M-TMSI** shall be set to 1 if the freezeM-TMSI parameter was present within PurgeMS-Res; otherwise shall be set to 0.
- **Freeze P-TMSI** shall be set to 1 if the freezeP-TMSI parameter was present within PurgeMS-Res; otherwise shall be set to 0.

### 8.4.3 PurgeMS-Arg mapping to PUR

When the IWF needs to construct a PUR command as a result of receiving a MAP-PurgeMS message (see section 7.4.2 step 3), the the IWF shall populate AVPs of PUR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of PurgeMS-Arg.

**Supported-Features** AVP shall be absent.

## 8.4.4 PUA mapping to PurgeMS-Res/Error

When the IWF needs to construct MAP-PurgeMS Ack message as a result of receiving a PUA command (see section 7.4.2.step 5), the IWF shall populate sub-parameters of PurgeMS-Res/Error as described below:

### PurgeMS-Res:

**freezeTMSI** in PurgeMS-Res shall be absent.

**freezeP-TMSI** in PurgeMS-Res shall be present if a Freeze-P-TMSI indication was received within the PUA-Flags AVP within PUA.

**extensionContainer** in PurgeMS-Res shall be absent.

**freezeM-TMSI** in PurgeMS-Res shall be present if a Freeze-M-TMSI indication was received within the PUA-Flags AVP within PUA.

### PurgeMS Error:

An error of **unknownSubscriber** with unknownSubscriberParam containing a unknownSubscriberDiagnostic of "imsiUnknown" shall be sent if the received AIA command contains an Experimental-Result AVP with a value of "User Unknown".

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

## 8.5 Mapping of Parameters for the Insert Subscriber Data Procedure

### 8.5.1 InsertSubscriberDataArg mapping to IDR

When the IWF needs to construct an IDR command as a result of receiving a MAP-InsertSubscriberData message (see sections 7.5.1 step 2, and 7.5.2 step 3), the IWF shall populate AVPs of IDR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of InsertSubscriberDataArg.

**Supported-Features** AVP shall be absent.

**Subscription-Data** AVP: See chapter 8.2.2.

**IDR-Flags** AVP: Flags shall be set as follows:

UE Reachability Request shall be set to 1 if the ue-reachabilityRequestIndicator was present within InsertSubscriberDataArg; otherwise shall be set to 0 or the AVP shall be absent.

### 8.5.2 IDA mapping to InsertSubscriberDataRes/Error

When the IWF needs to construct a MAP-InsertSubscriberData Ack message as a result of receiving an IDA command (see sections 7.5.1 step 4 and 7.5.2.step 5), the IWF shall populate sub-parameters of InsertSubscriberDataRes/Error as described below:

#### InsertSubscriberDataRes:

**teleserviceList** in InsertSubscriberDataRes shall include all teleserviceCodes that have been received within InsertSubscriberDataArg.

**bearerServiceList** in InsertSubscriberDataRes shall include all bearerServiceCodes that have been received within InsertSubscriberDataArg.

**ss-List** in InsertSubscriberDataRes shall include all ssCodes that have been received within InsertSubscriberDataArg.

**odb-GeneralData** in InsertSubscriberDataRes shall include all odb categories that have been requested within the received InsertSubscriberDataArg but are not supported by the serving node as indicated within the Supported-Feature AVP within IDA.

**regionalSubscriptionResponse** in InsertSubscriberDataRes

-shall be set to regionalSubscNotSupported if regional subscription was requested within the received InsertSubscriberDataArg but is not supported by the serving node as indicated within the Supported-Feature AVP within IDA.

-shall be set to networkNode-AreaRestricted if regional subscription was requested within the received InsertSubscriberDataArg but a Network-Node-Area-Restricted indication has been received within the IDA-Flags AVP within IDA.

- otherwise shall be absent.

**supportedCamelPhases** in InsertSubscriberDataRes shall be absent or shall indicate that no CAMEL phase is supported.

**extensionContainer** in CancelLocationRes shall be absent.

**offeredCamel4CSIs** in InsertSubscriberDataRes shall be absent.

**supportedFeatures** in InsertSubscriberDataRes shall be populated with the information received within the Supported-Features AVP within IDA.

**InsertSubscriberData Error:**

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

### 8.5.3 IDR mapping to InsertSubscriberDataArg/ ActivateTraceModeArg

When the IWF needs to construct a MAP-InsertSubscriberData message or a MAP-ActivateTraceMode message as a result of receiving an IDR command (see sections 7.5.2 step 2, and 7.10.2 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of InsertSubscriberDataArg/ActivateTraceModeArg as described below:

**InsertSubscriberDataArg:**

**imsi** in InsertSubscriberDataArg shall be populated with the value received within the User-Name AVP within IDR.

**msisdn** in InsertSubscriberDataArg shall be populated with the value received within the MSISDN AVP within the Subscription-Data AVP within IDR.

