

# ETSI TS 132 260 V8.19.0 (2016-01)



**Digital cellular telecommunications system (Phase 2+);  
Universal Mobile Telecommunications System (UMTS);  
LTE;  
Telecommunication management;  
Charging management;  
IP Multimedia Subsystem (IMS) charging  
(3GPP TS 32.260 version 8.19.0 Release 8)**



---

Reference

RTS/TSGS-0532260v8j0

---

Keywords

GSM,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 .....	9
3.1 Definitions .....	9
3.2 Symbols.....	10
3.3 Abbreviations .....	10
4 Architecture Considerations .....	11
4.1 High level IP Multimedia Subsystem (IMS) architecture .....	11
4.2 IMS offline charging architecture.....	12
4.3 IMS online charging architecture .....	13
5 Charging Principles .....	14
5.1 IMS Charging Principles .....	14
5.1.1 IMS Charging applicability .....	14
5.1.2 IMS Charging Correlation .....	14
5.1.2.1 Basic Principles for IMS Domain Correlation .....	14
5.1.2.2 IMS Charging Identifier (ICID).....	14
5.1.2.3 Access network charging identifier.....	15
5.1.2.4 Inter Operator Identifier (IOI).....	15
5.1.2.5 Void.....	15
5.1.3 SDP handling .....	15
5.1.4 Trigger conditions.....	15
5.2 IMS Offline Charging Principles.....	16
5.2.1 Basic Principles .....	16
5.2.2 Diameter message flows and types .....	18
5.2.2.1 Message Flows - successful cases and scenarios .....	18
5.2.2.1.1 Session Establishment - Mobile Origination .....	18
5.2.2.1.2 Session Establishment - Mobile Termination.....	19
5.2.2.1.3 Mid-Session Procedures .....	20
5.2.2.1.4 Session Release - Mobile Initiated .....	21
5.2.2.1.5 Session-Unrelated Procedures .....	22
5.2.2.1.6 Session Establishment - PSTN Initiated.....	23
5.2.2.1.7 Session Establishment - IMS Initiated.....	24
5.2.2.1.8 Session Release - PSTN Initiated .....	25
5.2.2.1.9 Session Release - IMS Initiated.....	26
5.2.2.1.10 Multi-Party Call.....	27
5.2.2.1.11 AS Related Procedures - AS Acting as a Redirect Server .....	29
5.2.2.1.12 AS Related Procedures - AS Acting as a Voice Mail Server.....	30
5.2.2.1.13 AS Related Procedures - AS Acting as a SCC AS .....	31
5.2.2.1.14 Initiating Alternate Charged Party Call .....	51
5.2.2.1.15 Session Establishment via IBCF to S-CSCF - IMS Initiated.....	52
5.2.2.1.16 AS Related Procedures - AS Acting as a MMTel AS. ....	53
5.2.2.2 Message Flows - Error Cases and Scenarios.....	53
5.2.2.2.1 Session Related SIP Procedures- Reception of SIP error messages .....	53
5.2.2.2.2 Session Related SIP Procedures - SIP session failure .....	53
5.2.2.2.3 Session Unrelated SIP procedures .....	53
5.2.2.2.4 CDF Connection Failure.....	53
5.2.2.2.5 No Reply from CDF .....	53
5.2.2.2.6 Duplicate Detection .....	54

5.2.2.2.7	CDF Detected Failure .....	54
5.2.3	CDR generation .....	54
5.2.4	GTP" record transfer flows .....	54
5.2.5	Bi CDR file transfer .....	54
5.3	IMS Online Charging Scenarios.....	54
5.3.1	Basic Principles .....	54
5.3.2	Diameter Message Flows and Types .....	56
5.3.2.1	Immediate Event Charging (IEC) .....	56
5.3.2.1.1	Message Flows - Successful Cases and Scenarios.....	56
5.3.2.1.2	Message Flows - Error Cases and Scenarios .....	57
5.3.2.2	Event Charging with Unit Reservation (ECUR) and Session Charging with Unit Reservation (SCUR) .....	58
5.3.2.2.1	Message Flows - Successful Cases and Scenarios.....	58
5.3.2.2.1.2	Expiration of Reservation Validity .....	58
5.3.2.2.2	Message Flows - Error Cases and Scenarios .....	65
5.3.2.3	IMS Service Termination by OCS .....	65
5.3.2.3.1	Triggers on Ro interface which imply the termination of the IMS service .....	65
5.3.2.3.2	Indication to the UE of the reason for IMS service release .....	66
6	Definition of charging information .....	67
6.1	Data description for IMS offline charging .....	67
6.1.1	Rf Message contents .....	67
6.1.1.1	Charging Data-Request Message.....	67
6.1.1.2	Charging Data Response Message.....	68
6.1.2	GTP" message contents .....	68
6.1.3	CDR Description on the Bi Interface.....	68
6.1.3.1	CDR Field Types .....	68
6.1.3.2	CDR Triggers.....	69
6.1.3.2.1	Session Related CDRs.....	69
6.1.3.2.2	Session Unrelated CDRs .....	69
6.1.3.3	S-CSCF CDR Content.....	70
6.1.3.4	P-CSCF CDR Content.....	73
6.1.3.5	I-CSCF CDR Content .....	76
6.1.3.6	MRFC CDR Content.....	77
6.1.3.7	MGCF CDR Content.....	80
6.1.3.8	BGCF CDR Content .....	82
6.1.3.9	SIP AS CDR Content.....	84
6.1.3.10	IBCF CDR Content .....	87
6.2	Data description for IMS online charging .....	89
6.2.1	Ro message contents .....	89
6.2.1.1	Debit and Reserve Units Request Message .....	90
6.2.1.2	Debit and Reserve Units Response Message.....	91
6.3	IMS Charging Specific Parameters .....	92
6.3.1	Definition of IMS charging information.....	92
6.3.1.1	IMS charging information assignment for Service Information .....	92
6.3.1.2	Definition of the IMS Information.....	92
6.3.2	Detailed Message Format for offline charging .....	94
6.3.3	Detailed Message Format for online charging .....	96
6.3.4	Formal IMS charging parameter description .....	98
6.3.4.1	IMS charging information for CDRs .....	98
6.3.4.2	IMS charging information for charging events .....	98

