ETSI TS 129 311 V8.3.0 (2013-07)

Universal Mobile Telecommunications System (UMTS);
LTE;
Service Level Interworking (SLI) for messaging services
(3GPP TS 29.311 version 8.3.0 Release 8)

Reference
RTS/TSGC-0329311v830

Keywords
LTE,UMTS

ETSI

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Sous-Préfecture de Grasse (06) N° 7803/88

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Foreword

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

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Contents

Foreword

This Technical Specification has been produced by the 3rd 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 specifies the protocol details of service level interworking between Instant Message as specified in OMA-TS-SIMPLE_IM [4] using the 3GPP IP Multimedia CN subsystem and the Short Message Service over both legacy CS/PS network as specified in the 3GPP TS 23.040 [2] and a generic IP Conectivity Access Network (IP-CAN) as specified in the 3GPP TS 24.341 [5]. These include:

- Procedures to implement service level interworking between IM and SM.
- Enhancement of the IP-SM-GW as an Application Server to support service selection, authorization and mapping between IM and SM protocols.
- Interaction between service level interworking and transport layer interworking.

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 23.040: "Technical realization of the Short Message Service (SMS) Point to Point (PP)".

[3] 3GPP TS 24.229: "Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[4] OMA: "Instant Messaging using SIMPLE", OMA-TS-SIMPLE_IM-V1_0-20080903-C, http://www.openmobilealliance.org/ftp/Public_documents/MWG/IM/Permanent_documents/OMA-TS-SIMPLE_IM-V1_0-20080903-C.zip.

[5] 3GPP TS 24.341: "Support of SMS over IP networks; Stage 3".

[6] 3GPP TS 23.204: "Support of Short Message Service (SMS) over generic 3GPP Internet Protocol (IP) access; Stage 2".

[7] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[8] IETF RFC 3428 "Session Initiation Protocol (SIP) Extension for Instant Messaging"

[9] 3GPP TS 24.011: "Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface".

[10] IETF RFC 3261: "SIP: Session Initiation Protocol".

[11] 3GPP TS 23.002: "Network architecture".

[12] 3GPP TS 23.228: "IP multimedia subsystem; Stage 2".

[13] IETF RFC 3841: "Caller Preferences for the Session Initiation Protocol (SIP)".

[14] 3GPP TS 23.042: "Compression algorithm for text messaging services".

[15] 3GPP TS 27.005: "Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)"

[16] 3GPP TS 26.141: "IP Multimedia System (IMS) Messaging and Presence; Media formats and codecs".

[17] 3GPP TS 23.038: "Alphabets and language-specific information".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TR 21.905 [1] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in 3GPP TR 21.905 [1].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.204 [6], subclause 3.1 apply:

SMSIP MESSAGE
Instant Message

For the purposes of the present document, the following terms and definitions given in RFC 3261 [10] apply.

Header
Header field
Request
Response
Status-Code (see RFC 3261 [10], subclause 7.2)

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.002 [11], subclauses 4.1.1.1 and 4a.7 apply:

Home Subscriber Server (HSS)

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.040 [2] apply:

WVG Object

For the purposes of the present document, the following terms and definitions given in 3GPP TS 23.228 [12], subclauses 4.3.3.1, 4.3.6 and 4.6 apply:

Serving-CSCF (S-CSCF)

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP 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 3GPP TR 21.905 [1].

AS	Application Server
IM	Instant Message
IMDN	Instant Message Disposition Notification
IP-SM-GW	IP-Short-Message-Gateway
SM	Short Message
UDH	User Data Header
WVG	Wireless Vector Graphics

4 Overview of service level interworking for messaging services

4.1 Introduction

The service level interworking for messaging services provides the interworking function between Instant Message and the Short Message to enable the communication between SM UE and Instant Message UE. The architecture for service level interworking is specified in 3GPP TS 23.204 [6].

4.2 Service level interworking between SM and IM

In order to provide the service level interworking between SM and IM, the following protocol mapping functionalities defined in 3GPP TS 23.204 [6] shall be supported:

- Instant Message mapped to Short Message over CS/PS;
- Instant Message mapped to Short Message over IP; and
- Short Message mapped to Instant Message.

4.3 Interaction with transport layer interworking

Both transport layer interworking and service level interworking shall be provided by IP-SM-GW. The interaction between transport layer interworking and service level interworking depends on the user subscription and authorization, on the UE capabilities, and on operator policy.

If a user only subscribes to either transport layer interworking or to service level interworking, only procedures defined for the subscribed interworking shall be performed by the IP-SM-GW.

If a user subscribes to both transport layer interworking and service level interworking, but the user is only authorised for one of the interworking when the message is processed, only the authorised interworking shall be performed by the IP-SM-GW.

If a user subscribes to both transport layer interworking and service level interworking, and is authorised for both, the behaviour of the IP-SM-GW depends on the specific scenario, on the registered capabilities of the UE, and finally is defined by operator policy and user preferences.

5 Functional entities

5.1 Application Server (AS)

An AS may implement the role of an IP-SM-GW (see subclause 6.1).

6 Roles

6.1 IP-Short-Message-Gateway (IP-SM-GW)

6.1.1 General

An IP-SM-GW is an entity that provides the service level interworking for:

- delivering a Short Message or concatenated Short Messages as an Instant Message;

- delivering concatenated Short Messages as a large Instant Message;
- delivering an Instant Message as a (concatenated) Short Message in the terminating network; and
- submitting an Instant Message as a (concatenated) Short Message in the originating network.

In addition to the procedures specified in subclause 6.1, the IP-SM-GW shall support the procedures specified in subclause 5.7 of 3GPP TS 24.229[3].

The IP-SM-GW handles the following messages for SM to IM interworking:

- receiving a SIP REGISTER request, as described in subclause 6.1.2;
- receiving a routing information query as described in subclause 6.1.3.1;
- receiving an SMS-DELIVER (MT-FORWARD-SHORT-MESSAGE) as described in subclause 6.1.4.2;
- sending a SIP MESSAGE request as described in subclause 6.1.4.3.1;
- sending a SIP INVITE request as described in subclause 6.1.4.3.2; and
- sending an SMS-DELIVER-REPORT as described in subclause 6.1.4.4.