**category** in InsertSubscriberDataArg shall be absent.

**subscriberStatus** in InsertSubscriberDataArg shall be populated with the value received within the Subscriber-Status AVP within the Subscription-Data AVP within IDR.

**bearerServiceList** in InsertSubscriberDataArg shall be absent.

**teleserviceList** in InsertSubscriberDataArg shall be absent

**provisionedSS** in InsertSubscriberDataArg shall be absent.

**odb-Data** in InsertSubscriberDataArg shall be populated with the value received within the Operator-Determined-Barring AVP and HPLMN-ODB AVP within the Subscription-Data AVP within IDR.

**roamingRestrictedDueToUnsupportedFeature** in InsertSubscriberDataArg shall be absent.

**regionalSubscriptionData** in InsertSubscriberDataArg shall be populated with the value received within the Regional-Subscription-Zone-Code AVPs within the Subscription-Data AVP within IDR.

**vbsSubscriptionData** in InsertSubscriberDataArg shall be absent.

**vgcsSubscriptionData** in InsertSubscriberDataArg shall be absent

**vlrCamelSubscriptionInfo** in InsertSubscriberDataArg shall be absent.

**naea-PreferredCI** in InsertSubscriberDataArg shall be absent.

**gprsSubscriptionData** in InsertSubscriberDataArg shall be populated with GPRS-Subscription Data received within the Subscription-Data AVP within IDR.

**roamingRestrictedInSgsnDueToUnsupportedFeature** in InsertSubscriberDataArg shall be present if a Roaming-Restricted-due-To-Unsupported-Feature AVP was received within the Subscription-Data AVP within IDR.

**networkAccessMode** in InsertSubscriberDataArg shall be populated with the value received within the Network-Access-Mode AVP within the Subscription-Data AVP within IDR.

**lsaInformation** in InsertSubscriberDataArg shall be absent.

**lmu-Indicator** in InsertSubscriberDataArg shall be absent.

**lcsInformation** in InsertSubscriberDataArg shall be absent.

**istAlertTimer** in InsertSubscriberDataArg shall be absent.

**superChargerSupportedInHLR** in InsertSubscriberDataArg shall be absent.

**mc-SS-Info** in InsertSubscriberDataArg shall be absent.

**cs-AllocationRetentionPriority** in InsertSubscriberDataArg shall be absent.

**sgsn-CAMEL-SubscriptionInfo** in InsertSubscriberDataArg shall be absent.

**chargingCharacteristics** in InsertSubscriberDataArg shall be populated with the value received within the 3GPP-Charging-Characteristics AVP within the Subscription-Data AVP within IDR.

**accessRestrictionData** in InsertSubscriberDataArg shall be populated with the value received within the Access-Restriction-Data AVP within the Subscription-Data AVP within IDR.

**ics-Indicator** in InsertSubscriberDataArg shall be absent.

**LCS Information** in InsertSubscriberDataArg shall be populated with the value received within the LCS-Info AVP within the Subscription-Data AVP within ULA.

**Teleservice List** in InsertSubscriberDataArg shall be populated with the value received within the Teleservice-List AVP within the Subscription-Data AVP within ULA.

**Call Barring Information List** in InsertSubscriberDataArg shall be populated with the value received within the Call- Barring-Info-List AVP within the Subscription-Data AVP within ULA.

Sub-parameters of **eps-SubscriptionData** in InsertSubscriberDataArg shall be populated as follows:

**apn-oi-Replacement** shall be populated with the value received in the APN-OI-Replacement AVP within the Subscription-Data AVP within IDR.

**rfsp-id** shall be populated with the value received within the RAT-Frequency-Selection-Priority-ID AVP within the Subscription-Data AVP within IDR.

**ambr** shall be populated with the value received within the AMBR AVP within the Subscription-Data AVP within IDR.

**apn-ConfigurationProfile** shall be populated with the value received within the APN-Configuration-Profile AVP within the Subscription-Data AVP within IDR.

**stn-sr** shall be populated with the value received within the STN-SR AVP within the Subscription-Data AVP within IDR.

**csg-SubscriptionDataList** in InsertSubscriberDataArg shall be populated with information received within the CSG-Subscription-Data AVPs within the Subscription-Data AVP within IDR.

**ue-ReachabilityRequestIndicator** in the InsertSubscriberDataArg shall be present if the corresponding information was present within the IDR-Flags AVP within an IDR; otherwise it shall be absent.

#### **ActivateTraceModeArg:**

**imsi** shall be populated with the value received within the User-Name AVP within IDR.

**TraceReference** shall be populated with the value of Trace-ID part of the Trace-Reference AVP received within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**TraceType** shall be present with any value.