<b>Annex A (informative):</b>	<b>Bibliography.....</b>	<b>99</b>
-------------------------------	--------------------------	-----------

<b>Annex B (informative):</b>	<b>Message Flows for Service Termination by OCS.....</b>	<b>100</b>
-------------------------------	--	------------

B.1	Scenario 1 - Session Related (SCUR): Service Termination on reception of an initial SIP INVITE Request.....	100
-----	---	-----

B.2	Scenario 2 - Session Related (SCUR): Service Termination triggered after an early SIP Dialog is established.....	101
-----	--	-----

B.3	Scenario 3 - Session Related (SCUR): Service Termination triggered after a confirmed SIP Dialog is established.....	104
B.4	Scenario 4 - Session Unrelated (ECUR): Service Termination on reception of an initial SIP non-INVITE Request.....	107
B.5	Scenario 5 - Session Unrelated (IEC): Service Termination on reception of an initial SIP non-INVITE Request.....	108
<b>Annex C (informative):</b>	<b>Change history .....</b>	<b>109</b>
	History .....	110

---

# 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 is part of a series of documents that specify charging functionality and charging management in GSM/UMTS networks. The GSM/UMTS core network charging architecture and principles are specified in document TS 32.240 [1], which provides an umbrella for other charging management documents that specify:

- the content of the CDRs per domain and subsystem (offline charging),
- the content of real-time charging events per domain / subsystem (online charging);
- the functionality of online and offline charging for those domains and subsystems;
- the interfaces that are used in the charging framework to transfer the charging information (i.e. CDRs or charging events)

The complete document structure for these TSs is defined in TS 32.240 [1].

The present document specifies the Offline and Online Charging description for the IP Multimedia Subsystem (IMS), based on the functional descriptions of the IMS in 3GPP TS 23.228 [200]. This charging description includes the offline and online charging architecture and scenarios specific to IMS, as well as the mapping of common 3GPP charging architecture specified in TS 32.240 [1] onto IMS. It further specifies the structure and content of the CDRs for offline charging, and the charging events for online charging. The present document is related to other 3GPP charging TSs as follows:

- The common 3GPP charging architecture is specified in TS 32.240 [1];
- The parameters, abstract syntax and encoding rules for these CDR types are specified in TS 32.298 [51].
- A transaction based mechanism for the transfer of CDRs within the network is specified in TS 32.295 [54].
- The file based mechanism used to transfer the CDRs from the network to the operator's billing domain (e.g. the billing system or a mediation device) is specified in TS 32.297 [52].
- The 3GPP Diameter application that is used for IMS offline and online charging is specified in TS 32.299 [50].

All terms, definitions and abbreviations used in the present document, that are common across 3GPP TSs, are defined in the 3GPP Vocabulary, TR 21.905 [100]. Those that are common across charging management in GSM/UMTS domains, services or subsystems are provided in the umbrella document TS 32.240 [1] and are copied into clause 3 of the present document for ease of reading. Finally, those items that are specific to the present document are defined exclusively in the present document.

Furthermore, requirements that govern the charging work are specified in 3GPP TS 22.115 [102].

---

# 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 TS 32.240: "Telecommunication management; Charging management; Charging architecture and principles".

[2] 3GPP TS 32.250: "Telecommunication management; Charging management; Circuit Switched (CS) domain charging".