

# ETSI TS 129 336 V13.2.0 (2016-03)



**Universal Mobile Telecommunications System (UMTS);  
LTE;  
Home Subscriber Server (HSS) diameter interfaces for  
interworking with packet data networks and applications  
(3GPP TS 29.336 version 13.2.0 Release 13)**



---

**Reference**RTS/TSGC-0429336vd20

---

**Keywords**LTE, UMTS

---

**ETSI**

---

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

---

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

Siret N° 348 623 562 00017 - NAF 742 C  
Association à but non lucratif enregistrée à la  
Sous-Préfecture de Grasse (06) N° 7803/88

---

**Important notice**

---

The present document can be downloaded from:

<http://www.etsi.org/standards-search>

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the only prevailing document is the print of the Portable Document Format (PDF) version kept on a specific network drive within ETSI Secretariat.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at

<http://portal.etsi.org/tb/status/status.asp>

If you find errors in the present document, please send your comment to one of the following services:

<https://portal.etsi.org/People/CommiteeSupportStaff.aspx>

---

**Copyright Notification**

---

No part may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm except as authorized by written permission of ETSI.

The content of the PDF version shall not be modified without the written authorization of ETSI.

The copyright and the foregoing restriction extend to reproduction in all media.

© European Telecommunications Standards Institute 2016.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are Trade Marks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are Trade Marks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

**GSM®** and the GSM logo are Trade Marks registered and owned by the GSM Association.

---

## Intellectual Property Rights

IPRs essential or potentially essential to the present document may have been declared to ETSI. The information pertaining to these essential IPRs, if any, is publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (<https://ipr.etsi.org>).

Pursuant to the ETSI IPR Policy, no investigation, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

---

## Foreword

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

The present document may refer to technical specifications or reports using their 3GPP identities, UMTS identities or GSM identities. These should be interpreted as being references to the corresponding ETSI deliverables.

The cross reference between GSM, UMTS, 3GPP and ETSI identities can be found under <http://webapp.etsi.org/key/queryform.asp>.

---

## Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the [ETSI Drafting Rules](#) (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

# Contents

Intellectual Property Rights .....	2
Foreword.....	2
Modal verbs terminology.....	2
Foreword.....	6
1 Scope .....	7
2 References .....	7
3 Definitions, symbols and abbreviations .....	8
3.1 Abbreviations .....	8
4 General Description.....	8
4.1 Introduction .....	8
5 Diameter-based S6m/S6n Interface.....	9
5.1 Introduction .....	9
5.2 Procedure Descriptions.....	10
5.2.1 Subscriber Information Retrieval.....	10
5.2.1.1 General .....	10
5.2.1.2 Detailed Behaviour of the HSS .....	11
5.2.1.3 Detailed Behaviour of the MTC-IWF .....	12
5.2.1.4 Detailed Behaviour of the MTC-AAA.....	12
6 Protocol Specification .....	12
6.1 Introduction .....	12
6.1.1 Use of Diameter Base Protocol.....	12
6.1.2 Securing Diameter Messages.....	12
6.1.3 Accounting Functionality .....	13
6.1.4 Use of Sessions .....	13
6.1.5 Transport Protocol .....	13
6.1.6 Routing Considerations.....	13
6.1.7 Advertising Application Support .....	13
6.1.8 Diameter Application Identifier.....	14
6.1.9 Use of the Supported-Features AVP .....	14
6.1.10 User Identity to HSS resolution .....	14
6.2 Commands.....	14
6.2.1 Introduction.....	14
6.2.2 Command-Code values.....	14
6.2.3 Subscriber-Information-Request (SIR) Command .....	15
6.2.4 Subscriber-Information-Answer (SIA) Command.....	15
6.3 Result-Code AVP and Experimental-Result AVP Values .....	16
6.3.1 General.....	16
6.3.2 Success.....	16
6.3.3 Permanent Failures .....	16
6.3.3.1 DIAMETER_ERROR_USER_UNKNOWN (5001) .....	16
6.3.3.2 DIAMETER_ERROR_UNAUTHORIZED_REQUESTING_ENTITY (5510).....	16
6.3.3.3 DIAMETER_ERROR_UNAUTHORIZED_SERVICE (5511) .....	16
6.4 AVPs .....	16
6.4.1 General.....	16
6.4.2 User-Identifier.....	17
6.4.3 Service-ID.....	18
6.4.4 SCS-Identity .....	18
6.4.5 Service-Parameters .....	18
6.4.6 T4-Parameters.....	18
6.4.7 Service-Data .....	18
6.4.8 T4-Data.....	19