**TraceReference2** shall be populated with the value of MCC+MNC part of the Trace-Reference AVP received within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**TraceDepthList** shall be populated with the value received in the Trace-Depth-List AVP within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**TraceNE-TypeList** shall be populated with the value received in the Trace-NE-Type-List AVP within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**TraceInterfaceList** shall be populated with the value received in the Trace-Interface-List AVP within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**TraceEventList** shall be populated with the value received in the Trace-Event-List AVP within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**Omc-Id** shall be populated with the value received in the OMC-Id AVP within the Trace-Data AVP within the Subscription-Data AVP within IDR.

**TraceCollectionEntity** shall be populated with the address received within the Trace-Collection-Entity AVP within the Subscription-Data AVP within IDR.

### 8.5.4 InsertSubscriberDataRes / Error mapping to IDA

When the IWF needs to construct an IDA command as a result of receiving an InsertSubscriberData Ack/Error message (see sections 7.5.2 step 8), the IWF shall populate AVPs of IDA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if no InsertSubscriberData error component was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**IDA-Flags** AVP: Flags shall be set as follows:

- **Network-Node-Area-Restricted** shall be set to 1 if the regionalSubscriptionResponse parameter within InsertSubscriberDataRes indicated regionalSubscNotSupported; otherwise shall be set to 0.

**Supported-Features** AVP: Support of features shall be indicated according to information received within the supportedFeatures parameter within InsertSubscriberDataRes.

### 8.5.5 ProvideSubscriberInfoArg mapping to IDR

When the IWF needs to construct an IDR command as a result of receiving a MAP-ProvideSubscriberInfo message (see sections 7.5.1 step 2, and 7.5.2 step 3), the IWF shall populate AVPs of IDR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of ProvideSubscriberInfoArg.

**Supported-Features** AVP shall be absent.



**Subscription-Data** AVP shall be empty.

**IDR-Flags** AVP: Flags shall be set as follows:

**UE Reachability Request** shall be set to 0.

**T-ADS Data Request** shall be set to 1 if the t-adsData within the RequestedInfo parameter within ProvideSubscriberInfoArg was present; otherwise it shall be set to 0 or the AVP shall be absent.

**EPS User State Request** shall be set to 1 if the subscriberState was present within ProvideSubscriberInfoArg; otherwise it shall be set to 0 or the AVP shall be absent.

**EPS Location Information Request** shall be set to 1 if the locationInformation was present within ProvideSubscriberInfoArg; otherwise it shall be set to 0 or the AVP shall be absent.

**Current Location Request** shall be set to 1 if the currentLocation was present within ProvideSubscriberInfoArg; otherwise it shall be set to 0.

## 8.5.6 IDA mapping to ProvideSubscriberInfoRes/Error

When the IWF needs to construct a MAP-ProvideSubscriberInfo Ack message as a result of receiving an IDA command (see sections 7.5.1 step 4 and 7.5.2.step 5), the IWF shall populate sub-parameters of ProvideSubscriberInfoRes/Error as described below:

**ProvideSubscriberInfoRes:**

Sub-parameters of **SubscriberInfo** in ProvideSubscriberInfoRes shall be populated as follows:

**imsVoiceOverPS-SessionsIndication** shall be populated with the value received in the IMS-Voice-Over-PS-Sessions-Supported AVP within IDA.

**lastUE-ActivityTime** shall be populated with the value received in the Last-UE-Activity-Time AVP within IDA.

**lastRAT-Type** shall be populated with the value received in the RAT-Type AVP within IDA.

**eps-SubscriberState** shall be populated with the value received in the EPS-User-State AVP within IDA.

Sub-parameters of **locationInformationEPS** shall be populated with the values of the corresponding AVPs received in the EPS-Location-Information AVP within IDA.

**extensionContainer** in ProvideSubscriberInfoRes shall be absent.

**ProvideSubscriberInfo Error:**

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

## 8.5.7 IDR mapping to ProvideSubscriberInfoArg

When the IWF needs to construct a MAP-ProvideSubscriberInfo message as a result of receiving an IDR command (see sections 7.5.2 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of ProvideSubscriberInfoArg as described below:

**ProvideSubscriberInfoArg:**

**imsi** in ProvideSubscriberInfoArg shall be populated with the value received within the User-Name AVP within IDR.

**imsi** in ProvideSubscriberInfoArg shall be absent.

Sub-parameters of **requestedInfo** in ProvideSubscriberInfoArg shall be populated as follows:

**t-adsData** in requestedInfo shall be present if the "T-ADS Data Request" flag was set in the IDR-Flags AVP within IDR.