The IP-SM-GW handles the following messages for IM to SM interworking:

- sending MAP-SEND-ROUTING-INFO-FOR-SM as described in subclause 6.1.3.2;
- receiving a SIP MESSAGE request as described in subclause 6.1.5.2 and subclause 6.1.6.2;
- sending an SMS-DELIVER (MT-FORWARD-SHORT-MESSAGE) as described in subclause 6.1.5.3;
- sending an SMS-SUBMIT (MO-FORWARD-SHORT-MESSAGE) as described in subclause 6.1.6.3;
- receiving an SMS-DELIVER-REPORT as described in subclause 6.1.5.4;
- receiving an SMS-SUBMIT-REPORT (MO-FORWARD-SHORT-MESSAGE-ACK) as described in subclause 6.1.6.4;
- receiving an SMS-STATUS-REPORT (MT-FORWARD-SHORT-MESSAGE) as described in subclause 6.1.6.5; and
- sending a SIP MESSAGE containing an IMDN as described in subclause 6.1.5.5 and subclause 6.1.6.6.

6.1.2 Notification about registration status and UE capabilities

Upon receipt of a third-party REGISTER request, the IP-SM-GW shall:

- send a 200 (OK) response for the REGISTER request;
- subscribe to the reg event package for the public user identity registered at the user's registrar (S-CSCF) as described in 3GPP TS 24.229 [3]; and
- if the MSISDN is received in the message body of the REGISTER request within the <service-info> XML element, then store the MSISDN.

Upon receipt of a NOTIFY request the IP-SM-GW shall store the information about the UE registration status and its ability for receiving Instant Messages, i.e. if the public user identity has a contact registered with the ability to receive Instant Messages.

NOTE 1: The ability of an UE to receive Instant Messages is included in the Contact header of the REGISTER request as described in OMA-TS-SIMPLE_IM [4].

NOTE 2: The IP-SM-GW will also receive information about the ability of the UE to receive Short Messages over IP as defined in 3GPP TS 24.341 [5].

6.1.3 Handling of routing information

6.1.3.1 Answering routing information query

The IP-SM-GW shall answer the routing information query which is received from the HSS/HLR as described in 3GPP TS 24.341 [5].

6.1.3.2 Querying of routing information

To retrieve the routing information needed for routing the translated Short Message(s) to the servicing MSC or SGSN, the IP-SM-GW shall send the MAP-SEND-ROUTING-INFO-FOR-SM message to HSS/HLR as described in 3GPP TS 29.002 [7]. The IP-SM-GW shall include the following information in the MAP-SEND-ROUTING-INFO-FOR-SM message:

a) Invoke-ID parameter set in accordance with 3GPP TS 29.002 [7];

b) MSISDN parameter set to the address of the associated SIP MESSAGE receiver retrieved as part of the subscriber data from the HSS at registration by the IP-SM-GW or locally configured in the IP-SM-GW;

c) SM-RP-PRI parameter set in accordance with 3GPP TS 29.002 [7];

d) Service Centre Address parameter set to the address of the IP-SM-GW;

e) SM-RP-MTI parameter set to 0 (SMS Deliver);

f) SM-RP-SMEA parameter set based on the value of the P-Asserted-Identity header in the Instant Message if the P-Asserted-Identity header contains a E.164 address; and

g) GPRS Support Indicator parameter set to indicate that IP-SM-GW supports GPRS specific procedure of combine delivery of Short Message via MSC and/or via the SGSN in accordance with 3GPP TS 29.002 [7].

6.1.4 Delivering Short Message(s) as an Instant Message

6.1.4.1 General

This section describes the procedure when the IP-SM-GW located in the terminating network interworks Short Message(s) to an Instant Message.

IP-SM-GW procedures at the reception of the Short Message are described in subclause 6.1.4.2.

The creation of the IM is described in subclause 6.1.4.3.

The creation of the Short Message delivery report is described in subclause 6.1.4.4.

6.1.4.2 Receiving of SMS-DELIVER

When the IP-SM-GW in the terminating networks receives a Short Message from the SMS-GMSC, it shall:

1) determine if service level interworking is needed for the served user (in SM-RP-DA), i.e. if the served user is subscribed for service level interworking and if multiple options are available to deliver the Short Message, then user preference or operator policy indicates priority to receive a Short Messages as an Instant Message; and

2) determine if service level interworking is allowed for the received Short Message. Annex A specifies the transfer protocol level criteria that disallow service level interworking.

The procedure when service level interworking is not allowed is described in subclause 6.1.4.5

If service level interworking for the received SM is not needed, the IP-SM-GW shall:

a) attempt to deliver the Short Message over CS/PS;

b) perform transport level interworking, as described in 3GPP TS 24.341 [5]; or

c) create a delivery report indicating failure.

If the received Short Message is the first segment of the concatenated Short Message and the IP-SM-GW decides to use service level interworking, the IP-SM-GW shall store and acknowledge all segments except the last segment of the concatenated Short Message. When the IP-SM-GW receives the last segment of the concatenated Short Message and the full length of the received concatenated Short Message in Instant Message format is less than the allowed message length of an Instant Message, the IP-SM-GW shall create an Instant Message that includes the concatenated Short Message in accordance with subclause 6.1.4.3.1.

NOTE: The allowed message length of an Instant Message is defined in IETF RFC 3428 [8].

If the message length of the user generated Short Messages in IM format is greater than the allowed message length of an Instant Message and the IM user has registered the capability to receive Instant Messages, the procedure shall be in accordance with subclause 6.1.4.3.2.

