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Universal Mobile Telecommunications System (UMTS); LTE; Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol (3GPP TS 29.272 version 10.4.0 Release 10)



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# Foreword

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# 1 Scope

The present document describes the Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related diameter-based interfaces towards the Home Subscriber Server (HSS), and the MME and the SGSN related diameter-based interface towards the Equipment Identity Register (EIR).

This specification defines the Diameter application for the MME-HSS, S6a reference point, and for the SGSN-HSS, S6d reference point. The interactions between the HSS and the MME/SGSN are specified, including the signalling flows.

This specification defines the Diameter application for the MME-EIR, S13 reference point, and for the SGSN-EIR, S13' reference point. The interactions between the MME/SGSN and the EIR are specified, including the signalling flows.

In this specification, if there is no specific indication, the following principles apply:

- "SGSN" refers to an SGSN which at least supports the S4 interface and may support Gn and Gp interfaces.
- "S4-SGSN" refers to an SGSN which supports the S4 interface and does not support Gn and Gp interfaces.
- Gn/Gp-SGSN refers to an SGSN which supports the Gn and Gp interfaces and does not support S4 interface.
- "GPRS subscription data" refers to the parameters in the HLR column in Table 5.2. in 3GPP TS 23.008 [30].
- "EPS subscription data" refers to the parameters in the HSS column in Table 5.2A-1 in 3GPP TS 23.008 [30].

The Evolved Packet System stage 2 description (architecture and functional solutions) is specified in 3GPP TS 23.401 [2] and in 3GPP TS 23.060 [12].

# 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 23.401: "GPRS enhancements for E-UTRAN access ".
- [3] 3GPP TS 23.003: "Numbering, addressing and identification".
- [4] IETF RFC 3588: "Diameter Base Protocol".
- [5] 3GPP TS 33.401: "3GPP System Architecture Evolution: Security Architecture".
- [6] IETF RFC 4005: "Diameter Network Access Server Application".
- [7] IETF RFC 2234: "Augmented BNF for syntax specifications".
- [8] 3GPP TS 32.299: "Charging management; Diameter charging applications".
- [9] 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol".
- [10] 3GPP TS 29.212: "Policy and Charging Control over Gx reference point".
- [11] 3GPP TS 29.214: "Policy and Charging Control over Rx reference point".

- [12] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2".
- [13] 3GPP TS 22.016: "International Mobile station Equipment Identities (IMEI)".
- [14] IETF RFC 4960: "Stream Control Transmission Protocol".
- [15] Void
- [16] 3GPP TS 33.210: "3G Security; Network Domain Security; IP Network Layer Security"...
- [17] 3GPP TS 29.228: "IP multimedia (IM) Subsystem Cx and Dx Interfaces; Signalling flows and Message Elements".
- [18] 3GPP TS 33.102: "3G Security; Security Architecture".
- [19] 3GPP TS 36.413: "Evolved Universal Terrestrial Radio Access Network (E-UTRAN); S1 Application Protocol (S1AP)".
- [20] IETF RFC 5778: "Diameter Mobile IPv6: Support for Home Agent to Diameter Server Interaction".
- [21] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)".
- [22] 3GPP TS 32.298: "Charging Management; CDR parameter description".
- [23] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and configuration management".
- [24] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [25] 3GPP TS 29.329: "Sh Interface based on the Diameter protocol".
- [26] IETF RFC 5447: "Diameter Mobile IPv6: Support for Network Access Server to Diameter Server Interaction".
- [27] IETF RFC 4004: "Diameter Mobile IPv4 Application".
- [28] 3GPP2 A.S0022: "Interoperability Specification (IOS) for Evolved High Rate Packet Data (eHRPD) Radio Access Network Interfaces and Interworking with Enhanced Universal Terrestrial Radio Access Network (E-UTRAN)".
- [29] 3GPP TS 23.011: "Technical realization of Supplementary Services General Aspects".
- [30] 3GPP TS 23.008: "Organization of subscriber data".
- [31] 3GPP TS 24.008: "Mobile radio interface Layer 3 specification; Core network protocols; Stage 3".
- [32] IETF RFC 5516: "Diameter Command Code Registration for Third Generation Partnership Project (3GPP) Evolved Packet System (EPS)".
- [33] 3GPP TS 32.251: "Telecommunication management; Charging management; Packet Switched (PS) domain charging".
- [34] 3GPP TS 23.292: " IP Multimedia Subsystem (IMS) centralized services ".
- [35] 3GPP TS 23.216: "Single Radio Voice Call Continuity (SRVCC)".
- [36] 3GPP TS 23.015:"Technical realization of Operator Determined Barring (ODB)".
- [37] 3GPP TS 29.173: "Diameter-based SLh interface for Control Plane LCS".
- [38] 3GPP TS 29.303: "Domain Name System Procedures; Stage 3".
- [39] 3GPP TS 29.060: "General Packet Radio Service (GPRS); GPRS Tunnelling Protocol (GTP) across the Gn and Gp Interface".

[40] 3GPP TS 36.300: "Evolved Universal Terrestrial Radio Access (E-UTRA) and Evolved Universal Terrestrial Radio Access Network (E-UTRAN); Overall description; Stage 2".

# 3 Definitions and abbreviations

# 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1] apply.

# 3.2 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].

AVP	Attribute Value Pair
С	Conditional
EIR	Equipment Identity Register
ESM	EPS Session Management
HSS	Home Subscriber Server
IE	Information Element
М	Mandatory
MME	Mobility Management Entity
0	Optional
ODB	Operator Determined Barring
URRP-MME	User Reachability Request Parameter for MME
URPP-SGSN	User Reachability Request Parameter for SGSN

# 4 General Description

This document describes the S6a/S6d and S13/S13' interfaces related procedures, message parameters and protocol specifications.

The procedures, message parameters and protocol are similar between S6a and S6d. S6a is used for location changes of the MME, while S6d is for location changes of the SGSN. Refer to section 5 for the differences, especially section 5.2.1.

The procedures, message parameters and protocol are identical as for the S13 and S13'. See section 6 for details.

In the tables that describe the Information Elements transported by each Diameter command, each Information Element is marked as (M) Mandatory, (C) Conditional or (O) Optional in the "Cat." column. For the correct handling of the Information Element according to the category type, see the description detailed in section 6 of the 3GPP TS 29.228 [17].

# 5 MME – HSS (S6a) and SGSN – HSS (S6d)

# 5.1 Introduction

The S6a interface enables the transfer of subscriber related data between the MME and the HSS as described in the 3GPP TS 23.401 [2].

The S6d interface enables the transfer of subscriber related data between the SGSN and the HSS as described in 3GPP TS 23.060 [12].

# 5.2 Mobility Services

# 5.2.1 Location Management Procedures

# 5.2.1.1 Update Location

# 5.2.1.1.1 General

The Update Location Procedure shall be used between the MME and the HSS and between the SGSN and the HSS to update location information in the HSS. The procedure shall be invoked by the MME or SGSN and is used:

- to inform the HSS about the identity of the MME or SGSN currently serving the user, and optionally in addition;
- to update MME or SGSN with user subscription data;
- to provide the HSS with other user data, such as Terminal Information or UE SRVCC Capability.

This procedure is mapped to the commands Update-Location-Request/Answer (ULR/ULA) in the Diameter application specified in chapter 7.

Table 5.2.1.1.1/1 specifies the involved information elements for the request.

Table 5.2.1.1.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
IMSI	User-Name (See IETF RFC 3588 [4])	М	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Terminal Information (See 7.3.3)	Terminal- Information	0	This information element shall contain information about the user"s mobile equipment. Within this Information Element, only the IMEI and the Software-Version AVPs shall be used on the S6a/S6d interface.
ULR Flags (See 7.3.7)	ULR-Flags	М	This Information Element contains a bit mask. See 7.3.7 for the meaning of the bits.
Visited PLMN Id (See 7.3.9)	Visited-PLMN- Id	М	This IE shall contain the MCC and the MNC, see 3GPP TS 23.003[3]. It may be used to apply roaming based features.
RAT Type (See 7.3.13)	RAT-Type	М	This Information Element contains the radio access type the UE is using. See section 7.3.13 for details.
SGSN number (See 7.3.102)	SGSN- Number	С	This Information Element contains the ISDN number of the SGSN, see 3GPP TS 23.003 [3]. It shall be present when the message is sent on the S6d interface and the SGSN supports LCS or SMS functionalities or the Gs interface. It may be present when the message is sent on the S6a interface and the requesting node is a combined MME/SGSN.
Homogeneous Support of IMS Voice Over PS Sessions	Homogeneous -Support-of- IMS-Voice- Over-PS- Sessions	0	This Information Element, if present, indicates whether or not "IMS Voice over PS Sessions" is supported homogeneously in all TAs or RAs in the serving node (MME or SGSN or combined MME/SGSN). The value "SUPPORTED" indicates that there is support for "IMS Voice over PS Sessions" in all TAs or RAs. The value "NOT_SUPPORTED" indicates that theres is not support for "IMS Voice over PS Sessions" in any of the TAs or RAs.
V-GMLC address	GMLC- Address	С	This Information Element shall contain, if available, the IPv4 or IPv6 address of the V-GMLC associated with the serving node.
Active APN	Active-APN	0	This Information Element, if present, contains the list of active APNs stored by the MME or SGSN, including the identity of the PDN GW assigned to each APN. For the case of explicitly subscribed APNs, the following information shall be present: - Context-Identifier: context id of subscribed APN in use
			<ul> <li>Service-Selection: name of subscribed APN in use</li> <li>MIP6-Agent-Info: including PDN GW identity in use for subscribed APN</li> <li>Visited-Network-Identifier: identifies the PLMN where the PDN GW was allocated</li> </ul>
			For the case of the Wildcard APN, the following information shall be present: - Context-Identifier: context id of the Wildcard APN - Specific-APN-Info: list of APN-in use and related PDN GW identity when the subscribed APN is the wildcard APN
			It may be present when MME or SGSN needs to restore PDN GW data in HSS due to a Reset procedure.
UE SRVCC Capability	UE-SRVCC- Capability	С	This information element shall indicate if the UE supports or does not support the SRVCC capability and shall be present if this information is available to the MME or the SGSN.

Table 5.2.1.1.1/1: U	Indate Location	Request
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Information element name	Mapping to Diameter AVP	Cat.	Description
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. The Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable: - User Unknown - Unknown EPS Subscription - RAT Not Allowed - Roaming Not Allowed
Error- Diagnostic	Error- Diagnostic	0	If the Experimental Result indicates "Unknown EPS Subscription", Error Diagnostic may be present to indicate whether or not GPRS subscription data are subscribed (i.e. whether or not Network Access Mode stored in the HSS indicates that only circuit service is allowed). If the Experimental Result indicates "Roaming Not Allowed", and the Update Location is rejected due to ODB, Error Diagnostic may be present to indicate the specific type of ODB.
ULA-Flags (See 7.3.8)	ULA-Flags	С	This Information Element contains a bit mask. See 7.3.8 for the meaning of the bits. It shall be present only when the Result-Code AVP is DIAMETER_SUCCESS.
Subscription Data (See 7.3.2)	Subscription- Data	С	This Information Element shall contain the complete subscription profile of the user. It shall be present if success is reported, unless an explicit "skip subscriber data" indication was present in the request.

Table 5.2.1.1.1/2: Update Location Answer

# 5.2.1.1.2 Detailed behaviour of the MME and the SGSN

The MME shall make use of this procedure to update the MME identity stored in the HSS (e.g. at initial attach, inter MME tracking area update or radio contact after HSS reset).

The SGSN shall make use of this procedure to update the SGSN identity stored in the HSS (e.g. at initial attach, inter SGSN routing area update or radio contact after HSS reset).

For UEs receiving emergency services, in which the UE was not successfully authenticated, the MME or SGSN shall not make use of the Update Location procedure.

If the Update Location request is to be sent due to an inter node (SGSN to MME) update and the previous SGSN is a Gn/Gp SGSN, the MME shall set the "Single-Registration-Indication" flag in the ULR-Flags information element in the request.

If the Update Location request is to be sent due to an initial attach, the MME or SGSN shall set the "Initial-Attach-Indicator" flag in the ULR-Flags information element in the request.

A combined MME/SGSN shall set the "Skip Subscriber Data" flag in the ULR-Flags if subscriber data are already available due to a previous location update.

A combined MME/SGSN that has chosen the option to include the SGSN Number within ULR sent over S6a shall be prepared to receive a single subscription data update message (IDR or DSR) from the HSS when the subscription data is modified.

If the MME or SGSN knows about the homogeneity of the support of IMS Voice over PS Sessions in all TAs or RAs associated to that serving node (i.e., it is supported in all the TA/RAs or it is not supported in any of the TA/RAs), it shall include this indication to the HSS in the "Homogeneous Support of IMS Voice over PS Sessions" IE.

The MME or SGSN may include dynamic APN and PGW ID data in the list of Active-APN AVPs, in order to restore this information in the HSS after a Reset procedure.

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A standalone MME shall not indicate its support for any SGSN specific features (such as SMS related features), and it shall not request explicitly the download of GPRS data (via the GPRS-Subscription-Data-Indicator flag; see clause 7.3.7).

For a standalone MME or SGSN, if EPS or GPRS subscription data is received, the standalone MME or SGSN shall replace all of the EPS or GPRS subscription data of the user in the MME or SGSN. Any optional EPS or GPRS data not received, but stored in the standalone MME or SGSN, shall be deleted.

For a combined MME/SGSN, if EPS subscription data of the user is received, it shall replace all of the EPS subscription data of the user. Any optional EPS data not received by the combined MME/SGSN, but stored in the MME/SGSN, shall be deleted.

For a combined MME/SGSN, if GPRS subscription data of the user is received, it shall replace all of the GPRS subscription data of the user. Any optional GPRS data not received by the combined MME/SGSN, but stored in the MME/SGSN, shall be deleted.

When receiving an Update Location response from the HSS, the MME or SGSN shall check the result code. If it indicates success the MME or SGSN shall store the received subscription profile (if any), and it shall store the HSS identity as received in the Origin-Host AVP.

For UEs receiving emergency services (i.e. emergency attached UEs or normal attached UEs with a UE Requested PDN Connection for emergency services), and if the MME or SGSN supports emergency services for users in limited service state, the MME or SGSN shall proceed even if the Update Location procedure fails (e.g. authenticated users with roaming restrictions or RAT-Type restrictions in HSS).

When receiving GPRS-Subscription-Data AVP in the response, the SGSN or combined MME/SGSN shall delete all the stored PDP-Contexts, if there are any, and then store all the received PDP-Contexts.

When receiving the APN-Configuration-Profile AVP in a ULA, the MME or SGSN shall delete all the stored APN-Configurations, if there are any, and then store all the received APN-Configurations.

For each of the received APN-Configurations in the APN-Configuration-Profile, if both the MIP6-Agent-Info and the PDN-GW-Allocation-Type AVPs are absent in the APN-Configuration AVP, the MME or SGSN shall perform the PGW selection (static or dynamic) according to the local configuration. If MIP6-Agent-Info is present, and PDN-GW-Allocation-Type is not present, this means that the PDN GW address included in MIP6-Agent-Info has been statically allocated. If the MIP6-Agent-Info contains an FQDN of the PDN GW, the MME shall retrieve the PGW PLMN ID from the MIP6-Agent-Host AVP within the MIP6-Agent-Info AVP.

If the MME/SGSN supports interworking with Gn/Gp-SGSNs, it shall ensure that the context identifier sent over GTPv1 for each of the received APN-Configurations is within the range of 0 and 255.

NOTE 1: If the MME/SGSN receives from HSS a Contex-Identifier value higher than 255, how this value is mapped to a value between 0 and 255 is implementation specific.

If the subscriber is not roaming and the SIPTO-Permission information for an APN is present, the MME or SGSN shall allow SIPTO for that APN only if the SIPTO-Permission information indicates so.

If the subscriber is not roaming and the SIPTO-Permission information for an APN is not present, the MME or SGSN may allow SIPTO for that APN.

If the subscriber is roaming and the SIPTO-Permission information for an APN is present, the MME or SGSN shall allow SIPTO for that APN only if the SIPTO-Permission information indicates so and the VPLMN Dynamic Address is allowed and the MME or SGSN selects a PDN GW in the VPLMN.

If the subscriber is roaming and the SIPTO-Permission information for an APN is not present, the MME or SGSN shall not allow SIPTO for that APN.

NOTE 2: Based on local configuration, the MME or SGSN can determine not to allow SIPTO for an APN, regardless if the SIPTO-Permission information is present.

If MPS-Priority AVP is present and the UE is subscribed to the eMLPP or 1x RTT priority service in the CS domain as indicated by the MPS-CS-Priority bit of the AVP, the MME shall allow the UE to initiate the RRC connection with higher priority than other normal UEs during CS Fallback procedure. If the MPS-Priority AVP is present and the UE is subscribed to MPS in the EPS domain as indicated by the MPS-EPS-Priority bit of the AVP, the MME shall allow the UE to initiate the RRC connection with higher priority than other normal UEs during the MPS-EPS-Priority bit of the AVP, the MME shall allow the UE to initiate the RRC connection with higher priority than other normal UEs.

If the subscriber is not roaming, the MME or SGSN may allow or prohibit the UE to use LIPA as indicated by LIPA-Permission for a specific APN.

If the subscriber is roaming and the VPLMN-LIPA-Allowed AVP indicates that the UE is not allowed to use LIPA in the VPLMN where the UE is attached, the MME or SGSN shall not provide LIPA for the UE and shall not consider the LIPA-Permission AVP. If the VPLMN-LIPA-Allowed AVP indicates that the UE is allowed to use LIPA in the VPLMN, the MME or SGSN may allow or prohibit the UE to use LIPA as indicated by LIPA-Permission for a specific APN. The VPLMN-Dynamic-Address-Allowed AVP shall not be considered if it is received when the MME or SGSN establishes a PDN connection with LIPA.

If the LIPA-Permission information for an APN indicates LIPA only, the MME or SGSN shall only allow LIPA for that APN via the authorized CSGs according to the CSG Subscription Data. If the LIPA-Permission information for an APN indicates LIPA prohibited, the MME or SGSN shall not allow LIPA for that APN. If the LIPA-Permission information for an APN indicates LIPA conditional, the MME or SGSN shall allow non LIPA, and LIPA for that APN via the authorized CSGs according to the CSG Subscription Data. If the LIPA-Permission APN indicates LIPA conditional, the MME or SGSN shall allow non LIPA, and LIPA for that APN via the authorized CSGs according to the CSG Subscription Data. If the LIPA-Permission AVP is not present for a specific APN, the APN shall not be allowed to use LIPA.

The LIPA-Permission information for the Wildcard APN shall apply to any APN that is not explicitly present in the subscription data.

The SIPTO-Permission information for the Wildcard APN shall apply to any APN that is not explicitly present in the subscription data.

If the subscription data received for a certain APN indicates that the APN was authorized as a consequence of having the Wildcard APN in the user subscription in HSS, then the MME shall not store this APN data beyond the lifetime of the UE session and the MME shall delete them upon disconnection of the UE.

If the MME supports the Relay Node functionality (see 3GPP TS 36.300 [40]) and the subscription data indicates that the subscriber is not a relay, the MME shall reject the attach request from a device attempting to attach to EPS as a Relay Node. If a device requests to be attached to EPS as an UE, the MME shall proceed with the attach procedure regardless of the content of the Relay Node Indicator.

If trace data are received in the subscriber data, the MME or SGSN shall start a Trace Session. For details, see 3GPP TS 32.422 [23].

If the Ext-PDP-Type AVP is present in the PDP-Context AVP, the SGSN or combined MME/SGSN shall ignore the value of the PDP-Type AVP.

If the subscriber is not roaming and the Subscribed-Periodic-RAU-TAU-Timer information is present, the MME or SGSN shall allocate the subscribed value to the UE as periodic RAU or TAU timer. If the subscriber is roaming and the Subscribed-Periodic-RAU-TAU-Timer information is present, the MME or SGSN may use the subscribed periodic RAU/TAU timer value as an indication to decide for allocating a locally configured periodic RAU/TAU timer value to the UE.

# 5.2.1.1.3 Detailed behaviour of the HSS

When receiving an Update Location request the HSS shall check whether subscription data exists for the IMSI.

If the HSS determines that there is not any type of subscription for the IMSI (including EPS, GPRS and CS subscription data), a Result Code of DIAMETER\_ERROR\_USER\_UNKNOWN shall be returned.

If the Update Location Request is received over the S6a interface, and the subscriber has not any APN configuration, the HSS shall return a Result Code of DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION.

If the Update Location Request is received over the S6d interface, and the subscriber has neither an APN configuration profile nor GPRS subscription data, the HSS shall return a Result Code of DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION.

When sending DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION, an Error Diagnostic information may be added to indicate whether or not GPRS subscription data are subscribed (i.e. whether or not Network Access Mode stored in the HSS indicates that only circuit service is allowed).

The HSS shall check whether the RAT type the UE is using is allowed. If it is not, a Result Code of DIAMETER\_ERROR\_RAT\_NOT\_ALLOWED shall be returned.

The HSS shall check whether roaming is not allowed in the VPLMN due to ODB. If so a Result Code of DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED shall be returned. When this error is sent due to the MME or SGSN not supporting a certain ODB category, an Error Diagnostic information element may be added to indicate the type of ODB; if this error is sent due to the ODB indicating "Barring of Roaming", Error Diagnostic shall not be included.

If the Update Location Request is received over the S6a interface, the HSS shall send a Cancel Location Request with a Cancellation-Type of MME\_UPDATE\_PROCEDURE (CLR; see chapter 7.2.7) to the previous MME (if any) and replace the stored MME-Identity with the received value (the MME-Identity is received within the Origin-Host AVP). The HSS shall reset the "UE purged in MME" flag. If the "Single-Registration-Indication" flag was set in the received request, the HSS shall send a Cancel Location Request with a Cancellation-Type of SGSN \_UPDATE\_PROCEDURE to the SGSN (MAP Cancel Location), and delete the stored SGSN address and SGSN number. If the "Initial-Attach-Indicator" flag was set in the received request, regardless of whether the "Single-Registration-Indication" flag is set, the HSS shall send a Cancel Location Request with a Cancellation-Type of INITIAL\_ATTACH\_PROCEDURE (CLR; see chapter 7.2.7, or MAP Cancel Location) to the SGSN if there is an SGSN registration.

If the Update Location Request is received over the S6d interface, the HSS shall send a Cancel Location Request with a Cancellation-Type of SGSN\_UPDATE\_PROCEDURE (CLR; see chapter 7.2.7, or MAP Cancel Location) to the previous SGSN (if any) and replace the stored SGSN-Identity with the received value (the SGSN-Identity is received within the Origin-Host AVP). The HSS shall reset the "UE purged in SGSN" flag. If the "Initial-Attach-Indicator" flag was set in the received request, the HSS shall send a Cancel Location Request with a Cancellation-Type of INITIAL\_ATTACH\_PROCEDURE (CLR; see chapter 7.2.7) to the MME if there is an MME registration.

When the HSS receives the Update Location Request, if a 15<sup>th</sup> digit of the IMEI AVP is received, the HSS may discard the digit.

If the Update Location Request includes the list of active APNs, the HSS shall delete all the stored dynamic PDN GW information, if there are any, and then replace them by the PDN GW information received in the list of Active-APN AVPs.

If the Update Location Request is received over the S6a interface for a user for which the URRP-MME parameter is set in the HSS, the HSS shall clear the URRP-MME parameter and send an indication to the corresponding Service Related Entities.

If the Update Location Request is received over the S6d interface for a user for which the URRP-SGSN parameter is set in the HSS, the HSS shall clear the URRP-SGSN parameter and send an indication to the corresponding Service Related Entities.

If no result code has been sent to the MME or SGSN so far, the HSS shall include the subscription data in the ULA command according to the ULR-Flags and the supported/unsupported features of the MME or SGSN, unless an explicit "skip subscriber data" indication has been received in the request, and shall return a Result Code of DIAMETER\_SUCCESS.

When the APN-Configuration-Profile AVP is present in the Subscription-Data AVP sent within a ULA, the AVP shall contain at least the default APN Configuration and a Context-Identifier AVP that identifies the per subscriber's default APN configuration. The default APN Configuration shall not contain the Wildcard APN (see 3GPP TS 23.003 [3], clause 9.2); the default APN shall always contain an explicit APN.

The GPRS Subscription data (if available in the HSS) shall only be present in the ULA command if it was indicated by the serving node in the ULR-Flags AVP (see clause 7.3.7), or when the subscription data is returned by a Pre-Rel-8 HSS (via an IWF) or when the Update Location Request is received over the S6d interface and there is no APN configuration profile stored for the subscriber.

The HSS shall use the indication received in the GPRS-Subscription-Data-Indicator for future use in the subscriber data update procedures.

The HSS shall store the new terminal information and/or the new UE SRVCC capability, if they are present in the request. If the UE SRVCC capability is not present, the HSS shall store that it has no knowledge of the UE SRVCC capability.

LCS-Info, Teleservice-List and Call-Barring-Infor-List data shall be included according to the list of supported features indicated by the serving node (see clause 7.3.10). The check of the SMS supported features, which are only applicable to SGSN, may be skipped if the HSS determines that the serving node is a standalone MME (see clause 7.3.7).

The HSS may use the indication received in the Node-Type-Indicator for future use in the subscriber data update procedures.

Subscriber-Status AVP shall be present in the Subscription-Data AVP when sent within a ULA. If the value "OPERATOR\_DETERMINED\_BARRING" is sent, the Operator-Determined-Barring AVP or HPLMN-ODB AVP shall also be present in the Subscription-Data AVP, or vice versa.

Access-Restriction-Data AVP shall be present within the Subscription-Data AVP sent within a ULA if at least one of the defined restrictions applies.

The AMBR AVP shall be present in the Subscription-Data AVP when the APN-Configuration-Profile AVP is sent within a ULA (as part of the Subscription-Data AVP) and may be present in the Subscription-Data AVP when the GPRS-Subscription-Data AVP is present.

The EPS-Subscribed-QoS-Profile AVP and the AMBR AVP shall be present in the APN-Configuration AVP when the APN-Configuration AVP is sent in the APN-Configuration-Profile AVP and when the APN-Configuration-Profile AVP is sent within a ULA (as part of the Subscription-Data AVP).

For those APNs that have been authorized as a consequence of having the Wildcard APN in the user subscription, the HSS shall include the specific APN name and associated PDN-GW identity inside the APN context of the Wildcard APN. This indicates to the MME that the particular APN shall not be cached in the MME and it shall be deleted when the UE session is terminated.

If a Result Code of DIAMETER\_SUCCESS is returned, the HSS shall set the Separation Indication in the response.

If the HSS receives an indication in the ULR command about the homogeneous support of IMS Voice over PS Sessions in all TA/RAs associated to a serving node, it may use this information in the future in order to skip the T-ADS data retrieval, as described in clause 5.2.2.1 (IDR/IDA commands).

### 5.2.1.2 Cancel Location

#### 5.2.1.2.1 General

The Cancel Location Procedure shall be used between the HSS and the MME and between the HSS and the SGSN to delete a subscriber record from the MME or SGSN. The procedure shall be invoked by the HSS and is used:

- to inform the MME or SGSN about the subscriber"s subscription withdrawal or
- to inform the MME or SGSN about an ongoing update procedure i.e. MME or SGSN change.
- to inform the MME or SGSN about an initial attach procedure.

This procedure is mapped to the commands Cancel-Location-Request/Answer (CLR/CLA) in the Diameter application specified in chapter 7.

Table 5.2.1.2.1/1 specifies the involved information elements for the request.

Table 5.2.1.2.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
IMSI	User-Name (See IETF RFC 3588 [4])	М	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Cancellation Type (See 7.3.24)	Cancellation- Type	М	Defined values that can be used are: - MME-Update Procedure, - SGSN-Update Procedure, - Subscription Withdrawal, - Update Procedure_IWF, - Initial Attach Procedure.

#### Table 5.2.1.2.1/1: Cancel Location Request

#### Table 5.2.1.2.1/2: Cancel Location Answer

Information element name	Mapping to Diameter AVP	Cat.	Description
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Result (See 7.4)	Result-Code / Experimental- Result	Μ	The result of the operation. The Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol.

### 5.2.1.2.2 Detailed behaviour of the MME and the SGSN

When receiving a Cancel Location request the MME or SGSN shall check whether the IMSI is known.

If it is not known, a result code of DIAMETER\_SUCCESS is returned.

If it is known, the MME or SGSN shall check the Cancellation Type and act accordingly. If a cancellation type of "Initial Attach Procedure" is received, the MME or SGSN shall not delete the subscription data. For details see 3GPP TS 23.401[2] and 3GPP TS 23.060[12]. Also in this case a result code of DIAMETER\_SUCCESS is returned.

When a UE is served by a single combined MME/SGSN for both E-UTRAN and non-E-UTRAN access, the combined MME/SGSN shall check the Cancellation-Type. If it indicates Subscription Withdrawal or Update Procedure\_IWF, the CLR is processed both in the MME part and in the SGSN part of the combined node. Otherwise, the CLR is processed only in the affected part of the combined node and subscription data are kept for the not affected part.

### 5.2.1.2.3 Detailed behaviour of the HSS

The HSS shall make use of this procedure when the subscriber's subscription is withdrawn by the HSS operator and when the HSS detects that the UE has moved to a new MME or SGSN area.

The HSS shall include a cancellation type of "Subscription Withdrawal" if the subscriber"s subscription is withdrawn by the operator and shall include a cancellation type of "MME Update Procedure" if the UE moved to a new MME area and shall include a cancellation type of "SGSN Update Procedure" if the UE moved to a new SGSN area, and shall include a cancellation type of "Initial Attach Procedure" if the cancel location is initiated due to an Initial Attach from the UE.

# 5.2.1.3 Purge UE

# 5.2.1.3.1 General

The Purge UE Procedure shall be used between the MME and the HSS and between the SGSN and the HSS to indicate that the subscriber's profile has been deleted from the MME or SGSN either by an MMI interaction or automatically, e.g. because the UE has been inactive for several days.

This procedure is mapped to the commands Purge-UE-Request/Answer (PUR/PUA) in the Diameter application specified in chapter 7.

Table 5.2.1.3.1/1 specifies the involved information elements for the request.

Table 5.2.1.3.1/2 specifies the involved information elements for the answer.

Information Description Mapping to Cat. Diameter AVP element name IMSI User-Name This information element shall contain user IMSI, formatted according to Μ (See IETF 3GPP TS 23.003 [3], clause 2.2. RFC 3588 [4]) Supported Supported-0 If present, this information element shall contain the list of features Features Features supported by the origin host. (See 3GPP TS 29.229 [9]) PUR-Flags **PUR-Flags** 0 If present, this Information Element shall contain a bitmask. See section (See 7.3.149) 7.3.149 for the meaning of the bits.

Table 5.2.1.3.1/1: Purge UE Request

#### Table 5.2.1.3.1/2: Purge UE Answer

Information element name	Mapping to Diameter AVP	Cat.	Description
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. The Result-Code AVP shall be used to indication success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable: - User Unknown
PUA-Flags (See 7.3.48)	PUA-Flags	С	This Information Element shall contain a bit mask. See section 7.3.48 for the meaning of the bits. It shall be present only when the Result-Code AVP is DIAMETER_SUCCESS.

#### 5.2.1.3.2 Detailed behaviour of the MME and the SGSN

The MME shall make use of this procedure to set the "UE Purged in the MME" flag in the HSS when the subscription profile is deleted from the MME database due to MMI interaction or after long UE inactivity.

The SGSN shall make use of this procedure to set the "UE Purged in SGSN" flag in the HSS when the subscription profile is deleted from the SGSN database due to MMI interaction or after long UE inactivity.