**subscriberState** in requestedInfo shall be present if the "EPS User State Request" flag was set in the IDR-Flags AVP within IDR.

**locationInformation** in requestedInfo shall be present if the "EPS Location Information Request" flag was set in the IDR-Flags AVP within IDR.

**currentLocation** in requestedInfo shall be present if the "Current Location Request" flag was set in the IDR-Flags AVP within IDR.

**extensionContainer** in ProvideSubscriberInfoArg shall be absent.

**callPriority** in ProvideSubscriberInfoArg shall be absent.

## 8.5.8 ProvideSubscriberInfoRes/Error mapping to IDA

When the IWF needs to construct an IDA command as a result of receiving an ProvideSubscriberInfo Ack/Error message (see sections 7.5.2 step 8), the IWF shall populate AVPs of IDA as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Supported-Features** AVP shall be absent.

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if no ProvideSubscriberInfo error component was received;
- an appropriate DIAMETER base protocol result code otherwise.

**IMS-Voice-Over-PS-Sessions-Supported** AVP shall be populated with the value received within the imsVoiceOverPS-SessionsIndication parameter within the SubscriberInfo parameter of ProvideSubscriberInfoRes.

**Last-UE-Activity-Time** AVP shall be populated with the value received within the lastUE-ActivityTime parameter within the SubscriberInfo parameter of ProvideSubscriberInfoRes.

**RAT-Type** AVP shall be populated with the value received within the lastRAT-Type parameter within the SubscriberInfo parameter of ProvideSubscriberInfoRes.

**EPS-User-State** AVP shall be populated with the value received within the eps-SubscriberState parameter within the SubscriberInfo parameter of ProvideSubscriberInfoRes.

AVPs within **EPS-Location-Information** AVP shall be populated with the values of the corresponding sub-parameters received within the locationInformationEPS parameter within the SubscriberInfo parameter of ProvideSubscriberInfoRes.

**IDA-Flags** AVP shall be absent.

## 8.6 Mapping of Parameters for the Delete Subscriber Data Procedure

### 8.6.1 DeleteSubscriberDataArg mapping to DSR

When the IWF needs to construct a DSR command as a result of receiving a MAP-DeleteSubscriberData message (see sections 7.6.1 step 2, and 7.6.2 step 3), the the IWF shall populate AVPs of DSR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of DeleteSubscriberDataArg.

**Supported-Features** AVP shall be absent.

**DSR-Flags** AVP: Flags shall be set as follows:

- **RegionalSubscriptionWithdrawal** shall be set to 1 if a regionalSubscriptionIdentifier parameter was present in DeleteSubscriberDataArg; otherwise shall be set to 0.
- **Complete APN Configuration Profile Withdrawal** shall be set to 1 if the allEPS-Data parameter was present within the EPS-SubscriptionDataWithdraw parameter within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **Subscribed Charging Characteristics Withdrawal** shall be set to 1 if the chargingCharacteristicsWithdraw parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **PDN Subscription Context Withdrawal** shall be set to 1 if the contextIdList parameter was present within the EPS-SubscriptionDataWithdraw parameter within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **STN-SR** shall be set to 1 if the stn-srWithdraw parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **GMLC List Withdrawal** shall be set to 1 if the GMLC List Withdraw parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **LCS Withdrawal** shall be set to 1 if the SS code list parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **Complete PDP context list Withdrawal** shall be set to 1 if the allGPRS-Data parameter was present within the GPRS-SubscriptionDataWithdraw parameter within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **PDP context Withdrawal** shall be set to 1 if the contextIdList parameter was present within the GPRS-SubscriptionDataWithdraw parameter within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **Roaming Restricted in due to unsupported feature** shall be set to 1 if the roamingRestrictedInSgsnDueToUnsupportedFeature parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **Trace Data Withdrawal** shall be set to 0.
- **CSG Deleted** shall be set to 1 if the csg-SubscriptionDeleted parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **APN-OI-Replacement** shall be set to 1 if the apn-oi-replacementWithdraw parameter was present within DeleteSubscriberDataArg; otherwise shall be set to 0.
- **SMS Withdrawal** shall be set to 1 if the SS-Code list parameter was present within DeleteSubscriberDataArg and the service codes are related to short message services; otherwise shall be set to 0.

**Context-Identifier** AVPs shall be populated with values received within the contextIdList parameter within EPS-SubscriptionDataWithdraw or GPRS-SubscriptionDataWithdraw within DeleteSubscriberDataArg;

## 8.6.2 DSA mapping to DeleteSubscriberDataRes/Error

When the IWF needs to construct a MAP-DeleteSubscriberData Ack message as a result of receiving a DSA command (see sections 7.6.1 step 4 and 7.6.2.step 5), the IWF shall populate sub-parameters of DeleteSubscriberDataRes/Error as described below:

### DeleteSubscriberDataRes:

**regionalSubscriptionResponse** in DeleteSubscriberDataRes shall be set to:

- regionalSubscNotSupported if a corresponding information was received within the Supported-Feature AVP within DSA .
- networkNode-AreaRestricted if a Network-Node-Area-Restricted indication was received within the DSA-Flags AVP within DSA.