6.4.9	HSS-Cause .....	19
6.4.10	SIR-Flags .....	19
6.4.11	External-Identifier .....	20
6.4.12	Serving-Node .....	20
6.4.13	Additional-Serving-Node .....	21
6.4.14	IP-SM-GW-Number .....	21
6.4.15	IP-SM-GW-Name .....	21
6.4.16	OC-Supported-Features .....	21
6.4.17	OC-OLR .....	21
6.4.18	IP-SM-GW-Realm .....	21
7	Diameter-based S6t Interface .....	22
7.1	Introduction .....	22
7.2	Procedure Descriptions .....	22
7.2.1	Configuration Information on S6t .....	22
7.2.1.1	General .....	22
7.2.1.2	Detailed Behaviour of the HSS .....	23
7.2.1.3	Detailed Behaviour of the SCEF .....	25
7.2.2	Reporting on S6t .....	25
7.2.2.1	General .....	25
7.2.2.2	Detailed Behaviour of the HSS .....	26
7.2.2.3	Detailed Behaviour of the SCEF .....	26
8	Protocol Specification for S6t .....	26
8.1	Introduction .....	26
8.1.1	Use of Diameter Base Protocol .....	26
8.1.2	Securing Diameter Messages .....	26
8.1.3	Accounting Functionality .....	26
8.1.4	Use of Sessions .....	26
8.1.5	Transport Protocol .....	27
8.1.6	Routing Considerations .....	27
8.1.7	Advertising Application Support .....	27
8.1.8	Diameter Application Identifier .....	27
8.1.9	Use of the Supported-Features AVP .....	27
8.1.10	User Identity to HSS resolution .....	28
8.2	Commands .....	28
8.2.1	Introduction .....	28
8.2.2	Command-Code values .....	28
8.2.3	Configuration Information Request (CIR) Command .....	28
8.2.4	Configuration-Information-Answer (CIA) Command .....	29
8.2.5	Reporting-Information-Request (RIR) Command .....	29
8.2.6	Reporting-Information-Answer (RIA) Command .....	30
8.3	Result-Code AVP and Experimental-Result AVP Values .....	30
8.3.1	General .....	30
8.3.2	Success .....	30
8.3.3	Permanent Failures .....	30
8.3.3.1	DIAMETER_ERROR_USER_UNKNOWN (5001) .....	30
8.3.3.2	DIAMETER_ERROR_UNAUTHORIZED_REQUESTING_ENTITY (5510) .....	30
8.3.3.3	DIAMETER_ERROR_UNAUTHORIZED_SERVICE (5511) .....	30
8.3.3.4	DIAMETER_ERROR_REQUESTED_RANGE_IS_NOT_ALLOWED (5512) .....	30
8.3.3.5	DIAMETER_ERROR_CONFIGURATION_EVENT_STORAGE_NOT_SUCCESSFUL (5513) .....	31
8.3.3.6	DIAMETER_ERROR_CONFIGURATION_EVENT_NON_EXISTANT (5514) .....	31
8.4	AVPs .....	31
8.4.1	General .....	31
8.4.2	Monitoring-Event-Configuration .....	33
8.4.3	Monitoring-Event-Report .....	34
8.4.4	SCEF-Reference-ID .....	34
8.4.5	SCEF- ID .....	34
8.4.6	SCEF-Reference-ID-for-Deletion .....	34
8.4.7	Monitoring-Type .....	34
8.4.8	Maximum-Number-of-Reports .....	35