The combined MME/SGSN shall make use of this procedure to set the "UE Purged in MME" and "UE Purged in SGSN" flags in the HSS when the subscription profile is deleted from the common MME/SGSN database due to MMI interaction or after long UE inactivity on all registered accesses. If the HSS has indicated support for the Partial Purge feature (see clause 7.3.10), the combined MME/SGSN may also indicate to the HSS a Purge of the UE in only one of the serving nodes in the combined node (either in the MME or in the SGSN).

When receiving a Purge UE response from the HSS the MME shall check the Result Code. If it indicates success, the MME shall check the PUA flag "freeze M-TMSI", and if set freeze the M-TMSI i.e. block it for immediate re-use.

When receiving a Purge UE response from the HSS the SGSN shall check the Result Code. If it indicates success, the SGSN shall check the PUA flag "freeze P-TMSI", and if set freeze the P-TMSI i.e. block it for immediate re-use.

When receiving a Purge UE response from the HSS the combined MME/SGSN shall check the Result Code. If it indicates success, the combined MME/SGSN shall check the PUA flag "freeze M-TMSI" and "freeze P-TMSI", and if set freeze the M-TMSI and/or the P-TMSI i.e. block it for immediate re-use.

#### 5.2.1.3.3 Detailed behaviour of HSS

When receiving a Purge UE request the HSS shall check whether the IMSI is known.

If it is not known, a result code of DIAMETER\_ERROR\_USER\_UNKNOWN shall be returned.

If it is known, the HSS shall set the result code to DIAMETER\_SUCCESS and compare the received identity in the Origin-Host with the stored MME-Identity and with the stored SGSN-Identity. If the received identity matches the stored MME-identity and the stored SGSN-Identity, then:

- if the HSS supports the Partial Purge feature (see clause 7.3.10), and the combined MME/SGSN indicated that the UE was purged in only one of the serving nodes, the HSS shall set the PUA flags according to the serving node where the purge was done (i.e., either "freeze M-TMSI" if the purge was done in the MME, or "freeze P-TMSI" if the purge was done in the SGSN); similarly, the HSS shall set either the "UE purged in MME" flag, or "UE purged in SGSN" flag, accordingly;
- if the HSS does not support the Partial Purge feature, or the combined MME/SGSN did not indicate that the UE was purged in only one of the serving nodes, the HSS shall set the PUA flags "freeze M-TMSI" and "freeze P-TMSI" in the answer message and set the flag "UE purged in MME" and "UE purged in SGSN";

If the received identity matches the stored MME-identity but not the stored SGSN-identity, the HSS shall set the PUA flag "freeze M-TMSI" and clear the PUA flag "freeze P-TMSI" in the answer message and set the flag "UE purged in MME";

If the received identity matches the stored SGSN-identity but not the stored MME-identity, the HSS shall set the PUA flag "freeze P-TMSI" and clear the PUA flag "freeze M-TMSI" in the answer message and set the flag "UE purged in SGSN";

If the received identity does not match the stored MME-identity and does not match the stored SGSN-identity, the HSS shall clear the PUA flags "freeze M-TMSI" and "freeze P-TMSI in the answer message.

# 5.2.2 Subscriber Data Handling Procedures

# 5.2.2.1 Insert Subscriber Data

#### 5.2.2.1.1 General

The Insert Subscriber Data Procedure shall be used between the HSS and the MME and between the HSS and the SGSN for updating and/or requesting certain user data in the MME or SGSN in the following situations:

- due to administrative changes of the user data in the HSS and the user is now located in an MME or SGSN, i.e. if the user was given a subscription and the subscription has changed;
- the operator has applied, changed or removed Operator Determined Barring for this user;
- activate subscriber tracing in the MME or the SGSN;
- to indicate to the MME or SGSN that the HSS has requested to be notified when the UE has become reachable;
- to request from the MME or SGSN the necessary data to support the T-ADS functionality;
- to retrieve location information and/or state information from the MME or the SGSN;
- to update the STN-SR (e.g., as a result of an Sh interaction with an SCC-AS).

If the HSS knows that the UE has attached to the same combined MME/SGSN via both the E-UTRAN and UTRAN/GERAN, i.e. the HSS has received the Update Location Request over both the S6a interface and S6d interface respectively with the same SGSN number, the HSS should invoke this procedure for a single time to update and/or request certain user data in the combined MME/SGSN, i.e. the HSS should not invoke this procedure for each of the MME and the SGSN registered respectively.

If the Node-Type-Indicator information has been previously received as cleared in the ULR-Flags during update location procedure for the MME, the HSS may skip any change of the SMS related subscription data and consequently does not have to make use of the Insert Subscriber Data procedure to update the subscription data in the MME.

This procedure is mapped to the commands Insert Subscriber Data-Request/Answer (IDR/IDA) in the Diameter application specified in clause 7.

Table 5.2.2.1.1/1 specifies the involved information elements for the request.

Table 5.2.2.1.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
IMSI	User-Name (See IETF RFC 3588 [4])	Μ	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Subscription Data (See 7.3.2)	Subscription- Data	М	This Information Element shall contain the part of the subscription profile that either is to be added to the subscription profile stored in the MME or SGSN or is replacing a part of the subscription profile stored in the MME or SGSN.
IDR Flags (See 7.3.103)	IDR-Flags	С	This Information Element shall contain a bit mask. See 7.3.103 for the meaning of the bits.

#### Table 5.2.2.1.1/1: Insert Subscriber Data Request

Information element name	Mapping to Diameter AVP	Cat.	Description
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. Result-Code AVP shall be used to indicate success / errors defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable in this case: - User Unknown
IMS Voice over PS Sessions Supported (See 7.3.106)	IMS-Voice- Over-PS- Sessions- Supported	С	If available to the serving node, this information element shall indicate whether or not "IMS Voice over PS Sessions" is supported by the UE's most recently used TA or RA in the serving node (MME or SGSN or combined MME/SGSN).
Last UE Activity Time (See 7.3.107)	Last-UE- Activity-Time	С	If available to the serving node, this information element shall contain the time of the last radio contact with the UE.
RAT Type	RAT-Type	С	If available to the serving node, this information element shall indicate the RAT Type of the access where the UE was present at the time of the last radio contact.
IDA-Flags (See 7.3.47)	IDA-Flags	С	This Information Element shall contain a bit mask. See 7.3.47 for the meaning of the bits.
EPS-User- State	EPS-User- State	С	This Information Element shall contain the EPS-User State. It shall be present if EPS user state was requested within IDR.
EPS-Location- Information	EPS-Location- Information	С	This Information Element shall contain the EPS-Location Information. It shall be present if EPS location information was requested within IDR.

Table 5.2.2.1.1/2: Insert Subscriber Data Answer

### 5.2.2.1.2 Detailed behaviour of the MME and the SGSN

When receiving an Insert Subscriber Data request the MME or SGSN shall check whether the IMSI is known.

If it is not known, a result code of DIAMETER\_ERROR\_USER\_UNKNOWN shall be returned.

If it is known, the MME or SGSN shall replace the specific part of the stored subscription data with the received data, or shall add the received data to the stored data.

When receiving the APN-Configuration-Profile AVP within the Subscription-Data AVP, the MME or SGSN shall check the All-APN-Configurations-Included-Indicator value. If it indicates

"All\_APN\_CONFIGURATIONS\_INCLUDED", the MME or SGSN shall delete all stored APN-Configurations and then store all received APN-Configurations. Otherwise, the MME or SGSN shall check the Context-Identifier value of each received APN-Configuration. If the Context-Identifier of a received APN-Configuration matches a Context-Identifier of a stored APN-Configuration, the MME or SGSN shall replace the stored APN-Configuration with the received APN-Configuration. If the Context-Identifier of a received APN-Configuration does not match a Context-Identifier of a stored APN-Configuration, the MME or SGSN shall add the received APN-Configuration to the stored APN-Configurations. If the addition or update of the subscription data succeeds in the MME or SGSN, the Result-Code shall be set to DIAMETER\_SUCCESS. The MME or SGSN shall then acknowledge the Insert Subscriber Data message by returning an Insert Subscriber Data Answer.

For each of the received APN-Configurations in the APN-Configuration-Profile, if both the MIP6-Agent-Info and the PDN-GW-Allocation-Type AVPs are absent in the APN-Configuration AVP, the MME or SGSN shall perform the PGW selection (static or dynamic) according to the local configuration. If MIP6-Agent-Info is present, and PDN-GW-Allocation-Type is not present, this means that the PDN GW address included in MIP6-Agent-Info has been statically allocated.

If the MME/SGSN supports interworking with Gn/Gp-SGSNs, it shall ensure that the context identifier sent over GTPv1 for each of the received APN-Configurations is within the range of 0 and 255.

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NOTE: If the MME/SGSN receives from HSS a Contex-Identifier value higher than 255, how this value is mapped to a value between 0 and 255 is implementation specific.

If the MME is requested to notify the HSS when the UE becomes reachable, the MME shall set the URRP-MME parameter to indicate the need to inform the HSS about UE reachability, e.g. when the next NAS activity from the UE is detected. If the SGSN is requested to notify the HSS when the UE becomes reachable, the SGSN shall set the URRP-SGSN parameter to indicate the need to inform the HSS about UE reachability, e.g. when the next NAS activity from the URRP-sGSN parameter to indicate the need to inform the HSS about UE reachability, e.g. when the next NAS activity from the UE is detected.

When receiving GPRS-Subscription-Data AVP within the Subscription-Data AVP, the SGSN or combined MME/SGSN shall check the Complete-Data-List-Included-Indicator value. If it indicates

"All\_PDP\_CONTEXTS\_INCLUDED", the SGSN or combined MME/SGSN shall delete all stored PDP-Contexts and then store all received PDP-Contexts. Otherwise, the SGSN or combined MME/SGSN shall check the Context-Identifier value of each received PDP-Context. If the Context-Identifier of a received PDP-Context matches a Context-Identifier of a stored PDP-Context, the SGSN or combined MME/SGSN shall replace the stored PDP-Context with the received PDP-Context. If the Context-Identifier of a received PDP-Context does not match a Context-Identifier of a stored PDP-Context, the SGSN or combined MME/SGSN shall add the received PDP-Context to the stored PDP-Context.

If the MME or SGSN receives an empty Subscription-Data AVP, it shall take no action with regard to the stored subscription data.

When receiving HPLMN-ODB AVP within the Subscription-Data AVP, the SGSN shall replace stored HPLMN-ODB data (if any) with the received information rather than add the received information to the stored information. Unsupported Barring categories need not be stored.

When receiving Operator-Determined-Barring AVP within the Subscription-Data AVP, the MME or SGSN shall replace stored ODB subscription information (if any) with the received information rather than add the received information to the stored information. Unsupported Barring categories need not be stored.

When receiving Access-Restriction-Data AVP within the Subscription-Data AVP, the MME or SGSN shall replace stored information (if any) with received information rather than add received information to stored information.

When receiving APN-OI-Replacement AVP within the Subscription-Data AVP, the MME or SGSN shall replace the stored information (if any) with the received information.

When receiving Regional-Subscription-Zone-Code AVP within the Subscription-Data AVP, the MME or SGSN shall replace stored Zone Codes (if any) with the received information rather than add the received information to the stored information. MMEs and SGSNs that do not support regional subscription need not store zone codes. If due to regional subscription restrictions or access restrictions the entire SGSN area is restricted, SGSN shall report it to the HSS by returning the "SGSN Area Restricted" indication within the IDA flags.

When receiving CSG-Subscription-Data AVP within the Subscription-Data AVP the MME or SGSN shall replace stored information (if any) with the received information rather than add the received information to the stored information.

When receiving Teleservice-List AVP, Call-Barring-Infor-List, or LCS-Info AVP, the MME or SGSN shall replace stored information (if any) with the received information rather than add the received information to the stored information.

When receiving the IDR-Flags with the "T-ADS Data Request" bit set the MME or SGSN or combined MME/SGSN shall return in the IDA message the time stamp of the UE's most recent radio contact and the associated RAT Type, and an indication of whether or not IMS Voice over PS is supported in the current (and most recently used) TA or RA.

When receiving the IDR-Flags with the "EPS User State Request" bit and/or "EPS Location Information Request" bits set the MME or SGSN shall return the corresponding user information to the HSS. If the serving node is a combined MME/SGSN, and the UE is attached via both E-UTRAN and UTRAN/GERAN on the same node, the combined MME/SGSN shall provide the corresponding user information relevant for both MME and SGSN. If the Current Location Request bit was also set and the UE is in idle mode, then the MME or SGSN or combined MME/SGSN shall page the UE in order to return the most up-to-date corresponding user information.

When receiving the IDR-Flags with only the "Current Location Request" bit set (i.e. the "EPS Location Information Request" bit is not set), the MME or SGSN or combined MME/SGSN shall set the Result-Code to DIAMETER\_UNABLE\_TO\_COMPLY.

If the MME or SGSN cannot fulfil the received request, e.g. due to a database error, it shall set the Result-Code to DIAMETER\_UNABLE\_TO\_COMPLY. In this case the MME or SGSN shall mark the subscription record "Subscriber to be restored in HSS".

If trace data are received in the subscriber data, the MME or SGSN shall start a Trace Session. For details, see 3GPP TS 32.422 [23].

If the Ext-PDP-Type AVP is present in the PDP-Context AVP, the SGSN or combined MME/SGSN shall ignore the value of the PDP-Type AVP.

### 5.2.2.1.3 Detailed behaviour of HSS

The HSS shall make use of this procedure to replace a specific part of the user data stored in the MME or SGSN with the data sent, or to add a specific part of user data to the data stored in the MME or SGSN.

Subscriber-Status AVP shall be present in the Subscription-Data AVP, sent within IDR, if the current value in the MME or SGSN needs to be changed. To remove all Operator Determined Barring Categories the Subscriber-Status shall be set to "SERVICE\_GRANTED". If Subscriber-Status AVP is present and set to OPERATOR\_DETERMINED\_BARRING, the Operator-Determined-Barring AVP or HPLMN-ODB AVP shall also be present in the Subscription-Data AVP.

Access-Restriction-Data AVP shall be present within the Subscription-Data AVP send within an IDR if the information stored in the MME or SGSN needs to be modified.

APN-OI-Replacement AVP shall be present in the Subscription-Data AVP sent within an IDR, if the UE level APN-OI-Replacement has been added or modified in the HSS.

The APN-Configuration-Profile AVP shall be present in the Subscription-Data AVP sent within an IDR if the Context-Identifier associated with the default APN configuration is changed or at least one APN-Configuration is added or modified by the HSS. If the default APN is changed in the HSS, the APN-Configuration-Profile AVP shall contain the Context-Identifier associated with the default APN and the APN-Configuration AVP for the default APN. The default APN Configuration shall not contain the Wildcard APN (see 3GPP TS 23.003 [3], clause 9.2); the default APN shall always contain an explicit APN.

The EPS-Subscribed-QoS-Profile AVP and the AMBR AVP shall be present in the APN-Configuration AVP when the APN-Configuration AVP is sent in the APN-Configuration-Profile AVP and when the APN-Configuration-Profile AVP is sent within a IDR (as part of the Subscription-Data AVP).

If the GPRS-Subscription-Data-Indicator information has been previously received as set in the ULR-Flags during update location procedure for the SGSN or combined MME/SGSN, the HSS shall make use of this procedure to replace the GPRS Subscription Data stored in the SGSN or combined MME/SGSN with the data sent or to add a PDP-Context to the data stored in the SGSN or combined MME/SGSN.

If the HSS receives a message (e.g. via MAP ATM or Sh Sh-Subs-Notif) from a Service Related Entity (e.g. IP-SM-GW) indicating that the UE is unreachable,

- the HSS shall associate the subscription to UE reachability of the service-related entity to the URRP-MME and the URRP-SGSN parameters (if not already done)
- and if the URRP-MME and/or the URRP-SGSN parameters were not already set (i.e. at least one service-related entity already listed as subscribed), the HSS shall
  - set the URRP-MME and/or URRP-SGSN parameters and
  - send an IDR command to the registered MME and/or to the registered SGSN including the "UE Reachability Request flag" in the IDR Request Flags in order to request the MME and/or SGSN to notify the HSS when the UE becomes reachable again, unless the HSS knows from the previous ULR command that the registered MME and/or the registered SGSN do not support UE reachability notifications.

If the IDR is sent for the only purpose to request the MME and/or SGSN about the UE reachability status notification, the Subscription-Data AVP shall be included empty.

If the HSS has received a message from a service related entity requesting EPS User State and/or EPS Location Information without the Serving Node Indication IE, the HSS shall set the "EPS User State Request" bit and/or "EPS Location Information Request" bit respectively in the IDR-Flags. The HSS may optionally also set the "Current Location Request" bit along with the "EPS Location Information Request" bit in the IDR-Flags, if the most up-to-date set of information is needed, unless the HSS knows from the previous ULR command that the registered MME and/or the registered SGSN do not support State/Location Information retrieval. If the IDR is sent only for the purpose of requesting the MME or the SGSN User State or Location Information, the Subscription-Data AVP included shall be empty.

If the HSS has received a message from an AS requesting the current access network's support status of "IMS Voice over PS Sessions", and there is no indication about homogeneous support of IMS Voice over PS Sessions in all the serving nodes currently registered in HSS for the UE, the HSS shall set the "T-ADS Data Request flag" in the IDR Request Flags, unless the HSS knows from the previous ULR command that the registered MME and/or the registered SGSN do not support T-ADS data retrieval. If the IDR is sent for the only purpose to retrieve the "IMS Voice over PS Sessions Supported" indication from the MME or SGSN, the Subscription-Data AVP included shall be empty.

If the HSS received an indication in a former ULR command from the MME or SGSN about homogeneous support of IMS Voice over PS Sessions in all TA/RAs associated to that serving node, it may use this information to skip the retrieval of T-ADS data. This can only be done if all the registered serving nodes in HSS for the UE indicated in ULR the same type of homogeneous support (i.e. both serving nodes indicated "SUPPORTED", or both serving nodes indicated "NOT\_SUPPORTED"; otherwise, the retrieval of T-ADS data shall be done, to receive the time of the last radio contact with the UE.

All APN and PGW-ID pairs stored in the HSS not associated with an explicit APN subscription, (i.e. the access to that APN has been authorized as a consequence of having the Wildcard APN in the user subscription), shall be included by the HSS inside the APN context of the Wildcard APN, as multiple instances of the Specific-APN-Info AVP.

When receiving an Insert Subscriber Data answer with "SGSN Area Restricted" the HSS shall set the SGSN area restricted flag as "SGSN area restricted".

### 5.2.2.2 Delete Subscriber Data

#### 5.2.2.2.1 General

This procedure shall be used between the MME and the HSS and between the SGSN and the HSS, to remove some or all data of the HSS user profile stored in the MME or SGSN. The procedure shall be invoked by the HSS and it corresponds to the functional level operation Delete Subscriber Data (see 3GPP TS 23.401[2]).

It shall be used to remove:

- all or a subset of the EPS subscription data (APN Configuration Profile) for the subscriber from the MME or SGSN;
- the regional subscription;
- the subscribed charging characteristics;
- Session Transfer Number for SRVCC;
- trace data.

If the HSS knows that the UE has attached to the same combined MME/SGSN via both E-UTRAN and UTRAN/GERAN, i.e. the HSS has received the Update Location Request over both the S6a interface and S6d interface respectively with the same SGSN number, the HSS should invoke this procedure for a single time to remove some or all data of the HSS user profile stored in the combined MME/SGSN, i.e. not invoke this procedure for each of the MME and the SGSN registered respectively.

If the Node-Type-Indicator information has been previously received as cleared in the ULR-Flags during update location procedure for the MME, the HSS may skip any removal of the SMS related subscription data and consequently does not have to make use of the Delete Subscriber Data procedure to update the subscription data in the MME.

This procedure is mapped to the commands Delete-Subscriber-Data-Request/Answer (DSR/DSA) in the Diameter application specified in chapter 7.

Table 5.2.2.2.1/1 specifies the involved information elements for the request.

Table 5.2.2.2.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
IMSI	User-Name (See IETF RFC 3588 [4])	М	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
DSR Flags (See 7.3.25)	DSR-Flags	М	This Information Element shall contain a bit mask. See 7.3.25 for the meaning of the bits.
Trace Reference (See 7.3.64)	Trace- Reference	С	This parameter shall contain the same value as used for the activation of the Trace Session. This element shall be present only if the "Trace Data Withdrawal" bit is set in the DSR-Flags.
Context Identifier (See 7.3.27)	Context- Identifier	С	This parameter shall identify the PDN subscription context or GPRS-PDP context that shall be deleted. This element shall be present only if the "PDN subscription contexts Withdrawal" bit or the "PDP context withdrawal" bit is set in the DSR-Flags. In the "PDN subscription contexts Withdrawal" case, the Context-Identifier shall not be associated with the default APN configuration. For the compatibility with the MAP protocol as defined in the 3GPP TS 29.002 [24], this parameter shall not have a value of zero.
TS Code List (See 7.3.100)	TS-Code	С	This parameter shall contain the teleservice codes that are to be deleted from the subscription. This element shall be present only if the "SMS Withdrawal" bit is set in the DSR-Flags and the SMS related teleservice codes are to be deleted.
SS Code List (See 7.3.87)	SS-Code	С	This parameter shall contain the supplementary service codes that are to be deleted from the subscription. This element shall be present only if the "SMS Withdrawal" bit is set or the "LCS Withdrawal" bit is set in the DSR-Flags.

#### Table 5.2.2.2.1/2: Delete Subscriber Data Answer

Information element name	Mapping to Diameter AVP	Cat.	Description
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. The Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable in this case: - User Unknown
DSA Flags (See 7.3.26)	DSA-Flags	С	This Information Element shall contain a bit mask. See 7.3.26 for the meaning of the bits.

### 5.2.2.2.2 Detailed behaviour of the MME and the SGSN

When receiving a Delete Subscriber Data request, the MME or SGSN shall check whether the IMSI is known.

If it is not known, a result code of DIAMETER\_ERROR\_USER\_UNKNOWN shall be returned.

If it is known, but the Context-Identifier is associated with the default APN configuration, the MME shall not delete the PDN subscription context, and return an error with a Result-Code set to DIAMETER\_UNABLE\_TO\_COMPLY. Otherwise, the MME or SGSN shall delete the corresponding data according to the indication as sent in the request, and acknowledge the Delete Subscriber Data message by returning a Delete Subscriber Data Answer.

If an MME receives a Delete Subscriber Data Request with the "Complete APN Configuration Profile Withdrawal" bit set in the DSR-Flags AVP, it shall return an error with a Result-Code set to DIAMETER\_UNABLE\_TO\_COMPLY.

If the deletion of the subscription data succeeds in the MME or SGSN, the Result-Code shall be set to DIAMETER\_SUCCESS.

If the Regional Subscription is deleted from the subscription data, the SGSN shall check for its routing areas whether they are allowed or not. If the entire SGSN area is restricted, SGSN shall report it to the HSS by returning the "SGSN Area Restricted" indication within the DSA flags.

If the EPS Subscription Data is deleted from the subscription data, the MME or SGSN shall check whether all EPS Subscription Data for the subscriber is deleted or if only a subset of the stored EPS Subscription Data for the subscriber is deleted, the MME or SGSN may then deactivate the associated affected active EPS bearers.

If the Subscribed Charging Characteristics are deleted from the subscription data, the Gn/Gp-SGSN shall maintain the existing Subscribed Charging Characteristics throughout the lifetime of the existing MM and PDP contexts, see 3GPP TS 32.251 [33].

If the Subscribed Charging Characteristics are deleted from the subscription data, the MME or S4-SGSN shall maintain the existing Subscribed Charging Characteristics throughout the lifetime of the existing IP CAN bearer, see 3GPP TS 32.251 [33].

If the MME or SGSN cannot fulfil the received request for other reasons, e.g. due to a database error, it shall set the Result-Code to DIAMETER\_UNABLE\_TO\_COMPLY. In this case, the MME or SGSN shall mark the subscription record "Subscriber to be restored in HSS".

If trace data are deleted from the subscription data, the MME or SGSN shall deactivate the Trace Session identified by the trace reference. For details, see 3GPP TS 32.422 [23].

### 5.2.2.2.3 Detailed behaviour of the HSS

The HSS shall make use of this procedure to remove deleted subscription data from the MME or SGSN.

The HSS shall make use of this procedure to remove deleted GPRS Subscription Data from the SGSN or combined MME/SGSN if the GPRS-Subscription-Data-Indicator information has been previously received as set in the ULR-Flags during update location procedure for the MME.

The HSS shall not set the "Complete APN Configuration Profile Withdrawal" bit in the DSR-Flags AVP when sending a Delete Subscriber Data Request to an MME, since the default APN shall always be present in an MME.

When receiving a Delete Subscriber Data Answer with "SGSN Area Restricted" the HSS shall set the SGSN area restricted flag as "SGSN area restricted".

# 5.2.3 Authentication Procedures

### 5.2.3.1 Authentication Information Retrieval

#### 5.2.3.1.1 General

The Authentication Information Retrieval Procedure shall be used by the MME and by the SGSN to request Authentication Information from the HSS.

This procedure is mapped to the commands Authentication-Information-Request/Answer (AIR/AIA) in the Diameter application specified in chapter 7.

Table 5.2.3.1.1/1 specifies the involved information elements for the request.

Table 5.2.3.1.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
IMSI	User-Name (See IETF RFC 3588 [4])	М	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Requested E- UTRAN Authentication Info (See 7.3.11)	Requested- EUTRAN- Authentication- Info	С	This information element shall contain the information related to authentication requests for E-UTRAN.
Requested UTRAN/GERA N Authentication Info (See 7.3.12)	Requested- UTRAN- GERAN Authentication- Info	С	This information element shall contain the information related to authentication requests for UTRAN or GERAN.
Visited PLMN ID (See 7.3.9)	Visited-PLMN- ID	М	This IE shall contain the MCC and the MNC of the visited PLMN, see 3GPP TS 23.003 [3].

Table 5.2.3.1.1/1: Authentication Information Request

#### Table 5.2.3.1.1/2: Authentication Information Answer

Information element name	Mapping to Diameter AVP	Cat.	Description
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. This IE shall contain the Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable in this case: - User Unknown - Unknown EPS Subscription
Error- Diagnostic	Error- Diagnostic	0	If the Experimental Result indicated "Unknown EPS Subscription", Error Diagnostic may be present to indicate whether or not GPRS subscription data are subscribed (i.e. whether or not Network Access Mode stored in the HSS indicates that only circuit service is allowed).
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Authentication Info (See 7.3.17)	Authentication- Info	С	This IE shall contain the Authentication Vectors.

### 5.2.3.1.2 Detailed behaviour of the MME and the SGSN

The MME or SGSN shall make use of this procedure in order to retrieve the Authentication Vectors from the HSS.

If the MME or SGSN supports Emergency services for users in limited service state, and the user's IMSI is not available from the UE, or the user's IMSI is marked as unauthenticated, the MME or SGSN shall not make use of the Authentication Information Retrieval procedure.

If the request is triggered by a synchronization failure during E-UTRAN authentication, the MME or combined MME/SGSN shall include the Re-Synchronization Information in the Requested-EUTRAN-Authentication-Info AVP in the request.

If the request is triggered by a synchronization failure during UTRAN or GERAN authentication, the SGSN or combined MME/SGSN shall include the Re-Synchronization Information in the Requested-UTRAN-GERAN-Authentication-Info AVP in the request.

Re-Synchronization Information shall not be present in both the Requested-EUTRAN-Authentication-Info AVP and the Requested-UTRAN-GERAN-Authentication-Info AVP.

A stand alone MME shall include the Requested-EUTRAN-Authentication-Info AVP and shall not include the Requested-UTRAN-GERAN-Authentication-Info AVP in the request. The Immediate-Response-Preferred AVP should be present if a EUTRAN-Vector is needed for immediate use.

A stand alone SGSN shall not include the Requested-EUTRAN-Authentication-Info AVP and shall include the Requested-UTRAN-GERAN-Authentication-Info AVP in the request. The Immediate-Response-Preferred AVP should be present if a UTRAN/GERAN-Vector is needed for immediate use.

A combined MME/SGSN may include both the Requested-EUTRAN-Authentication-Info AVP and the Requested-UTRAN-GERAN-Authentication-Info AVP in the request. If both the Requested-EUTRAN-Authentication-Info AVP and the Requested-UTRAN-GERAN-Authentication-Info AVP are present in the request, the Immediate-Response-Preferred AVP shall be present if the requested authentication vectors are needed for immediate use. The content of the Immediate-Response-Preferred AVP shall correspond to the access type which the UE is currently to be authenticated. The Immediate-Response-Preferred AVP shall not be present in both the Requested-EUTRAN-Authentication-Info AVP and the Requested-UTRAN-GERAN-Authentication-Info AVP. The presence of an Immediate-Response-Preferred AVP shall indicate that a vector is needed for immediate use.

When EUTRAN-AVs and UTRAN-AVs or GERAN-AVs are requested, presence of Immediate-Response-Preferred AVP within the Requested-EUTRAN-Authentication-Info AVP shall indicate that EUTRAN-AVs are requested for immediate use in the MME/SGSN; presence of Immediate-Response-Preferred AVP within the Requested-UTRAN-GERAN-Authentication-Info AVP shall indicate that UTRAN-AVs or GERAN-AVs are requested for immediate use in the MME/SGSN. It may be used by the HSS to determine the number of vectors to be obtained from the AuC and the number of vectors downloaded to the MME or SGSN.

When receiving an Authentication Information response from the HSS, the MME or SGSN shall check the Result Code. If it indicates success and Authentication Information is present in the result, the MME or SGSN shall use the received vectors. For details see 3GPP TS 33.401 [5].

If the MME or SGSN supports Emergency services for users in limited service state, the MME or SGSN shall proceed even if the Authentication Information Retrieval procedure has failed. In this case, the MME or SGSN shall mark the user's IMSI as unauthenticated.

Vectors with lower Item Number should be used before Vectors with higher Item Number are used in the MME or SGSN. For Vectors received within different requests those received by the earlier request should be used before those received by the later request.

### 5.2.3.1.3 Detailed behaviour of the HSS

When receiving an Authentication Information request the HSS shall check whether subscription data exists for the IMSI.

If the HSS determines that there is not any type of subscription for the IMSI (including EPS, GPRS and CS subscription data), a result code of DIAMETER\_ERROR\_USER\_UNKNOWN shall be returned.

Otherwise, if there is no EPS subscription data, the HSS shall return a result code of

DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION. An Error Diagnostic information may be added to indicate whether or not GPRS subscription data are subscribed (i.e. whether or not Network Access Mode stored in the HSS indicates that only circuit service is allowed).

The HSS shall then request the AuC to generate the corresponding requested Authentication Vectors (AVs). Subject to load considerations and/or other implementation specific considerations which may be based on the presence of an Immediate-Response-Preferred AVP, less AVs than the requested number of AVs may be generated.

If EUTRAN-Authentication-Info is requested, when receiving AVs from the AuC, the HSS shall generate the KASME before sending the response to the MME or combined MME-SGSN.

If the AuC is unable to calculate any corresponding AVs due to unallowed attachment for the UE, e.g. the UE is attaching via E-UTRAN with a SIM card equipped, the HSS shall return an error

DIAMETER\_AUTHORIZATION\_REJECTED, the HSS shall not return any AV to the requesting node in the response. Otherwise, if no corresponding pre-computed AV is available, and the AuC is unable to calculate any corresponding AVs due to unknown failures, such as the internal database error, the result code shall be set to DIAMETER\_AUTHENTICATION\_DATA\_UNAVAILABLE. The MME or the SGSN may request authentication vectors again.

For details see 3GPP TS 33.401 [5]. KASME generation is not performed before sending the response to the SGSN.