**extensionContainer** in DeleteSubscriberDataRes shall be absent.

**DeleteSubscriberData Error:**

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

### 8.6.3 DSR mapping to DeleteSubscriberDataArg/ DeactivateTraceModeArg

When the IWF needs to construct a MAP-DeleteSubscriberData message or a MAP-DeactivateTraceMode message as a result of receiving a DSR command (see sections 7.6.2 step 2, 7.11.2 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of DeleteSubscriberDataArg/DeactivateTraceModeArg as described below:

**DeleteSubscriberDataArg:**

**imsi** in DeleteSubscriberDataArg shall be populated with the value of the User-Name AVP received within DSR.

**basicServiceList** in DeleteSubscriberDataArg shall be absent.

**ss-List** in DeleteSubscriberDataArg shall be absent.

**roamingRestrictionDueToUnsupportedFeature** in DeleteSubscriberDataArg shall be absent.

**regionalSubscriptionIdentifier** in DeleteSubscriberDataArg shall be present if a Regional-Subscription-Withdrawal indication has been received within the DSR-Flags AVP within DSR. If present, the value of the ZoneCode is arbitrary.

**vbsGroupIndication** in DeleteSubscriberDataArg shall be absent.

**vgcsGroupIndication** in DeleteSubscriberDataArg shall be absent.

**camelSubscriptionInfoWithdraw** in DeleteSubscriberDataArg shall be absent.

**extensionContainer** in DeleteSubscriberDataArg shall be absent.

**gprsSubscriptionDataWithdraw** in DeleteSubscriberDataArg shall be present if corresponding information was received within the DSR-Flags AVP and GPRS-Context-Identifier AVPs within DSR.

**roamingRestrictedInSgsnDueToUnsupportedFeature** in DeleteSubscriberDataArg shall be present if a corresponding indication has been received within the DSR-Flags AVP within DSR.

**lsaInformationWithdraw** in DeleteSubscriberDataArg shall be absent.

**gmlc-ListWithdraw** in DeleteSubscriberDataArg shall be absent.

**istInformationWithdraw** in DeleteSubscriberDataArg shall be absent.

**specificCSI-Withdraw** in DeleteSubscriberDataArg shall be absent.

**chargingCharacteristicsWithdraw** in DeleteSubscriberDataArg shall be present if a Subscribed-Charging-Characteristics-Withdrawal indication was received within the DSR-Flags AVP within DSR.

**stn-srWithdraw** in DeleteSubscriberDataArg shall be present if a STN-SR indication was received within the DSR-Flags AVP within DSR.

**epsSubscriptionDataWithdraw** in DeleteSubscriberDataArg shall be present if a Complete-APN-Configuration-Profil-Withdrawal indication or a PDN-Subscription-Context-Withdrawal indication was received within the DSR-Flags AVP. The sub-parameter allePS-Data shall be present if a Complete-APN-Configuration-Profile-Withdrawal indication was received in the DSR-Flags AVP within DSR. The sub-parameter contextIdList shall be present if a PDN-Subscription-Context-Withdrawal indication was received within the DSR-Flags AVP within DSR; if so, the contextIdList shall be populated with values received within the Context-Identifier AVPs within DSR.

**GMLC List Withdraw** in DeleteSubscriberDataArg shall be present if a GMLC List Withdrawal indication was received within the DSR-Flags AVP.

**SS-Code List** in DeleteSubscriberDataArg shall be present if corresponding information was received within the DSR-Flags AVP and SS-Code AVPs within DSR.

**apn-oi-replacementWithdraw** in DeleteSubscriberDataArg shall be present if a APN-OI-Replacement indication was received within the DSR-Flags AVP within DSR.

**csg-SubscriptionDeleted** in DeleteSubscriberDataArg shall be present if a CSG Deleted indication was received within the DSR-Flags AVP within DSR.

**SS-Code List** in DeleteSubscriberDataArg shall be present if SMS Withdrawal bit was set within the DSR-Flags AVP and SS-Code AVPs was within DSR.

#### **DeactivateTraceModeArg:**

**imsi** in DeactivateTraceModeArg shall be populated with the value received within the User-Name AVP within DSR.

**TraceReference** in DeactivateTraceModeArg shall be populated with the value of Trace-ID part of the Trace-Reference AVP received within DSR.

**TraceReference2** in DeactivateTraceModeArg shall be populated with the value of MCC+MNC part of the Trace-Reference AVP received within DSR.