6.1.4.3 Sending of Instant Message

6.1.4.3.1 Sending of the Instant Message in a SIP MESSAGE Request

After receiving either a single Short Message within a MT_FORWARD_SHORT_MESSAGE or a full set of concatenated Short Messages not exceeding the size limit of a SIP MESSAGE based Instant Message that is to be delivered as an Instant Message, the IP-SM-GW shall send a SIP MESSAGE request applying the related procedures for an AS acting as an originating UA as defined in subclause 5.7.3 in 3GPP TS 24.229 [3]. In addition, the IP-SM-GW shall include in the SIP MESSAGE request:

a) the Request URI set to a Tel URI or a SIP URI corresponding to the MSISDN of the recipient. The IMSI received in the SM-RP-DA in the MT_FORWARD_SHORT_MESSAGE which corresponds to the MT Correlation ID previously created when the SRI message was received, is used to obtain the MSISDN;

b) the P-Asserted Identity header field set to a Tel URI based on TP-OA parameter received in MT_FORWARD_SHORT_MESSAGE (SMS-DELIVER);

c) the appropriate MIME type(s) in the Content-Type header field;

d) an Accept-Contact header field with the IM feature-tag "+g.oma.sip-im";

e) a User-Agent header field to indicate the IM release version as specified in OMA-TS-SIMPLE_IM [4];

f) a Request-Disposition header field with the value "no-queue", as specified in RFC 3841 [13], in order to ensure the SIP MESSAGE is not queued for delivery if the recipient is temporarily unreachable; and

g) the contents of the Body set to the contents of the Short Message(s) formatted in appropriate MIME type based on received content in SM.

The IP-SM-GW shall send the SIP MESSAGE request to the S-CSCF.

6.1.4.3.2 Sending of a large Instant Message

After receiving a full set of concatenated Short Messages exceeding the size limit of a SIP MESSAGE based Instant Message, the IP-SM-GW shall send a INVITE request applying the related procedures for an AS acting as an originating UA as defined in subclause 5.7.3 in 3GPP TS 24.229 [3]. In addition, The IP-SM-GW shall include in the INVITE request:

a) an Accept-Contact header field with the IM feature-tags "+g.oma.sip-im" and "+g.oma.sip-im.large-message";

b) a User-Agent header field to indicate the IM release version as specified in OMA-TS-SIMPLE_IM [4];

c) in the Contact header field, the IM feature-tag "+g.oma.sip-im";

d) the Request-URI set to the public user identity deduced from the information in SM-RP-DA;

e) the P-Asserted Identity header field set to a Tel URI based on TP-OA parameter received in MT_FORWARD_SHORT_MESSAGE;

f) a Request-Disposition header field with the value "no-queue", as specified in RFC 3841 [13], in order to ensure the SIP INVITE is not queued for delivery if the recipient is temporarily unreachable; and

g) in the SDP, the direction attribute set to a=sendonly as described in OMA-TS-SIMPLE_IM [4].

The IP-SM-GW shall send the INVITE request to the S-CSCF.

Upon receipt of a 2XX SIP reponse to the INVITE request, the IP-SM-GW shall send MSRP SEND request(s) containing the content of the concatenated Short Messages as described in OMA-TS-SIMPLE_IM [4].

Upon receipt of corresponding response for the last chunk of MSRP SEND request, e.g. 200 OK, the IP-SM-GW shall generated a BYE request to release the session as in 3GPP TS 24.229 [3].

6.1.4.4 Sending of SMS-DELIVER-REPORT

6.1.4.4.1 Common Procedures

If the IP-SM-GW decided to send SMS-DELIVER-REPORT, it shall send the MT-FORWARD-SHORT-MESSAGE-ACK message to the SMS-GMSC in accordance with 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2] with the following information:

- Invoke Id parameter set in accordance with 3GPP TS 29.002 [7];

- If the received SIP response is not a 2XX response, then the value of the User error parameter shall be mapped from the SIP response Status Code as described in Table 6.1.4.4.1.1;

NOTE 1: If the received SIP response is a 2XX response then the User error parameter is not contained in the MT-FORWARD-SHORT-MESSAGE-ACK message.

Table 6.1.4.4.1.1: Mapping from Status Code to User error parameter

SIP response Status Code	Value of the user error parameter
3XX	System Failure
5XX	System Failure
400 Bad Request	System Failure
401 Unauthorized	Illegal Subscriber indicates that delivery of the mobile terminated Short Message failed because the mobile station failed authentication
402 Payment Required	System Failure
403 Forbidden	System Failure
404 Not Found	Unidentified subscriber
405 Method Not Allowed	System Failure
406 Not Acceptable	System Failure
407 Proxy authentication required	Illegal Subscriber indicates that delivery of the mobile terminated Short Message failed because the mobile station failed authentication
408 Request Timeout	System Failure
410 Gone	System Failure
413 Request Entity too long	System Failure
414 Request-URI too long	System Failure
415 Unsupported Media type	System Failure
416 Unsupported URI scheme	System Failure
420 Bad Extension	System Failure
421 Extension required	System Failure
423 Interval Too Brief	System Failure
433 Anonymity Disallowed.)	System Failure
480 Temporarily Unavailable	Absent Subscriber SM
481 Call/Transaction does not exist	System Failure
482 Loop detected	System Failure
483 Too many hops	System Failure
484 Address Incomplete	System Failure
485 Ambiguous	System Failure
486 Busy Here	Subscriber busy for MT SMS
487 Request terminated	System Failure
488 Not acceptable here	System Failure
493 Undecipherable	System Failure
600 Busy Everywhere	Subscriber busy for MT SMS
603 Decline	Subscriber busy for MT SMS
604 Does not exist anywhere	Unidentified subscriber
606 Not acceptable	System Failure

- SM-RP-UI set to SMS-DELIVER-REPORT; and
- the elements of the SMS-DELIVER-REPORT shall be set as described in 3GPP TS 23.040[2] with the following information:

  a) TP-MTI element set to 00(SMS-DELIVER-REPORT);

  b) TP-PI element set in accordance with 3GPP TS 23.040[2];

  c) TP-PID element set to 00000000(SME-to-SME protocol);

  d) TP-DCS element set in accordance with 3GPP TS 23.040[2];

  e) TP-UDL element set in accordance with 3GPP TS 23.040[2];

  f) TP-UD element set in accordance with 3GPP TS 23.040[2]; and

  g) If the received SIP response is not a 2XX response, then the value of the TP-FCS element shall be mapped from the SIP response Status Code as described in Table 6.1.4.4.1.2.