If the Requested-EUTRAN-Authentication-Info AVP is present in the request, the HSS shall download E-UTRAN authentication vectors to the MME. If the Requested-UTRAN-GERAN-Authentication-Info AVP is present in the request, the HSS shall download UTRAN or GERAN authentication vectors to the SGSN.

If the Immediate Response Preferred parameter has been received, the HSS may use it together with the number of requested vectors and the number of vectors stored in the HSS that are pre-computed to determine the number of vectors to be obtained from the AuC. The HSS may return less number of vectors than requested to the MME or SGSN. If both the Requested-EUTRAN-Authentication-Info AVP and the Requested-UTRAN-GERAN-Authentication-Info AVP are in the request, and one of them includes the Immediate Response Preferred parameter, the HSS may omit the vectors request that are not for immediate use. KASME is always computed for each E-UTRAN vector due to the PLMN-binding before sending the response to the MME independent of the presence of the Immediate Response Preferred parameter.

If the Re-Synchronization-Info AVP has been received, the HSS shall check the AUTS parameter before sending new authentication vectors to the MME or the SGSN. For details see 3GPP TS 33.102 [18]. If both the Requested-EUTRAN-Authentication-Info AVP and the Requested-UTRAN-GERAN-Authentication-Info AVP are in the request, and both of them include the Re-Synchronization-Info AVP, the HSS shall not check the AUTS parameter and return the result code of DIAMETER\_UNABLE\_TO\_COMPLY. Any authentication vectors shall not be sent by the HSS to the requesting node in the response.

If more than one EPS or UTRAN or GERAN Vector is to be included within one Authentication-Info AVP, the Item-Number AVP shall be present within each Vector.

The HSS shall then return the result code DIAMETER\_SUCCESS and the generated AVs (if any) to the MME or SGSN.

# 5.2.4 Fault Recovery Procedures

### 5.2.4.1 Reset

#### 5.2.4.1.1 General

The Reset Procedure shall be used by the HSS, after a restart, to indicate to the MME and to the SGSN that a failure has occurred.

This procedure is mapped to the commands Reset-Request/Answer (RSR/RSA) in the Diameter application specified in chapter 7.

Table 5.2.4.1.1/1 specifies the involved information elements for the request.

Table 5.2.4.1.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
User Id List (See 7.3.50)	User-Id	0	This IE shall contain a list of User-Ids where a User-Id comprises the leading digits of an IMSI (i.e. MCC, MNC, leading digits of MSIN) and it shall identify the set of subscribers whose IMSIs begin with the User-Id. The HSS may include this information element if the occurred failure is limited to subscribers identified by one or more User-Ids.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.

Table 5.2.4.1.1/1: Reset Request

#### Table 5.2.4.1.1/2: Reset Answer

Information element name	Mapping to Diameter AVP	Cat.	Description
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Result (See 7.4)	Result-Code / Experimental- Result	М	This IE shall contain the result of the operation. The Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. There are no Experimental-Result codes applicable for this command.

# 5.2.4.1.2 Detailed behaviour of the MME and the SGSN

When receiving a Reset message the MME or SGSN or combined MME/SGSN shall mark all impacted subscriber records " Location Information Confirmed in HSS " as "Not Confirmed". The MME or SGSN or combined MME/SGSN shall make use of the HSS Identity received in the Origin-Host AVP (by comparing it with the value stored after successful ULA) and may make use of the received User-Id-List (if any) in order to determine which subscriber records are impacted.

At the next authenticated radio contact with the UE concerned, if the subscriber record "Location Information Confirmed in HSS" is marked as "Not Confirmed", the restoration procedure shall be triggered.

### 5.2.4.1.3 Detailed behaviour of the HSS

The HSS shall make use of this procedure in order to indicate to all relevant MMEs, SGSN, and combined MME/SGSNs that the HSS has restarted and may have lost the current MME-Identity and SGSN-Identity of some of its subscribers who may be currently roaming in the MME area and/or SGSN area, and that the HSS, therefore, cannot send a Cancel Location messages or Insert Subscriber Data messages when needed.

The HSS optionally may include a list of Ids identifying a subset of subscribers served by the HSS, if the occurred failure is limited to those subscribers.

The HSS should invoke this procedure towards a combined MME/SGSN only for a single time even if some of the impacted subscribers are attached to the combined MME/SGSN via UTRAN/GERAN and some of the impacted subscribers are attached to the combined MME/SGSN via E-UTRAN.

# 5.2.5 Notification Procedures

### 5.2.5.1 Notification

#### 5.2.5.1.1 General

The Notification Procedure shall be used between the MME and the HSS and between the SGSN and the HSS when an inter MME or SGSN location update does not occur but the HSS needs to be notified about

- an update of terminal information;
- an update of the UE SRVCC capability.

The Notification Procedure shall also be used between the MME and the HSS and between the SGSN and the HSS if the HSS needs to be notified about:

- an assignment/change of a dynamically allocated PDN GW for an APN, if such a notification is needed taking into account the access restrictions;

The Notification Procedure shall be used between the MME and the HSS when an inter MME location update does not occur but the HSS needs to be notified about

- the need to send a Cancel Location to the current SGSN.

The Notification Procedure shall be used between the SGSN and the HSS to notify the HSS about:

- the UE is present or the UE has memory capacity available to receive one or more short messages.

The Notification Procedure shall be used between the MME and the HSS to notify the HSS that:

- the UE has become reachable again.

This procedure is mapped to the commands Notify-Request/Answer (NOR/NOA) in the Diameter application specified in chapter 7.

Table 5.2.5.1.1/1 specifies the involved information elements for the request.

Table 5.2.5.1.1/2 specifies the involved information elements for the answer.

Information element name	Mapping to Diameter AVP	Cat.	Description
IMSI	User-Name (See IETF RFC 3588 [4])	М	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.
Terminal Information (See 7.3.3)	Terminal- Information	С	This information element shall contain information about the user"s mobile equipment. When notifying the HSS about any change of Terminal Information, the MME or SGSN shall include the new Terminal Information in the request. Within this Information Element, only the IMEI and the Software-Version AVPs shall be used on the S6a/S6d interface.
PDN GW Identity (See 7.3.45)	MIP6-Agent- Info	С	This IE shall contain the identity of the selected and dynamically allocated PDN GW for an APN. It shall be present if a new PDN-GW has been selected and the subscriber is allowed handover to non 3GPP access. When notifying the HSS about a newly selected PDN GW, the MME or SGSN shall include the PDN-GW-Identity in the request.
PGW PLMN ID	Visited- Network- Identifier	С	This IE identifies the PLMN in which the PDN GW is located. It shall be present when the PDN GW Identity is present and does not contain an FQDN.
Context Identifier (See 7.3.27)	Context- Identifier	0	This parameter shall identify the APN Configuration with which the selected PDN GW shall be correlated. It may be present if it is available and the PDN-GW is present and is particular for one specific APN and not common to all the APNs. For the compatibility with the MAP protocol as defined in the 3GPP TS 29.002 [24], this parameter shall not have a value of zero.
APN (See TS 23.008 [30])	Service- Selection (See IETF RFC 5778 [20])	С	This IE shall contain the APN for the selected and dynamically allocated PDN GW. It shall be present if the selected PDN-GW is present and is particular for one specific APN and not common to all the APNs.
Alert Reason (See 7.3.83)	Alert-Reason	С	This parameter shall indicate if the mobile subscriber is present or the MS has memory available. It shall be present when notifying the HSS about the presence of the UE or the UE has memory capacity available to receive one or more short messages.
UE SRVCC Capability	UE-SRVCC- Capability	С	This information element shall indicate if the UE supports or does not support the SRVCC capability. When notifying the HSS about a change of the UE SRVCC Capability, the MME or SGSN shall include the new UE SRVCC Capability in the request.
NOR Flags (See 7.3.49)	NOR-Flags	C	This Information Element shall contain a bit mask. See 7.3.49 for the meaning of the bits. Absence of this information element shall be interpreted as all bits set to 0. When notifying the HSS about the need to send cancel location to the current SGSN, the MME shall set the "Single-Registration-Indication" flag in the NOR-Flags. When notifying the HSS about the "restricted" status of the current SGSN area, the SGSN shall set the "SGSN area restricted" flag in the NOR-Flags. When notifying the HSS about the presence of the UE or the UE has memory capacity available to receive one or more short messages, the SGSN shall set the "Ready for SM" flag in the NOR-Flags. When notifying the HSS that the UE has become reachable again, the MME shall set the "UE Reachable" flag in the NOR-Flags.

Table	5.2.5.	1.1/1:	Notify	Request
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Information element name	Mapping to Diameter AVP	Cat.	Description
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. The Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S6a/S6d errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable in this case: - User Unknown
Supported Features (See 3GPP TS 29.229 [9])	Supported- Features	0	If present, this information element shall contain the list of features supported by the origin host.

Table 5.2.5.1.1/2: Notify Answer

#### 5.2.5.1.2 Detailed behaviour of the MME and the SGSN

If the MME or SGSN supports Emergency services, the MME or SGSN shall not make use of the Notification procedure for users receiving emergency services (i.e. emergency attached UEs or normal attached UEs with a UE Requested PDN Connection for emergency services).

The MME or SGSN shall include conditional AVPs in NOR according to the description given in table 5.2.5.1.1/1.

If the MME sends a Notify Request to inform the HSS that the UE has become reachable again, the MME shall clear the corresponding URRP-MME for the UE.

If the SGSN sends a Notify Request to inform the HSS that the UE has become reachable again, the SGSN shall clear the corresponding URRP-SGSN for the UE.

When receiving a Notify response from the HSS, if the result code indicates DIAMETER\_ ERROR\_UNKNOWN\_SERVING\_NODE, the MME or SGSN shall consider the Notification procedure as failed, and it shall mark the subscriber record as "Subscriber to be restored in HSS".

#### 5.2.5.1.3 Detailed behaviour of the HSS

When receiving a Notify request the HSS shall check whether the IMSI is known.

If it is not known, a result code of DIAMETER\_ERROR\_USER\_UNKNOWN shall be returned.

If the IMSI is known, and the source MME or SGSN originating the Notify message is not currently registered in HSS for that UE, a result code of DIAMETER\_ERROR\_UNKNOWN\_SERVING\_NODE shall be returned.

If the IMSI is known, and the source MME or SGSN is currently registered in HSS, the HSS shall set the result code to DIAMETER\_SUCCESS, unless otherwise stated, and

- store the new terminal information if present in the request;
- store the new UE SRVCC capability if present in the request;
- store the new PDN GW and PLMN ID for an APN if present in the request and the APN is present in the subscription and if PDN GW is dynamically allocated; otherwise the HSS shall not store the new PDN GW data and shall set the result code to DIAMETER\_ERROR\_UNABLE\_TO\_COMPLY;
- store the new PDN GW and PLMN ID, and the APN itself, if both are present in the request, and the APN is not present in the subscription but a wild card APN is present in the subscription;
- mark the location area as "restricted" if so indicated in the request;
- send Cancel Location to the current SGSN if so indicated in the request;
- if the UE has become reachable again, and NOR is received on S6a from an MME or on S6d from an SGSN, the HSS shall respectively clear the URRP-MME or the URPP-SGSN parameter for the UE and send an indication t of UE reachability from MME or SGSN o the Service Related Entities if there is any;

- when NOR is received on S6d from an SGSN (with the Alert Reason present), the HSS shall reset the MNRG flag and send a MAP-Alert-Service-Centre message, i.e. the behaviour in the HSS should be the same as when a MAP-Ready for SM is received from an SGSN;

and then send the response to the MME or SGSN.

# 6 MME – EIR (S13) and SGSN – EIR (S13')

## 6.1 Introduction

The S13 interface shall enable the ME Identity check procedure between the MME and the EIR as described in the 3GPP TS 23.401 [2].

The S13' interface shall enable the ME Identity check procedure between the SGSN and the EIR as described in the 3GPP TS 23.060 [12].

## 6.2 ME Identity Check Procedures

### 6.2.1 ME Identity Check

#### 6.2.1.1 General

This Mobile Equipment Identity Check Procedure shall be used between the MME and the EIR and between the SGSN and the EIR to check the Mobile Equipment's identity status (e.g. to check that it has not been stolen, or, to verify that it does not have faults).

This procedure is mapped to the commands ME-Identity-Check-Request/Answer (ECR/ECA) in the Diameter application specified in chapter 6.

Table 6.2.1.1/1 specifies the involved information elements for the request.

Table 6.2.1.1/2 specifies the involved information elements for the answer.

#### Table 6.2.1.1/1: ME Identity Check Request

Information element name	Mapping to Diameter AVP	Cat.	Description
Terminal Information (See 7.3.3)	Terminal- Information	М	This information element shall contain the information about the used mobile equipment i.e. the IMEI.
IMSI	User-Name (See IETF RFC 3588 [4])	0	This information element shall contain the user IMSI, formatted according to 3GPP TS 23.003 [3], clause 2.2.

#### Table 6.2.1.1/2: ME Identity Check Answer

Information element name	Mapping to Diameter AVP	Cat.	Description
Result (See 7.4)	Result-Code / Experimental- Result	Μ	This IE shall contain the result of the operation. The Result-Code AVP shall be used to indicate success / errors as defined in the Diameter Base Protocol. The Experimental-Result AVP shall be used for S13/S13' errors. This is a grouped AVP which shall contain the 3GPP Vendor ID in the Vendor-Id AVP, and the error code in the Experimental-Result-Code AVP. The following errors are applicable in this case: - Unknown equipment
Equipment Status (See 7.3.51)	Equipment- Status	С	This information element shall contain the status of the requested mobile equipment as defined in 3GPP TS 22.016 [13]. It shall be present if the result of the ME Identity Check is DIAMETER_SUCCESS.

### 6.2.1.2 Detailed behaviour of the MME and the SGSN

The MME or the SGSN shall make use of this procedure to check the ME identity, if the MME or the SGSN is configured to check the IMEI with the EIR.

IMSI may be sent together with Terminal Information to the EIR for operator-determined purposes.

When receiving the ME Identity Check answer from the EIR, the MME or the SGSN shall check the result code and the equipment status. Dependent upon the result, the MME or the SGSN will decide its subsequent actions (e.g. sending an Attach Reject if the EIR indicates that the Mobile Equipment is unknown or blacklisted).

### 6.2.1.3 Detailed behaviour of the EIR

When receiving an ME Identity Check request, the EIR shall check whether the mobile equipment is known. The EIR shall identify the mobile equipment based on the first 14 digits of the IMEI AVP.

If it is not known, a result code of DIAMETER\_ERROR\_EQUIPMENT\_UNKNOWN is returned.

If it is known, the EIR shall return DIAMETER\_SUCCESS with the equipment status.

# 7 Protocol Specification and Implementation

## 7.1 Introduction

### 7.1.1 Use of Diameter base protocol

The Diameter Base Protocol as specified in IETF RFC 3588 [4] shall apply except as modified by the defined support of the methods and the defined support of the commands and AVPs, result and error codes as specified in this specification. Unless otherwise specified, the procedures (including error handling and unrecognised information handling) shall be used unmodified.

### 7.1.2 Securing Diameter Messages

For secure transport of Diameter messages, see 3GPP TS 33.210 [16]

## 7.1.3 Accounting functionality

Accounting functionality (Accounting Session State Machine, related command codes and AVPs) shall not be used on the S6a, S6d, S13 and S13' interfaces.

### 7.1.4 Use of sessions

Between the MME and the HSS and between the SGSN and the HSS and between the MME and the EIR, Diameter sessions shall be implicitly terminated. An implicitly terminated session is one for which the server does not maintain state information. The client shall not send any re-authorization or session termination requests to the server.

The Diameter base protocol includes the Auth-Session-State AVP as the mechanism for the implementation of implicitly terminated sessions.

The client (server) shall include in its requests (responses) the Auth-Session-State AVP set to the value NO\_STATE\_MAINTAINED (1), as described in IETF RFC 3588 [4]. As a consequence, the server shall not maintain any state information about this session and the client shall not send any session termination request. Neither the Authorization-Lifetime AVP nor the Session-Timeout AVP shall be present in requests or responses.

## 7.1.5 Transport protocol

Diameter messages over the S6a, S6d, S13 and S13' interfaces shall make use of SCTP IETF RFC 4960 [14] .

### 7.1.6 Routing considerations

This clause specifies the use of the Diameter routing AVPs Destination-Realm and Destination-Host.

If an MME or SGSN knows the address/name of the HSS for a certain user, and the associated home network domain name, both the Destination-Realm and Destination-Host AVPs shall be present in the request.

If an MME or SGSN knows only the home network domain name for a certain user, the Destination-Realm AVP shall be present and the command shall be routed to the next Diameter node.

If an MME or SGSN knows only the identity of the user, the home network domain name shall be derived from the user's IMSI (MNC and MCC values) to construct the EPC Home Network Realm/Domain, as indicated in 3GPP TS 23.003 [3], clause 19.2, and use it as Destination-Realm.

Consequently, the Destination-Host AVP is declared as optional in the ABNF for all requests initiated by an MME or SGSN.

The address/name of the EIR shall be locally configured in the MME.

Requests initiated by the HSS towards an MME or SGSN shall include both Destination-Host and Destination-Realm AVPs.

The HSS obtains the Destination-Host AVP to use in requests towards an MME or SGSN, from the Origin-Host AVP received in previous requests from the MME or SGSN. Consequently, the Destination-Host AVP is declared as mandatory in the ABNF for all requests initiated by the HSS.

The HSS obtains the Destination-Realm AVP to use in requests towards an MME or SGSN, from the Origin-Realm AVP received in previous requests from the MME or SGSN.

Destination-Realm AVP is declared as mandatory in the ABNF for all requests.

If the Vendor-Specific-Application-ID AVP is received in any of the commands, it may be ignored by the receiving node, and it shall not be used for routing purposes.

### 7.1.7 Advertising Application Support

The HSS, MME, SGSN and EIR shall advertise support of the Diameter S6a/S6d and/or S13/S13' Application by including the value of the application identifier in the Auth-Application-Id AVP within the Vendor-Specific-Application-Id grouped AVP of the Capabilities-Exchange-Request and Capabilities-Exchange-Answer commands.

The vendor identifier value of 3GPP (10415) shall be included in the Supported-Vendor-Id AVP of the Capabilities-Exchange-Request and Capabilities-Exchange-Answer commands, and in the Vendor-Id AVP within the Vendor-Specific-Application-Id grouped AVP of the Capabilities-Exchange-Request and Capabilities-Exchange-Answer commands.

The Vendor-Id AVP included in Capabilities-Exchange-Request and Capabilities-Exchange-Answer commands that is not included in the Vendor-Specific-Application-Id AVPs as described above shall indicate the manufacturer of the Diameter node as per RFC 3588 [4].

### 7.1.8 Diameter Application Identifier

This clause specifies two Diameter applications: one is for the S6a/S6d interface application, and the other is for the S13/S13' interface application.

The S6a/S6d interface application allows a Diameter server and a Diameter client:

- to exchange location information;
- to authorize a user to access the EPS;
- to exchange authentication information;
- to download and handle changes in the subscriber data stored in the server.

The S6a/S6d interface protocol shall be defined as an IETF vendor specific Diameter application, where the vendor is 3GPP. The vendor identifier assigned by IANA to 3GPP (http://www.iana.org/assignments/enterprise-numbers) is 10415.

The Diameter application identifier assigned to the S6a/S6d interface application is 16777251 (allocated by IANA).

The S13/S13' interface application allows a Diameter server and a Diameter client:

- to check the validity of the ME Identity.

The S13/S13' interface protocol shall be defined as an IETF vendor specific Diameter application, where the vendor is 3GPP. The vendor identifier assigned by IANA to 3GPP (http://www.iana.org/assignments/enterprise-numbers) is 10415.

The Diameter application identifier assigned to the \$13/\$13' interface application is 16777252 (allocated by IANA).

### 7.1.9 Use of the Supported-Features AVP

When new functionality is introduced on the S6a/S6d interfaces, it should be defined as optional. If backwards incompatible changes can not be avoided, the new functionality shall be introduced as a new feature and support advertised with the Supported-Features AVP. The usage of the Supported-Features AVP on the S6a/S6d interfaces is consistent with the procedures for the dynamic discovery of supported features as defined in clause 7.2 of 3GPP TS 29.229 [9].

When extending the application by adding new AVPs for a feature, the new AVPs shall have the M bit cleared and the AVP shall not be defined mandatory in the command ABNF.

As defined in 3GPP TS 29.229 [9], the Supported-Features AVP is of type grouped and contains the Vendor-Id, Feature-List-ID and Feature-List AVPs. On the all reference points as specified in this specificaion, the Supported-Features AVP is used to identify features that have been defined by 3GPP and hence, for features defined in this document, the Vendor-Id AVP shall contain the vendor ID of 3GPP (10415). If there are multiple feature lists defined for the reference point, the Feature-List-ID AVP shall differentiate those lists from one another.

The Table 7.3.10/1 defines the features applicable to the S6a/S6d interfaces for the feature list with a Feature-List-ID of 1.

## 7.2 Commands

### 7.2.1 Introduction

This section defines the Command code values and related ABNF for each command described in this specification.

## 7.2.2 Command-Code values

This section defines Command-Code values for the S6a/S6d interface application and S13/S13' interface application as allocated by IANA in the IETF RFC 5516 [32].

Every command is defined by means of the ABNF syntax IETF RFC 2234 [7], according to the rules in IETF RFC 3588 [4]. In the case, the definition and use of an AVP is not specified in this document, the guidelines in IETF RFC 3588 [4] shall apply.

NOTE: For this release, the Vendor-Specific-Application-ID is included as an optional AVP in all commands in order to ensure interoperability with diameter agents following a strict implementation of IETF RFC 3588, by which messages not including this AVP will be rejected. IETF RFC 3588 indicates that the AVP shall be present in all proxiable commands, such as those specified here, dispite that the contents of this AVP are redundant since the Application ID is already present in the command header. This AVP may be removed in subsequent revisions of this specification, once the diameter base protocol is updated accordingly.

The following Command Codes are defined in this specification:

Command-Name	Abbreviation	Code	Section
Update-Location-Request	ULR	316	7.2.3
Update-Location-Answer	ULA	316	7.2.4
Cancel-Location-Request	CLR	317	7.2.7
Cancel-Location-Answer	CLA	317	7.2.8
Authentication-Information- Request	AIR	318	7.2.5
Authentication-Information- Answer	AIA	318	7.2.6
Insert-Subscriber-Data-Request	IDR	319	7.2.9
Insert-Subscriber-Data-Answer	IDA	319	7.2.10
Delete-Subscriber-Data-Request	DSR	320	7.2.11
Delete-Subscriber-Data-Answer	DSA	320	7.2.12
Purge-UE-Request	PUR	321	7.2.13
Purge-UE-Answer	PUA	321	7.2.14
Reset-Request	RSR	322	7.2.15
Reset-Answer	RSA	322	7.2.16
Notify-Request	NOR	323	7.2.17
Notify-Answer	NOA	323	7.2.18

Table 7.2.2/1: Command-Code values for S6a/S6d

For these commands, the Application-ID field shall be set to 16777251 (application identifier of the S6a/S6d interface application, allocated by IANA).

Command-Name	Abbreviation	Code	Section
ME-Identity-Check-Request	ECR	324	7.2.19
ME-Identity-Check-Answer	ECA	324	7.2.20

Table 7.2.2/2: Command-Code values for S13/S13'

For these commands, the Application-ID field shall be set to 16777252 (application identifier of the S13/S13' interface application, allocated by IANA).

### 7.2.3 Update-Location-Request (ULR) Command

The Update-Location-Request (ULR) command, indicated by the Command-Code field set to 316 and the "R" bit set in the Command Flags field, is sent from MME or SGSN to HSS.

#### Message Format

```
< Update-Location-Request> ::= < Diameter Header: 316, REQ, PXY, 16777251 >
                             < Session-Id >
                             [ Vendor-Specific-Application-Id ]
                             { Auth-Session-State }
                             { Origin-Host }
                             { Origin-Realm }
                             [Destination-Host]
                             { Destination-Realm }
                             { User-Name }
                             *[ Supported-Features ]
                             [Terminal-Information]
                             { RAT-Type }
                             { ULR-Flags }
                             [UE-SRVCC-Capability ]
                             { Visited-PLMN-Id }
                             [SGSN-Number]
                             [Homogeneous-Support-of-IMS-Voice-Over-PS-Sessions]
                             [GMLC-Address]
                             *[ Active-APN ]
                             *[ AVP ]
                             *[ Proxy-Info ]
                             *[ Route-Record ]
```

### 7.2.4 Update-Location-Answer (ULA) Command

The Update-Location-Answer (ULA) command, indicated by the Command-Code field set to 316 and the 'R' bit cleared in the Command Flags field, is sent from HSS to MME or SGSN.

Message Format

< Update-Location-Answer> ::= < Diameter Header: 316, PXY, 16777251 > < Session-Id > [ Vendor-Specific-Application-Id ] [Result-Code] [Experimental-Result] [Error-Diagnostic] { Auth-Session-State } { Origin-Host } { Origin-Realm } \*[ Supported-Features ] [ ULA-Flags ] [Subscription-Data] \*[ AVP ] \*[ Failed-AVP ] \*[ Proxy-Info ]

\*[ Route-Record ]

### 7.2.5 Authentication-Information-Request (AIR) Command

The Authentication-Information-Request (AIR) command, indicated by the Command-Code field set to 318 and the 'R' bit set in the Command Flags field, is sent from MME or SGSN to HSS.

Message Format

```
< Authentication-Information-Request> ::= < Diameter Header: 318, REQ, PXY, 16777251 > 
< Session-Id >
```

```
[ Vendor-Specific-Application-Id ]

{ Auth-Session-State }

{ Origin-Host }

{ Origin-Realm }

[ Destination-Host ]

{ Destination-Realm }

{ User-Name }

*[Supported-Features]

[ Requested-EUTRAN-Authentication-Info ]

[ Requested-UTRAN-GERAN-Authentication-Info ]

{ Visited-PLMN-Id }

*[ AVP ]

*[ Proxy-Info ]

*[ Route-Record ]
```

### 7.2.6 Authentication-Information-Answer (AIA) Command

The Authentication-Information-Answer (AIA) command, indicated by the Command-Code field set to318 and the 'R' bit cleared in the Command Flags field, is sent from HSS to MME or SGSN.

Message Format

< Authentication-Information-Answer> ::= < Diameter Header: 318, PXY, 16777251 > < Session-Id > [ Vendor-Specific-Application-Id ] [Result-Code] [Experimental-Result] [Error-Diagnostic] { Auth-Session-State } { Origin-Host } { Origin-Realm } \* [Supported-Features] [ Authentication-Info ] \*[ AVP ] \*[ Failed-AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

## 7.2.7 Cancel-Location-Request (CLR) Command

The Cancel-Location-Request (CLR) command, indicated by the Command-Code field set to 317 and the 'R' bit set in the Command Flags field, is sent from HSS to MME or SGSN.

Message Format

```
< Cancel-Location-Request> ::= < Diameter Header: 317, REQ, PXY, 16777251 >
< Session-Id >
[ Vendor-Specific-Application-Id ]
{ Auth-Session-State }
{ Origin-Host }
```

- { Origin-Realm } { Destination-Host } { Destination-Realm } { User-Name } \*[Supported-Features ] { Cancellation-Type } \*[ AVP ] \*[ Proxy-Info ]
- \*[ Route-Record ]

### 7.2.8 Cancel-Location-Answer (CLA) Command

The Cancel-Location-Answer (CLA) command, indicated by the Command-Code field set to 317 and the 'R' bit cleared in the Command Flags field, is sent from MME or SGSN to HSS.

#### Message Format

### 7.2.9 Insert-Subscriber-Data-Request (IDR) Command

The Insert-Subscriber-Data-Request (IDR) command, indicated by the Command-Code field set to 319 and the 'R' bit set in the Command Flags field, is sent from HSS to MME or SGSN.

Message Format

```
< Insert-Subscriber-Data-Request> ::=
                                        < Diameter Header: 319, REQ, PXY, 16777251 >
                                     < Session-Id >
                                     [ Vendor-Specific-Application-Id ]
                                     { Auth-Session-State }
                                     { Origin-Host }
                                      Origin-Realm }
                                      Destination-Host }
                                      Destination-Realm }
                                     { User-Name }
                                     *[ Supported-Features]
                                     { Subscription-Data}
                                     [IDR-Flags]
                                     *[ AVP ]
                                     *[ Proxy-Info ]
                                     *[ Route-Record ]
```

### 7.2.10 Insert-Subscriber-Data-Answer (IDA) Command

The Insert-Subscriber-Data-Answer (IDA) command, indicated by the Command-Code field set to 319 and the 'R' bit cleared in the Command Flags field, is sent from MME or SGSN to HSS.

Message Format

```
< Insert-Subscriber-Data-Answer> ::= < Diameter Header: 319, PXY, 16777251 >
< Session-Id >
[ Vendor-Specific-Application-Id ]
```

\*[ Supported-Features ] [Result-Code] [Experimental-Result] { Auth-Session-State } Origin-Host } { Origin-Realm } [IMS-Voice-Over-PS-Sessions-Supported] [Last-UE-Activity-Time] [RAT-Type] [ IDA-Flags ] [EPS-User-State] [EPS-Location-Information] \*[ AVP ] \*[ Failed-AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.11 Delete-Subscriber-Data-Request (DSR) Command

The Delete-SubscriberData-Request (DSR) command, indicated by the Command-Code field set to 320 and the 'R' bit set in the Command Flags field, is sent from HSS to MME or SGSN.

Message Format

```
< Delete-Subscriber-Data-Request > ::= < Diameter Header: 320, REQ, PXY, 16777251 >
                                     < Session-Id >
                                     [Vendor-Specific-Application-Id]
                                     { Auth-Session-State }
                                     { Origin-Host }
                                     { Origin-Realm }
                                     { Destination-Host }
                                     { Destination-Realm }
                                     { User-Name }
                                     *[ Supported-Features ]
                                     { DSR-Flags }
                                     *[ Context-Identifier ]
                                     [Trace-Reference]
                                     *[TS-Code]
                                     *[ SS-Code ]
                                     *[ AVP ]
                                     * [ Proxy-Info ]
                                     *[ Route-Record ]
```

### 7.2.12 Delete-Subscriber-Data-Answer (DSA) Command

The Delete-SubscriberData-Answer (DSA) command, indicated by the Command-Code field set to 320 and the 'R' bit cleared in the Command Flags field, is sent from MME or SGSN to HSS.

Message Format

< Delete-Subscriber-Data-Answer> ::= < Diameter Header: 320, PXY, 16777251 > < Session-Id > [ Vendor-Specific-Application-Id ] \*[ Supported-Features ] [ Result-Code ] [ Experimental-Result ] { Auth-Session-State } { Origin-Host } { Origin-Realm } [ DSA-Flags ] \*[ AVP ] \*[ Failed-AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.13 Purge-UE-Request (PUR) Command

The Purge-UE-Request (PUR) command, indicated by the Command-Code field set to 321 and the 'R' bit set in the Command Flags field, is sent from MME or SGSN to HSS.

#### Message Format

< Purge-UE-Request> ::= < Diameter Header: 321, REQ, PXY, 16777251 > < Session-Id > [ Vendor-Specific-Application-Id ] { Auth-Session-State } { Origin-Host } { Origin-Realm } [ Destination-Host ] { Destination-Realm } { User-Name } [ PUR-Flags ] \*[ Supported-Features ] \*[ AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.14 Purge-UE-Answer (PUA) Command

The Purge-UE-Answer (PUA) command, indicated by the Command-Code field set to 321 and the 'R' bit cleared in the Command Flags field, is sent from HSS to MME or SGSN.