## 8.6.4 DeleteSubscriberDataRes / Error mapping to DSA

When the IWF needs to construct a DSA command as a result of receiving a DeleteSubscriberData Ack/Error message (see sections 7.6.2 step 6), the IWF shall populate AVPs of DSA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if a DeleteSubscriberDataRes parameter was received in a TCAP ResultLast component;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Supported-Features** AVP shall be present and shall indicate support of Regional Subscription if a Regional-Subscription-Withdrawal indication was present within the DSR-Flags AVP within DSR and no regionalSubscNotSupported indication was received in regionalSubscriptionResponse in DeleteSubscriberDataRes.

**DSA-Flags** AVP: Flags shall be set as follows:

- **Network-Node-Area-Restricted** shall be set to 1 if a networkNode-AreaRestricted indication was received within the regionalSubscriptionResponse parameter within DeleteSubscriberDataRes; otherwise shall be set to 0.

## 8.7 Mapping of Parameters for the Reset Procedure

### 8.7.1 Reset (v1 or v2) mapping to RSR

When the IWF needs to construct a RSR command as a result of receiving a MAP-Reset message with AC version 1 or version 2 (see sections 7.7.1 step 2, and 7.7.2 step 4), the the IWF shall populate AVPs of RSR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Id** AVPs shall be populated with the values received within the HLR-Id parameters within hlr-list within ResetArg.

**Supported-Features** AVP shall be absent.

## 8.7.2 RSR mapping to ResetArg (v1 or v2)

When the IWF needs to construct MAP-Reset message as a result of receiving a RSR command (see section 7.7.2 step 2), the IWF shall open a MAP dialogue in version 1 or version 2 according to an implementation option; note that the IWF shall be prepared to fall back to v1 when v2 is chosen. Sub-parameters of ResetArg shall be populated as described below:

**networkResource** in ResetArg (only v1) shall be set to hlr.

**hlr-Number** in ResetArg shall be populated with a value locally assigned to the IWF and consistent with SS7 routing principles.

**hlr-List** in ResetArg shall be populated with values received within User-Id AVPs within RSR.

## 8.8 Mapping of Parameters for the Notification Procedure

### 8.8.1 NOR mapping to UpdateGprsLocation-Arg

When the IWF needs to construct a MAP-UpdateGprsLocation message as a result of receiving an NOR command (see sections 7.8.1 step 2 and 7.8.2. step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of UpdateGprsLocation-Arg as described below:

**imsi** in UpdateGprsLocationArg shall be populated with the value of the User-Name AVP received within NOR.

**sgsn-Number** in UpdateGprsLocationArg shall be populated with a value locally assigned to the IWF and consistent with SS7 routing principles.

**sgsn-Address** in UpdateGprsLocationArg shall be populated with the IP-address of the source node sending the NOR command.

**extensionContainer** in UpdateGprsLocationArg shall be absent.

**sgsn-Capability** in UpdateGprsLocationArg shall be absent.

**informPreviousNetworkEntity** in UpdateGprsLocationArg shall be absent;

**ps-LCS-NotSupportedByUE** in UpdateGprsLocationArg shall be absent

**v-gmlc-Address** in UpdateGprsLocationArg shall be absent.

**add-info** in UpdateGprsLocationArg shall be present if a Terminal-Information AVP was present in the received NOR. If present the parameter shall be populated with the received IMEI and software version, and with a skipSubscriberDataUpdate indication.

**eps-info** in UpdateGprsLocationArg shall be present and contain a pdn-gw-update parameter if the received NOR contained a MIP6-Agent-Info AVP. It shall be present and contain a isr-Information parameter if the received NOR contained a Single-Registration-Indication indication within the NOR-Flags AVP.

**servingNodeTypeIndicator** in UpdateGprsLocationArg shall be present.

**skipSubscriberData Update** in UpdateGprsLocationArg shall be present.

**usedRAT-Type** in UpdateGprsLocationArg shall be absent.

**gprsSubscriptionDataNotNeeded** in UpdateGprsLocationArg shall be absent.

**nodeTypeIndicator** in UpdateGprsLocationArg shall be absent.

**areaRestricted** in UpdateGprsLocationArg shall be present if the corresponding information was received within the NOR-Flags AVP within a NOR; otherwise it shall be absent.

**ue-reachableIndicator** in UpdateGprsLocationArg shall be present if the corresponding information was received within the NOR-Flags AVP within a NOR; otherwise it shall be absent.

**ue-srvcc-Capability** in UpdateGprsLocationArg shall be present if a UE-SRVCC-Capability AVP was present in the received NOR. If present the parameter shall be populated with the received ue-srvcc-Capability.