NOTE 2: If the received SIP response is a 2XX response then the TP-FCS element is not contained in the SMS-DELIVER-REPORT.

Table 6.1.4.4.1.2: Mapping from Status Code to TP-FCS element

SIP response Status Code	Value of the TP-FCS element
3XX	FF Unspecified error cause
5XX	FF Unspecified error cause
400 Bad Request	FF Unspecified error cause
401 Unauthorized	FF Unspecified error cause
402 Payment Required	FF Unspecified error cause
403 Forbidden	FF Unspecified error cause
404 Not Found	FF Unspecified error cause
405 Method Not Allowed	FF Unspecified error cause
406 Not Acceptable	FF Unspecified error cause
407 Proxy authentication required	FF Unspecified error cause
408 Request Timeout	FF Unspecified error cause
410 Gone	FF Unspecified error cause
413 Request Entity too long	FF Unspecified error cause
414 Request-URI too long	FF Unspecified error cause
415 Unsupported Media type	FF Unspecified error cause
416 Unsupported URI scheme	FF Unspecified error cause
420 Bad Extension	FF Unspecified error cause
421 Extension required	FF Unspecified error cause
423 Interval Too Brief	FF Unspecified error cause
433 Anonymity Disallowed.	FF Unspecified error cause
480 Temporarily Unavailable	FF Unspecified error cause
481 Call/Transaction does not exist	FF Unspecified error cause
482 Loop detected	FF Unspecified error cause
483 Too many hops	FF Unspecified error cause
484 Address Incomplete	FF Unspecified error cause
485 Ambiguous	FF Unspecified error cause
486 Busy Here	D2 Error in MS
487 Request terminated	FF Unspecified error cause
488 Not acceptable here	FF Unspecified error cause
493 Undecipherable	FF Unspecified error cause
600 Busy Everywhere	D2 Error in MS
603 Decline	D2 Error in MS
604 Does not exist anywhere	FF Unspecified error cause
606 Not acceptable	FF Unspecified error cause

6.1.4.4.2 Sending of SMS-DELIVER-REPORT after Short Message(s) delivered in a SIP MESSAGE Request

Upon receipt of a 2xx SIP response for the SIP MESSAGE request sent as described in subclause 6.1.4.3.1, the IP-SM-GW shall apply the procedures defined in subclause 6.1.4.4.1 to send the MT-FORWARD-SHORT-MESSAGE-ACK message to the SMS-GMSC.

Upon receipt of a non-2xx SIP response for the the INVITE request sent as described in subclause 6.1.4.3.1, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.4.x. If all retries fail, the IP-SM-GW shall apply the procedures defined in subclaue 6.1.4.4.1 to send the MT-FORWARD-SHORT-MESSAGE-ACK message to the SMS-GMSC.

6.1.4.4.3 Sending of SMS-DELIVER-REPORT after concatenated Short Messages delivered in a large Instant Message

Upon receipt of a non-2xx SIP response for the the INVITE request sent as described in subclause 6.1.4.3.2, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.4.6. If all retries fail, the IP-SM-GW shall apply the procedures defined in subclaue 6.1.4.4.1 to send the MT-FORWARD-SHORT-MESSAGE-ACK message for the last segment of the concatenated Short Messages to the SMS-GMSC.

Upon receipt of a non-200 response for the MSRP SEND request sent as described in subclause 6.1.4.3.2, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.4.6. If all retries fail, the IP-SM-GW shall apply the procedures defined in subclaue 6.1.4.4.1 to send the MT-FORWARD-SHORT-MESSAGE-ACK message for the last segment of the concatenated Short Messages to the SMS-GMSC. In addition, the

User error parameter shall be set to "System Failure" and in SMS-DELIVER-REPORT the TP-FCS element shall be set to "FF Unspecified error cause".

Upon receipt of a 2xx SIP response for the BYE request sent as described in subclause 6.1.4.3.2, the IP-SM-GW shall apply the procedures defined in subclause 6.1.4.4.1 to send the MT-FORWARD-SHORT-MESSAGE-ACK message for the last segment of the concatenated Short Messages to the SMS-GMSC.

Upon receipt of a non-2xx SIP response for the the BYE request sent as described in subclause 6.1.4.3.2, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.4.6. If all retries fail, the IP-SM-GW shall apply the procedures defined in subclaue 6.1.4.4.1 to send the MT-FORWARD-SHORT-MESSAGE-ACK message for the last segment of the concatenated Short Messages to the SMS-GMSC

6.1.4.5 Procedure when delivery of a Short Message as Instant Message is not allowed

If any one of the criteria specified in annex A indicate that service level interworking of a Short Message is not allowed then the IP-SM-GW shall:

- send an MT-FORWARD-SHORT-MESSAGE-ACK message to the SMS-GMSC in accordance with 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2] and a REPORT-SM-DELIVERY- STATUS message to the HLR/HSS as described in 3GPP TS 29.002 [7], if the service level interworking was the last option to for Short Message delivery; or

- attempt to deliver the Short Message without applying service level interworking according to operator policy, as described in 3GPP TS 23.040 [2] and 3GPP TS 24.341 [5].

6.1.4.6 Retry after unsuccessful delivery of Short Message

If the IP-SM-GW receives an error response when delivering a Short Message in one domain (circuit switched domain, packet switched domain or IMS domain), then based on operator policy, the IP-SM-GW shall attempt to deliver the Short Message in the next domain in its sequence of priority for retries.

If all retries fail, the IP-SM-GW shall send a MT-FORWARD-SHORT-MESSAGE-ACK message to the SMS-GMSC in accordance with 3GPP TS 29.002[7] and 3GPP TS 23.040[2] and a REPORT-SM-DELIVERY- STATUS message to the HLR/HSS as described in 3GPP TS 29.002 [7].

6.1.5 Delivering an Instant Message as a (concatenated) Short Message in the terminating network

6.1.5.1 General

This section describes the procedure when the IP-SM-GW located in the terminating network interworks an Instant Message to Short Message(s).