#### Message Format

## 7.2.15 Reset-Request (RSR) Command

The Reset-Request (RSR) command, indicated by the Command-Code field set to 322 and the 'R' bit set in the Command Flags field, is sent from HSS to MME or SGSN.

#### Message Format

< Reset-Request> ::= < Diameter Header: 322, REQ, PXY, 16777251 > < Session-Id > [ Vendor-Specific-Application-Id ] { Auth-Session-State } { Origin-Host } { Origin-Realm } { Destination-Host } { Destination-Realm } \*[ Supported-Features ]

\*[ User-Id ] \*[ AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.16 Reset-Answer (RSA) Command

The Authentication-Information-Answer (RSA) command, indicated by the Command-Code field set to 322 and the 'R' bit cleared in the Command Flags field, is sent from MME or SGSN to HSS.

Message Format

```
< Reset-Answer> ::= < Diameter Header: 322, PXY, 16777251 >
	< Session-Id >
	[ Vendor-Specific-Application-Id ]
	*[ Supported-Features ]
	[ Result-Code ]
	[ Experimental-Result ]
	{ Auth-Session-State }
	{ Origin-Host }
	{ Origin-Realm }
	*[ AVP ]
	*[ Failed-AVP ]
	*[ Proxy-Info ]
	*[ Route-Record ]
```

### 7.2.17 Notify-Request (NOR) Command

The Notify-Request (NOR) command, indicated by the Command-Code field set to 323 and the 'R' bit set in the Command Flags field, is sent from MME or SGSN to HSS.

Message Format

< Notify-Request> ::= < Diameter Header: 323, REQ, PXY, 16777251 > < Session-Id > [Vendor-Specific-Application-Id] { Auth-Session-State } { Origin-Host } { Origin-Realm } [Destination-Host] { Destination-Realm } { User-Name } \* [Supported-Features] [Terminal-Information] [MIP6-Agent-Info] [ Visited-Network-Identifier ] [ Context-Identifier ] [Service-Selection] [ Alert-Reason ] [UE-SRVCC-Capability] [NOR-Flags] \*[ AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.18 Notify-Answer (NOA) Command

The Notify-Answer (NOA) command, indicated by the Command-Code field set to 323 and the 'R' bit cleared in the Command Flags field, is sent from HSS to MME or SGSN.

Message Format

< Notify-Answer> ::= < Diameter Header: 323, PXY, 16777251 >

< Session-Id > [ Vendor-Specific-Application-Id ] [ Result-Code ] [ Experimental-Result ] { Auth-Session-State } { Origin-Host } { Origin-Realm } \*[ Supported-Features ] \*[ AVP ] \*[ Failed-AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.19 ME-Identity-Check-Request (ECR) Command

The ME-Identity-Check-Request (ECR) command, indicated by the Command-Code field set to 324 and the 'R' bit set in the Command Flags field, is sent from MME or SGSN to EIR.

Message Format

< ME-Identity-Check-Request > ::= < Diameter Header: 324, REQ, PXY, 16777252 > < Session-Id > [ Vendor-Specific-Application-Id ] { Auth-Session-State } { Origin-Host } { Origin-Realm } [ Destination-Host ] { Destination-Realm } { Terminal-Information } [ User-Name ] \*[ AVP ] \*[ Proxy-Info ] \*[ Route-Record ]

### 7.2.20 ME-Identity-Check-Answer (ECA) Command

The ME-Identity-Check-Answer (ECA) command, indicated by the Command-Code field set to 324 and the 'R' bit cleared in the Command Flags field, is sent from EIR to MME or SGSN.

Message Format

```
< ME-Identity-Check-Answer> ::= < Diameter Header: 324, PXY, 16777252 >
	< Session-Id >
	[ Vendor-Specific-Application-Id ]
	[ Result-Code ]
	[ Experimental-Result ]
	{ Auth-Session-State }
	{ Origin-Host }
	{ Origin-Realm }
	[ Equipment-Status ]
	*[ AVP ]
	*[ Failed-AVP ]
	*[ Proxy-Info ]
	*[ Route-Record ]
```

## 7.3 Information Elements

### 7.3.1 General

The following table specifies the Diameter AVPs defined for the S6a/S6d interface protocol and S13/S13' interface protocol, their AVP Code values, types, possible flag values and whether or not the AVP may be encrypted. The Vendor-ID header of all AVPs defined in this specification shall be set to 3GPP (10415).

For all AVPs which contain bit masks and are of the type Unsigned32, e.g., ULR-Flags, DSR-Flags, PUA-Flags, etc., bit 0 shall be the least significant bit. For example, to get the value of bit 0, a bit mask of 0x0001 should be used.

					AVP	Flag rules	5	
Attribute Name	AVP Code	Section defined	Value Type	Must	Мау		Must not	May Encr.
Subscription-Data	1400	7.3.2	Grouped	M, V				No
Terminal-Information	1401	7.3.3	Grouped	M, V				No
IMEI	1402	7.3.4	UTF8String	M, V				No
Software-Version	1403	7.3.5	UTF8String	M, V				No
QoS-Subscribed	1404	7.3.77	OctetString	M, V				No
ULR-Flags	1405	7.3.7	Unsigned32	M, V				No
ULA-Flags	1406	7.3.8	Unsigned32	M, V				No
Visited-PLMN-Id	1407	7.3.9	OctetString	M, V				No
Requested-EUTRAN- Authentication-Info	1408	7.3.11	Grouped	M, ∨				No
Requested-UTRAN- GERAN- Authentication-Info	1409	7.3.12	Grouped	M, V				No
Number-Of-Requested- Vectors	1410	7.3.14	Unsigned32	M, V				No
Re-Synchronization-Info	1411	7.3.15	OctetString	M, V	1			No
Immediate-Response- Preferred	1412	7.3.16	Unsigned32	M, V				No
Authentication-Info	1413	7.3.17	Grouped	M, V	1			No
E-UTRAN-Vector	1414	7.3.18	Grouped	M, V	1			No
UTRAN-Vector	1415	7.3.19	Grouped	M, V	1			No
GERAN-Vector	1416	7.3.20	Grouped	M, V				No
Network-Access-Mode	1417	7.3.21	Enumerated	M, V				No
HPLMN-ODB	1418	7.3.22	Unsigned32	M, V				No
Item-Number	1419	7.3.23	Unsigned32	M, V				No
	1419	7.3.23	× ·	M, V				No
Cancellation-Type	1420		Enumerated	M, V				
DSR-Flags		7.3.25	Unsigned32					No
DSA-Flags	1422	7.3.26	Unsigned32	M, V				No
Context-Identifier	1423	7.3.27	Unsigned32	M, V				No
Subscriber-Status	1424	7.3.29	Enumerated	M, V				No
Operator-Determined-Barring		7.3.30	Unsigned32	M, V				No
Access-Restriction-Data	1426	7.3.31	Unsigned32	M, V				No
APN-OI-Replacement	1427	7.3.32	UTF8String	M, V				No
All-APN-Configurations- Included-Indicator	1428	7.3.33	Enumerated	M, V				No
APN-Configuration-Profile	1429	7.3.34	Grouped	M, V				No
APN-Configuration	1430	7.3.35	Grouped	M, V				No
EPS-Subscribed-QoS-Profile	1431	7.3.37	Grouped	M, V				No
VPLMN-Dynamic-Address- Allowed	1432	7.3.38	Enumerated	M, V				No
STN-SR	1433	7.3.39	OctetString	M, V				No
Alert-Reason	1434	7.3.83	Enumerate	M, V	1			No
AMBR	1435	7.3.41	Grouped	M, V	1			No
CSG-Subscription-Data	1436	7.3.78	Grouped	M. V	1			No
CSG-Id	1437	7.3.79	Unsigned32	M, V				No
PDN-GW-Allocation-Type	1438	7.3.44	Enumerated	M, V				No
Expiration-Date	1439	7.3.80	Time	M, V				No
RAT-Frequency-Selection- Priority-ID	1440	7.3.46	Unsigned32	M, V				No
IDA-Flags	1441	7.3.47	Unsigned32	M, V	1			No
PUA-Flags	1442	7.3.48	Unsigned32	M, V				No
NOR-Flags	1443	7.3.49	Unsigned32	M, V	+			No
User-Id	1443	7.3.50	UTF8String	V V			М	No
Equipment-Status	1444	7.3.50	Enumerated	M, V	+		IVI	No
Regional-Subscription-Zone- Code	1445	7.3.52	OctetString	M, V				No
RAND	1447	7.3.53	OctetString	M, V	+			No
					+			
XRES	1448	7.3.54	OctetString	M, V	<u> </u>			No
AUTN	1449	7.3.55	OctetString	M, V				No
KASME	1450	7.3.56	OctetString	M, V	<u> </u>			No
Trace-Collection-Entity	1452	7.3.98	Address	M, V				No
Кс	1453	7.3.59	OctetString	M, V				No

SRES	1454	7.3.60	OctetString	M, V		No
PDN-Type	1456	7.3.62	Enumerated	M, V		No
Roaming-Restricted-Due-To-	1457	7.3.81	Enumerated	M, V		No
Unsupported-Feature Trace-Data	1458	7.3.63	Grouped	M, V		No
Trace-Reference	1459	7.3.64	OctetString	M, V		No
Trace-Depth	1462	7.3.67	Enumerated	M, V		No
Trace-NE-Type-List	1463	7.3.68	OctetString	M, V		No
Trace-Interface-List	1464	7.3.69	OctetString	M, V		No
Trace-Event-List	1465	7.3.70	OctetString	M, V		No
OMC-Id	1466	7.3.71	OctetString	M, V		No
GPRS-Subscription-Data	1467	7.3.72	Grouped	M, V		No
Complete-Data-List-Included-		7.3.73	Enumerated	M, V		No
Indicator				,		
PDP-Context	1469	7.3.74	Grouped	M, V		No
PDP-Type	1470	7.3.75	OctetString	M, V		No
3GPP2-MEID	1471	7.3.6	OctetString	M, V		No
Specific-APN-Info	1472	7.3.82	Grouped	M, V		No
LCS-Info	1473	7.3.84	Grouped	M, V		No
GMLC-Number	1474	7.3.85	OctetString	M, V		No
LCS-PrivacyException	1475	7.3.86	Grouped	M, V		No
SS-Code	1476	7.3.87	OctetString	M, V		No
SS-Status	1477	7.3.88	Grouped	M, V		No
Notification-To-UE-User	1478	7.3.89	Enumerated	M, V		No
External-Client	1479	7.3.90	Grouped	M, V		No
Client-Identity	1480	7.3.91	OctetString	M, V		No
GMLC-Restriction	1481	7.3.92	Enumerated	M, V		No
PLMN-Client	1482	7.3.93	Enumerated	M, V		No
Service-Type	1483	7.3.94	Grouped	M, V		No
ServiceTypeIdentity	1484	7.3.95	Unsigned32	M, V		No
MO-LR	1485	7.3.96	Grouped	M, V		No
Teleservice-List	1486	7.3.99	Grouped	M, V		No
TS-Code	1487	7.3.100	OctetString	M, V		No
Call-Barring-Infor-List	1488	7.3.101	Grouped	M, V		No
SGSN-Number	1489	7.3.102	OctetString	M, V		No
IDR-Flags	1490	7.3.103	Unsigned32	M, V		No
ICS-Indicator	1491	7.3.104	Enumerated	V	M	No
IMS-Voice-Over-PS- Sessions-Supported	1492	7.3.106	Enumerated	V	М	No
Homogeneous-Support-of-	1493	7.3.107	Enumerated	V	М	No
IMS-Voice-Over-PS-Sessions		1.0.101	Enamerated	v	101	
Last-UE-Activity-Time	1494	7.3.108	Time	V	М	No
EPS-User-State	1495	7.3.110	Grouped	V	М	No
EPS-Location-	1496	7.3.111	Grouped	V	м	No
Information	1-30	1.0.111	Cioupeu	v l	111	
MME-User-State	1497	7.3.112	Grouped	V	М	No
SGSN-User-State	1498	7.3.113	Grouped	V	Μ	No
			_			
User-State	1499	7.3.114	Enumerated	V	М	No
	1000	70445	Graunad	\ <i>\</i>		Nia
MME-Location	1600	7.3.115	Grouped	V	М	No
Information						
SGSN-Location-	1601	7.3.116	Grouped	V	м	No
Information	1001	7.5.110	Crouped	v	111	
E-UTRAN-Cell-Global-	1602	7.3.117	OctetString	V	М	No
Identity			Ŭ			
Tracking-Area-Identity	1603	7.3.118	OctetString	V	М	No
	1001	7.0.4.10	0-1-101			N
Cell-Global-Identity	1604	7.3.119	OctetString	V	М	No
Routing-Area-Identity	1605	7.3.120	OctetString	V	М	No
rea-luentity	1000	1.0.120		I*		1.10

Location-Area-Identity	1606	7.3.121	OctetString	V	М	No
Service-Area-Identity	1607	7.3.122	OctetString	V	M	No
Geographical- nformation	1608	7.3.123	OctetString	v	М	No
Geodetic-Information	1609	7.3.124	OctetString	V	М	No
Current-Location- Retrieved	1610	7.3.125	Enumerated	V	м	No
Age-Of-Location- nformation	1611	7.3.126	Unsigned32	V	м	No
Active-APN	1612	7.3.127	Grouped	V	М	No
Error-Diagnostic	1614	7.3.128	Enumerated	V	М	No
Ext-PDP-Address	1621	7.3.129	Address	V	М	No
UE-SRVCC-Capability	1615	7.3.130	Enumerated	V	M	No
MPS-Priority	1616	7.3.131	Unsigned32	V	M	No
VPLMN-LIPA-Allowed	1617	7.3.132	Enumerated	V	М	No
LIPA-Permission	1618	7.3.133	Enumerated	V	М	No
Subscribed-Periodic-RAU- TAU-Timer	1619	7.3.134	Unsigned32	V	М	No
Ext-PDP-Type	1620	7.3.75A	OctetString	V	М	No
SIPTO-Permission	1613	7.3.135	Enumerated	V	M	No
MDT-Configuration	1622	7.3.136	Grouped	V	М	No
Job-Type	1623	7.3.137	Enumerated	V	M	No
Area-Scope	1624	7.3.138	Grouped	V	М	No
_ist-Of-Measurements	1625	7.3.139	Unsigned32	V	М	No
Reporting-Trigger	1626	7.3.140	Unsigned32	V	М	No
Report-Interval	1627	7.3.141	Enumerated	V	М	No
Report-Amount	1628	7.3.142	Enumerated	V	М	No
Event-Threshold-RSRP	1629	7.3.143	Unsigned32	V	М	No
Event-Threshold-RSRQ	1630	7.3.144	Unsigned32	v	М	No
_ogging-Interval	1631	7.3.145	Enumerated	V	M	No
_ogging-Duration	1632	7.3.146	Enumerated	V	М	No
Relay-Node-Indicator	1633	7.3.147	Enumerated	V	М	No
MDT-User-Consent	1634	7.3.148	Enumerated	V	М	No
PUR-Flags	1635	7.3.149	Unsigned32	V	М	No
NOTE 1: The AVP header I denoted as "V", in details, see IETF	dicates wh	ether the optior	es whether support on al Vendor-ID field is			

The following table specifies the Diameter AVPs re-used by the S6a/S6d interface protocol from existing Diameter Applications, including a reference to their respective specifications and when needed, a short description of their use within S6a and S6d.

Any other AVPs from existing Diameter Applications, except for the AVPs from Diameter Base Protocol, do not need to be supported. The AVPs from Diameter Base Protocol are not included in table 7.3.1/2, but they may be re-used for the S6a/S6d protocol and the S13/S13' protocol.

Attribute Name	Reference	Comments	M-bit
Service-Selection	IETF RFC 5778 [20]	See section 7.3.36	
3GPP-Charging- Characteristics	3GPP TS 29.061 [21]	See 3GPP TS 32.251 [33] Annex A and 3GPP TS 32.298 [22] section 5.1.2.2.7 This attribute holds the EPS PDN Connection Charging Characteristics data for an EPS APN Configuration, or the PDP context Charging Characteristics for GPRS PDP context, or the Subscribed Charging Characteristics data for the subscriber level 3GPP Charging Characteristics; refer to 3GPP TS 23.008 [30].	
Supported-	3GPP TS		
Features	29.229 [9]		
Feature-List-ID	3GPP TS 29.229 [9]		
Feature-List	3GPP TS 29.229 [9]	See section 7.3.10	
Served-Party-IP- Address	3GPP TS 32.299 [8]	holds the PDN IP Address of the user	
QoS-Class-	3GPP TS		1
Identifier	29.212 [10]		
Allocation-	3GPP TS		
Retention-Priority	29.212 [10]	See section 7.3.40	
Priority-Level	3GPP TS 29.212 [10]		
Pre-emption-	3GPP TS		
Capability	29.212 [10]		
Pre-emption-	3GPP TS		
Vulnerability	29.212 [10]		
Max-Requested-	3GPP TS		
Bandwidth-DL	29.214 [11] 3GPP TS		
Max-Requested-			
Bandwidth-UL	29.214 [11]		
RAT-Type	3GPP TS 29.212 [10]	See section 7.3.13	Must set
MSISDN	3GPP TS		
	29.329 [25]		
MIP6-Agent-Info	IETF Draft RFC 5447		
	[26]		
MIP-Home-Agent-			1
Address	4004 [27]		
MIP-Home-Agent-			
Host	4004 [27]		
PDP-Address	3GPP TS 32.299 [8]		
Confidentiality-Key	,3GPP TS 29.229 [9]	See section 7.3.57	
Integrity-Key	3GPP TS 29.229 [9]	See section 7.3.58	
Visited-Network- Identifier	3GPP TS 29.229 [9]	See section 7.3.105	Must not se
GMLC-Address	3GPP TS 29.173 [37]	See section 7.3.109	Must not se
include: NOTE 2: If the M-	bit settings for r "Must set", "Must set", "Must set", "Must set for an bit is set for an	e-used AVPs override those of the defining specifications that are referenced. V ust not set". If the M-bit setting is blank, then the defining specification applies. AVP and the receiving server does not understand the AVP, it shall return a rej or an AVP, the receiving server shall not return a rejection, whether or not it under	alues ection.

Table 7.3.1/2: S6a/S6d and S13/S13' re-used Diameter AVPs

## 7.3.2 Subscription-Data

the AVP.

The Subscription-Data AVP is of type Grouped. It shall contain the information related to the user profile relevant for EPS and GERAN/UTRAN.

#### AVP format:

Subscription-Data ::= <AVP header: 1400 10415>

[Subscriber-Status]

[ MSISDN ]

[STN-SR]

[ ICS-Indicator ]

[Network-Access-Mode]

[ Operator-Determined-Barring ]

[HPLMN-ODB]

\*10[ Regional-Subscription-Zone-Code]

[ Access-Restriction-Data ]

[ APN-OI-Replacement ]

[LCS-Info]

[ Teleservice-List ]

[ Call-Barring-Infor-List ]

[ 3GPP-Charging-Characteristics ]

[AMBR]

[ APN-Configuration-Profile ]

[RAT-Frequency-Selection-Priority-ID]

[Trace-Data]

[GPRS-Subscription-Data]

\*[ CSG-Subscription-Data ]

[Roaming-Restricted-Due-To-Unsupported-Feature]

[ Subscribed-Periodic-RAU-TAU-Timer ]

[MPS-Priority]

[VPLMN-LIPA-Allowed]

[Relay-Node-Indicator]

[ MDT-User-Consent ]

\*[ AVP ]

The AMBR included in this grouped AVP shall include the AMBR associated to the user"s subscription (UE-AMBR); Max-Requested-Bandwidth-DL and Max-Requested-Bandwidth-DL within this AVP shall not both be set to "0".

The APN-OI-Replacement included in this grouped AVP shall include the UE level APN-OI-Replacement associated to the user"s subscription.

### 7.3.3 Terminal-Information

The Terminal-Information AVP is of type Grouped. This AVP shall contain the information about the user"s terminal.

AVP format

Terminal Information ::= <AVP header: 1401 10415>

[IMEI] [3GPP2-MEID] [Software-Version] \*[AVP]

### 7.3.4 IMEI

The IMEI AVP is of type UTF8String. This AVP shall contain the International Mobile Equipment Identity, as specified in 3GPP TS 23.003 [3]. It should consist of 14 digits, including the 8-digit Type Allocation Code (TAC) and the 6-digit Serial Number (SNR). It may also include a 15<sup>th</sup> digit.

### 7.3.5 Software-Version

The Software-Version AVP is of type UTF8String. This AVP shall contain the 2-digit Software Version Number (SVN) of the International Mobile Equipment Identity, as specified in 3GPP TS 23.003 [3].

### 7.3.6 3GPP2-MEID

This AVP is of type OctetString. This AVP contains the Mobile Equipment Identifier of the user's terminal. For further details on the encoding of the AVP data, refer to the encoding of the Mobile Identity (MEID) octets 3 to 10 in 3GPP2 A.S0022 [28] Annex A.

### 7.3.7 ULR-Flags

The ULR-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits shall be as defined in table 7.3.7/1:

Bit	Name	Description
0	Single-Registration- Indication	This bit, when set, indicates that the HSS shall send Cancel Location to the SGSN. An SGSN shall not set this bit when sending ULR.
1	S6a/S6d-Indicator	This bit, when set, indicates that the ULR message is sent on the S6a interface, i.e. the source node is an MME (or a combined MME/SGSN to which the UE is attached via E- UTRAN). This bit, when cleared, indicates that the ULR message is sent on the S6d interface, i.e. the source node is an SGSN (or a combined MME/SGSN to which the UE is attached via UTRAN or GERAN).
2	Skip Subscriber Data	This bit, when set, indicates that the HSS may skip subscription data in ULA. If the subscription data has changed in the HSS after the last successful update of the MME/SGSN, the HSS shall ignore this bit and send the updated subscription data. If the HSS effectively skips the sending of subscription data, the GPRS-Subscription-Data-Indicator flag can be ignored.
3	GPRS-Subscription- Data-Indicator	This bit, when set, indicates that the HSS shall include in the ULA command the GPRS subscription data, if available in the HSS; it shall be included in the GPRS-Subscription-Data AVP inside the Subscription-Data AVP (see 7.3.2). Otherwise, the HSS shall not include the GPRS-Subscription-Data AVP in the response, unless the Update Location Request is received over the S6d interface and there is no APN configuration profile stored for the subscriber, or when the subscription data is returned by a Pre-ReI-8 HSS (via an IWF). A standalone MME shall not set this bit when sending a ULR.
4	Node-Type- Indicator	This bit, when set, indicates that the requesting node is a combined MME/SGSN. This bit, when cleared, indicates that the requesting node is a single MME or SGSN; in this case, if the S6a/S6d-Indicator is set, the HSS may skip the check of those supported features only applicable to the SGSN, and consequently skip the download of the SMS related subscription data to a standalone MME.
5	Initial-Attach- Indicator	This bit, when set, indicates that the HSS shall send Cancel Location to the MME or SGSN if there is the MME or SGSN registration.
6	PS-LCS-Not- Supported-By-UE	This bit, when set, indicates to the HSS that the UE does not support neither UE Based nor UE Assisted positioning methods for Packet Switched Location Services. The MME shall set this bit on the basis of the UE capability information. The SGSN shall set this bit on the basis of the UE capability information and the access technology supported by the SGSN.
Bits not de receiving H		be cleared by the sending MME or SGSN and discarded by the

Table 7	7.3.7/1:	ULR-Flags
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## 7.3.8 ULA-Flags

The ULA-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits shall be as defined in table 7.3.8/1:

Bit	Name	Description
0	Separation Indication	This bit, when set, indicates that the HSS stores SGSN number and MME number in separate memory. A Rel-8 HSS shall set the bit. An IWF interworking with a pre Rel-8 HSS/HLR shall clear the bit.
Bits not de MME or S0		be cleared by the sending HSS and discarded by the receiving

#### Table 7.3.8/1: ULA-Flags

### 7.3.9 Visited-PLMN-Id

The Visited-PLMN-Id AVP is of type OctetString. This AVP shall contain the concatenation of MCC and MNC. See 3GPP TS 23.003 [3]. The content of this AVP shall be encoded as an octet string according to table 7.3.9-1.

See 3GPP TS 24.008 [31], clause 10.5.1.13, PLMN list, for the coding of MCC and MNC. If MNC is 2 digits long, bits 5 to 8 of octet 2 are coded as "1111".

8	7	6	5	4	3	2	1	
	мсс	digit 2			МСС	digit 1		octet 1
	MNC digit 3				MCC	digit 3		octet 2
	MNC	digit 2			MNC	digit 1		octet 3

Table 7.3.9/1: Encoding format for Visited-PLMN-Id AVP

### 7.3.10 Feature-List AVP

The syntax of this AVP is defined in 3GPP TS 29.229 [9]. For the S6a/S6d application, the meaning of the bits shall be as defined in table 7.3.10/1.

Feature bit	Feature	M/O	Description
0	ODB-all- APN	0	Operator Determined Barring of all Packet Oriented Services
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send this ODB barring category to the MME or SGSN within ULA. Instead the HSS may reject location update by sending
			DIAMETER_ERROR_ROAMING_NOT_ALLOWED and, optionally, including the type of ODB in the Error-Diagnostic AVP. If the MME or SGSN does not indicate support of this feature in IDA and the
			HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
1	ODB- HPLMN- APN	0	Operator Determined Barring of Packet Oriented Services from access points that are within the HPLMN whilst the subscriber is roaming in a VPLMN
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send this ODB barring category to the MME or SGSN within ULA. Instead the HSS may reject location update by sending DIAMETER_ERROR_ROAMING_NOT_ALLOWED and, optionally, including
			the type of ODB in the Error-Diagnostic AVP. If the MME or SGSN does not indicate support of this feature in IDA and the HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
2	ODB- VPLMN- APN	0	Operator Determined Barring of Packet Oriented Services from access points that are within the roamed to VPLMN
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send this ODB barring category to the MME or SGSN within ULA. Instead the HSS may reject location update by sending DIAMETER_ERROR_ROAMING_NOT_ALLOWED and, optionally, including the type of ODB in the Error-Diagnostic AVP. If the MME or SGSN does not indicate support of this feature in IDA and the
			HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
3	ODB-all- OG		Operator Determined Barring of all outgoing calls
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs to the SGSN. The HSS shall not send this ODB barring category to the MME. If the SGSN does not support this feature, the HSS shall not send this ODB barring category to the SGSN within ULA. Instead the HSS may reject location update.
			If the SGSN does not indicate support of this feature in IDA and the HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
4	ODB-all- Internatio	0	Operator Determined Barring of all outgoing international calls
	nalOG		This feature is applicable for the ULR/ULA and IDR/IDA command pairs to the SGSN. The HSS shall not send this ODB barring category to the MME. If the SGSN does not support this feature, the HSS shall not send this ODB barring category to the SGSN within ULA. Instead the HSS may reject location update.
			If the SGSN does not indicate support of this feature in IDA and the HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.

Table 7.3.10/1: Features of Feature-List-ID 1 used	in S6a/S6d
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5	ODB-all- Internatio nalOGNo	0	Operator Determined Barring of all outgoing international calls except those directed to the home PLMN country
	tToHPLM N-		This feature is applicable for the ULR/ULA and IDR/IDA command pairs to the SGSN. The HSS shall not send this ODB barring category to the MME.
	Country		If the SGSN does not support this feature, the HSS shall not send this ODB barring category to the SGSN within ULA. Instead the HSS may reject location update.
			If the SGSN does not indicate support of this feature in IDA and the HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
6	ODB-all-	0	Operator Determined Barring of all outgoing inter-zonal calls
	Interzona IOG		This feature is applicable for the ULR/ULA and IDR/IDA command pairs to the SGSN. The HSS shall not send this ODB barring category to the MME. If the SGSN does not support this feature, the HSS shall not send this ODB barring category to the SGSN within ULA. Instead the HSS may reject location update. If the SGSN does not indicate support of this feature in IDA and the HSS has
			sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
7	ODB-all- Interzona	0	Operator Determined Barring of all outgoing inter-zonal calls except those directed to the home PLMN country
	IOGNotT oHPLMN -Country		This feature is applicable for the ULR/ULA and IDR/IDA command pairs to the SGSN. The HSS shall not send this ODB barring category to the MME. If the SGSN does not support this feature, the HSS shall not send this ODB barring category to the SGSN within ULA. Instead the HSS may reject location update.
			If the SGSN does not indicate support of this feature in IDA and the HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and send CLR.
8	ODB-all- Interzona IOGAndI	0	Operator Determined Barring of all outgoing international calls except those directed to the home PLMN country and Barring of all outgoing inter-zonal calls
	nternatio nalOGNo tToHPLM N- Country		This feature is applicable for the ULR/ULA and IDR/IDA command pairs to the SGSN. The HSS shall not send this ODB barring category to the MME. If the SGSN does not support this feature, the HSS shall not send this ODB barring category to the SGSN within ULA. Instead the HSS may reject location update. If the SGSN does not indicate support of this feature in IDA and the HSS has sent this ODB category within IDR, the HSS may apply barring of roaming and
9	RegSub	0	send CLR. Regional Subscription
	-		This feature is applicable for the ULR/ULA, IDR/IDA and DSR/DSA command
			pairs. If the MME or SGSN does not support this feature, the HSS shall not send Regional Subscription Zone Codes to the MME or SGSN within ULA. Instead the HSS may reject location update. If the MME or SGSN does not indicate support of this feature in IDA and the HSS has sent Regional Subscription Zone Codes within IDR, the HSS may
10	Trace	0	apply barring of roaming and send CLR. Trace Function
			This feature is applicable for the ULR/ULA, IDR/IDA and DSR/DSA command
			pairs. If the MME or SGSN does not indicate support of this feature in ULR, the HSS shall not send Trace Data to the MME or SGSN within ULA.
			If the MME or SGSN does not indicate support of this feature in IDA, and the HSS has sent Trace Data within IDR, the HSS may store this indication, and not send any further Trace Data to that MME or SGSN.
			If the MME or SGSN does not indicate support of this feature in DSA, and the HSS has sent Trace Data within DSR, the HSS may store this indication, and not send any further Trace Data to that MME or SGSN

11	LCS-all-	0	All LCS Privacy Exception Classes
	PrivExce p		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over the S6d interface.
			If the SGSN does not support this feature, the HSS shall not send the related LCS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that SGSN.
12	LCS- Universal	0	Allow location by any LCS client
	Children		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over the S6d interface.
			If the SGSN does not support this feature, the HSS shall not send the related LCS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that SGSN.
13	LCS- CallSessi onRelate	0	Allow location by any value added LCS client to which a call/session is established from the target UE
	d		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over the S6d interface.
			If the SGSN does not support this feature, the HSS shall not send the related LCS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that SGSN.
14	LCS-	0	Allow location by designated external value added LCS clients
	CallSessi onUnrela ted		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over the S6d interface.
			If the SGSN does not support this feature, the HSS shall not send the related LCS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that SGSN.
15	LCS-	0	Allow location by designated PLMN operator LCS clients
	PLMNOp erator		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over the S6d interface.
			If the SGSN does not support this feature, the HSS shall not send the related LCS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that SGSN.
16	LCS-	0	Allow location by LCS clients of a designated LCS service type
	ServiceT ype		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over the S6d interface.
			If the SGSN does not support this feature, the HSS shall not send the related LCS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that SGSN.

