

# ETSI TS 129 338 V14.3.0 (2017-10)



TECHNICAL SPECIFICATION

**Universal Mobile Telecommunications System (UMTS);  
LTE;  
Diameter based protocols to support Short Message Service  
(SMS) capable Mobile Management Entities (MMEs)  
(3GPP TS 29.338 version 14.3.0 Release 14)**



---

**Reference**RTS/TSGC-0429338ve30

---

**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

<https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx>

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.

© ETSI 2017.

All rights reserved.

**DECT™**, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members.

**3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners.

**oneM2M** logo is protected for the benefit of its Members.

**GSM®** and the GSM logo are trademarks 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 Definitions .....	8
3.2 Abbreviations .....	8
4 General .....	8
4.1 Introduction .....	8
4.2 Use of Diameter Base protocol.....	8
4.3 Securing Diameter messages .....	9
4.4 Accounting functionality .....	9
4.5 Use of sessions .....	9
4.6 Transport protocol .....	9
4.7 Advertising application support .....	9
4.8 Diameter Application Identifier .....	10
4.9 Use of the Supported-Features AVP .....	10
5 Diameter based S6c interface between HSS and central SMS functions .....	10
5.1 Introduction .....	10
5.2 Procedures description .....	10
5.2.1 Send Routing Info for SM procedure.....	10
5.2.1.1 General .....	10
5.2.1.2 Detailed behaviour of the SMS-GMSC.....	14
5.2.1.3 Detailed behaviour of the HSS .....	14
5.2.1.4 Detailed behaviour of the SMS Router .....	15
5.2.2 Alert Service Centre procedure.....	15
5.2.2.1 General .....	15
5.2.2.2 Detailed behaviour of the HSS .....	16
5.2.2.3 Detailed behaviour of the SMS-IW MSC .....	17
5.2.3 Report SM Delivery Status procedure .....	17
5.2.3.1 General .....	17
5.2.3.2 Detailed behaviour of the SMS-GMSC.....	18
5.2.3.3 Detailed behaviour of IP-SM-GW .....	19
5.2.3.4 Detailed behaviour of the HSS .....	19
5.3 Protocol specification .....	19
5.3.1 Routing considerations .....	19
5.3.1.1 Requests from the SMS-GMSC or the SMS router.....	19
5.3.1.1.1 Introduction .....	19
5.3.1.1.2 Routing from the originating PLMN .....	20
5.3.1.1.3 Routing in the HPLMN .....	20
5.3.1.2 Requests from the HSS .....	21
5.3.2 Commands .....	21
5.3.2.1 Introduction.....	21
5.3.2.2 Command-Code values .....	21
5.3.2.3 Send-Routing-Info-for-SM-Request (SRR) Command.....	22
5.3.2.4 Send-Routing-info-for-SM-Answer (SRA) Command .....	22
5.3.2.5 Alert-Service-Centre-Request (ALR) Command .....	23
5.3.2.6 Alert-Service-Centre-Answer (ALA) Command .....	23
5.3.2.7 Report-SM-Delivery-Status-Request (RDR) Command .....	23
5.3.2.8 Report-SM-Delivery-Status-Answer (RDA) Command .....	24
5.3.3 AVPs.....	24

5.3.3.1	General .....	24
5.3.3.2	SM-RP-MTI .....	26
5.3.3.3	SM-RP-SMEA .....	26
5.3.3.4	SRR-Flags .....	27
5.3.3.5	SM-Delivery-Not-Intended .....	27
5.3.3.6	Serving-Node .....	27
5.3.3.7	Additional-Serving-Node .....	28
5.3.3.8	MWD-Status .....	28
5.3.3.9	MME-Absent-User-Diagnostic-SM .....	29
5.3.3.10	MSC-Absent-User-Diagnostic-SM .....	29
5.3.3.11	SGSN-Absent-Subscriber-Diagnostic-SM .....	29
5.3.3.12	Feature-List-ID AVP .....	29
5.3.3.13	Feature-List AVP .....	29
5.3.3.14	SM-Delivery-Outcome .....	29
5.3.3.15	MME-SM-Delivery-Outcome .....	30
5.3.3.16	MSC-SM-Delivery-Outcome .....	30
5.3.3.17	SGSN-SM-Delivery-Outcome .....	30
5.3.3.18	IP-SM-GW-SM-Delivery-Outcome .....	30
5.3.3.19	SM-Delivery-Cause .....	30
5.3.3.20	Absent-User-Diagnostic-SM .....	31
5.3.3.21	RDR-Flags .....	31
5.3.3.22	Maximum-UE-Availability-Time .....	31
5.3.3.23	SMS-GMSC-Alert-Event .....	31
5.3.3.24	DRMP .....	31
5.4	User identity to HSS resolution .....	31
6	Diameter based SGd/Gdd interfaces between MME/SGSN and central SMS functions .....	32
6.1	Introduction .....	32
6.2	Procedures description .....	32
6.2.1	MO Forward Short Message procedure .....	32
6.2.1.1	General .....	32
6.2.1.2	Detailed behaviour of the MME, the SGSN and the IP-SM-GW .....	34
6.2.1.3	Detailed behaviour of the SMS-IWMSC .....	34
6.2.2	MT Forward Short Message procedure .....	35
6.2.2.1	General .....	35
6.2.2.2	Detailed behaviour of the MME and the SGSN .....	36
6.2.2.3	Detailed behaviour of the SMS-GMSC .....	37
6.2.3	Alert Service Centre procedure .....	38
6.2.3.1	General .....	38
6.2.3.2	Detailed behaviour of the MME and the SGSN .....	39
6.2.3.3	Detailed behaviour of the SMS-GMSC .....	40
6.2.3.4	Detailed behaviour of the SMS-Router .....	40
6.3	Protocol specification .....	40
6.3.1	Routing considerations .....	40
6.3.1.1	Routing for MO Forward SM messages: .....	40
6.3.1.2	Routing for MT Forward SM messages: .....	41
6.3.2	Commands .....	41
6.3.2.1	Introduction .....	41
6.3.2.2	Command-Code values .....	41
6.3.2.3	MO-Forward-Short-Message-Request (OFR) Command .....	42
6.3.2.4	MO-Forward-Short-Message-Answer (OFA) Command .....	42
6.3.2.5	MT-Forward-Short-Message-Request (TFR) Command .....	43
6.3.2.6	MT-Forward-Short-Message-Answer (TFA) Command .....	43
6.3.3	AVPs .....	44
6.3.3.1	General .....	44
6.3.3.2	SC-Address .....	45
6.3.3.3	SM-RP-UI .....	45
6.3.3.4	TFR-Flags .....	45
6.3.3.5	SM-Delivery-Failure-Cause .....	45
6.3.3.6	SM-Enumerated-Delivery-Failure-Cause .....	46
6.3.3.7	SM-Diagnostic-Info .....	46
6.3.3.8	Feature-List-ID AVP .....	46