IP-SM-GW procedures at the reception of the IM are described in subclause 6.1.5.2

The creation and the delivery of a Short Message or concatenated Short Messages are described in subclause 6.1.5.3.

IP-SM-GW procedures at the reception of the Short Message delivery report are described in subclause 6.1.5.4.

The creation of delivery notification is described in subclause 6.1.5.5.

NOTE: Interworking for Large Message mode messaging and for Session Mode messaging as defined in OMA-TS-SIMPLE_IM [4] is out of scope of this specification.

6.1.5.2 Receiving of the Instant Message in a SIP MESSAGE Request

Upon receipt of a SIP MESSAGE request including an Instant Message in the terminating side, the IP-SM-GW shall:

1) check the recipient user's preferences, the current UE capability and operator policy before delivering the message. If operator policy mandates interworking or the recipient"s preference is to receive an Instant Message as a Short Message over CS/PS, the IP-SM-GW shall deliver the Instant Message as a Short Message over

CS/PS, If the UE of the Instant Message recipient is capable of accepting SMSIP MESSAGE as defined in 3GPP TS 24.341 [5] and operator policy mandates interworking or the recipient"s preference is to receive the message as a Short Message as a Short Message over IMS, the IP-SM-GW shall deliver the Instant Message as a Short Message over IMS; and

2) check if it is possible to interwork the IM to an SM.

If the IP-SM-GW decided to interwork the IM to a Short Message (or concatenated Short Messages) the IP-SM-GW shall:

1) if the CPIM body of the received SIP MESSAGE request includes a Disposition-Notification header with value "positive-delivery" or "negative-delivery" (i.e. the IM sender requests the Instant Message Delivery Notification) then store the values of the MESSAGE-ID Header contained in the CPIM body; and

2) proceed as described in subclause 6.1.5.3.

6.1.5.3 Sending of SMS-DELIVER (over CS/PS or IP)

6.1.5.3.1 General

Upon receipt of an Instant Message that is to be delivered as a Short Message over CS/PS, the IP-SM-GW shall query the routing information from HSS as described in subclause 6.1.3.2 then send the MT_FORWARD_SHORT_MESSAGE to the MSC or SGSN as described in 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2]. The MT_FORWARD_SHORT_MESSAGE shall be set as described in subclauses 6.1.5.3.2 and 6.1.5.3.3.

Upon receipt of an Instant Message that is to be delivered as a Short Message over IMS, the IP-SM-GW shall send the SMSIP MESSAGE containing RP-DATA message in the body to the S-CSCF as described in 3GPP TS 24.341 [5] and 3GPP TS 24.011 [9]. The SMSIP MESSAGE shall be set as described in subsclauses 6.1.5.3.2 and 6.1.5.3.4.

6.1.5.3.2 Common Procedures

Both the SM-RP-UI parameter of the MT_FORWARD_SHORT_MESSAGE and the RP-User Data element of the RP-DATA message in the SMSIP MESSAGE body shall be set to SMS-DELIVER. And the elements of SMS-DELIVER message shall be set in accordance with 3GPP TS 23.040 [2], with the following information:

a) TP-MTI element set to 00 (SMS-DELIVER);

b) TP-MMS element set in accordance with 3GPP TS 23.040 [2];

NOTE 1: For example, for concatenated Short Messages, TP-MMS would be set to 0 while there are more messages to send.

c) TP-RP element set to 0 (TP-Reply-Path parameter is not set in this SMS-DELIVER);

d) TP-UDHI element set in accordance with 3GPP TS 23.040 [2];

e) TP-SRI element shall be set to 1, if the SIP MESSAGE contains in a CPIM body a Disposition-Notification header with the value of "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE sender requests the Instant Message Delivery Notification). Otherwise, the TP-SRI element shall be set to 0;

f) if the SIP MESSAGE request contains the privacy header with "header" or "user" or "id" and the operator policy allows sending of anonymous SMS, the value of TP-OA element set to an anonymous value. Setting an address field to an anonymous value is described in annex B. If the SIP MESSAGE request does not contain the privacy header, the value of the TP-OA element set based on the value of the P-Asserted-Identity header in the Instant Message if the P-Asserted-Identity header contains a E.164 address;

NOTE 2: If no E.164 address is present in the P-Asserted-Identity header, the value of the TP-OA element will be implementation dependant.

g) TP-PID element set to 00000000 (SME-to-SME protocol);

h) TP-DCS element set in accordance with 3GPP TS 23.040 [2];

i) TP-SCTS element set to time when the IP-SM-GW received the Instant Message;

j) TP-UDL element set in accordance with 3GPP TS 23.040 [2]; and

k) TP-UD element set based on the content of Instant Message body.

If the content of the body in Short Message format is greater than the allowed message length of a Short Message, then the IP-SM-GW shall send concatenated Short Messages.

NOTE 3: In case of receiving MT_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-DELIVER-REPORT, containing the User error parameter for one segment of the concatenated Short Message, the default action of the IP-SM-GW is not to send any remaing segment.

3GPP TS 23.040 [2] specifies that a Short Message supports GSM 7-bit and UCS2 encoded text while an Instant Message may support different text types as defined in 3GPP TS 26.141 [17]. The IP-SM-GW shall reformat the received Instant Message text into an appropriate text type supported for Short Messages.

6.1.5.3.3 Sending of SMS-DELIVER over CS/PS

The parameters of the MT_FORWARD_SHORT_MESSAGE shall be set as described in 3GPP TS 29.002 [7], with the following information:

- Invoke-ID parameter set in accordance with 3GPP TS 29.002 [7];
- SM-RP-DA element set to the address associated with the SIP MESSAGE receiver;
- SM-RP-OA element set to the address of the IP-SM-GW;
- More Messages To Send parameter set in accordance with 3GPP TS 29.002 [7]; and

NOTE: For example, for concatenated Short Messages, More Messages To Send would be set to 0 while there are more messages to send.

- SM-RP-UI parameter set to SMS-DELIVER.