17	LCS-all- MOLR-	0	All Mobile Originating Location Request Classes
	SS		This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send the related LCS information to the MME or SGSN within ULA.
			If the MME or SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that MME or SGSN.
18	LCS- BasicSelf	0	Allow an MS to request its own location
	Location		This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send the related LCS information to the MME or SGSN within ULA.
			If the MME or SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that MME or SGSN.
19	LCS- Autonom	0	Allow an MS to perform self location without interaction with the PLMN
	ousSelfL ocation		This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send the related LCS information to the MME or SGSN within ULA.
			If the MME or SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that MME or SGSN.
20	LCS- Transfer	0	Allow an MS to request transfer of its location to another LCS client
	ToThirdP arty		This feature is applicable for the ULR/ULA and IDR/IDA command pairs. If the MME or SGSN does not support this feature, the HSS shall not send the related LCS information to the MME or SGSN within ULA.
			If the MME or SGSN does not indicate support of this feature in IDA, and the HSS has sent the related LCS information within IDR, the HSS may store this indication, and not send any further LCS information to that MME or SGSN.
21	SM-MO- PP	0	Short Message MO-PP
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs over S6d.
			If the SGSN does not support this feature, the HSS shall not send the related SMS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related SMS information within IDR, the HSS may store this indication, and not send any further SMS information to that SGSN.
22	Barring- Outgoing	0	Barring of Outgoing Calls
	Calls		This feature is applicable for the ULR/ULA and IDR/IDA command pairs over S6d.
			If the SGSN does not support this feature, the HSS shall not send the related SMS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related SMS information within IDR, the HSS may store this indication, and not send any further SMS information to that SGSN.
23	BAOC	0	Barring of all outgoing calls
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs over S6d.
			If the SGSN does not support this feature, the HSS shall not send the related SMS information to the SGSN within ULA.
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related SMS information within IDR, the HSS may store this indication, and not send any further SMS information to that SGSN.

24	BOIC	0	Barring of outgoing international calls	
24	2010	•		
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs over S6d.	
			If the SGSN does not support this feature, the HSS shall not send the related SMS information to the SGSN within ULA.	
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related SMS information within IDR, the HSS may store this indication, and not send any further SMS information to that SGSN.	
25	BOICEx HC	0	Barring of outgoing international calls except those directed to the home PLMN Country	
			This feature is applicable for the ULR/ULA and IDR/IDA command pairs over S6d.	
			If the SGSN does not support this feature, the HSS shall not send the related SMS information to the SGSN within ULA.	
			If the SGSN does not indicate support of this feature in IDA, and the HSS has sent the related SMS information within IDR, the HSS may store this indication, and not send any further SMS information to that SGSN.	
26	UE- Reachabi	0	UE Reachability Notifcation	
	lity- Notificati		This feature is applicable for the ULR/ULA and IDR/IDA command pairs, over S6a and S6d.	
	011		If the MME or SGSN indicates in the ULR command that it does not support	
			the UE-Reachability-Notifications, the HSS shall not set the "UE-Reachability- Request" bit in IDR-Flags in subsequent IDR commands towards that MME or SGSN.	
27	T-ADS	0	Terminating Access Domain Selection Data Retrieval	
	Data Retrieval		This feature is applicable for the ULR/ULA and IDR/IDA command pairs, over S6a and S6d.	
			If the MME or SGSN indicates in the ULR command that it does not support the retrieval of T-ADS data via IDR/IDA commands, the HSS shall not set the "T-ADS Data Request" bit in IDR-Flags in subsequent IDR commands towards that MME or SGSN.	
28	State/Loc	0	State/Location Information Retrieval	
	ation- Informati on- Retrieval		This feature is applicable for the ULR/ULA and IDR/IDA command pairs, over S6a and S6d.	
			If the MME or SGSN indicates in the ULR command that it does not support State/Location Information Retrieval, the HSS shall not set the "EPS User State Request", "EPS Location Information Request" or "Current Location Request" bits in IDR-Flags in subsequent IDR commands towards that MME or SGSN.	
29	Partial	0	Partial Purge from a Combined MME/SGSN	
	Purge		This feature is applicable for the ULR/ULA and PUR/PUA command pairs, over S6a and S6d.	
			If the HSS indicates in the ULA command that it does not support Partial Purge, the combined MME/SGSN shall not include in the PUR command the indication of the specific serving node where the Purge has been done.	
Feature: A M/O: Define	Feature bit: The order number of the bit within the Supported-Features AVP, e.g. "1". Feature: A short name that can be used to refer to the bit and to the feature, e.g. "ODB-HPLMN-APN". M/O: Defines if the implementation of the feature is mandatory ("M") or optional ("O").			
Description	: A clear text	ual desc	ription of the feature.	

Features that are not indicated in the Supported-Features AVPs within a given application message shall not be used to construct that message.

## 7.3.11 Requested-EUTRAN-Authentication-Info

The Requested-EUTRAN-Authentication-Info is of type Grouped. It shall contain the information related to the authentication requests for E-UTRAN.

AVP format

Requested- EUTRAN-Authentication-Info ::= <AVP header: 1408 10415>

[Number-Of-Requested-Vectors]

[ Immediate-Response-Preferred ]

[Re-synchronization-Info]

\*[AVP]

### 7.3.12 Requested-UTRAN- GERAN-Authentication-Info

The Requested-UTRAN-GERAN-Authentication-Info is of type Grouped. It shall contain the information related to the to authentication requests for UTRAN or GERAN.

AVP format

Requested-UTRAN-GERAN-Authentication-Info ::= <AVP header: 1409 10415>

[Number-Of-Requested-Vectors]

[Immediate-Response-Preferred]

[ Re-synchronization-Info ]

\*[AVP]

## 7.3.13 RAT-Type

The RAT-Type AVP is of type Enumerated and is used to identify the radio access technology that is serving the UE. See 3GPP TS 29.212 [10] for the defined values.

### 7.3.14 Number-Of-Requested-Vectors

The Number-Of-Requested-Vectors AVP is of type Unsigned32. This AVP shall contain the number of AVs the MME or SGSN is prepared to receive.

### 7.3.15 Re-Synchronization-Info

The Re-Synchronization-Info AVP is of type OctetString. It shall contain the concatenation of RAND and AUTS.

### 7.3.16 Immediate-Response-Preferred

The Immediate-Response-Preferred AVP is of type Unsigned32. This optional AVP indicates by its presence that immediate response is preferred, and by its absence that immediate response is not preferred. If present, the value of this AVP is not significant.

When EUTRAN-AVs and UTRAN-AVs or GERAN-AVs are requested, presence of this AVP within the Requested-EUTRAN-Authentication-Info AVP shall indicate that EUTRAN-AVs are requested for immediate use in the MME/SGSN; presence of this AVP within the Requested-UTRAN-GERAN-Authentication-Info AVP shall indicate that UTRAN-AVs or GERAN-AVs are requested for immediate use in the MME/SGSN. It may be used by the HSS to determine the number of vectors to be obtained from the AuC and the number of vectors downloaded to the MME or SGSN.

### 7.3.17 Authentication-Info

The Authentication-Info AVP is of type Grouped. This AVP contains Authentication Vectors.

AVP format:

Authentication-Info ::= <AVP header: 1413 10415>

\*[ E-UTRAN-Vector ] \*[UTRAN-Vector] \*[GERAN-Vector] \*[AVP]

### 7.3.18 E-UTRAN-Vector

The E-UTRAN-Vector AVP is of type Grouped. This AVP shall contain an E-UTRAN Vector.

AVP format:

E-UTRAN-Vector ::= <AVP header: 1414 10415>

[ Item-Number ] { RAND } { XRES } { AUTN } { KASME } \*[AVP]

### 7.3.19 UTRAN-Vector

The UTRAN-Vector AVP is of type Grouped. This AVP shall contain an UTRAN Vector.

AVP format:

```
UTRAN-Vector ::= <AVP header: 1415 10415>
```

[ Item-Number ]
{ RAND }
{ XRES }
{ AUTN }
{ Confidentiality-Key }
{ Integrity-Key }
\*[AVP]

### 7.3.20 GERAN-Vector

The GERAN-Vector AVP is of type Grouped. This AVP shall contain a GERAN Vector.

AVP format:

```
GERAN-Vector ::= <AVP header: 1416 10415>
```

[ Item-Number ] { RAND } { SRES } { Kc } \*[AVP]

### 7.3.21 Network-Access-Mode

The Network-Access-Mode AVP is of type Enumerated. The following values are defined:

PACKET\_AND\_CIRCUIT (0)

Reserved (1)

ONLY\_PACKET (2)

### 7.3.22 HPLMN-ODB

The HPLMN-ODB AVP is of type Unsigned32 and it shall contain a bit mask indicating the HPLMN specific services of a subscriber that are barred by the operator. The meaning of the bits is HPLMN specific:

#### Table 7.3.22/1: HPLMN-ODB

Bit	Description
0	HPLMN specific barring type 1
1	HPLMN specific barring type 2
2	HPLMN specific barring type 3
3	HPLMN specific barring type 4

HPLMN-ODB may apply to mobile originated short messages and is therefore not applicable to the MME; See 3GPP TS 23.015 [36].

### 7.3.23 Item-Number

The Item-Number AVP is of type Unsigned32. The Item Number is used to order Vectors received within one request.

### 7.3.24 Cancellation-Type

The Cancellation-Type AVP is of type Enumerated and indicates the type of cancellation. The following values are defined:

#### MME\_UPDATE\_PROCEDURE (0)

This value is used when the Cancel Location is sent to the previous MME due to a received Update Location message from a new MME.

#### SGSN\_UPDATE\_PROCEDURE (1)

This value is used when the Cancel Location is sent to the previous SGSN due to a received Update Location message from a new SGSN.

#### SUBSCRIPTION\_WITHDRAWAL (2)

This value is used when the Cancel Location is sent to the current MME or SGSN due to withdrawal of the user"s subscription by the HSS operator.

#### UPDATE\_PROCEDURE\_IWF (3)

This value is used by an IWF when interworking with a pre-Rel-8 HSS.

#### INITIAL\_ATTACH\_PROCEDURE (4)

This value is used when the Cancel Location is sent to the MME or SGSN due to a received Update Location message during initial attach procedure from an SGSN or MME respectively.

### 7.3.25 DSR-Flags

The DSR-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits is defined in table 7.3.25/1:

Bit	Name	Description
0	Regional Subscription Withdrawal	This bit, when set, indicates that Regional Subscription shall be deleted from the subscriber data.
1	Complete APN Configuration Profile Withdrawal	This bit, when set, indicates that all EPS APN configuration data for the subscriber shall be deleted from the subscriber data. This flag only applies to the S6d interface.
2	Subscribed Charging Characteristics Withdrawal	This bit, when set, indicates that the Subscribed Charging Characteristics have been deleted from the subscription data.
3	PDN subscription contexts Withdrawal	This bit, when set, indicates that the PDN subscription contexts whose identifier is included in the Context-Identifier AVP shall be deleted. (Note 1)
4	STN-SR	This bit, when set, indicates that the Session Transfer Number for SRVCC shall be deleted from the subscriber data.
5	Complete PDP context list Withdrawal	This bit, when set, indicates that all PDP contexts for the subscriber shall be deleted from the subscriber data.
6	PDP contexts Withdrawal	This bit, when set, indicates that the PDP contexts whose identifier is included in the Context-Identifier AVP shall be deleted. (Note 2)
7	Roaming Restricted due to unsupported feature	This bit, when set, indicates that the roaming restriction shall be deleted from the subscriber data in the MME or SGSN.
8	Trace Data Withdrawal	This bit, when set, indicates that the Trace Data shall be deleted from the subscriber data.
9	CSG Deleted	This bit, when set, indicates that the CSG-Subscription-Data shall be deleted from the MME or SGSN.
10	APN-OI- Replacement	This bit, when set, indicates that the UE level APN-OI- Replacement shall be deleted from the subscriber data.
11	GMLC List Withdrawal	This bit, when set, indicates that the subscriber's LCS GMLC List shall be deleted from the MME or SGSN.
12	LCS Withdrawal	This bit, when set, indicates that the LCS service whose code is included in the SS-Code AVP shall be deleted from the MME or SGSN.
13	SMS Withdrawal	This bit, when set, indicates that the SMS service whose code is included in the SS-Code AVP or TS-Code AVP shall be deleted from the SGSN.
Note 2: If t Note 3: Bi	the Complete PDP contents ts not defined in this table receiving MME or SGSI	
Note 4: Bi	ts 3 and 6 are excluding	alternatives and shall not both be set.

Table 7.3.25/1: DSR-Flags

7.3.26 DSA-Flags

The DSA-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits is defined in table 7.3.26/1:

Bit	Name	Description					
0	Network Node area	This bit, when set, shall indicate that the complete Network Node					
	restricted	area (SGSN area) is restricted due to regional subscription.					
Note: Bits r	Note: Bits not defined in this table shall be cleared by the sending SGSN and discarded by the						
1	receiving HSS.						

#### Table 7.3.26/1: DSA-Flags

### 7.3.27 Context-Identifier

The Context-Identifier AVP is of type Unsigned32.

#### 7.3.28 Void

### 7.3.29 Subscriber-Status

The 3GPP Subscriber Status AVP is of type Enumerated. It shall indicate if the service is barred or granted. The following values are defined:

SERVICE\_GRANTED (0)

OPERATOR\_DETERMINED\_BARRING (1)

### 7.3.30 Operator-Determined-Barring

The Operator-Determined-Barring AVP is of type Unsigned32 and it shall contain a bit mask indicating the services of a subscriber that are barred by the operator. The meaning of the bits is the following:

Bit	Decorintion
BIL	Description
0	All Packet Oriented Services Barred
1	Roamer Access HPLMN-AP Barred
2	Roamer Access to VPLMN-AP Barred
3	Barring of all outgoing calls
4	Barring of all outgoing international calls
5	Barring of all outgoing international calls
	except those directed to the home PLMN
	country
6	Barring of all outgoing inter-zonal calls
7	Barring of all outgoing inter-zonal calls
	except those directed to the home PLMN
	country
8	Barring of all outgoing international calls
	except those directed to the home PLMN
	country and Barring of all outgoing inter-
	zonal calls

#### Table 7.3.30/1: Operator-Determined-Barring

### 7.3.31 Access-Restriction-Data

The Access-Restriction-Data AVP is of type Unsigned32 and it shall contain a bit mask where each bit when set to 1 indicates a restriction. The meaning of the bits is the following:

Bit	Description
0	UTRAN Not Allowed
1	GERAN Not Allowed
2	GAN Not Allowed
3	I-HSPA-Evolution Not Allowed
4	E-UTRAN Not Allowed
5	HO-To-Non-3GPP-Access Not Allowed

Table 7.3.31/1: Access-Restriction-Data

### 7.3.32 APN-OI-Replacement

The APN-OI-Replacement AVP is of type UTF8String. This AVP shall indicate the domain name to replace the APN OI for the non-roaming case and the home routed roaming case when constructing the APN, and the APN-FQDN upon which to perform a DNS resolution. See 3GPP TS 23.003 [3] and 3GPP TS 29.303 [38].

The contents of the APN-OI-Replacement AVP shall be formatted as a character string composed of one or more labels separated by dots (".").

### 7.3.33 All-APN-Configurations-Included-Indicator

The All-APN-Configurations-Included-Indicator AVP is of type Enumerated. The following values are defined:

All\_APN\_CONFIGURATIONS\_INCLUDED (0)

MODIFIED/ADDED\_APN\_CONFIGURATIONS\_INCLUDED (1)

## 7.3.34 APN-Configuration-Profile

The APN-Configuration-Profile AVP is of type Grouped. It shall contain the information related to the user's subscribed APN configurations for EPS. The Context-Identifier AVP within it shall that identify the per subscriber's default APN configuration.

The AVP format shall conform to:

APN-Configuration-Profile ::= <AVP header: 1429 10415>

{ Context-Identifier }

{ All-APN-Configurations-Included-Indicator }

1\*{APN-Configuration}

\*[AVP]

The Subscription-Data AVP associated with an IMSI contains one APN-Configuration-Profile AVP.

Each APN-Configuration-Profile AVP contains one or more APN-Configuration AVPs.

Each APN-Configuration AVP describes the configuration for a single APN.

Therefore, the cardinality of the relationship between IMSI and APN is one-to-many.

## 7.3.35 APN-Configuration

The APN-Configuration AVP is of type Grouped. It shall contain the information related to the user"s subscribed APN configurations. The Context-Identifier in the APN-Configuration AVP shall identify that APN configuration, and it shall not have a value of zero. Furthermore, the Context-Identifier in the APN-Configuration AVP shall uniquely

identify the EPS APN configuration per subscription. For a particular EPS user having multiple APN configurations, the Service-Selection AVP values shall be unique across APN-Configuration AVPs.

The AVP format shall conform to:

APN-Configuration ::= <AVP header: 1430 10415>

- { Context-Identifier }
- \* 2 [ Served-Party-IP-Address ]
- { PDN-Type }
- { Service-Selection}
- [ EPS-Subscribed-QoS Profile ]

[ VPLMN-Dynamic-Address-Allowed ]

[MIP6-Agent-Info]

[ Visited-Network-Identifier ]

- [ PDN-GW-Allocation-Type ]
- [ 3GPP-Charging-Characteristics ]

[AMBR]

- \*[ Specific-APN-Info ]
- [ APN-OI-Replacement ]
- [SIPTO-Permission]
- [LIPA-Permission]
- \*[ AVP ]

The AMBR included in this grouped AVP shall include the AMBR associated to this specific APN configuration (APN-AMBR).

The Served-Party-IP-Address AVP may be present 0, 1 or 2 times. These AVPs shall be present if static IP address allocation is used for the UE, and they shall contain either of:

- an IPv4 address, or
- an IPv6 address/prefix, or
- both, an IPv4 address and an IPv6 address/prefix.

For the IPv6 prefix, the lower 64 bits of the address shall be set to zero.

The PDN-GW-Allocation-Type AVP applies to the MIP6-Agent-Info AVP. Therefore, it shall not be present if MIP6-Agent-Info is not present.

The APN-OI-Replacement included in this grouped AVP shall include the APN-OI-Replacement associated with this APN configuration. This APN-OI-Replacement has higher priority than UE level APN-OI-Replacement.

The Visited-Network-Identifier AVP indicates the PLMN where the PGW was allocated, in case of dynamic PGW assignment.

NOTE: If interworking with MAP is needed, the Context-Identifier will be in the range of 1 and 50.

## 7.3.36 Service-Selection

The Service-Selection AVP is of type of UTF8String. This AVP shall contain either the APN Network Identifier (i.e. an APN without the Operator Identifier) per 3GPP TS 23.003 [3], clauses 9.1 & 9.1.1, or this AVP shall contain the wild card value per 3GPP TS 23.003 [3], clause 9.1.2, and 3GPP TS 23.008 [30], clause 2.13.6).

The contents of the Service-Selection AVP shall be formatted as a character string composed of one or more labels separated by dots ("."), or as the wild card APN, i.e., consisting of only one ASCII label, "\*".

This AVP is defined in IETF RFC 5778[20].

## 7.3.37 EPS-Subscribed-QoS-Profile

The EPS-Subscribed-QoS-Profile AVP is of type Grouped. It shall contain the bearer-level QoS parameters (QoS Class Identifier and Allocation Retention Priority) associated to the default bearer for an APN (see 3GPP TS 23.401 [2], clause 4.7.3).

AVP format

EPS-Subscribed-QoS-Profile ::= <AVP header: 1431 10415>

{ QoS-Class-Identifier }

{ Allocation-Retention-Priority }

\*[AVP]

### 7.3.38 VPLMN-Dynamic-Address-Allowed

The VPLMN Dynamic Address Allowed AVP is of type Enumerated. It shall indicate whether for this APN, the UE is allowed to use the PDN GW in the domain of the HPLMN only, or additionally, the PDN GW in the domain of the VPLMN. If this AVP is not present, this means that the UE is not allowed to use PDN GWs in the domain of the VPLMN. The following values are defined:

NOTALLOWED (0)

ALLOWED (1)

### 7.3.39 STN-SR

The STN-SR AVP is of type OctetString and shall contain the Session Transfer Number for SRVCC. See 3GPP TS 23.003 [3] for the definition of STN-SR. This AVP contains an STN-SR, in international number format as described in ITU-T Rec E.164 [8], encoded as a TBCD-string. See 3GPP TS 29.002 [24] for encoding of TBCD-strings.

### 7.3.40 Allocation-Retention-Priority

The Allocation-Retention-Priorit AVP is of typeGrouped and is defined in 3GPP TS 29.212 [10]. It shall indicate the Priority of Allocation and Retention for the corresponding APN configuration.

AVP format

Allocation-Retention-Priority ::= < AVP header: 1034 10415>

{ Priority-Level }

[ Pre-emption-Capability ]

[ Pre-emption-Vulnerability ]

If the Pre-emption-Capability AVP is not present in the Allocation-Retention-Priority AVP, the default value shall be PRE-EMPTION\_CAPABILITY\_DISABLED (1).

If the Pre-emption-Vulnerability AVP is not present in the Allocation-Retention-Priority AVP, the default value shall be PRE-EMPTION\_VULNERABILITY\_ENABLED (0).

### 7.3.41 AMBR

The AMBR AVP is of type Grouped.

AVP format

AMBR ::= <AVP header: 1435 10415>

{ Max-Requested-Bandwidth-UL }

{ Max-Requested-Bandwidth-DL }

\*[AVP]

### 7.3.42 MIP-Home-Agent-Address

The MIP-Home-Agent-Address AVP is of type Address and is defined in IETF RFC 4004 [27]. This AVP shall contain either IPv4 or IPv6 address of the PDN-GW and this IP address shall be used as the PDN-GW IP address.

### 7.3.43 MIP-Home-Agent-Host

The MIP-Home-Agent-Host is of type Grouped and is defined in IETF RFC 4004 [27]. This AVP shall contain a FQDN of the PDN-GW which shall be used to resolve the PDN-GW IP address using the Domain Name Service function.

MIP-Home-Agent-Host grouped AVP is composed by Destination-Host and Destination-Realm AVPs.

Destination-Host shall contain the hostname of the PDN-GW, formatted as described in 3GPP TS 29.303 [38], clause 4.3.2.

Destination-Realm shall be formatted as:

```
epc.mnc<MNC>.mcc<MCC>.3gppnetwork.org
```

where MNC and MCC values indicate the PLMN where the PDN-GW is located.

### 7.3.44 PDN-GW-Allocation-Type

The PDN-GW-Allocation-Type AVP is of type Enumerated. It shall indicate whether the PDN GW address included in MIP6-Agent-Info has been statically allocated (i.e. provisioned in the HSS by the operator), or dynamically selected by other nodes. The following values are defined:

STATIC (0)

DYNAMIC (1)

### 7.3.45 MIP6-Agent-Info

The MIP6-Agent-InfoAVP is of type Grouped and is defined in IETF RFC 5447 [26]. This AVP shall contain the identity of the PDN-GW. This AVP is used to convey the identity of the PDN-GW between the MME/SGSN and the HSS regardless of the specific mobility protocol used (GTP or PMIPv6). The identity of PDN-GW is either an IP address transported in MIP-Home-Agent-Address or an FQDN transported in MIP-Home-Agent-Host. FQDN shall be used if known to the MME/SGSN/HSS.

AVP format

MIP6-Agent-Info ::= < AVP Header: 486 > \*2[ MIP-Home-Agent-Address ]

[ MIP-Home-Agent-Host ] [ MIP6-Home-Link-Prefix ] \*[ AVP ]

Within the MIP6-Agent-Info AVP, if static address allocation is used, there may be either:

- an IPv4 address or an IPv6 address of the PGW contained in one MIP-Home-Agent-Address AVP;
- both IPv4 address and IPv6 address of the PGW contained in two MIP-Home-Agent-Address AVPs.

The AVP MIP6-Home-Link-Prefix is not used in S6a/S6d, but it is included here to reflect the complete IETF definition of the grouped AVP.

# 7.3.46 RAT-Frequency-Selection-Priority-ID

The RAT-Frequency-Selection-Priority-ID AVP is of type Unsigned32 and shall contain the subscribed value of Subscriber Profile ID for RAT/Frequency Priority. For details, see 3GPP TS 23.401 [2] and 3GPP TS 23.060 [12]. The coding is defined in 3GPP TS 36.413 [19]. Values shall be in the range of 1 to 256.

## 7.3.47 IDA-Flags

The IDA-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meanings of the bits are defined in table 7.3.47/1:

#### Table 7.3.47/1: IDA-Flags

Bit	Name	Description	
0	Network Node area	This bit, when set, shall indicate that the complete Network Node	
	restricted	area (SGSN area) is restricted due to regional subscription.	
Note: Bits not defined in this table shall be cleared by the sending SGSN and discarded by the			
receiving HSS.			

## 7.3.48 PUA-Flags

The PUA-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meanings of the bits are defined in table 7.3.48/1:

#### Table 7.3.48/1: PUA-Flags

bit	name	Description		
0	Freeze M-TMSI	This bit, when set, shall indicate to the MME that the M-TMSI		
		needs to be frozen, i.e. shall not be immediately re-used.		
1	Freeze P-TMSI	This bit, when set, shall indicate to the SGSN that the P-TMSI		
		needs to be frozen, i.e. shall not be immediately re-used.		
Note: Bits not defined in this table shall be cleared by the sending HSS and discarded by the				
receiving MME or SGSN.				

## 7.3.49 NOR-Flags

The NOR-Flags AVP is of type Unsigned32 and it contains a bit mask. The meaning of the bits is defined in table 7.3.49/1:

bit	name	Description
0	Single-Registration- Indication	This bit, when set, indicates that the HSS shall send Cancel Location to the SGSN. An SGSN shall not set this bit when sending NOR.
1	SGSN area restricted	This bit, when set, shall indicate that the complete SGSN area is restricted due to regional subscription.
2	Ready for SM	This bit, when set, shall indicate that the UE is present or the UE has memory capacity available to receive one or more short messages.
3	UE Reachable from MME	This bit, when set, shall indicate that the UE has become reachable again from MME.
4	Reserved	The use of this bit is deprecated. This bit shall be discarded by the receiving HSS.
5	UE Reachable from SGSN	This bit, when set, shall indicate that the UE has become reachable again from SGSN.
Note: Bits not defined in this table shall be cleared by the sending MME or SGSN and discarded by the receiving HSS.		

	Table	7.3.49/1:	NOR-Fla	as
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## 7.3.50 User-Id

The User-Id AVP shall be of type UTF8String. It shall contain the leading digits of an IMSI (i.e. MCC, MNC, leading digits of MSIN, see 3GPP TS 23.003 [3], clause 2.2) formatted as a character string. Within a HSS, a User-Id identifies a set of subscribers, each with identical leading IMSI digits.

## 7.3.51 Equipment-Status

The Equipment-Status AVP is of type Enumerated, and shall contain the status of the mobile equipment. The following values are defined:

WHITELISTED (0)

BLACKLISTED (1)

GREYLISTED (2)

#### 7.3.52 Regional-Subscription-Zone-Code

The Regional-Subscription-Zone-Code AVP is of type OctetString. Up to 10 zone codes shall all be defined as the tracking or routing areas into which the subscriber is allowed to roam. See 3GPP TS 23.003 [3].

NOTE: Any internal list of zone code roaming restrictions that may be generated by the MME/SGSN from the information in this AVP is an implementation issue only.

#### 7.3.53 RAND

The RAND AVP is of type OctetString. This AVP shall contain the RAND. See 3GPP TS 33.401 [5].

## 7.3.54 XRES

The XRES AVP is of type OctetString. This AVP shall contain the XRES. See 3GPP TS 33.401 [5].

#### 7.3.55 AUTN

The AUTN AVP is of type OctetString. This AVP shall contain the AUTN. See 3GPP TS 33.401 [5].

#### 7.3.56 KASME

The KASME AVP is of type OctetString. This AVP shall contain the K\_ASME. See 3GPP TS 33.401 [5].

#### 7.3.57 Confidentiality-Key AVP

The Confidentiality-Key is of type OctetString, and shall contain the Confidentiality Key (CK).

#### 7.3.58 Integrity-Key AVP

The Integrity-Key is of type OctetString, and shall contain the Integrity Key (IK).

#### 7.3.59 Kc AVP

The Kc-Key is of type OctetString, and shall contain the Ciphering Key (Kc).

#### 7.3.60 SRES

The SRES AVP is of type OctetString. This AVP shall contain the SRES. See 3GPP TS 33.102 [18].

#### 7.3.61 Void

#### 7.3.62 PDN-Type

The PDN-Type AVP is of type Enumerated and indicates the address type of PDN. The following values are defined:

IPv4 (0)

This value shall be used to indicate that the PDN can be accessed only in IPv4 mode.

IPv6 (1)

This value shall be used to indicate that the PDN can be accessed only in IPv6 mode.

IPv4v6 (2)

This value shall be used to indicate that the PDN can be accessed both in IPv4 mode, in IPv6 mode, and also from UEs supporting dualstack IPv4v6.

IPv4\_OR\_IPv6 (3)

This value shall be used to indicate that the PDN can be accessed either in IPv4 mode, or in IPv6 mode, but not from UEs supporting dualstack IPv4v6. It should be noted that this value will never be used as a requested PDN Type from the UE, since UEs will only use one of their supported PDN Types, i.e., IPv4 only, IPv6 only or IPv4v6 (dualstack). This value is only used as part of the APN subscription context, as an authorization mechanism between HSS and MME.

## 7.3.63 Trace-Data AVP

The Trace-Data AVP is of type Grouped. This AVP shall contain the information related to trace function.

AVP format

Trace-Data ::= <AVP header: 1458 10415>

{Trace-Reference}

{Trace-Depth}

{Trace-NE-Type-List}

[Trace-Interface-List] {Trace-Event-List} [OMC-Id] {Trace-Collection-Entity} [MDT-Configuration] \*[AVP]

#### 7.3.64 Trace-Reference AVP

The Trace-Reference AVP is of type OctetString. This AVP shall contain the concatenation of MCC, MNC and Trace ID, where the Trace ID is a 3 byte Octet String. See 3GPP TS 32.422 [23].

The content of this AVP shall be encoded as octet strings according to table 7.3.64/1.

See 3GPP TS 24.008 [31], clause 10.5.1.13, PLMN list, for the coding of MCC and MNC. If MNC is 2 digits long, bits 5 to 8 of octet 2 are coded as "1111".

8	7	6	5	4	3	2	1	1
	MCC	digit 2			MCC	digit 1		octet 1
	MNC	C digit 3			МСС	digit 3		octet 2
	MNC	digit 2			MNC	digit 1		octet 3
								octet 4
	Trace ID						octet 5	
								octet 6

#### Table 7.3.64/1: Encoding format for Trace-Reference AVP

- 7.3.65 Void
- 7.3.66 Void

#### 7.3.67 Trace-Depth AVP

The Trace-Depth AVP is of type Enumerated. The possible values are those defined in 3GPP TS 32.422 [23] for Trace Depth.

## 7.3.68 Trace-NE-Type-List AVP

The Trace-NE-Type-List AVP is of type OctetString. Octets are coded according to 3GPP TS 32.422 [23].

#### 7.3.69 Trace-Interface-List AVP

The Trace-Interface-List AVP is of type OctetString. Octets are coded according to 3GPP TS 32.422 [23].

#### 7.3.70 Trace-Event-List AVP

The Trace-Event-List AVP is of type OctetString. Octets are coded according to 3GPP TS 32.422 [23].

# 7.3.71 OMC-Id AVP

The OMC-Id AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24].

#### 7.3.72 GPRS-Subscription-Data

The GPRS-Subscription-Data AVP is of type Grouped. It shall contain the information related to the user profile relevant for GPRS.

AVP format:

GPRS-Subscription-Data ::= <AVP header: 1467 10415>

{ Complete-Data-List-Included-Indicator }

1\*50{PDP-Context}

\*[AVP]

NOTE: The max number of PDP-Context AVP aligns with the value of maxNumOfPDP-Contexts as defined in 3GPP TS 29.002[24].