6.3.3.9	Feature-List AVP .....	46
6.3.3.10	SM-Delivery-Timer.....	46
6.3.3.11	SM-Delivery-Start-Time .....	46
6.3.3.12	OFR-Flags.....	46
6.3.3.13	SMSMI-Correlation-ID.....	47
6.3.3.14	HSS-ID.....	47
6.3.3.15	Originating-SIP-URI.....	47
6.3.3.16	Destination-SIP-URI.....	47
6.3.3.17	Maximum-Retransmission-Time .....	47
6.3.3.18	Requested-Retransmission-Time .....	47
6.3.3.19	SMS-GMSC-Address.....	47
6.3.3.20	DRMP .....	48
7	Result Codes and Experimental-Result values.....	48
7.1	General .....	48
7.2	Success .....	48
7.3	Permanent Failures .....	48
7.3.1	General.....	48
7.3.2	DIAMETER_ERROR_USER_UNKNOWN (5001).....	48
7.3.3	DIAMETER_ERROR_ABSENT_USER (5550) .....	48
7.3.4	DIAMETER_ERROR_USER_BUSY_FOR_MT_SMS (5551).....	48
7.3.5	DIAMETER_ERROR_FACILITY_NOT_SUPPORTED (5552).....	48
7.3.6	DIAMETER_ERROR_ILLEGAL_USER (5553).....	49
7.3.7	DIAMETER_ERROR_ILLEGAL_EQUIPMENT (5554) .....	49
7.3.8	DIAMETER_ERROR_SM_DELIVERY_FAILURE (5555).....	49
7.3.9	DIAMETER_ERROR_SERVICE_NOT_SUBSCRIBED (5556).....	49
7.3.10	DIAMETER_ERROR_SERVICE_BARRED (5557) .....	49
7.3.11	DIAMETER_ERROR_MWD_LIST_FULL (5558) .....	49
7.4	Transient Failures.....	49
7.4.1	General.....	49
<b>Annex A (normative):</b>	<b>Diameter message priority mechanism.....</b>	<b>50</b>
A.1	General .....	50
A.2	S6c, SGd, Gdd interfaces .....	50
<b>Annex B (informative):</b>	<b>Change history .....</b>	<b>51</b>
History .....		52

---

# 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 defines the Diameter-based interfaces specific to SMS when they are used in conjunction with the "SMS in MME" architecture specified in 3GPP TS 23.272 [2] or for SGSN supporting EPS interfaces. It comprises:

- the Diameter application for the S6c interface between the HSS and the central SMS functions (SMS-GMSC, SMS Router) ;
- the Diameter application
  - for the SGd interface between the MME, the SMS-IW MSC, the SMS-GMSC and the SMS Router.
  - for the Gdd interface between the SGSN, the SMS-IW MSC, the SMS-GMSC and the SMS Router.

---

# 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 23.272: "Circuit Switched (CS) fallback in Evolved Packet System (EPS); Stage 2".
- [3] 3GPP TS 23.040: "Technical realization of the Short Message Service (SMS)".
- [4] 3GPP TS 29.272: "Evolved Packet System (EPS); Mobility Management Entity (MME) and Serving GPRS Support Node (SGSN) related interfaces based on Diameter protocol".
- [5] 3GPP TS 29.229: "Cx and Dx interfaces based on the Diameter protocol; Protocol details".
- [6] IETF RFC 2234: "Augmented BNF for Syntax Specifications: ABNF".
- [7] Void.
- [8] IETF RFC 5516: "Diameter Command Code Registration for the Third Generation Partnership Project (3GPP) Evolved Packet System (EPS)".
- [9] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".
- [10] 3GPP TS 29.173: "Location Services (LCS); Diameter-based SLh interface for Control Plane LCS".
- [11] 3GPP TS 33.210: "3G security; Network Domain Security (NDS); IP network layer security".
- [12] IETF RFC 4960: "Stream Control Transport Protocol".
- [13] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".
- [14] 3GPP TS 29.329: "Sh Interface based on the Diameter protocol; Protocol details".
- [15] 3GPP TS 29.336: "Home Subscriber Server (HSS) diameter interfaces for interworking with packet data networks and applications".
- [16] 3GPP TS 23.003: "Numbering, addressing and identification".