6.1.5.3.4 Sending of SMS-DELIVER over IP

The IP-SM-GW shall send the SMSIP MESSAGE as described in 3GPP TS 24.341 [5] with the following exceptions:

- the Request-URI mapped from the Request-URI of the associated SIP MESSAGE request; and
- the body of the request shall contain an RP-DATA message. The elements of the RP-DATA message shall be set as described in 3GPP TS 24.011 [9], with the following information:

  a) RP-Message Type element set to 001(network to MS);

  b) RP-Message Reference element set in accordance with 3GPP TS 24.011 [9];

  c) RP-Originator Address element set to the address of the IP-SM-GW; and

  d) RP-User Data set to SMS-DELIVER.

6.1.5.4 Receiving of SMS-DELIVER-REPORT (over CS/PS or IP)

6.1.5.4.1 Receiving of SMS-DELIVER-REPORT over CS/PS

Upon receipt of MT_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-DELIVER-REPORT, and if the associated SIP MESSAGE request received before was delivered as a single Short Message, the IP-SM-GW shall

- send a 200(OK) response to the associated SIP MESSAGE sender, if the MT_FORWARD_SHORT_MESSAGE_ACK message does not contain the User error parameter. If the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header

with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE sender; or

- attempt deliver the Short Message in the next domains as specified in subclause 6.1.5.6, if the MT_FORWARD_SHORT_MESSAGE_ACK message contains the User error parameter. If all retried fail, the IP-SM-GW shall send a Status-Code 4xx or 5xx response. The Status code to be sent is determined by examining the value of the User error parameter. Table 6.1.5.4.1.1 specifies the mapping of the User error parameter as described in 3GPP TS 29.002 [7], to SIP response status codes. If the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender.

Upon receipt of MT_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-DELIVER-REPORT, and if the associated SIP MESSAGE request received before was delivered as concatenated Short Messages, the IP-SM-GW shall wait for the last MT_FORWARD_SHORT_MESSAGE_ACK message. Then the IP-SM-GW shall

- send a 200(OK) response to the associated SIP MESSAGE sender, if none of the MT_FORWARD_SHORT_MESSAGE_ACK messages contains the User error parameter. If the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE sender; or

- attempt deliver the Short Message in the next domains as specified in subclause 6.1.5.6, if at least one of MT_FORWARD_SHORT_MESSAGE_ACK messages contains the User error parameter. If all retries fail, the IP-SM-GW shall send a Status-Code 4xx or 5xx response to the associated SIP MESSAGE sender. The Status code to be sent is determined by examining the value of the User error parameter. Table 6.1.5.4.1.1 specifies the mapping of the User error parameter as described in 3GPP TS 29.002 [7], to SIP response status codes. If the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender.

Table 6.1.5.4.1.1: Mapping from User error parameter to Status code

Value of the User error parameter	SIP response Status code
Unidentified subscriber	404 Not Found
Absent Subscriber SM	480 Temporarily unavailable
Subscriber busy for MT SMS	486 Busy Here
Facility Not Supported	500 Server Internal error
Illegal Subscriber indicates that delivery of the mobile terminated Short Message failed because the mobile station failed authentication	500 Server Internal error
Illegal equipment indicates that delivery of the mobile terminated Short Message failed because an IMEI check failed, i.e. the IMEI was blacklisted or not white-listed;	500 Server Internal error
System Failure	500 Server Internal error
SM Delivery Failure with cause "memory capacity exceeded in the mobile equipment"	480 Temporarily unavailable
SM Delivery Failure with cause "protocol error"	500 Server Internal error
SM Delivery Failure with cause "mobile equipment does not support the mobile terminated Short Message service"	500 Server Internal error
Unexpected Data Value	500 Server Internal error
Data Missing	500 Server Internal error

6.1.5.4.2 Receiving of SMS-DELIVER-REPORT over IP

Upon receipt of a SMSIP MESSAGE with RP-ACK or RP-ERROR message in the body, the IP-SM-GW shall respond with a 202(Accepted) response in accordance with 3GPP TS 24.341 [5].

If the SMSIP MESSAGE contains RP-ACK message in the body, and the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE sender. If the associated SIP MESSAGE request received before was delivered as concatenated Short Messages and all the SMSIP MESSAGE contains RP-ACK message in the body for the concatenated Short Messages, the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE sender.

If the SIP MESSAGE contains RP-ERROR message in the body, the IP-SM-GW shall attempt deliver the Short Message in the next domains as specified in subclause 6.1.5.6. If all retries fail and the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender. If the associated SIP MESSAGE request received before was delivered as concatenated Short Messages and at least one of the SMSIP MESSAGES contains RP-ERROR message in the body for the concatenated Short Messages, the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender.

6.1.5.5 Sending of IMDN

6.1.5.5.1 Sending of IMDN after a (concatenated) Short Message delivery over CS/PS

If the IP-SM-GW decided to send an Instant Message Delivery Notification, it shall act as an originating UA as defined in subclause 5.7.3 in 3GPP TS 24.229 [3] to send a SIP MESSAGE request with the following exceptions:

a) the Request-URI shall contain a public user identity of the stored sender identity of the associated SIP MESSAGE;

b) a User-Agent header field shall indicate the IM release version as specified in OMA-TS-SIMPLE_IM [4];

c) the P-Asserted-Identity header shall be mapped from the stored Request-URI of the associated SIP MESSAGE;

d) an Accept-Contact header field shall contain the IM feature-tag "+g.oma.sip-im";

e) the Content-Type header shall contain "message/imdn+xml"; and

f) the body of the request shall contain a CPIM message as defined in OMA-TS-SIMPLE_IM [4], including the following information:

   - the <message-id> XML element of the IMDN payload shall be set to the value of the stored Message-ID header in the CPIM body of the associated SIP MESSAGE request; and

   - the <disposition> XML element of the IMDN payload shall be set to <delivery/>.