#### 7.3.73 Complete-Data-List-Included-Indicator

The Complete-Data-List-Included-Indicator AVP is of type Enumerated. The following values are defined:

All\_PDP\_CONTEXTS\_INCLUDED (0)

MODIFIED/ADDED\_PDP CONTEXTS\_INCLUDED (1)

#### 7.3.74 PDP-Context

The PDP-Context AVP is of type Grouped. For a particular GPRS user having multiple PDP Context configurations, the Service-Selection AVP values may be the same for different PDP-Context AVPs.

AVP format

```
PDP-Context ::= <AVP header: 1469 10415>

{ Context-Identifier }

{ PDP-Type }

[ PDP-Address ]

{ QoS-Subscribed }

[ VPLMN-Dynamic-Address-Allowed ]

{ Service-Selection }

[ 3GPP-Charging-Characteristics]

[ Ext-PDP-Type ]

[ Ext-PDP-Type ]

[ Ext-PDP-Address ]

[ AMBR ]

[ SIPTO-Permission ]

[ LIPA-Permission ]

*[AVP]
```

The Ext-PDP-Address AVP may be present only if the PDP-Address AVP is present. If the Ext-PDP-Address AVP is present, then it shall not contain the same address type (IPv4 or IPv6) as the PDP-Address AVP.

The AMBR included in this grouped AVP shall include the AMBR associated to the APN included in the PDP-Context AVP (APN-AMBR).

#### 7.3.75 PDP-Type

The PDP-Type AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24].

## 7.3.75A Ext-PDP-Type

The Ext-PDP-Type AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24] and 3GPP TS 29.060 [39] and shall contain the value of IPv4v6.

#### 7.3.76 Void

## 7.3.77 QoS-Subscribed

The QoS-Subscribed AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24] (octets of QoS-Subscribed, Ext-QoS-Subscribed, Ext2-QoS-Subscribed, Ext3-QoS-Subscribed and Ext4-QoS-Subscribed values are concatenated).

#### 7.3.78 CSG-Subscription-Data

The CSG-Subscription-Data AVP is of type Grouped. This AVP shall contain the CSG-Id, optionally an associated expiration date and optionally the APNs which are allowed to be accessed via Local IP Access from the CSG.

#### AVP format

CSG-Subscription-Data ::= <AVP header: 1436 10415>

{ CSG-Id }

[Expiration-Date]

\*[ Service-Selection ]

\*[AVP]

## 7.3.79 CSG-ld

The CSG-Id-Data AVP is of type Unsigned32. Values are coded according to 3GPP TS 23.003 [3]. Unused bits (least significant) shall be padded with zeros.

## 7.3.80 Expiration-Date

The Expiration-Date AVP is of type Time (see IETF RFC 3588 [4]) and contains the point in time when subscription to the CSG-Id expires.

# 7.3.81 Roaming-Restricted-Due-To-Unsupported-Feature

The Roaming-Restricted-Due-To-Unsupported-Feature AVP is of type Enumerated and indicates that roaming is restricted due to unsupported feature. The following value is defined:

Roaming-Restricted-Due-To-Unsupported-Feature (0)

#### 7.3.82 Specific-APN-Info AVP

The Specific-APN-Info AVP is of type Grouped. It shall only be present in the APN configuration when the APN is a wild card APN. It shall contain the APN which is not present in the subscription context but the UE is authorized to connect to and the identity of the registered PDN-GW.

The AVP format shall conform to:

Specific-APN-Info ::= < AVP header: 1472 10415>

{ Service-Selection }

{ MIP6-Agent-Info }

[ Visited-Network-Identifier ]

\*[ AVP ]

#### 7.3.83 Alert-Reason AVP

The Alert-Reason AVP is of type Enumerated. The following values are defined:

UE\_PRESENT (0)

UE\_MEMORY\_AVAILABLE (1)

#### 7.3.84 LCS-Info

The LCS-Info AVP is of type Grouped. This AVP shall contain the following LCS related information for a subscriber:

- list of GMLCs in the HPLMN that are permitted to issue a call/session unrelated or call/session related MT-LR location request for this UE;
- privacy exception list that is applicable only over the S6d interface;
- MO-LR list.

AVP format

LCS-Info ::= <AVP header: 1473 10415>

\*[ GMLC-Number]

\*[ LCS-PrivacyException ]

\*[ MO-LR ]

\*[AVP]

#### 7.3.85 GMLC-Number

The GMLC-Number AVP is of type OctetString. This AVP shall contain the ISDN number of the GMLC. For further details on the encoding of this AVP, see 3GPP TS 23.003[3].

#### 7.3.86 LCS-PrivacyException

The LCS-PrivacyException AVP is of type Grouped. This AVP shall contain the classes of LCS Client that are allowed to locate any target UE.

AVP format

LCS-PrivacyException ::= <AVP header: 1475 10415>

{ SS-Code }

{ SS-Status } [ Notification-To-UE-User ] \*[ External-Client ] \*[ PLMN-Client ] \*[ Service-Type ]

\*[AVP]

#### 7.3.87 SS-Code

The SS-Code AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24].

#### 7.3.88 SS-Status

The SS-Status AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24]. For details, see 3GPP TS 23.011 [29].

#### 7.3.89 Notification-To-UE-User

The Privacy-Notification-UE-User AVP is of type Enumerated. The following values are defined:

NOTIFY\_LOCATION\_ALLOWED (0)

NOTIFYANDVERIFY\_LOCATION\_ALLOWED\_IF\_NO\_RESPONSE (1)

NOTIFYANDVERIFY\_LOCATION\_NOT\_ALLOWED\_IF\_NO\_RESPONSE (2)

LOCATION\_NOT\_ALLOWED (3)

#### 7.3.90 External-Client

The External-Client AVP is of type Grouped. This AVP shall contain the identities of the external clients that are allowed to locate a target UE for a MT-LR.

AVP format

External-Client ::= <AVP header: 1479 10415>

{ Client-Identity }

[GMLC-Restriction]

[Notification-To-UE-User]

\*[AVP]

#### 7.3.91 Client-Identity

The Client-Identity AVP is of type OctetString and it shall contain the ISDN number of the external client. For further details on the encoding of this AVP, see 3GPP TS 23.003 [3].

#### 7.3.92 GMLC-Restriction

The GMLC-Restriction AVP is of type Enumerated. The following values are defined:

GMLC\_LIST (0)

HOME\_COUNTRY (1)

#### 7.3.93 PLMN-Client

The PLMN-Client AVP is of type Enumerated. The following values are defined:

BROADCAST\_SERVICE (0)

O\_AND\_M\_HPLMN (1)

O\_AND\_M\_VPLMN (2)

ANONYMOUS\_LOCATION (3)

TARGET\_UE\_SUBSCRIBED\_SERVICE (4)

#### 7.3.94 Service-Type

The Service-Type AVP is of type Grouped. This AVP shall contain the identities of the service type of the clients that are allowed to locate a target UE for an MT-LR.

AVP format

```
Service-Type ::= <AVP header: 1483 10415>
```

{ ServiceTypeIdentity }

[GMLC-Restriction]

[ Notification-To-UE-User ]

\*[AVP]

#### 7.3.95 ServiceTypeIdentity

The ServiceTypeIdentity AVP is of type Unsigned32. For details on the values of this AVP, see 3GPP TS 29.002 [24].

#### 7.3.96 MO-LR

The MO-LR AVP is of type Grouped. This AVP shall contain the classes of MO-LR for which a subscription exists for a particular UE.

AVP format

MO-LR ::= <AVP header: 1485 10415>

{ SS-Code } { SS-Status } \*[AVP]

#### 7.3.97 Void

#### 7.3.98 Trace-Collection-Entity AVP

The Trace-collection-Entity AVP is of type Address and contains the IPv4 or IPv6 address of the Trace Collection Entity, as defined in 3GPP TS 32.422 [23], clause 5.9.

#### 7.3.99 Teleservice-List

The Teleservice-List AVP is of type Grouped. This AVP shall contain the service codes for the short message related teleservice for a subscriber:

AVP format

Teleservice-List ::= <AVP header: 1486 10415>

1 \* { TS-Code }\* [ AVP ]

# 7.3.100 TS-Code

The TS-Code AVP is of type OctetString. Octets are coded according to 3GPP TS 29.002 [24].

## 7.3.101 Call-Barring-Infor-List

The Call-Barring-Infor-List AVP is of type Grouped. This AVP shall contain the service codes for the short message related call barring services for a subscriber:

#### AVP format

Call-Barring-Infor-List ::= <AVP header: 1488 10415>

\* [ AVP ]

# 7.3.102 SGSN-Number AVP

The SGSN-Number AVP is of type OctetString and it shall contain the ISDN number of the SGSN. For further details on the definition of this AVP, see 3GPP TS 23.003[3]. This AVP contains an SGSN-Number in international number format as described in ITU-T Rec E.164 [8] and shall be encoded as a TBCD-string. See 3GPP TS 29.002 [24] for encoding of TBCD-strings.

#### 7.3.103 IDR-Flags

The IDR-Flags AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits shall be as defined in table 7.3.103/1:

bit	name	Description	
0	UE Reachability Request	This bit when set shall indicate to the MME or the SGSN that the HSS is awaiting a Notification of UE Reachability.	
1	T-ADS Data Request	This bit, when set, shall indicate to the MME or SGSN that the HSS requests the support status of "IMS Voice over PS Sessions", and the RAT Type and timestamp of the last radio contact with the UE.	
2	EPS User State Request	This bit, when set, shall indicate to the MME or the SGSN that the HSS requests the MME or the SGSN for the current user state.	
3	EPS Location Information Request	This bit, when set, shall indicate to the MME or the SGSN that the HSS requests the MME or SGSN for location information	
4	Current Location Request	This bit when set shall indicate to the MME or the SGSN that the HSS requests the MME or SGSN to provide the most current location information by paging the UE if the UE is in idle mode. This bit is used only in combination with the"EPS Location Information Request" bit.	
NOTE: Bits not defined in this table shall be cleared by the sending HSS and discarded by the receiving MME.			

Table 7.3.103/1: IDR-Flags

# 7.3.104 ICS-Indicator

The ICS-Indicator AVP is of type Enumerated. The meaning of the values is defined in 3GPP TS 23.292 [34] and 3GPP TS 23.216 [35]. The following values are defined:

FALSE (0)

TRUE (1)

#### 7.3.105 Visited-Network-Identifier

The Visited-Network-Identifier AVP contains the identity of the network where the PDN-GW was allocated, in the case of dynamic PDN-GW assignment.

The AVP shall be encoded as:

mnc<MNC>.mcc<MCC>.3gppnetwork.org

## 7.3.106 IMS-Voice-Over-PS-Sessions-Supported

The IMS-Voice-Over-PS-Sessions-Supported AVP is of type Enumerated. The following values are defined:

#### NOT\_SUPPORTED (0)

This value indicates that "IMS Voice over PS Sessions" is not supported by the UE's most recently used TA or RA in the serving node.

#### SUPPORTED (1)

This value indicates that "IMS Voice over PS Sessions" is supported by the UE's most recently used TA or RA in the serving node.

If this AVP is not present in the command, the default value is NOT\_SUPPORTED (0).

#### 7.3.107 Homogeneus-Support-of-IMS-Voice-Over-PS-Sessions

The Homogeneous-Support-of-IMS-Voice-Over-PS-Sessions AVP is of type Enumerated. The following values are defined:

#### NOT\_SUPPORTED (0)

This value indicates that "IMS Voice over PS Sessions" is not supported, homogeneously, in any of the TAs or RAs associated to the serving node.

#### SUPPORTED (1)

This value indicates that "IMS Voice over PS Sessions" is supported, homogeneously, in all of the TAs or RAs associated to the serving node.

If this AVP is not present in the command, it indicates that there is no homogeneous support of IMS Voice Over PS Sessions on all the TA/RAs of the serving node, or that the homogeneity of this support is unkown to the serving node.

#### 7.3.108 Last-UE-Activity-Time

The Last-UE-Activity-Time AVP is of type Time (see IETF RFC 3588 [4]), and contains the point of time of the last radio contact of the serving node (MME or SGSN) with the UE.

#### 7.3.109 GMLC-Address

The GMLC-Address AVP is of type Address and shall contain the IPv4 or IPv6 address of the V-GMLC associated with the serving node.

## 7.3.110 EPS-User-State

The EPS-User-State AVP is of type Grouped. It shall contain the information related to the user state in the MME and/or the SGSN.

AVP format

EPS-User-State ::= <AVP header:1495 10415>

[MME-User-State]

[SGSN-User-State]

\*[AVP]

#### 7.3.111 EPS-Location-Information

The EPS-LocationInformation AVP is of type Grouped. It shall contain the information related to the user location relevant for EPS.

AVP format

EPS-Location-Information ::= <AVP header: 1496 10415>

[MME-Location-Information]

[SGSN-Location-Information]

\*[AVP]

## 7.3.112 MME-User-State

The MME-User-State AVP is of type Grouped. It shall contain the information related to the user state in the MME.

AVP format

MME-User-State ::= <AVP header: 1497 10415>

[User-State]

\*[AVP]

# 7.3.113 SGSN-User-State

The SGSN-User-State AVP is of type Grouped. It shall contain the information related to the user state in the SGSN.

AVP format

SGSN-User-State ::= <AVP header: 1498 10415>

[User-State]

\*[AVP]

#### 7.3.114 User-State

The User-State AVP is of type Enumerated and indicates the user state in EPS. The following values are defined:

DETACHED (0)

ATTACHED\_NOT\_REACHABLE\_FOR\_PAGING (1)

ATTACHED\_REACHABLE\_FOR\_PAGING (2)

CONNECTED\_NOT\_REACHABLE\_FOR\_PAGING (3)

CONNECTED\_REACHABLE\_FOR\_PAGING (4)

NETWORK\_DETERMINED\_NOT\_REACHABLE (5)

# 7.3.115 MME-Location-Information

The MME-Location-Information AVP is of type Grouped. It shall contain the information related to the user location relevant for the MME.

AVP format

MME-Location-Information ::= <AVP header: 1600 10415>

[E-UTRAN-Cell-Global-Identity] [Tracking-Area-Identity] [Geographical-Information] [Geodetic-Information] [Current-Location-Retrieved] [Age-Of-Location-Information] \*[AVP]

# 7.3.116 SGSN-Location-Information

The SGSN-Location-Information AVP is of type Grouped. It shall contain the information related to the user location relevant for the SGSN.

AVP format

SGSN-Location-Information ::= <AVP header: 1601 10415>

[Cell-Global-Identity] [Location-Area-Identity] [Service-Area-Identity] [Routing-Area-Identity] [Geographical-Information] [Geodetic-Information] [Current-Location-Retrieved] [Age-Of-Location-Information] \*[AVP]

# 7.3.117 E-UTRAN-Cell-Global-Identity

The E-UTRAN-Cell-Global-Identity AVP is of type OctetString and shall contain the E-UTRAN Cell Global Identification of the user which identifies the cell the user equipment is registered, as specified in 3GPP TS 23.003 [3]. Octets are coded as described in 3GPP TS 29.002 [24].

# 7.3.118 Tracking-Area-Identity

The Tracking-Area-Identity AVP is of type OctetString and shall contain the Tracking Area Identity of the user which identifies the tracking area where the user is located, as specified in 3GPP TS 23.003 [3]. Octets are coded as described in 3GPP TS 29.002 [24].

# 7.3.119 Cell-Global-Identity

The Cell-Global-Identity AVP is of type OctetString and shall contain the Cell Global Identification of the user which identifies the cell the user equipment is registered, as specified in 3GPP TS 23.003 [3]. Octets are coded as described in 3GPP TS 29.002 [24].

# 7.3.120 Routing-Area-Identity

The Routing-Area-Identity AVP is of type OctetString and shall contain the Routing Area Identity of the user which identifies the routing area where the user is located, as specified in 3GPP TS 23.003 [3]. Octets are coded as described in 3GPP TS 29.002 [24].

# 7.3.121 Location-Area-Identity

The Location-Area-Identity AVP is of type OctetString and shall contain the Location Area Identification of the user which identifies the Location area where the user is located, as specified in 3GPP TS 23.003 [3]. Octets are coded as described in 3GPP TS 29.002 [24].

# 7.3.122 Service-Area-Identity

The Service-Area-Identity AVP is of type OctetString and shall contain the Service Area Identifier of the user where the user is located, as specified in 3GPP TS 23.003 [3]. Octets are coded as described in 3GPP TS 29.002 [24].

# 7.3.123 Geographical-Information

The Geographical-Information AVP is of type OctetString and shall contain the geographical Information of the user. For details and octet encoding, see 3GPP TS 29.002 [24].

# 7.3.124 Geodetic-Information

The Geodetic-Information AVP is of type OctetString and shall contain the Geodetic Location of the user. For details and octet encoding, see 3GPP TS 29.002 [24].

# 7.3.125 Current-Location-Retrieved

The Current-Location-Retrieved AVP is of type Enumerated. The following values are defined:

```
ACTIVE-LOCATION-RETRIEVAL (0)
```

This value is used when location information was obtained after a successful paging procedure for Active Location Retrieval.

# 7.3.126 Age-Of-Location-Information

The Age-Of-Location-Information AVP is of type Unsigned32 and shall contain the the elapsed time in minutes since the last network contact of the user equipment. For details, see 3GPP TS 29.002 [24].

# 7.3.127 Active-APN

The Active-APNs AVP is of type Grouped. It shall contain information about a dynamically established APN on a serving node, so the HSS can restore it, if it is eventually lost after a node restart.

The AVP format shall conform to:

Active-APN ::= <AVP header: 1612 10415>

- { Context-Identifier }
  [ Service-Selection ]
  [ MIP6-Agent-Info ]
  [ Visited-Network-Identifier ]
- \*[ Specific-APN-Info ]

\*[ AVP ]

#### 7.3.128 Error-Diagnostic

The Error-Diagnostic AVP is of type Enumerated. The following values are defined:

- GPRS\_DATA\_SUBSCRIBED (0)

This value shall be used when Experimental-Error is DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION and there is GPRS Subscription Data for the user.

- NO\_GPRS\_DATA\_SUBSCRIBED (1)

This value shall be used when Experimental-Error is DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION and there is not GPRS Subscription Data for the user.

- ODB-ALL-APN (2)

This value shall be used when Experimental-Error is DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED and the Operator Determined Barring indicates "All Packet Oriented Services Barred" (see clause 7.3.30).

- ODB-HPLMN-APN (3)

This value shall be used when Experimental-Error is DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED and the Operator Determined Barring indicates "Roamer Access HPLMN-AP Barred" (see clause 7.3.30).

- ODB-VPLMN-APN (4)

This value shall be used when Experimental-Error is DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED and the Operator Determined Barring indicates "Roamer Access to VPLMN-AP Barred" (see clause 7.3.30).

# 7.3.129 Ext-PDP-Address AVP

The Ext-PDP-Address AVP is of type Address and indicates an additional address of the data protocol, and it may be included when the PDP supports dual-stack (IPv4v6).

#### 7.3.130 UE-SRVCC-Capability

The UE-SRVCC-Capability AVP is of type Enumerated. It shall indicate if the UE supports or does not support the SRVCC capability. The following values are defined:

UE-SRVCC-NOT-SUPPORTED (0)

**UE-SRVCC-SUPPORTED** (1)

# 7.3.131 MPS-Priority

The MPS-Priority AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits shall be as defined in table 7.3.131/1:

Bit	Name	Description		
0	MPS-CS-Priority	This bit, when set, indicates that the UE is subscribed to the		
		eMLPP or 1x RTT priority service in the CS domain.		
1	MPS-EPS-Priority	This bit, when set, indicates that the UE is subscribed to the		
		MPS in the EPS domain.		
Note: Bits not defined in this table shall be cleared by the sending HSS and discarded by the				
	receiving MME or SGSN.			

NOTE: The HSS derives the information for MPS-CS-Priority from the eMLPP Subscription Data as defined in the 3GPP TS 29.002 [24] or 1x RTT priority service which is out of the scope of 3GPP.

## 7.3.132 VPLMN-LIPA-Allowed

The VPLMN-LIPA-Allowed AVP is of type Enumerated. It shall indicate whether the UE is allowed to use LIPA in the VPLMN where the UE is roaming. The following values are defined:

#### LIPA-NOTALLOWED (0)

This value indicates that the UE is not allowed to use LIPA in the VPLMN where the UE is roaming.

#### LIPA-ALLOWED (1)

This value indicates that the UE is allowed to use LIPA in the VPLMN where the UE is roaming.

## 7.3.133 LIPA-Permission

The LIPA-Permission AVP is of type Enumerated. It shall indicate whether the APN can be accessed via Local IP Access. The following values are defined:

#### LIPA-PROHIBITED (0)

This value indicates that this APN is prohibited to be accessed via LIPA.

LIPA-ONLY (1)

This value indicates that this APN can be accessed only via LIPA.

#### LIPA-CONDITIONAL (2)

This value indicates that this APN can be accessed via both non LIPA and LIPA.

#### 7.3.134 Subscribed-Periodic-RAU-TAU-Timer

The Subscribed-Periodic-TAU-RAU-Timer AVP is of type Unsigned32 and it shall contain the subscribed periodic TAU/RAU timer value in seconds.

## 7.3.135 SIPTO-Permission

The SIPTO-Permission AVP is of type Enumerated. It shall indicate whether the traffic associated with this particular APN is allowed or not for SIPTO.

The following values are defined:

SIPTO\_ALLOWED (0)

SIPTO\_NOTALLOWED (1)

#### 7.3.136 MDT-Configuration

The MDT-Configuration AVP is of type Grouped. It shall contain MDT related information as specified in 3GPP TS 32.422 [23].

The AVP format shall conform to:

```
MDT-Configuration ::= <AVP header: 1622 10415>
{ Job-Type }
[ Area-Scope ]
[ List-Of-Measurements ]
[ Reporting-Trigger ]
[ Report-Interval ]
[ Report-Amount ]
[ Report-Amount ]
[ Event-Threshold-RSRP ]
[ Logging-Interval ]
[ Logging-Interval ]
*[ AVP ]
```

# 7.3.137 Job-Type

The Job-Type AVP is of type Enumerated. The possible values are those defined in 3GPP TS 32.422 [23] for Job-Type.

#### 7.3.138 Area-Scope

The Area-Scope AVP is of type Grouped. See 3GPP TS 32.422 [23].

The AVP format shall conform to:

Area-Scope ::= <AVP header: 1623 10415>

- \*[ Cell-Global-Identity ]
- \*[ E-UTRAN-Cell-Global-Identity ]
- \*[ Routing-Area-Identity ]
- \*[ Location-Area-Identity ]
- \*[ Tracking-Area-Identity ]

\*[ AVP ]

#### 7.3.139 List-Of-Measurements

The List-Of-Measurements AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits is defined in 3GPP TS 32.422 [23]. The most significant bit is bit 8 of the first octet.

# 7.3.140 Reporting-Trigger

The Reporting-Trigger AVP is of type Unsigned32 and it shall contain a bit mask. The meaning of the bits is defined in 3GPP TS 32.422 [23]. The most significant bit is bit 8 of the first octet.

# 7.3.141 Report-Interval

The Report-Interval AVP is of type Enumerated. The possible values are those defined in 3GPP TS 32.422 [23] for Report Interval

# 7.3.142 Report-Amount

The Report-Amout AVP is of type Enumerated. The possible values are those defined in 3GPP TS 32.422 [23] for Report Amount.

# 7.3.143 Event-Threshold-RSRP

The Event-Threshold-RSRP AVP is of type Unsigned32. See 3GPP TS 32.422 for allowed values

# 7.3.144 Event-Threshold-RSRQ

The Event-Threshold-RSRQ AVP is of type Unsigned32. See 3GPP TS 32.422 for allowed values

# 7.3.145 Logging-Interval

The Logging-Interval AVP is of type Enumerated. The possible values are those defined in 3GPP TS 32.422 [23] for Logging Interval

# 7.3.146 Logging-Duration

The Logging-Duration AVP is of type Enumerated. The possible values are those defined in 3GPP TS 32.422 [23] for Logging Duration

# 7.3.147 Relay-Node-Indicator

The Relay-Node-Indicator AVP is of type Enumerated. It shall indicate whether the subscription data belongs to a Relay Node or not (see 3GPP TS 36.300 [40]). The following values are defined:

NOT\_RELAY\_NODE (0)

This value indicates that the subscription data does not belong to a Relay Node.

RELAY\_NODE (1)

This value indicates that the subscription data belongs to a Relay Node.

The default value when this AVP is not present is NOT\_RELAY\_NODE (0).

# 7.3.148 MDT-User-Consent

The MDT-User-Consent AVP is of type Enumerated. It shall indicate whether the user has given his consent for MDT activation or not (see 3GPP TS 32.422 [23]). The following values are defined:

CONSENT\_NOT\_GIVEN (0)

CONSENT\_GIVEN (1)

The default value when this AVP is not present in ULA is CONSENT\_NOT\_GIVEN (0). Absence of this AVP in IDR shall be interpreted as the MDT-User-Consent has not been modified.

# 7.3.149 PUR-Flags

The PUR-Flags AVP is of type Unsigned32 and it shall contain a bitmask. The meaning of the bits is defined in table 7.3.149/1:

bit	name	Description	
0	UE Purged in MME	This bit, when set, indicates that the combined MME/SGSN has purged the UE in the MME part of the node. This bit shall not be set by a standalone SGSN.	
1	UE Purged in SGSN This bit, when set, shall indicate that the combined MME/SGSN has purged the UE in the SGSN part of the node. This bit shall not be set by a standalone MME.		
NOTE:			

#### Table 7.3.149/1: PUR-Flags

# 7.4 Result-Code and Experimental-Result Values

# 7.4.1 General

This section defines result code values that shall be supported by all Diameter implementations that conform to this specification.

# 7.4.2 Success

Result codes that fall within the Success category shall be used to inform a peer that a request has been successfully completed. The Result-Code AVP values defined in Diameter Base Protocol RFC 3588 [4] shall be applied.

# 7.4.3 Permanent Failures

Errors that fall within the Permanent Failures category shall be used to inform the peer that the request has failed, and should not be attempted again. The Result-Code AVP values defined in Diameter Base Protocol RFC 3588 [4] shall be applied. When one of the result codes defined here is included in a response, it shall be inside an Experimental-Result AVP and the Result-Code AVP shall be absent.

## 7.4.3.1 DIAMETER\_ERROR\_USER\_UNKNOWN (5001)

This result code shall be sent by the HSS to indicate that the user identified by the IMSI is unknown

## 7.4.3.2 DIAMETER\_ERROR\_UNKNOWN\_EPS\_SUBSCRIPTION (5420)

This result code shall be sent by the HSS to indicate that no EPS subscription is associated with the IMSI.

## 7.4.3.3 DIAMETER\_ERROR\_RAT\_NOT\_ALLOWED (5421)

This result code shall be sent by the HSS to indicate the RAT type the UE is using is not allowed for the IMSI.

## 7.4.3.4 DIAMETER\_ERROR\_ROAMING\_NOT\_ALLOWED (5004)

This result code shall be sent by the HSS to indicate that the subscriber is not allowed to roam within the MME or SGSN area.

#### 7.4.3.5 DIAMETER\_ERROR\_EQUIPMENT\_UNKNOWN (5422)

This result code shall be sent by the EIR to indicate that the mobile equipment is not known in the EIR.

#### 7.4.3.6 DIAMETER\_ERROR\_UNKOWN\_SERVING\_NODE (5423)

This result code shall be sent by the HSS to indicate that a Notify command has been received from a serving node which is not registered in HSS as the node currently serving the user.

#### 7.4.4 Transient Failures

Result codes that fall within the transient failures category shall be used to inform a peer that the request could not be satisfied at the time it was received, but may be able to satisfy the request in the future. The Result-Code AVP values defined in Diameter Base Protocol RFC 3588 [4] shall be applied. When one of the result codes defined here is included in a response, it shall be inside an Experimental-Result AVP and the Result-Code AVP shall be absent.

#### 7.4.4.1 DIAMETER\_AUTHENTICATION\_DATA\_UNAVAILABLE (4181)

This result code shall be sent by the HSS to indicate that an unexpectedly transient failure occurs. The requesting node can try the request again in the future.

# 8 User identity to HSS resolution

The User identity to HSS resolution mechanism enables the MME, SGSN (for non-roaming case) or Diameter Relay/proxy agents in the home network (for roaming case) to find the identity of the HSS that holds the subscriber data for a given user identity when multiple and separately addressable HSSs have been deployed in the home network. The resolution mechanism is not required in networks that utilise a single HSS.

This User identity to HSS resolution mechanism may rely on routing capabilities provided by Diameter and be implemented in the home operator network within dedicated Diameter Agents (Redirect Agents or Proxy Agents) responsible for determining the HSS identity based on the provided user identity. If this Diameter based implementation is selected by the Home network operator, the principles described below shall apply.

In non-roaming case, in networks where more than one independently addressable HSS are deployed in the home network, each MME and SGSN shall be configured with the address/identity of a Diameter Agent (Redirect Agent or Proxy Agent) implementing this resolution mechanism.

For support of roaming case, Diameter Relay agents and/or Diameter Proxy agents in the home network receiving the Diameter signalling from visited networks shall be configured with the address/identity of a Diameter Agent (Redirect Agent or Proxy Agent) implementing this resolution mechanism.

To get the HSS identity that holds the subscriber data for a given user identity in the home network, the Diameter request normally destined to the HSS shall be sent to a pre-configured address/identity of a Diameter agent supporting the User identity to HSS resolution mechanism.

- If this Diameter request is received by a Diameter Redirect Agent, the Diameter Redirect Agent shall determine the HSS identity based on the provided user identity and shall return a notification of redirection towards the HSS identity, in response to the Diameter request. Multiple HSS identities may be included in the response, as specified in IETF RFC 3588 [4]. In such a case, the requesting Diameter entity shall send the Diameter request to the first HSS identity in the ordered list received in the Diameter response from the Diameter Redirect Agent. If no successful response to the Diameter request is received, the requesting Diameter entity shall send a Diameter request to the next HSS identity in the ordered list. This procedure shall be repeated until a successful response from an HSS is received. After the user identity to HSS resolution, the MME or the SGSN shall store the determined HSS identity/name/Realm and shall use it in further Diameter requests to the same user identity.
- If this Diameter request is received by a Diameter Proxy Agent, the Diameter Proxy Agent shall determine the HSS identity based on the provided user identity and shall forward the Diameter request directly to the HSS. In this case, the user identity to HSS resolution decision is communicated to the MME/SGSN in the Origin-Host/Origin-Realm AVPs of the response. The MME or the SGSN may store the determined HSS identity/name/Realm and may use it in further Diameter requests to the same user identity.

In roaming case, whereas a Diameter Relay Agent is stateless, a stateful Diameter Proxy Agent in the home network may store the determined HSS identity/name/Realm and use it in further Diameter requests associated to the same user identity.

NOTE: Alternatives to the user identity to HSS resolution Diameter based implementation are outside the scope of this specification.

# Annex A (normative): MME mapping table for S6a and NAS Cause Code values

The MME will at Attach communicate with HSS to retrieve subscription data. If this operation is not successful, there are several possible cause codes, which need to be mapped to appropriate cause codes over NAS to the UE.

This mapping shall be as shown in Tables A.1 and A.2.