## 8.8.2 UpdateGprsLocation-Arg mapping to NOR

When the IWF needs to construct a NOR command as a result of receiving a MAP-UpdateGprsLocation message with a pdn-gw-update parameter within eps-info or with an isr-Information parameter within eps-info not indicating updateLocation or with a skipSubscriberDataUpdate parameter within add-info or with ue-srvcc-Capability parameter but without usedRAT-Type parameter (see section 7.8.2 step 4), the the IWF shall populate AVPs of NOR as described below:

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**User-Name** AVP shall be populated with the value received within the imsi parameter of UpdateGprsLocation-Arg.

**Supported-Features** AVP shall be absent.

**Terminal-Information** AVP shall be present if an add-info parameter was present inUpdateGprsLocationArg..

**MIP6-Agent-Info** AVP shall be present if pdn-gw-Identity was received within pdn-gw-update parameter within eps-info within UpdateGprsLocationArg.

**Service-Selection** AVP shall be present if apn was received within pdn-gw-update parameter within eps-info within UpdateGprsLocationArg.

**NOR-Flags** AVP: Flags shall be set as follows:

- Single-Registration-Indication shall be set to 1 if a cancelSGSN indication was received within the ISR-Information within the eps-info within the UpdateGprsLocationArg; otherwise it shall be set to 0.
- SGSN area restricted shall be set to 1 if an sgsnAreaRestricted indication was received within the UpdateGprsLocationArg; otherwise it shall be set to 0.
- Ready for SM shall be set to 0.
- UE Reachable shall be set to 1 if a ue-reachableIndicator was received within the UpdateGprsLocationArg; otherwise it shall be set to 0.

**Context-Identifier** AVP shall be present if contextId was received within pdn-gw-update parameter within eps-info within UpdateGprsLocationArg.

**UE-SRVCC-Capability** AVP shall be present if a ue-srvcc-Capability parameter was present in UpdateGprsLocationArg. If present the AVP shall be populated with the received ue-srvcc-Capability parameter.

## 8.8.3 NOR mapping to ReadyForSM-Arg

When the IWF needs to construct a MAP-ReadyForSM message as a result of receiving an NOR command (see sections 7.8.1 step 2 and 7.8.2. step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of ReadyForSMArg as described below:

**imsi** in ReadyForSMArg shall be populated with the value of the User-Name AVP received within NOR.

**alertReason** in ReadyForSMArg shall be populated with the value of the Alert-Reason AVP received within NOR.

**alertReasonIndicator** in ReadyForSMArg shall be present.

**additionalAlertReasonIndicator** in ReadyForSMArg shall be absent.

**extensionContainer** in ReadyForSMArg shall be absent.

## 8.8.4 ReadyForSM-Arg mapping to NOR

When the IWF needs to construct a NOR command as a result of receiving a MAP-ReadyForSM message (see section 7.8.2 step 4), the the IWF shall populate AVPs of NOR as described below:

**User-Name** AVP shall be populated with the value received within the imsi parameter of ReadyForSMArg.

**Supported-Features** AVP shall be absent.

**Terminal-Information** AVP shall be absent.

**MIP6-Agent-Info** AVP shall be absent.

**Context-Identifier** AVP shall be absent.

**Service-Selection** AVP shall be absent.

**Alert-Reason** AVP shall be present and populated with the value received within the alertReason parameter of ReadyForSMArg.

**NOR-Flags** AVP: Flags shall be set as follows:

- Single-Registration-Indication shall be set to 0.
- SGSN area restricted shall be set to 0.
- Ready for SM shall be set to 1.
- UE Reachable shall be set to 0.

## 8.9 Mapping of Parameters for the IMEI Check Procedure

### 8.9.1 ECR mapping to CheckIMEI-Arg

When the IWF needs to construct a MAP-CheckIMEI message as a result of receiving an ECR command (see section 7.9.1 step 2), the IWF shall open a MAP dialogue in application context version 3 and populate sub-parameters of CheckIMEI-Arg as described below:

**imei** in CheckIMEI-Arg shall be populated with the imei (and software version) as received within the Terminal-Information AVP within ECR.

**requestedEquipmentInfo** in CheckIMEI-Arg shall indicate equipmentStatus.

**extensionContainer** in CheckIMEI-Arg shall be absent.

### 8.9.2 CheckIMEI-Res / Error mapping to ECA

When the IWF needs to construct an ECA command as a result of receiving a CheckIMEI Ack/Error message (see section 7.9.1 step 4), the IWF shall populate AVPs of ECA as described below:

**Result-Code / Experimental-Result** AVP shall be set to:

- DIAMETER\_SUCCESS if a CheckIMEI-Res parameter was received in a TCAP ResultLast component;
- DIAMETER\_ERROR\_UNKNOWN\_EQUIPMENT if an error of unknownEquipment was received;
- an appropriate DIAMETER base protocol result code otherwise.