6.1.5.5.2 Sending of IMDN after a (concatenated) Short Message delivery over IP

If the IP-SM-GW decided to send an Instant Message Delivery Notification, it shall act as a Routeing B2BUA Application Server (AS) as defined in subclause 5.7.5 in 3GPP TS 24.229 [3] to send a SIP MESSAGE request with the following exceptions:

a) the Request-URI shall contain a public user identity of the stored sender identity of the associated SIP MESSAGE;

b) the P-Asserted-Identity header shall be set to the value of the stored Request-URI of the associated SIP MESSAGE request;

c) the Accept-Contact header shall contain the IM feature tag "+g.oma.sip-im";

d) the User-Agent header shall indicate the IM release version as specified in OMA-TS-SIMPLE_IM [4];

e) the Content-Type header shall contain "message/imdn+xml"; and

f) the body of the request shall contain a CPIM message as defined in OMA-TS-SIMPLE_IM [4], including the following information:

- the <message-id> XML element of the IMDN payload which shall be set to the value of the stored Message-ID header in the CPIM body of the associated SIP MESSAGE request; and

- the <disposition> XML element of the IMDN payload which shall be set to <delivery/>.

6.1.5.6 Retry after unsuccessful delivery of Short Message

If the IP-SM-GW receives an error response when delivering a Short Message in one domain (circuit switched domain, packet switched domain or IMS domain), then based on operator policy, the IP-SM-GW shall attempt to deliver the Short Message in the next domain in its sequence of priority for retries.

If all retries fail, the IP-SM-GW shall send a REPORT-SM-DELIVERY- STATUS message to the HLR/HSS as described in 3GPP TS 29.002 [7].

6.1.5.7 Error handling when interworking from Instant Message to Short Message is not possible

When interworking is needed but is not possible, the IP-SM-GW shall send one of the following error responses to the sender of the Instant Message:

- If the error is because none of the content in the SIP MESSAGE request is interworkable to a Short Message, then the IP-SM-GW shall include a 415 (Unsupported Media Type) response and shall also include an Accept header field listing the types of text media supported by SM as described in 3GPP TS 26.141 [16]. For service level interworking of Instant Message to Short Message, only text shall be supported.

- Otherwise a 488 (Not Acceptable Here) response shall be returned.

6.1.5.8 Partial interworking from Instant Message to Short Message

If an Instant Message contains other media than text content, the IP-SM-GW may remove the unsupported content.

Based on Operator policy the IP-SM-GW may insert text warning the receiver that non-text content has been removed from the message.

6.1.6 Submitting an Instant Message as a (concatenated) Short Message in the originating network

6.1.6.1 General

This section describes the procedure when the IP-SM-GW located in the originating network interworks an Instant Message to a Short Message.

IP-SM-GW procedures at the reception of the IM are described in subclause 6.1.6.2.

The creation of a (concatenated) Short Message is described in subclause 6.1.6.3.

IP-SM-GW procedures at the reception of the Short Message submit report are described in subclause 6.1.6.4.

IP-SM-GW procedures at the reception of the Short Message status report are described in subclause 6.1.6.5.

The creation of delivery notification is described in subclause 6.1.6.6.

NOTE: Interworking for Large Message mode messaging and for Session Mode messaging as defined in OMA-TS-SIMPLE_IM [4] is out of scope of this specification.

6.1.6.2 Receiving of the Instant Message in a SIP MESSAGE Request

Upon receipt of a SIP MESSAGE request including an Instant Message, the IP-SM-GW shall attempt service level interworking if operator policy mandates interworking or the IP-SM-GW cannot find a SIP address for the recipient.

If IP-SM-GW determined that service level interworking needed, then the IP-SM-GW shall:

1) check if the message originator is authorized for service level interworking; and

NOTE: It can be assumed that all subscribers are authorized for service level interworking if interworking is mandated by operator policy.

2) check if the service level interworking is possible.

If IP-SM-GW decided to submit the Instant Message as a Short Message, then the IP-SM-GW shall:

1) respond with a 202(Accepted) response in accordance with 3GPP TS 24.229 [3];

2) store the values of the Request-URI, the P-Asserted-Identity header and the MESSAGE-ID Header contained in the CPIM body, if the received SIP MESSAGE request includes a CPIM body and a Disposition-Notification header with value "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE sender requests the Instant Message Delivery Notification); and

3) proceed as described in subclause 6.1.6.3.

6.1.6.3 Sending of SMS-SUBMIT over CS/PS

To submit a Short Message to the SC, the IP-SM-GW shall send MO_FORWARD_SHORT_MESSAGE as described in 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2]. In addition, for the information elements listed below, the following interworking procedures shall apply:

- Invoke-ID pareameter set in accordance with 3GPP TS 29.002 [7];

- SM-RP-DA parameter set to the address of user"s home network Service Centre configured in the IP-SM-GW, or retrieved as part of the subscriber data from the HSS at registration by the IP-SM-GW;

- if the SIP MESSAGE request contains the privacy header with "header" or "user" or "id" and the operator policy allows sending of anonymous SM, the value of SM-RP-OA parameter shall be set to an anonymous value. Setting an address field to an anonymous value is described in annex B. If the SIP MESSAGE request does not contain the privacy header, the value of the SM-RP-OA parameter shall be set based on the value of the P-Asserted-Identity or the address retrieved as part of the subscriber data from the HSS at registration by the IP-SM-GW;

- SM-RP-UI parameter set to SMS-SUBMIT; and

- the elements of the SMS-SUBMIT message shall be set as described in 3GPP TS 23.040 [2] subclause 9.2.2, with the following information:

  a) TP-MTI element set to 01 (SMS-SUBMIT);

  b) TP-RD element set to 1 (Instruct the SC to reject an SMS SUBMIT for an SM still held in the SC which has the same TP MR and the same TP DA as the previously submitted SM from the same OA.);

  c) if the SIP MESSAGE request contains an Expires header with a non-zero value, the value of TP VPF element shall be set according to the TP VP element. Otherwise, the value of TP VPF element shall be set to 00 (TP VP field not present);

  d) TP VP element set based on the Expires header value and the optional Date header value;

  e) TP-UDHI element set in accordance with 3GPP TS 23.040 [2];

  f) if the SIP MESSAGE contains in a CPIM body a Disposition-Notification header with the value of "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE sender requests the Instant Message Delivery Notification), the value of TP SRR element shall be set to 1 (A status report is requested), Otherwise, the value of TP-SRR element shall be set to 0 (A status report is not requested);

g) TP-MR element set in accordance with 3GPP TS 23.040 [2];

h) TP-RP element set to 0 (TP Reply Path parameter is not set in this SMS SUBMIT);

i) TP-DA element set based on the value of the Request-URI in the Instant Message as long as the Request-URI contains a E.164 address;

j) TP-PI element set to 00000000 (SME-to-SME protocol);

k) TP-DCS element set in accordance with 3GPP TS 23.040 [2];

l) TP-UDL element set in accordance with 3GPP TS 23.040 [2]; and

m) TP-UD element set based on the content of Instant Message body.