Reject indication from HSS to MME over S6a/S6d	NAS Cause Code to UE
DIAMETER_ERROR_USER_UNKNOWN (5001)	#8 "EPS services and non-EPS services not allowed"
DIAMETER_ERROR_UNKNOWN_EPS_SUBSCRIPTION (5420) without Error Diagnostic, or with Error Diagnostic of GPRS_DATA_SUBSCRIBED	#15 "No suitable cells in tracking area"
DIAMETER_ERROR_UNKNOWN_EPS_SUBSCRIPTION (5420) with Error Diagnostic of NO_GPRS_DATA_SUBSCRIBED	#7 "EPS services not allowed"
DIAMETER_ERROR_RAT_NOT_ALLOWED (5421)	<ul><li>#15 "No suitable cells in tracking area", or</li><li>#13 "Roaming not allowed in this tracking area", or</li><li>#12 "Tracking area not allowed"</li><li>(NOTE 1)</li></ul>
DIAMETER_ERROR_ROAMING_NOT_ALLOWED (5004) , without Error Diagnostic (NOTE 3)	#11 "PLMN not allowed"
DIAMETER_ERROR_ROAMING_NOT_ALLOWED (5004), with Error Diagnostic of ODB_HPLMN_APN or ODB_VPLMN_APN	#14 "EPS services not allowed in this PLMN"
DIAMETER_ERROR_ROAMING_NOT_ALLOWED (5004), with Error Diagnostic of ODB_ALL_APN	#19 "ESM failure"
DIAMETER_AUTHORIZATION_REJECTED (5003)	#15 "No suitable cells in tracking area"
DIAMETER_UNABLE_TO_COMPLY (5012), DIAMETER_INVALID_AVP_VALUE (5004) (NOTE 2)	#17 "Network failure"
NOTE 1: Any of those NAS Cause Code values may be set         NOTE 2: Any other permanent errors from the diameter bas         Cause Code #17 "Network failure".         NOTE 3: The MME might detect that roaming is not allowed	se protocol, not listed here, should be also mapped to NAS

#### Table A.2: Mapping between NAS Cause Code values and network conditions

NAS cause code to UE	Condition
#2 "IMSI Unknown in HSS"	The MME receives a SGsAP-LOCATION-UPDATE- REJECT message from the VLR indicating in the reject cause "IMSI unknown in HSS". Only used in the Combined Tracking and Location Area Update procedure.
#14 "EPS services not allowed in this PLMN"	The MME receives in Update-Location-Answer message an indication of Roaming restricted in MME due to unsupported feature

#19 "ESM failure"	The value OPERATOR_DETERMINED_BARRING is received in the Subscriber-Status AVP			
#12 "Tracking area not allowed"	The HSS indicates that due to subscription to a "regionally restricted service" the UE is not allowed to operate in the tracking area.			
#25 "Not authorized for this CSG"	The CSG ID of the cell from where the UE has sent the TRACKING AREA UPDATE REQUEST message is not contained in the Allowed CSG list.			
#15 "No suitable cells in tracking area"	The MME receives the Diameter error DIAMETER_UNABLE_TO_DELIVER (3002) and no re- routing takes place or DIAMETER_REALM_NOT_SERVED (3003) from another Diameter Agent (e.g. from a Diameter EDGE Relay Agent or from the GRX/IPX)			
#15 "No suitable cells in tracking area" #14 "EPS services not allowed in this PLMN"	The MME detects that it cannot communicate with the HSS in the HPLMN of the subscriber. How the MME detect this is implementation specific.			
NOTE: Any of those NAS Cause Code values may be sent to the UE, depending on operator's choice / configuration, e.g. NAS Cause Code #14 is to be sent to the UE if the network is an LTE only network.				

# Annex B (informative): Change history

<b>SG #</b> <u></u> T#42 T#42	TSG Doc.           CP-080475           CP-080691           CP-080691	CR 0001 0002 0005 0006 0007 0008 0009 0010 0011 0011 0013 0014 0015 0017 0018	Rev           1           1           -           2           3           -           1           -           2           3           -           1           -           2           3           -           1           -           2           3           -           1           -           2	Subject/Comment         V2.0.0 approved in CT#41         S6a Vendor-Specific-Application-Id AVP         RegSub feature         Clarification on Immediate-Response-Preferred         Correction of the Reference of Supported Features         Definition of RAT-Frequency-Selection-Priority         ME Identity Check         Gr alignment         Closed Subscriber Group         AVP codes         MSISDN AVP         Result codes         Removal of Editor's note in ULA Flag	Old 2.0.0 8.0.0	New           8.0.0           8.1.0
	CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080703 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691	0002 0005 0006 0007 0008 0009 0010 0011 0012 0013 0014 0015 0017	1 - 1 - 2 2 3 - 1 - -	S6a Vendor-Specific-Application-Id AVP         RegSub feature         Clarification on Immediate-Response-Preferred         Correction of the Reference of Supported Features         Definition of RAT-Frequency-Selection-Priority         ME Identity Check         Gr alignment         Closed Subscriber Group         AVP codes         MSISDN AVP         Result codes         Removal of Editor's note in ULA Flag		
,1#42	CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080703 CP-080971 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691 CP-080691	0002 0005 0006 0007 0008 0009 0010 0011 0012 0013 0014 0015 0017	1 - 1 - 2 2 3 - 1 - -	RegSub feature         Clarification on Immediate-Response-Preferred         Correction of the Reference of Supported Features         Definition of RAT-Frequency-Selection-Priority         ME Identity Check         Gr alignment         Closed Subscriber Group         AVP codes         MSISDN AVP         Result codes         Removal of Editor's note in ULA Flag	8.0.0	8.1.0
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	CP-080691 CP-080691 CP-080691	0017	2			
	CP-080691 CP-080691			Duplicated AMBR AVP and Use of Called-Station-Id		
	CP-080691	0018	-	Change of AVP to carry the APN information		
			1	Reference to 3GPP-Charging-Characteristics		
	CP-080691	0019	-	Access Restriction Data Definition		
		0020	-	AMBR Definition	1	
	CP-080691	0021	1	AVPs Encoding	1	
	CP-080691	0022	1	PDN-GW Delete	1	
	CP-080691	0023	1	Requesting Node Type Clarification	l	
	CP-080691	0024	-	Authn Session State AVP	]	
	CP-080691	0026	2	Trace Session Activation and Deactivation	l	
	CP-080691	0027	1	Context-Identifier in APN-Configuration-Profile		
			-			
	CP-080703		-			
	Context Identifier clarification					
	CP-080691	0034	1	APN-Configuration correction	-	
	CP-080691		-	Removal of Supported RAT Types		
	CP-080691	0039	1	Extension of the Terminal-Information AVP for non-3GPP accesses		
	CP-080691	0040	-	Conditionality of ULA-Flags and PUA-Flags AVPs		
	CP-080691	0042	-	Wrong Description for Complete APN Configuration Profile Withdrawal		
	CP-080691	0043	-	Purge UE Detailed Behaviour		
	CP-080691	0044	1	MME/SGSN area restricted flag cleanup		
			-	TS number in cover page corrected	8.1.0	8.1.1
CT#43	CP-090056	0048	2		8.1.1	8.2.0
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          CP-080703         0032         -           CP-080691         0033         1           CP-080691         0034         1           CP-080691         0037         -           CP-080691         0039         1           CP-080691         0040         -           CP-080691         0043         -           CP-080691         0043         -           CP-080691         0043         -           CP-080691         0043         -           CP-080691         0044         1           CP-080691         0044         -           CP-090056         0048         2           CP-090046         0051         2           CP-090046         0053         2           CP-090046         0055         -           CP-090046         0055         -           CP-090046         0057         2           CP-090046         0058         2           CP-090046         0063         1           CP-090046         0063         1           CP-090046         0064         -           CP-090046</td><td>CP-080691       0029       -       APN-OIReplacement         CP-080703       0032       -       Access Restriction         CP-080691       0034       1       APN-Configuration correction         CP-080691       0034       1       APN-Configuration correction         CP-080691       0037       -       Removal of Supported RAT Types         CP-080691       0040       -       Conditionality of ULA-Flags and PUA-Flags AVPs         CP-080691       0040       -       Conditionality of ULA-Flags and PUA-Flags AVPs         CP-080691       0043       -       Purge UE Detailed Behaviour         CP-080691       0043       -       Purge UE Detailed Behaviour         CP-080691       0044       1       MME/SGSN area restricted flag cleanup         -       TS number in cover page corrected       -         CP-090046       0049       -       Clarification of the relationship between Subscriber-Status and ODB         CP-090046       0051       2       Context-Identifier in APN-Configuration-Profile         CP-090046       0052       -       Update of the AVP Codes         CP-090044       0054       1       Ready for SM         CP-090044       0055       -       ODB for SM</td><td>CP-080691         0022         -         APN-OIReplacement           CP-080703         0032         -         Access Restriction           CP-080691         0033         1         Context Identifier clarification           CP-080691         0037         -         Removal of Supported RAT Types           CP-080691         0039         1         Extension of the Terminal-Information AVP for non-3GPP accesses           CP-080691         0040         -         Conditionality of ULA-Flags and PUA-Flags AVPs           CP-080691         0042         -         Wrong Description for Complete APN Configuration Profile           Withdrawal         CP-080691         0043         -         Purge UE Detailed Behaviour           CP-080691         0043         -         TS number in cover page corrected         8.1.0           T#43         CP-090066         0048         2         Context Identifier In PN-Configuration-Profile         8.1.1           CP-090046         0051         2         Context Identifier N2PN-Configuration-Profile         8.1.1           CP-090044         0052         -         Update of Wildcard APN         8.1.1           CP-090044         0056         2         Handling LCS Subscription Data         CP-090044         0055         -         0D</td></td<>	CP-080691         0029           CP-080703         0032           CP-080691         0033           CP-080691         0034           CP-080691         0037           CP-080691         0039           CP-080691         0040           CP-080691         0041           CP-080691         0043           CP-080691         0043           CP-080691         0043           CP-080691         0044           CP-080691         0043           CP-080691         0044           CP-090046         0051           CP-090046         0052           CP-090046         0053           CP-090046         0055           CP-090046         0055           CP-090046         0056           CP-090046         0058           CP-090046         0066           CP-090046         0066           CP-090046         0066           CP-090046         0070           CP-090046         0070           CP-090046         0070           CP-090046         0076           CP-090046         0077           CP-090046         0070	CP-080691         0029         - 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      ODB for SM	CP-080691         0022         -         APN-OIReplacement           CP-080703         0032         -         Access Restriction           CP-080691         0033         1         Context Identifier clarification           CP-080691         0037         -         Removal of Supported RAT Types           CP-080691         0039         1         Extension of the Terminal-Information AVP for non-3GPP accesses           CP-080691         0040         -         Conditionality of ULA-Flags and PUA-Flags AVPs           CP-080691         0042         -         Wrong Description for Complete APN Configuration Profile           Withdrawal         CP-080691         0043         -         Purge UE Detailed Behaviour           CP-080691         0043         -         TS number in cover page corrected         8.1.0           T#43         CP-090066         0048         2         Context Identifier In PN-Configuration-Profile         8.1.1           CP-090046         0051         2         Context Identifier N2PN-Configuration-Profile         8.1.1           CP-090044         0052         -         Update of Wildcard APN         8.1.1           CP-090044         0056         2         Handling LCS Subscription Data         CP-090044         0055         -         0D