**Auth-Session-State** AVP shall be set to the value NO\_STATE\_MAINTAINED (1).

**Equipment-Status** AVP shall be populated with a value as received within the equipmentStatus parameter within CheckIMEI-Res.



## 8.10 Mapping of Parameters for the Trace Activate Procedure

### 8.10.1 ActivateTraceMode-Arg mapping to IDR

When the IWF needs to construct an IDR command as a result of receiving a MAP-ActivateTraceMode message (see sections 7.10.1 step 2), the IWF shall populate AVPs of the IDR as described below:

**User-Name** AVP shall be populated with the value received within the imsi parameter of ActivateTraceModeArg.

**Supported-Features** AVP shall be absent.

**Subscription-Data** AVP shall be present and populated as follows:

**Trace-Data** AVP shall be present and populated as in chapter 8.2.2.

All other sub-AVPs shall be absent.

### 8.10.2 IDA mapping to ActivateTraceMode-Res / Error

When the IWF needs to construct a MAP-ActivateTraceMode Ack message as a result of receiving an IDA command (see sections 7.10.1 step 4), the IWF shall populate sub-parameters of ActivateTraceMode Res/Error as described below:

**ActivateTraceModeRes:**

**traceSupportIndicator** shall be present if an indication of support of this feature was received within the Supported-Feature AVP within IDA; Otherwise, it shall be absent.

**extensionContainer** shall be absent.

**ActivateTraceMode Error:**

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

## 8.11 Mapping of Parameters for the Trace Deactivate Procedure

### 8.11.1 DeactivateTraceMode-Arg mapping to DSR

When the IWF needs to construct an DSR command as a result of receiving a MAP-DeactivateTraceMode message (see sections 7.11.1 step 2), the IWF shall populate AVPs of DSR as described below:

**User-Name** AVP shall be populated with the value received within the imsi parameter of DeactivateTraceModeArg.

**Trace-Reference** AVP shall be populated with the values received within the traceReference and traceReference2 parameters of DeactivateTraceModeArg.

**Supported-Features** AVP shall be absent.

**DSR-Flags** AVP: Trace Data Withdrawal shall be set to 1. All other Flags shall be set as 0.

**Context-Identifier** AVPs shall be absent.

### 8.11.2 DSA mapping to DeactivateTraceMode-Res / Error

When the IWF needs to construct a MAP-DeactivateTraceMode Ack message as a result of receiving an DSA command (see sections 7.11.1 step 4), the IWF shall populate sub-parameters of DeactivateTraceMode Res/Error as described below:

**DeactivateTraceModeRes:**

**extensionContainer** shall be absent.

**DeactivateTraceMode Error:**

Values other than SUCCESS within the Result-Code / Experimental-Result AVP shall be mapped onto an appropriate MAP error.

## Annex A (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
2008-12	CT#42	CP-080711			Version 1.0.0 approved in CT#42	1.0.0	8.0.0
2009-03	CT#43	CP-090056	0001		Supported RAT Type	8.0.0	8.1.0
		CP-090056	0002		Trace		
		CP-090056	0004		Context Identifier for Update or Removal of PDN GW		
		CP-090044	0005	2	Ready For SM		
		CP-090044	0006		Handling LCS Subscription Data		
		CP-090056	0007	1	Requesting-Node-Type mapping		
		CP-090056	0008		Parameter mapping correction		
2009-06	CT#44	CP-090308	0011		Parameter Mapping	8.1.0	8.2.0
		CP-090380	0013	3	User Data Download		
2009-09	CT#45	CP-090545	0014		Notification of SMS over IP Non-Delivery for E-UTRAN and UE Reachability	8.2.0	8.3.0
		CP-090545	0015		Removal of User Data Handling Principles		
		CP-090545	0016	2	Cancel Location for Initial Attach		
2009-12	-	-	-	-	Update to Rel-9 version (MCC)	8.3.0	9.0.0
2011-03	CT#51	CP-110082	0018	1	UE SRVCC Capability Support for IWF	9.0.0	10.0.0
2011-06	CT#52	CP-110380	0020	1	Parameter Mapping for MDT	10.0.0	10.1.0
2012-03	CT#55	CP-120024	0025	1	Mapping of Parameters for Insert Subscriber Data	10.1.0	10.2.0
		CP-120025	0028		Mapping of Parameters for Cancel Location		
2012-12	CT#58	CP-120714	0041	1	Clarification on EPS Info	10.2.0	10.3.0

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## History

<b>Document history</b>		
V10.0.0	May 2011	Publication
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V10.2.0	April 2012	Publication
V10.3.0	January 2013	Publication