8.4.9	UE-Reachability-Configuration .....	35
8.4.10	Monitoring-Duration .....	35
8.4.11	Maximum-Detection-Time .....	35
8.4.12	Reachability-Type .....	35
8.4.13	Maximum-Latency .....	35
8.4.14	Maximum-Response-Time .....	36
8.4.15	Location-Information-Configuration .....	36
8.4.16	MONTE-Location-Type .....	36
8.4.17	Accuracy .....	36
8.4.18	Association-Type .....	36
8.4.19	Roaming-Information .....	36
8.4.20	Reachability-Information .....	36
8.4.21	EPS-Location-Information .....	37
8.4.22	IMEI-Change .....	37
8.4.23	Feature-List AVP .....	37
8.4.23.1	Feature-List AVP for the S6t application .....	37
8.4.24	Monitoring-Event-Config-Status .....	38
8.4.25	AESE-Communication-Pattern .....	38
8.4.26	Communication-Pattern-Set .....	39
8.4.27	Periodic-Communication-Indicator .....	39
8.4.28	Communication-duration-time .....	39
8.4.29	Periodic-time .....	39
8.4.30	Scheduled-communication-time .....	39
8.4.31	Stationary indication .....	40
8.4.32	AESE-Communication-Pattern-Config-Status .....	40
8.4.33	AESE-Error-Report .....	40
8.4.34	MME-Location-Information .....	40
8.4.35	SGSN-Location-Information .....	41
8.4.36	User-Identifier .....	41
8.4.37	Service-Result .....	41
8.4.38	Service-Result-Code .....	42
8.4.39	CIR-Flags .....	42
8.4.40	Supported-Services .....	42
8.4.41	Supported-Monitoring-Events .....	42
8.4.42	Validity-Time .....	43
<b>Annex A (normative): Diameter overload control mechanism .....</b>		<b>44</b>
A.1	General .....	44
A.2	S6m interface .....	44
A.2.1	General .....	44
A.2.2	HSS behaviour .....	44
A.2.3	MTC-IWF behaviour .....	44
A.3	S6t interface .....	44
A.3.1	General .....	44
A.3.2	HSS behaviour .....	45
A.3.3	SCEF behaviour .....	45
<b>Annex B (Informative): Diameter overload control node behaviour .....</b>		<b>46</b>
B.1	Introduction .....	46
B.2	Message prioritisation over S6m .....	46
B.3	Message prioritisation over S6t .....	46
<b>Annex C (informative): Change history .....</b>		<b>47</b>
History .....		48

---

# Foreword

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

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

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

---

# 1 Scope

The present document describes the Diameter-based interfaces between the HSS and other network elements involved in the architecture for interworking with packet data networks and applications, such as Machine-Type Communications (MTC).

In particular, this document specifies the S6m interface between the Home Subscriber Server (HSS) and the MTC Interworking Function (MTC-IWF), the S6n interface between the HSS and the MTC-AAA and the S6t interface between the HSS and the Service Capability Exposure Function (SCEF). The procedures over those interfaces are defined in 3GPP TS 23.682 [2].

---

# 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 23.682: "Architecture enhancements to facilitate communications with packet data networks and applications".
- [3] IETF RFC 3588: "Diameter Base Protocol".
- [4] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security".
- [5] IETF RFC 4960: "Stream Control Transport Protocol".
- [6] 3GPP TS 29.228: "IP multimedia (IM) Subsystem Cx Interface; Signalling flows and Message Elements".
- [7] 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol; protocol details".
- [8] 3GPP TS 29.173: "Diameter-based SLh interface for Control Plane LCS".
- [9] IETF RFC 5234: "Augmented BNF for Syntax Specifications: ABNF".
- [10] 3GPP TS 29.329: "Sh Interface based on the Diameter protocol".
- [11] 3GPP TS 23.003: "Numbering, addressing and identification".
- [12] 3GPP TS 29.338: "Diameter based protocols to support SMS capable MMEs".
- [13] 3GPP TS 29.368: "Tsp interface protocol between the MTC Interworking Function (MTC-IWF) and Service Capability Server (SCS)".
- [14] 3GPP TS 29.272: "Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".
- [15] IETF RFC 7683: "Diameter Overload Indication Conveyance".
- [16] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging applications".