CP-000287         0087         1         Coding of Immediate Response Preferred AVP           CP-000287         0088         -         Removal of Requesting Mode Type from AIR           CP-000287         0081         -         Removal of Requesting Mode Type from AIR           CP-000287         0081         -         Reputational Control Code Code Introlation           CP-000287         0081         -         Distingtion of TAME monologing           CP-000287         0086         -         Distingtion of TAME monologing           CP-000287         0086         -         Distingtion of TAME monologing           CP-000287         0086         -         Use To TAME monologing         Distingtion of TAME monologing           CP-000487         0086         -         Use To Tame monologing         Distingtion of TAME monologing         Distingtion of TAME monologing           CP-000431         0086         -         Use To Tame monologing         Distingtion of TAME monologing         Distingtion of TAME monologing           CP-000531         0104         -         Use To Tame monologing the total monologing         Distingtion of TAME monologing           CP-000531         0116         -         The tame monologing the total monologing the total monologing         Distingtion of the total monologing the total monologing the total mon						Design that 20	1	
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CP-900287         0099         — Removal of Reguesting Mode Type from AIR           CP-900287         0091         Clarification of PLMN encoding           CP-900287         0092         Clarification of PLMN encoding           CP-900287         0093         Disameter Command Codes for SR4260(S13)513"           CP-900287         0095         I-Pomating of APNI is Revice-Stelection AVP           CP-900287         0095         I-Disameter Codes           CP-900281         01013         CP-80165         8.3.0           CP-900531         0102         Correction on APN-O-Replacement         8.3.0           CP-900531         0103         Cacanol Location for Initial Attach           CP-900531         0105         I-Usage of DIAMETER_ERROR_UNNOWNE EPS_SUBSCRIPTION           CP-900531         0106         Z-Disage of Single Registration Indication           CP-900531         0116         Z-Conrection in Dahater           CP-900531         0116         Concellon to Dahater           CP-900532         01116					-		-	
CP-960237         0001         Regional-Subscription-Zone-Code clafification           CP-960227         0002         Clarification of PLNN encoding           CP-960227         0004         Update of Diameter Codes           CP-960227         0006         1         Formatting of APN in Service-Selection AVP           CP-960227         0006         1         Formatting of APN in Service-Selection AVP           CP-960227         0006         1         UER processing refunction (Findameter Codes           2009-09         CT#45         CP-900251         1010         2         CPREStower Selection (Findameter Codes           CP-900251         0102         USage of DIAMETER, ERROR, UNKNOWL EPS SUBSCRIPTION         CP-900531         0103         CPREStower Selection (Findameter Codes           CP-900531         0102         USage of Single Registration Indication         CP-900531         0104         Subscription 2004 VPI Indication           CP-900531         0102         USage of Single Registration Indication         CP-900531         0112         Subscription 2004 VPI Indication APN           CP-900531         0112         Subscription 2004 VPI Indication APN         CP-900531         0113         CPIENDAME           CP-900531         0114         Cendul APN and AVPI Individend APN         CPIENDAME         CPIENDAME					-			
2009-09         Clarification of PLAN encoding           2009-09         CP-900227         0004         Update of Diameter Condex           2009-09         CT#45         CP-900227         0005         I: Formating of APN in Service-Selection AVP           2009-09         CT#45         CP-900237         0006         I: Surge of Single Argeistanton-Inclation           2009-09         CT#45         CP-900231         0100         2         Correction on APN-OI-Registanton-Inclation           2009-09         CT#45         CP-900231         0100         2         Correction on APN-OI-Registanton-Inclation           2009-09         CT#45         CP-900231         0101         2         Correction on APN-OI-Registanton-Inclation           CP-900251         01013         C Carel Location for Initial Attach         CP-900251         0105         I: Usage of DNIRe Registration Indication           CP-900531         0105         I: Usage of DNIRe Registration Indication         CP-900531         0106         I: Usage of DNIRe Registration Indication           CP-900531         0102         I: Otariang DAP correction         Pote Pathy correction         CP-900531         0111         Three ID rengh correction         Pote Pathy correction         CP-900531         0112         Correction IndiPathy corection Pathy Pathy         CP-900532					-	Regional-Subscription-Zone-Code clarification	-	
CP-900227         0004         Update of Diameter Codes           CP-900276         0005         IF-promising of APNI is Service-Selection AVP           CP-900376         0006         3         User Data Download Indication           CP-900376         0007         Usage of Single-registration-Indication         B.3.0         8.4.0           CP-900376         0100         C correction on APN-OR-Registration-Indication         B.3.0         8.4.0           CP-900376         0101         I Gasge of DiAMETER ERROR_UNKNOWL EPS_SUBSCRIPTION         CP-900531         0106         I Correction on APNIC Replacement         B.3.0         8.4.0           CP-900531         0106         I Correction Context State Release         CP-900531         0106         I Correction Context State Release         CP-900531         0106         I Correction Context State Release         CP-900531         0107         I Aterning Reason Devinvur         CP-900531         0108         I Widcard APN         CP-900531         0111         Trace ID length Correction Answer         CP-900531         0114         Default APN and WAP in Update Location Answer         CP-900532         0113         Default APN and WAP in Update Location Answer         CP-900532         0114         Default APN and WAP in Update Location Answer         CP-900532         0116         Corenoton an Update APN and WAP in Update Location Answe			CP-090287	0092	-			
209-09         CT#45         CP-090375         0066         1         Enhancement           2009-09         CT#45         CP-090375         007         Usage of Single-Registration-Indication           2009-09         CT#45         CP-090531         0100         2         Correction on APN-OI-Registration-Indication           2009-09         CT#45         CP-090531         0101         3         CPR5 subscription data over \$6d           CP-090531         0102         1         Usage of Single-Registration India Atcah           CP-090531         0103         6         Cancel Location for India Atcah           CP-090531         0106         1         Subscription India Atcah           CP-090531         0106         2         Characteristics Reference           CP-090531         0106         2         Usage of Single-Registration Indication           CP-090531         0106         2         Usage of Single-Registration Indication           CP-090531         0111         1         Default values for Notection Indication           CP-090531         0112         1         Default values for Notection Indication           CP-090531         0113         Default values for Notection Indication of Someand           CP-090532         0113         Defaul			CP-090287	0093	-	Diameter Command Codes for S6a/S6d/S13/S13"		
CP-090375         0096         3         User Data Download Indication           2009-09         CT#45         0091-04         U.R. processing enhancement         8.3.0         8.4.0           2009-09         CT#45         CP-09032         0100         2         Correction on APN-OR-Rphacement         8.3.0         8.4.0           2009-09         CT#45         CP-09053         0102         1         Usage of DiAMETRE ERROR.UNKNOWN, EPS, SUBSCRIPTION CP-090531         0106         2         Usage of DiAMETRE ERROR.UNKNOWN, EPS, SUBSCRIPTION CP-090531         0106         2         Usage of DiAMETRE ERROR.OR.UNKNOWN, EPS, SUBSCRIPTION CP-090531         0106         2         Usage of DiAMETRE ERROR.UNKNOWN, EPS, SUBSCRIPTION CP-090531         0106         2         Usage of DiAMETRE ERROR.OR.UNKNOWN, EPS, SUBSCRIPTION CP-090533         0101         1         Date of Diametre CP         Diametre C					-			
CP-0900315         0097         Usage of Single-Registration-Indication           2009.09         CTf455         CP-0900531         0100         2         Correction on APN-Or-Replacement         8.3.0         8.4.0           CP-0900531         0100         2         Correction on APN-Or-Replacement         8.3.0         8.4.0           CP-0900531         0102         1         Usage of DIAMETER_ERROR_UNRNVEPS_SUBSCRIPTION         6.7.0           CP-0900531         0104         4         Subscriber Data Update         CP-0900531         0106         1         Usage of Single Registration Indication         CP-0900531         0106         1         Usage of Single Registration Indication         CP-0900531         0107         1         Alering Resson Behaviou         CP-0900531         0107         1         Subscriber's NAM         CP-0900531         0110         1         Default APN and Wilcard APN         CP-0900531         0116         1         CP-0900531         0116         1         Correction son DR-RAMP and Service Type AVP         CP-0900531         0116         1         Correction son DR-RAMP and Service Type AVP         CP-0900532         0122         1         Correction son DR-RAMP and Service Type AVP         CP-0900532         0122         1         Correction son DR-RAMP and Service Type AVP         CP-0900532         0								
CP-09046         0098         3         ULR processing enhancement         8.3.0         8.4.0           2009-09         CT#45         CP-090728         0100         3         GPRS subscription data over 564         6.3.0         8.4.0           CP-090728         0100         1         Usage of DIAMETER_ERROR, UNKNOWN_EPS_SUBSCRIPTION         6.3.0         8.4.0           CP-090531         0102         1         Usage of Single Registration Indication         CP-090631         0106         1         Usage of Single Registration Indication         CP-090631         0106         1         Usage of Single Registration Indication         CP-090631         0101         2         Subscriber's NAM         CP-090631         0101         2         Subscriber's NAM         CP-090631         0111         1         Tace ID lenging characteristics Reference         CP-090632         0111         1         Carection on DR Wildscard APN         CP-090632         0120         1         T6-00402					3			
2009-09         CT#45         CP-030631         0100         2         Correction on APN-OR-Replacement         8.3.0         8.4.0           CP-030631         0102         1         Usage of DIAMETER_ERROR_UNKNOWLEPS_SUBSCRIPTION           CP-030631         0103         6         Cancel Location for Initial Attach           CP-030631         0104         4         Subscripter Data Update           CP-030631         0106         1         Usage of Single Registration Indication           CP-030631         0106         1         Usage of Single Registration Indication           CP-030631         0101         1         Harring Reason Behaviour           CP-030631         0111         1         Subscriptor-Date Registration Indication Answer           CP-030631         0111         1         Subscriptor-Date AVP in Update Location Answer           CP-030631         0111         1         Default APN and Wilcard APN           CP-030632         0118         Corrections on IDR ABAV and Savios Type AVP           CP-030633         0118         Corrections on IDR ABAV and Savios Type AVP           CP-030632         0124         1         Corrections on IDR ABAV and Savios Type AVP           CP-030632         0132         1         Tocarections on IDR ABAV and Savios Type AVP <td></td> <td></td> <td></td> <td></td> <td>-</td> <td></td> <td></td> <td></td>					-			
Cp-090726         0101         3         CPR 500531         0102         1         Usaged of DAMETER, ERROR, UNKNOWN, EPS_SUBSCRIPTION           CP-090736         0102         1         Usaged of Single Registration Indication           CP-090736         0104         4         Subscripter Data Update           CP-090736         0106         1         Usaged of Single Registration Indication           CP-090353         0106         1         Usaged of Data AVP In Update Location Answer           CP-090353         01114         1         Default Values Or Allocation Retention Priority AVP           CP-090353         0114         1         Default Values Corrections an Usage of Calues Consumand           CP-090353         0118         1         Carrection in behavior of DSR-Flags           CP-090353         0114         1         Carrection an behavior of DSR-Flags           CP-090353         0112         1         Clarification of the process of skip subscripter All           CP-090353         0112								
CP-090531         0102         1         Usage of DIAMETER_LERKOR_UNKNOWN_EPS_SUBSCRIPTION CP-090531           CP-090531         0104         4         Subscriber Data Update           CP-090531         0105         1         Usage of Single Registration Indication           CP-090531         0106         2         Charging Characteristics Reference           CP-090531         0106         1         Wildcard APN           CP-090531         0106         1         Wildcard APN           CP-090531         01114         1         Subscriber's NAM           CP-090531         0114         1         Subscriber's NAM           CP-090531         0114         1         Default APN and Wildcard APN           CP-090531         0114         1         Default APN and Wildcard APN           CP-090531         0115         2         Corrections on DR AbPr and Sing subscriber data flag in the HSS           CP-090532         01161         1         Corrections on DR AbPr and Sing subscriber data flag in the HSS           CP-090532         0126         1         FO-000532         0126         Forman of DR AbPr and Sing subscriber data flag in the HSS           CP-090532         0126         1         Gorrections on DR AbPr and Sing subscrib and APP         Goreenaa	2009-09	CT#45					8.3.0	8.4.0
CP-90631         0103         6         Cancel Location for Initial Attach           CP-90631         0104         Subscriber Data Update           CP-90631         0105         1         Usages/cP-parateristics Reference           CP-90631         0106         2         Charging Characteristics Reference           CP-90631         0109         -         Subscriber's NAM           CP-90631         0111         Trace ID length correction           CP-90631         0112         1         Subscription-Data AVP in Update Location Answer           CP-90631         0113         1         Trace ID length correction           CP-90631         0114         Default APN and Wildcard APN           CP-90631         0114         Default APN and Wildcard APN           CP-90632         0123         1         Correction in behavior of DSR-Flags           CP-90632         0123         1         Clain flag AVP           CP-90632         0124         1         Clain flag AVP           CP-90632         0124         1         Clain flag AVP           CP-90632         0128         1         Supported Faure concept with 29.229           CP-90632         0128         1         GP-P200532         0128         Supportenolos an								
CP-090531         0104         4         Subscriper Data Update           CP-090531         0105         1         Usage of Single Registration Indication           CP-090531         0106         2         Charging Characteristics Reference           CP-090531         0100         1         Wildcard APN           CP-090531         0108         1         Wildcard APN           CP-090531         0112         1         Subscripter's NAM           CP-090531         0113         1         Default APN and Wildcard APN           CP-090531         0114         Default APN and Wildcard APN           CP-090531         0115         C         Corrections in Defavit APN in Update Location Answer           CP-090531         0116         1         Corrections on DR ABNF and Service Type APP           CP-090532         01120         1         TS-Code AVP is missing in DSR command           CP-090532         01221         1         TS-Code AVP is missing in DSR command           CP-090532         0122         1         PR-Segnita DAP           CP-090532         0126         APN-Configuration-Profile           CP-090532         0133         1         EPS ubscribed DAS           CP-090532         0133         1 <td< td=""><td></td><td></td><td></td><td></td><td>_</td><td></td><td>_</td><td></td></td<>					_		_	
CP-090531         0105         1         Usage of Single Registration Indication           CP-090531         0106         2.         Charging Charactensitics Reference           CP-090531         0109         1         Alerting Reason Behaviour           CP-090531         0109         1         Subscriptor-NAM           CP-090531         0111         1         Subscriptor-Nata AVP in Update Location Answer           CP-090531         01112         1         Subscriptor-Nata AVP in Update Location Answer           CP-090531         01114         Default APN and Wildcard APN           CP-090531         0116         1         PDF and APN           CP-090531         0116         1         PDF and APN           CP-090532         0120         1         Clarification on the process of skip subscripter data flag in the HSS           CP-090532         0121         1         Clarification on the process of skip subscripter data flag in the HSS           CP-090532         0122         1         Clarification on the process of skip subscriptor AVP           CP-090532         0122         1         Other of the missing in DSR command           CP-090532         0122         1         Other of the Subscriptor-Date Update           CP-090532         0130         - <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td>							_	
CP-906531         0106         2         Charging Characteristics Reference           CP-906531         0107         1         Alerting Reason Behaviour           CP-906531         0108         1         Wildcard APN           CP-906531         0111         1         Trace ID length correction           CP-906531         0111         1         Trace ID length correction           CP-906531         0113         1         Default APN and Wildcard APN           CP-906531         0115         2         Corrections and Wildcard APN           CP-906531         0116         1         Corrections on DR ABNF and Service Type APP           CP-906531         0116         1         Corrections on DR ABNF and Service Type APP           CP-906532         0120         1         TS-Code AVF Is missing in DSR command           CP-906532         0122         1         Cleanup of the TS           CP-906532         0126         APN-Configuration-Profile           CP-906532         0128         1         Migment of Supportel Feature concept with 29.229           CP-906532         0133         1         Trace Depth per session           CP-906532         0134         1         Earlice APP           CP-906523         0134					_			
CP-900531         0107         1         Alerning Reason Behaviour           CP-900531         0109         -         Subscriber's NAM           CP-900531         0110         -         Trace ID length correction           CP-900531         0111         1         Subscription-Data AVP in Update Location Answer           CP-900531         0111         1         Default APN and Wilclard APN           CP-900531         0116         1         PON Type           CP-900531         0116         1         PON Type           CP-900532         0123         1         Cleanup of the TS           CP-900532         0123         1         Cleanup of the TS           CP-900532         0123         1         Cleanup of the TS           CP-900532         0124         1         Stopproved the TS           CP-900532         0126         1         GPP2MEID AVP           CP-900532         0126         2         APN Configuration-Profile           CP-900532         0136         1         Restruction of the TS 29/22           CP-900532         0136         1         Restruction of the TS 29/22           CP-900532         0136         1         Restructin the TS 29/22           CP-					_		-	
CP-00031         0108         1         Wildcard APN           CP-000531         0101         -         Trace ID length correction           CP-000531         0111         -         Trace ID length correction           CP-000531         0113         1         Obfault values for Allocation Retention Priority AVP           CP-000531         0116         2         Correction in behavior of DSR-Flags           CP-000531         0116         1         Corrections on IDR ABNF and Service Type AVP           CP-000532         0119         1         Corrections on IDR ABNF and Service Type AVP           CP-000532         0112         1         Corrections on IDR ABNF and Service Type AVP           CP-000532         0112         1         Corrections on IDR ABNF and Service Type AVP           CP-000532         0123         1         Ceronogation         Ceronogation           CP-000532         0124         1         Formatol User-Id         Ceronogation           CP-000532         0128         1         3GPP2-MEID AVP         Ceronogation           CP-000532         0131         Trace Depth Per 3ession         Cero-00532         Cero-00532           CP-000532         0131         Trace Depth Per 3ession         Cero-00532         Cero-00532								
CP-000531         0109         -         Subscriptors NAM           CP-000531         0111         Trace ID length correction           CP-000531         0112         1         Subscription-Data AVP in Update Location Answer           CP-000531         0116         1         Default Values for Allocation Retention Priority AVP           CP-000531         0116         1         Corrections on IDR ABNF and Service Type AVP           CP-000532         0118         1         Clarification on IDR ABNF and Service Type AVP           CP-000532         0120         1         TS-Code AVP is missing in DSR command           CP-000532         0120         1         TS-Code AVP is missing in DSR command           CP-000532         0120         1         TS-Code AVP is missing in DSR command           CP-000532         0120         1         TG-Code AVP is missing in DSR command           CP-000532         0120         1         TG-RS Subscription Data Update           CP-000532         0131         EPRS Subscription-Zone-Codes           CP-000532         0133         1         Trace Depth per session           CP-000532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-000532         0141         1         Extra Regional-Subscripti							1	
CP-090531         0111         Trace ID length correction           CP-090531         0113         1         Subscription-Data AVP in Update Location Answer           CP-090531         0113         1         Default Values for Allocation Retention Priority AVP           CP-090531         0116         2         Correction in behavior of DSR-Flags           CP-090531         0116         PDN Type           CP-090532         0120         1         TS-Code AVP is missing in DSR command           CP-090532         0120         1         TS-Code AVP is missing in DSR command           CP-090532         0123         1         Clearup of the TS           CP-090532         0126         1         FS-Code AVP is missing in DSR command           CP-090532         0126         1         Clearup of the TS           CP-090532         0128         1         Clearup and the TS           CP-090532         0128         1         APR-Conlinguration-Profile           CP-090532         0128         1         APR-Conlinguration-Profile           CP-090532         0131         FerS Subscription-Zone-Codes           CP-090532         0131         Tecre Subscription-Zone-Codes           CP-090532         0141         Clarification of Subscription-Zone-					-		-	
CP-900531         0112         1         Subscription-Data AVP in Update Location Answer           CP-900531         0114         Default APN and Wildcard APN           CP-900531         0116         1         Default APN and Wildcard APN           CP-900531         0116         1         DPN Type           CP-900532         0119         1         Correction in behavior of DSR-Flags           CP-900532         0119         1         Corrections on IDR ABNF and Service Type AVP           CP-900532         0121         1         Sched AVP Is missing in DSR command           CP-900532         0122         1         GPresubscription-Data Update           CP-900532         0124         1         GPresubscription-Portile           CP-900532         0122         1         GPResubscription-Portile           CP-900532         0123         1         GPResubscription-Portile           CP-900532         0131         1         Restruction of the TS         P272           CP-900532         0141         1         Extra Regional-Subscription-Porte-Codes         P2900532           CP-900532         0142         1         Clarification of Service-Selection AVP encoding         P2900532           CP-900532         0144         RFSP coding					-		1	
CP-090531         0113         1         Default Values for Allocation Retention Priority AVP           CP-090531         0116         1         Dott Type           CP-090531         0116         1         Correction in behavior of DSR-Flags           CP-090531         0116         1         Corrections on IDR ABNF and Service Type AVP           CP-090532         0123         1         Corrections on IDR ABNF and Service Type AVP           CP-090532         0123         1         Cleanup of the TS           CP-090532         0124         Format Of User-Id           CP-090532         0128         1         SGPP2-MEID AVP           CP-090532         0128         1         SGPP2-MEID AVP           CP-090532         0128         1         SGPP2-MEID AVP           CP-090532         0130         1         Restruction of the TS 29.272           CP-090532         0131         1         Restruction of the TS 29.272           CP-090532         0134         1         Election AVP encoding           CP-090532         0134         1         Clarification of Save-Selection AVP encoding           CP-090532         0144         1         Clarification of Save-Selection AVP encoding           CP-090532         0144					1		1	
CP-090531         0114         -         Default APN and Wildcard APN           CP-090531         0116         1         PPN Type           CP-090531         0118         1         Correction in behavior of DSR-Flags.           CP-090532         0119         1         Corrections on IDR ABNF and Service Type AVP           CP-090532         0123         1         Cleanup of the TS           CP-090532         0124         1         TS Code AVP Is missing in DSR command           CP-090532         0124         1         GPR8 Subscription Data Update           CP-090532         0124         1         GPR8 Subscription Data Update           CP-090532         0124         1         GPR8 Subscription Data Update           CP-090532         0124         1         GPR8 Subscription Profile           CP-090532         0133         1         Trace Depth per session           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0144         Clarification of Service-Selection AVP encoding           CP-090532         0144         I         Clarification of Subscription Data List Mandling in           CP-090532         0144         I         Clarification of Subscription Data List Handling in </td <td></td> <td></td> <td></td> <td></td> <td>_</td> <td></td> <td>1</td> <td></td>					_		1	
CP-090531         0116         2         Correction in behavior of DSR-Flags           CP-090531         0116         1         PONType           CP-090532         0119         1         Corrections on IDR ABNF and Service Type AVP           CP-090532         0120         1         TS-Code AVP Is missing in DSR command           CP-090532         0124         1         Formatol User-id           CP-090532         0126         1         GPR-Subscription Data Update           CP-090532         0126         1         GPR-Subscription Data Update           CP-090532         0128         1         GPR-Subscription Data Update           CP-090532         0128         1         GPR-Subscription-Zone           CP-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0141         1         Eartia Regional-Subscription-Zone-Codes           CP-090532         0144         1         Eartia Regional-Subscription-Data L					-  -		1	
CP-090531         0116         1         PDN Type           CP-090532         0119         1         Corrections on IDR ABNF and Service Type AVP           CP-090532         0120         1         TS-Code AVP is missing in DSR command           CP-090532         0123         1         Cleanup of the TS           CP-090532         0124         1         Format of User-Id           CP-090532         0125         1         GPRS Subscription Data Update           CP-090532         0126         2         APN-Configuration-Profile           CP-090532         0126         1         MIP6-Agent-Info AVP           CP-090532         0133         1         EPS Subscribed OoS           CP-090532         0133         1         EPS Subscribed OoS           CP-090532         0133         1         EPS Subscribed OoS           CP-090532         0140         -         Clarification of Service-Selection AVP encoding           CP-090532         0141         1         Exta Regional-Subscription-Zone-Codes           CP-090532         0141         1         Exta Regional-Subscription Pata Update           CP-090532         0141         1         Exta Regional-Subscription Data List Handling in           Molin         Miff			-		2		1	
2009-09         CT#45         CP-090532         0118         1         Corrections on DR ABNF and Service Type AVP           CP-090532         0120         1         TS-Code AVP is missing in DSR command         CP-090532         0123         1         Cleanup of the TS           CP-090532         0123         1         Cleanup of the TS         CP-090532         0124         1         Great         Great <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td>							1	
CP-090532         0119         1         Corrections on IDR ABNF and Service Type AVP           CP-090532         0123         1         Cleanup of the TS           CP-090532         0124         1         Format of User-1d           CP-090532         0125         1         GPRS Subscription Data Update           CP-090532         0126         2         APN-Configuration-Profile           CP-090532         0126         1         GPRS Subscription Data Update           CP-090532         0133         1         EPS-MEID AVP           CP-090532         0133         1         EPS Subscribed Ocs           CP-090532         0133         1         EPS Subscribed Ocs           CP-090532         0133         1         Trace Degth per session           CP-090532         0134         1         Trace Degth per session           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0144         1         Extra Regional-Subscription-Zone-Codes           CP-090566         0142         3         Upstresolution to Tolameter Proxy Agents           CP-090562         0144					_		1	
CP-090532         0123         1         Cleanup of the TS           CP-090532         0124         1         Format of User-Id           CP-090532         0126         1         GPRS Subscription Data Update           CP-090532         0126         1         GPRS Subscription Data Update           CP-090532         0128         1         GPP2-MEID AVP           CP-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0133         1         Restruction of the TS 29.272           CP-090532         0138         1         Trace Depth per session           CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0142         1         Carification of Service-Selection AVP encoding           CP-090532         0144         -         RFSP coding         8.4.0         9.0.0           2009-09         CT#45         CP-090562         0131         Emergency Support in S6a         9.0.0         9.1.0           MME/SGSN         CP-090767         0152         Intigreation on Some Subscription Data List Handling in         9.0.0					1		-	
CP-090532         0124         1         Formal of User-Id           CP-090532         0125         1         GPRS Subscription Data Update           CP-090532         0126         2         APN-Configuration-Profile           CP-090532         0128         1         3GPP2-MEID AVP           CP-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0133         1         EPS Subscribed QoS           CP-090532         0133         1         Trace Depth per session           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090560         0123         3         Emergency Support in S6a         9.0.0           2009-09         CT#46         CP-090560         0122         3         Optimization of Subscription Data Update         8.4.0         9.0.0           CP-090560         0122         3         Optimization of Subscription Data Update         0.0.0         9.1.0           ME/SGSN         CP-090767         0152			CP-090532	0120	1	TS-Code AVP is missing in DSR command		
CP-090532         0125         1         GPRS Subscription Data Update           CP-090532         0128         1         3GPP2-MEID AVP           CP-090532         0129         1         MIP6-Agent-Info AVP           CP-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0133         1         EPS Subscribed QoS           CP-090532         0133         1         Trace Depth per session           CP-090532         0140         -         Clarification of Unsported Feature Concept with 29.229           CP-090532         0140         -         Clarification of Unsported Feature Concept with 29.229           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0142         1         Clarification of Service-Selection AVP encoding           CP-090532         0144         1         RFSP coding         Portentity resolution for Diameter Proxy Agents           2009-09         CT#45         CP-090560         0122         3         Optimization of Subscription Data List Handling in         9.0.0           2009-12         CT#46         CP-090560         122         RFSP alignment in 29.272         CP-090767           CP-090767         0152			CP-090532	0123	1	Cleanup of the TS		
CP-090532         0126         2         APN-Configuration-Profile           CP-090532         0129         1         3GPP2-MEID AVP           CP-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0133         1         ReS Subscribed OoS           CP-090532         0133         1         ReSTuction of the TS 29.272           CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0143         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0144         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090552         0144         -         RFSP coding         -           2009-09         CT#45         CP-090566         0122         3         Optimization of Subscription Data List Handling in         -           2009-12         CT#46         CP-090562         1131         Emergency Support in S6a         -         -           2009-12         CT#46         CP-090767         0152         2         RFSP alignment in 29.272         -           CP-090767			CP-090532	0124	1			
CP-090532         0128         1         3GPP2-MEID AVP           CP-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0133         1         EPS Subscribed QoS           CP-090532         0133         1         EPS Subscribed QoS           CP-090532         0138         1         Trace Depth per session           CP-090532         0141         1         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Clarification of Subscription-Zone-Codes           CP-090532         0142         1         Clarification of Subscription-Zone-Codes           CP-090532         0144         -         RESP coding           CP-090532         0144         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090532         0144         -         RFSP coding         9.0.0           2009-09         CT#45         CP-090560         0122         3         Optimization of Subscription Data Update         8.4.0         9.0.0           CP-090582         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           CP-090760         0152         2 <td< td=""><td></td><td></td><td>CP-090532</td><td>0125</td><td>1</td><td>GPRS Subscription Data Update</td><td></td><td></td></td<>			CP-090532	0125	1	GPRS Subscription Data Update		
CP-09032         0129         1         MIP6-Agent-Info AVP           CP-09032         0130         -         Alignment of Supported Feature concept with 29.229           CP-09032         0133         1         EPS Subscribed QoS           CP-09032         0138         1         Trace Depth per session           CP-090322         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090322         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090322         0142         1         Clarification of Service-Selection AVP encoding           CP-090322         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090322         0144         -         RFSP coding         84.0         9.0.0           2009-09         CT#45         CP-090566         0122         3         Optimization of Subscription Data Update         84.0         9.0.0           2009-12         CT#46         CP-0901030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           CP-090767         0152         2         RFSP adignment in 29.272         CP-090767         0153         1         Notify Request for Emergency Attached UES					2			
CF-090532         0130         -         Alignment of Supported Feature concept with 29.229           CP-090532         0133         1         EPS Subscribed QoS           CP-090532         0134         1         Trace Depth per session           CP-090532         0134         1         Trace Depth per session           CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0144         -         Clarification of Service-Selection AVP encoding           CP-090532         0144         -         RFSP coding         8.4.0           2009-09         CT#45         CP-090562         0122         3         Optimization of Subscription Data Update         8.4.0         9.0.0           2009-02         CT#46         CP-090562         0142         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-090730         0149         1         APN level APN-OI-Replacement         -         -         -         -         0.0.0         9.1.0           CP-090767         0152         2         RFSP alignment in 29.272								
CP-090532         0133         1         EPS Subscribed QoS           CP-090532         0137         1         Restruction of the TS 29.272           CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090532         0144         -         RFSP coding            2009-09         CT#45         CP-090562         0121         3         Optimization of Subscripton Data List Handling in MME/SGSN         9.0.0         9.0.0         9.1.0           2009-12         CT#46         CP-090767         0150         1         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-090767         0152         2         RFSP alignment in 29.272         CP-090800         0150         2         ICS-Flag           CP-090767         0152         2         RFSP alignment in 29.272         CP-090767         0152         2         Wildcard APN					1			
CP-090532         0137         1         Restruction of the TS 29.272           CP-090532         0138         1         Trace Depth per session           CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090532         0144         -         RFSP coding         0ptimization of Subscripton-Zone-Subscription Data Update           2009-09         CT#45         CP-090562         0131         Emergency Support in S6a         9.0.0           2009-12         CT#46         CP-090562         0131         Emergency Support in S6a         9.0.0           2009-12         CT#46         CP-090562         0131         Emergency Support in S6a         9.0.0           2009-12         CT#46         CP-090130         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0           2009-12         CT#46         CP-090130         0150         2         ICS-Flag           CP-090767         0152         2         RFSP alignment in 29.272         CP-090767         0157         1         <					-		_	
CP-090532         0138         1         Trace Depth per session           CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0142         1         Clarification of Service-Selection AVP encoding           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090532         0144         RFSP coding         8.4.0         9.0.0           2009-09         CT#45         CP-090562         0112         3         Optimization of Subscriptor Data Update         8.4.0         9.0.0           2009-12         CT#46         CP-090562         0131         Emergency Support in S6a         9.0.0         9.1.0           2009-12         CT#46         CP-090767         0145         1         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-090767         0152         2         RFSP alignment in 29.272         CP-090767         0153         1         Notify Request for Emergency Attached UEs         CP-090767         0155         2         Wildcard APN           CP-090767         0155								
CP-090532         0140         -         Clarification of Unsigned32 bit flag AVPs           CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0143         1         Clarification of Service-Selection AVP encoding           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090552         0144         -         RFSP coding           2009-09         CT#45         CP-090562         0121         3           CP-090562         0131         Emergency Support in S6a         9.0.0           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN           2009-12         CT#46         CP-090767         0152         2         RFSP alignment in 29.272           CP-090767         0152         2         RFSP alignment in 29.272         CP-090767         0157         1         Uidcard APN           CP-090767         0153         1         Notify Request for Emergency Attached UEs         CP-090767         0153         CP-090767         0153         CP-090767         0153         CP-090767         0153         CP-090767         0157         1         Lifetime of Charging Cha							-	
CP-090532         0141         1         Extra Regional-Subscription-Zone-Codes           CP-090532         0142         1         Clarification of Service-Selection AVP encoding           CP-090532         0144         1         User to HSS identity resolution for Diameter Proxy Agents           CP-090552         0144         -         RFSP coding         8.4.0         9.0.0           2009-09         CT#45         CP-090562         0122         3         Optimization of Subscriptor Data Update         8.4.0         9.0.0           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-090767         0152         2         RFSP alignment in 29.272         CP-090800         0150         2         ICS-Flag           CP-090767         0155         1         Notify Request for Emergency Attached UEs         CP-090767         0155         2         Wildcard APN           CP-090767         0155         2         Wildcard APN         CP-090767         0163         FQDN for S6a NOR           CP-090767         0163         1         FORDN for S6a NOR         CP-091030         O171         Static PDN GW <t< td=""><td></td><td></td><td></td><td></td><td>1</td><td></td><td>_</td><td></td></t<>					1		_	
CP-090532         0142         1         Clarification of Service-Selection AVP encoding           CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           2009-09         CT#45         CP-090552         01141         -         RFSP coding           2009-12         CT#46         CP-090562         0131         Emergency Support in S6a         8.4.0         9.0.0           2009-12         CT#46         CP-090562         0131         Emergency Support in S6a         9.0.0         9.1.0           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-090767         0152         2         RFSP alignment in 29.272         9.0.0         9.1.0           CP-090767         0153         1         Notify Request for Emergency Attached UEs         9.0.0         9.1.0           CP-090767         0155         2         Wildcard APN         9.0.0         9.1.0           CP-090767         0155         2         Wildcard APN         9.0.0         9.1.0           CP-090767         0163         FQDN for S6a NOR         0.0.0         0.0.0         0.					-		-	
CP-090532         0143         1         User to HSS identity resolution for Diameter Proxy Agents           2009-09         CT#45         CP-090562         0112         3         Optimization of Subscriber Data Update         8.4.0         9.0.0           2009-12         CT#46         CP-0910562         0131         Emergency Support in S6a         9.0.0           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-090793         0149         1         APN level APN-OI-Replacement         9.0.0         9.1.0           CP-090767         0152         2         RFSP alignment in 29.272         0.0         0.0         9.1.0           CP-090767         0155         2         Wildcard APN         0.0         0.0         0.0         9.0.0         9.1.0           CP-090767         0155         2         Wildcard APN         0.0         0.0         0.0         9.0.0         0.0         9.0.0         9.0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0         0.0 <td></td> <td></td> <td></td> <td></td> <td>1</td> <td></td> <td>-</td> <td></td>					1		-	
CP-090532         0144         -         RFSP coding           2009-09         CT#45         CP-090556         0122         3         Optimization of Subscriber Data Update         8.4.0         9.0.0           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           2009-12         CT#46         CP-091030         0149         1         APN level APN-OI-Replacement         9.0.0         9.1.0           CP-090767         0152         I         RFSP alignment in 29.272         CP-090767         0153         1         Notify Request for Emergency Attached UEs         CP-090767         0153         1         Notify Request for Emergency Attached UEs         CP-090767         0155         2         Wildcard APN           CP-090767         0155         2         Wildcard APN         CP-090767         0155         2         FODN for S6a NOR           CP-090767         0155         2         FODN for S6a NOR         CP-090767         0165         HPLMN-ODB AVP correction           CP-090767         0165         -         HPLMN-ODB AVP correction         CP-091030         0177         Clarification on Usage of Re-Synchronization-Info AVP         CP-091030         0177					1			
2009-09         CT#45         CP-090556         0122         3         Optimization of Subscriber Data Update         8.4.0         9.0.0           2009-12         CT#46         CP-090562         0131         Emergency Support in S6a         9.0.0           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           CP-090793         0149         1         APN level APN-OI-Replacement         9.0.0         9.1.0           CP-090767         0152         2         RFSP alignment in 29.272         9.0.0         9.0.0         9.1.0           CP-090767         0155         2         RFSP alignment in 29.272         9.0.0         9.0.0         9.1.0           CP-090767         0155         2         Wildcard APN         9.0.0         9.0.0         9.0.0           CP-090767         0155         2         Wildcard APN         9.0.0         9.0.0         9.0.0           CP-090767         0155         2         Wildcard APN         9.0.0         9.0.0           CP-090767         0163         2         FQDN for S6a NOR         9.0.0         9.0.0           CP-090767         0165         HPLMN-ODB AVP c					-		-	
CP-090562         0131         Emergency Support in S6a           2009-12         CT#46         CP-091030         0148         4         Clarification on Some Subscription Data List Handling in MME/SGSN         9.0.0         9.1.0           CP-090793         0149         1         APN level APN-OI-Replacement         9.0.0         9.1.0           CP-090767         0152         2         RFSP alignment in 29.272         9.0.0         9.1.0           CP-090767         0155         2         Wildcard APN         9.0.0         9.1.0           CP-090767         0165         1         Lifetime of Charging Characteristics after Change         9.0.0           CP-090767         0165         1         HUMN-ODB AVP correction         9.0.0         9.1.0           CP-091030         0171         1         Static PDN GW         9.0.0         9.0.0         9.0.0           CP-091030         0179         1         Clarification on the Number of PDP-Co	2009-09	CT#45			3	0	840	900
2009-12CT#46CP-09103001484Clarification on Some Subscription Data List Handling in MME/SGSN9.0.09.1.0CP-09079301491APN level APN-OI-Replacement	2000-00	01#40					0.7.0	5.5.0
MME/SGSNCP-09079301491APN level APN-OI-ReplacementCP-09080001502ICS-FlagCP-09076701522RFSP alignment in 29.272CP-09080101531Notify Request for Emergency Attached UEsCP-09076701552Wildcard APNCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09076701632FQDN for S6a NORCP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-09103001771Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001771Clarification on Usage of RPD-Contexts in the GPRS- Subscription-Data AVPCP-09103001791Clarification Service-Selection valuesCP-09103001872IMEL encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09103001911QoS attributesCP-090776702001Destination RealmCP-09077670202-Correction to fault recovery procedure and ME identity check	2009-12	CT#46			4	Clarification on Some Subscription Data List Handling in	9,0,0	9,1.0
CP-09079301491APN level APN-OI-ReplacementCP-09080001502ICS-FlagCP-09076701522RFSP alignment in 29.272CP-09076701552Wildcard APNCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09076701652Wildcard APNCP-09076701632FQDN for S6a NORCP-09076701632FQDN for S6a NORCP-09076701632FQDN for S6a NORCP-09103001711Static PDN GWCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001771Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration Service-Selection valuesCP-09103001872IMEI encodingCP-09103001891APN-Configuration for UE ReachabilityCP-09103001911QoS attributesCP-09077602001Destination RealmCP-09077602001Destination RealmCP-0907760202-Correction to fault recovery procedure and ME identity check					Ľ			
CP-09080001502ICS-FlagCP-09076701522RFSP alignment in 29.272CP-09080101531Notify Request for Emergency Attached UEsCP-09076701552Wildcard APNCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-09103001711Static PDN GWCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-09103001872IMEI encodingCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check			CP-090793	0149	1		1	
CP-09076701522RFSP alignment in 29.272CP-09080101531Notify Request for Emergency Attached UEsCP-09076701552Wildcard APNCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09103001592Correction on the UE initiated detach procedureCP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001771Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0910300185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09103001981APN-Configuration for UE ReachabilityCP-090778901961Subscription-Data clarification for UE ReachabilityCP-09077670202-Correction to fault recovery procedure and ME identity check						ICS-Flag	1	
CP-09076701552Wildcard APNCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09103001592Correction on the UE initiated detach procedureCP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-0910320167From GMLC-Address to GMLC-NumberCP-09103001771Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001771Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09103001911Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09076702001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check			CP-090767	0152	2	RFSP alignment in 29.272	]	
CP-09076701552Wildcard APNCP-09076701571Lifetime of Charging Characteristics after ChangeCP-09103001592Correction on the UE initiated detach procedureCP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-0910320167From GMLC-Address to GMLC-NumberCP-09103001771Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001771Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09103001911Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09076702001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check			CP-090801	0153	1		]	
CP-09103001592Correction on the UE initiated detach procedureCP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-0910320167From GMLC-Address to GMLC-NumberCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check			CP-090767	0155	2	Wildcard APN	]	
CP-09076701632FQDN for S6a NORCP-0907670165-HPLMN-ODB AVP correctionCP-0910320167From GMLC-Address to GMLC-NumberCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					_		_	
CP-0907670165-HPLMN-ODB AVP correctionCP-0910320167From GMLC-Address to GMLC-NumberCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					2	Correction on the UE initiated detach procedure	1	
CP-0910320167From GMLC-Address to GMLC-NumberCP-09103001711Static PDN GWCP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					2		1	
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CP-09103001771Clarification on Usage of Re-Synchronization-Info AVPCP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					<u> </u>		1	
CP-09103001791Clarification on the Number of PDP-Contexts in the GPRS- Subscription-Data AVPCP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					_		1	
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CP-0907670185-APN-Configuration-Profile usage in IDRCP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check			CP-091030	0179	1			
CP-09103001872IMEI encodingCP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check			CP-090767	0185	-		1	
CP-09103001891APN-Configuration Service-Selection valuesCP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					2		1	
CP-09103001911QoS attributesCP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check							1	
CP-09078901961Subscription-Data clarification for UE ReachabilityCP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check								
CP-09103001982Vendor Specific Application IDCP-09077602001Destination RealmCP-0907670202-Correction to fault recovery procedure and ME identity check					1		1	
CP-090776         0200         1         Destination Realm           CP-090767         0202         -         Correction to fault recovery procedure and ME identity check				0198	2	Vendor Specific Application ID		
			CP-090776	0200	1	Destination Realm	1	
			CP-090767	0202	-			
procedure						procedure	]	

		CP-090767	0204	-	Reference of 3GPP-Charging-Characteristics	]	
		CP-090767	0206		Reset procedure MME/SGSN behavior		
2010-03	CT#47	CP-100020	0181	2	Correction to Purge UE Detailed Behaviour	9.1.0	9.2.0
		CP-100020	0210		HPLMN ODB	-	
		CP-100048 CP-100020	0211	2	TADS support in S6a/S6d Cancellation-Type clarifications	-	
		CP-100020 CP-100020	0217 0219	1	IETF References update	-	
		CP-100020	0219	-	Static PDN GW	-	
		CP-100046	0222	1	Addition of V-GMLC address for S6a	-	
		CP-100040	0223	1	Handling of UE Reachability MME Parameter	-	
		CP-100020	0227	<u> </u>	Indication of PLMN ID of the selected PGW	-	
		CP-100040	0228	1	Context-Identifier in NOR	-	
		CP-100235	0230	5	EPS Subscriber State and Location Information Request		
		CP-100040	0233	1	Reset to Combined MME/SGSN		
		CP-100040	0234	1	NOR-Flags correction		
		CP-100040	0236	2	Indication of LCS Capabilities support over S6a/S6d		
		CP-100040	0238	1	Fix ambiguity on context id AVP		
2010-06	CT#48	CP-100264	0241	1	Service-Selection values	9.2.0	9.3.0
			0243	1	MIP6-Agent-Info	-	
			0245	2	Fix ambiguity on usage of the Supported-Features AVP Correction of Context-Identifier	-	
		CD 100277	0260	1	Dynamic information update after a Reset procedure	-	
		CP-100277	0247 0248	1	Notify command from unknown MME	-	
		CP-100416	0248	4	S6a Error Codes	-	
		CP-100410 CP-100279	0249	3	URRP for SGSN	-	
		CP-100265	0262	3	MME mapping between Diameter error codes and NAS Cause Code values	1	
2010-09	CT#49	CP-100456	0268	1	Restoration of the SGSN Number in the VLR	9.3.0	9.4.0
	-	CP-100457	0272	1	QoS-Subscribed	1	-
		CP-100457	0273		Trace-Reference AVP encoding		
		CP-100457	0284		Usage of MIP-Home-Agent-Host AVP		
		CP-100457	0285		Correction on HSS behaviour about IMEI		
	CP-100577	0275	2	NAS Cause Code values			
	CP-100463	0276	<u> </u>	LCS Privacy Features for MME	4		
	CP-100443	0281	2	Correction to Delete Subscriber Data for SGSN	-		
		CP-100443	0283	1	Unclear Cancel-Type Setting for Single Registration and Initial Attach		
2010-09	CT#49	CP-100465	0267	1	Addition of SIPTO permissions in PS subscription data	940	10.0.0
2010-09	CT#50	CP-100403	0207	1	HSS Error Returned due to ODB		10.0.0
2010 10	01//00	CP-100689	0316	1	Clarification on Access Restriction Data	10.0.0	10.1.0
		CP-100698	0297	1	Removal of Notify Messages during detach or last PDN connection		
		CP-100679	0303	1	deactivation via 3GPP access Usage of Served Party IP Address AVP inside the APN	-	
					Configuration		
		CP-100679	0305	1	Usage of APN-OI-Replacement AVP		
		CP-100679	0307			-	
				<u> </u>	AMBR clarification		
		CP-100679	0308		AMBR clarification Store HSS Identity in MME/SGSN after successful ULA		
		CP-100679 CP-100679	0308 0315	3	AMBR clarification Store HSS Identity in MME/SGSN after successful ULA Fix ambiguity in the LCS related indication	-	
		CP-100679 CP-100679 CP-100679	0308 0315 0327	2	AMBR clarification Store HSS Identity in MME/SGSN after successful ULA Fix ambiguity in the LCS related indication Unknown EPS Subscription	- - - -	
		CP-100679 CP-100679 CP-100679 CP-100688	0308 0315 0327 0325		AMBR clarification Store HSS Identity in MME/SGSN after successful ULA Fix ambiguity in the LCS related indication Unknown EPS Subscription Periodic TAU/RAU timer in HSS subscription	- - - -	
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707	0308 0315 0327 0325 0313	2	AMBR clarification Store HSS Identity in MME/SGSN after successful ULA Fix ambiguity in the LCS related indication Unknown EPS Subscription Periodic TAU/RAU timer in HSS subscription Correction of Restoration flag	-	
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707	0308 0315 0327 0325 0313 0319	2	AMBR clarification Store HSS Identity in MME/SGSN after successful ULA Fix ambiguity in the LCS related indication Unknown EPS Subscription Periodic TAU/RAU timer in HSS subscription Correction of Restoration flag Default APN and Wildcard APN	-	
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707	0308 0315 0327 0325 0313 0319 0322	2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP	-	
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699	0308 0315 0327 0325 0313 0319 0322 0323	2 1 1 1	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP		
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699	0308 0315 0327 0325 0313 0319 0322 0323 0291	2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC		
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100687	0308 0315 0327 0325 0313 0319 0322 0323	2 1 1 1 3	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP		
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100687 CP-100683	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289	2 1 1 1 3	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data         Addition of LIPA permission in Subscription Data	- - - - - - - - - - - - - - - - - - -	
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100687	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290	2 1 1 1 3	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100689 CP-100683 CP-100684	0308 0315 0327 0325 0313 0319 0322 0323 0323 0291 0290 0289 0288	2 1 1 3 4 1 1	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data         SIPTO Permission for Wildcard APN	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100687 CP-100683 CP-100684 CP-110087	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0288 0329	2 1 1 3 4 1 1 2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of LIPA permission in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100699 CP-100699 CP-100683 CP-100683 CP-100684 CP-110087 CP-110042	0308 0315 0327 0325 0313 0319 0322 0323 0291 0289 0289 0288 0329 0330	2 1 1 3 4 1 1 2 2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of LIPA permission in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100699 CP-100699 CP-100687 CP-100683 CP-100684 CP-110087 CP-110042 CP-110042	0308 0315 0327 0325 0313 0319 0322 0323 0291 0289 0289 0288 0288 0329 0330	2 1 1 3 4 1 2 2 3	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of LIPA permission in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location         Info Retrieval         Correction of error cause handling	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100699 CP-100699 CP-100687 CP-100684 CP-100684 CP-110087 CP-110042 CP-110042 CP-110042	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0288 0329 0330 0330	2 1 1 3 4 1 2 2 3	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of LIPA permission in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location         Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100699 CP-100699 CP-100687 CP-100684 CP-110087 CP-110042 CP-110042 CP-110042 CP-110042	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0289 0320 0330 0337 0339 0343	2 1 1 3 4 1 2 2 3 2 1	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of LIPA permission in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location         Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag         AMBR Correction	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100683 CP-100683 CP-100684 CP-110087 CP-110042	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0289 0329 0330 0337 0339 0343 0332 0334 0346	2 1 1 3 4 1 2 2 3 2 1 2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag         AMBR Correction         Correction on PGW PLMN ID         Relay Node Indicator         PDP Address correction	10.1.0	10.2.0
2011-03	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100683 CP-100683 CP-100684 CP-110042 CP-110051	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0289 0329 0329 0330 0337 0339 0343 0332 0334 0346 0351	2 1 1 3 4 1 2 2 3 2 1 2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of LIPA permission in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag         AMBR Correction         Correction on PGW PLMN ID         Relay Node Indicator         PDP Address correction         Ambiguity in IDR flags	10.1.0	10.2.0
		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100683 CP-100684 CP-110087 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110051 CP-110051 CP-110051	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0289 0329 0330 0330 0337 0339 0343 0332 0334 0346 0351 0353	2 1 1 3 4 1 2 2 3 2 1 2 2 1 1	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag         AMBR Correction         Correction on PGW PLMN ID         Relay Node Indicator         PDP Address correction         Ambiguity in IDR flags         Homogeneous Support for IMS Voice over PS AVP missing		10.2.0
	CT#51	CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100683 CP-100683 CP-100684 CP-110087 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110051 CP-110051 CP-110051 CP-110051 CP-110051	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0288 0329 0330 0330 0333 0337 0339 0343 0332 0334 0334 0334 0335 0351 0353	2 1 1 1 3 4 1 1 2 2 3 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 2 2 2 2 2 2 2 2 2 2 2	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag         AMBR Correction         Correction on PGW PLMN ID         Relay Node Indicator         PDP Address correction         Ambiguity in IDR flags         Homogeneous Support for IMS Voice over PS AVP missing		10.2.0
2011-03		CP-100679 CP-100679 CP-100679 CP-100688 CP-100707 CP-100707 CP-100707 CP-100699 CP-100699 CP-100683 CP-100684 CP-110087 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110042 CP-110051 CP-110051 CP-110051	0308 0315 0327 0325 0313 0319 0322 0323 0291 0290 0289 0289 0329 0330 0330 0337 0339 0343 0332 0334 0346 0351 0353	2 1 1 3 4 1 2 2 3 2 1 2 2 1 1	AMBR clarification         Store HSS Identity in MME/SGSN after successful ULA         Fix ambiguity in the LCS related indication         Unknown EPS Subscription         Periodic TAU/RAU timer in HSS subscription         Correction of Restoration flag         Default APN and Wildcard APN         Usage of PGW Allocation Type AVP         Usage of STN-SR AVP         Enhanced SRVCC         Addition of MPS Priority in Subscription Data         SIPTO Permission for Wildcard APN         Minimization of Drive Tests (MDT)         Feature Flags for UE Reachability Notification and State/Location Info Retrieval         Correction of error cause handling         Setting of M bit AVP flag         AMBR Correction         Correction on PGW PLMN ID         Relay Node Indicator         PDP Address correction         Ambiguity in IDR flags         Homogeneous Support for IMS Voice over PS AVP missing		

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2011-09	CT#53	CP-110562	0372	1	Active-APN AVP definition	10.3.0 10.4.0
		CP-110562	0374		Context-Identifier when interworking with GTPv1	
		CP-110562	0380	1	APN-AMBR for GPRS	
		CP-110565	0377		Correction on DIAMETER_AUTHORIZATION_REJECTED	
		CP-110699	0381		Correction of implementation error in TS 29.272, CR 324	

# History

Document history						
V10.2.0	May 2011	Publication				
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