If the content of the body in Short Message format is greater than the allowed message length of a Short Message, then the IP-SM-GW shall send concatenated Short Messages.

NOTE: In case of receiving MO_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-SUBMIT-REPORT, containing the User error parameter for one segment of the concatenated Short Message, the default action of the IP-SM-GW is not to send any remaing segment.

3GPP TS 23.040 [2] specifies that a Short Message supports GSM 7-bit and UCS2 encoded text while an Instant Message may support different text types as defined in 3GPP TS 26.141 [16]. The IP-SM-GW shall reformat the received Instant Message text into an appropriate text type supported for Short Messages.

6.1.6.4 Receiving of SMS-SUBMIT-REPORT

Upon receipt of MO_FORWARD_SHORT_MESSAGE_ACK with the SM-RP-UI parameter set to value SMS-SUBMIT-REPORT, not containing the User error parameter, and if the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE sender requests the Instant Message Delivery Notification), the IP-SM-GW shall store the value of TP Service Centre Time Stamp element.

Upon receipt of MO_FORWARD_SHORT_MESSAGE_ACK with the SM-RP-UI parameter set to value SMS-SUBMIT-REPORT, containing the User error parameter, and if the associated SIP MESSAGE request received before contains in a CPIM body a Disposition-Notification header with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender. If the associated SIP MESSAGE request received before was delivered as concatenated Short Messages as described in subclause 6.1.6.3, and one of the MO_FORWARD_SHORT_MESSAGE_ACK for the concatenated Short Messages contains the User error parameter, the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender.

6.1.6.5 Receiving of SMS-STATUS-REPORT

Upon receipt of a MT_FORWARD_SHORT_MESSAGE with the SM-RP-UI parameter set to value of SMS-STATUS-REPORT, the IP-SM-GW shall:

- retrieve the TP-Service-Centre-Time-Stamp and TP-Recipient-Address, then find the associated SIP MESSAGE request instance containing the stored TP-Service-Center-Time-Stamp and SM-RP-Originating Address element with the same value; and

- if the SMS-STATUS-REPORT matchs one associated SIP MESSAGE request, send an Instant Message Delivery Notification or discard the SMS-STATUS-REPORT as described in Table 6.1.6.5.1; or

- wait for the last SMS-STATUS-REPORT, if the associated SIP MESSAGE request was delivered as concatenated Short Messages as described in subclause 6.1.6.3. If all SMS-STATUS-REPORTs for concatenated Short Messages contains the TP-Status element set to "00000000" and the associated SIP MESSAGE request contains in a CPIM body a Disposition-Notification header with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE sender. If at least one of SMS-STATUS-REPORT for concatenated Short Messages contains the TP-Status element set between "00000001" and "00011111" or between "01000000" and "11111111", and the associated SIP MESSAGE request contains in a CPIM body a Disposition-Notification header with value "negative-

delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE sender.

Table 6.1.6.5.1: Process of the received SMS-STATUS-REPORT

The value of TP-Status element of SMS-STATUS-REPORT	The parameter of the Disposition-Notification header in the CPIM body of the associated SIP MESSAGE	Process of the IP-SM-GW
"00000000"	Include "positive-delivery"	Shall send Instant Message Delivery Notification to the associated SIP MESSAGE sender
"00000001" to "00011111" or "01000000" to "11111111"	Include "negative-delivery"	Shall send Instant Message Delivery Notification to the associated SIP MESSAGE sender
"00100000" to "00111111"	Include "positive-delivery" or 'negative-delivery'	May discard the SMS-STATUS-REPORT
"00000000"	Not include "positive-delivery"	May discard the SMS-STATUS-REPORT
"00000001" to "00011111" or "01000000" to "11111111"	Not include "negative-delivery"	May discard the SMS-STATUS-REPORT

6.1.6.6 Sending of IMDN (both for SUBMIT-REPORT and STATUS-REPORT)

If the IP-SM-GW decided to send an Instant Message Delivery Notification, it shall act as an originating UA as defined in subclause 5.7.3 in 3GPP TS 24.229 [3] to send a SIP MESSAGE request with the following exceptions:

a) the Request-URI shall contain a public user identity of the stored sender identity of the associated SIP MESSAGE;

b) the P-Asserted-Identity header shall be set to the value of the stored Request-URI of the associated SIP MESSAGE request;

c) the Accept-Contact header shall be set with the IM feature tag "+g.oma.sip-im";

d) the User-Agent header which shall be set with the IM release version as specified in OMA-TS-SIMPLE_IM [4];

e) the Content-Type header shall contain "message/imdn+xml"; and

f) the body of the request shall contain a CPIM message as defined in OMA-TS-SIMPLE_IM [4], including the following information:

- the <message-id> XML element of the IMDN payload shall be set to the value of the stored Message-ID header in the CPIM body of the associated SIP MESSAGE request; and

- the <disposition> XML element of the IMDN payload shall be set to <delivery/>.

6.1.6.7 Error handling when interworking from Instant Message to Short Message is not possible

When interworking is needed but is not possible, the IP-SM-GW shall send one of the following error responses to the sender of the Instant Message:

- If the error is because none of the content in the SIP MESSAGE request is interworkable to a Short Message, then the IP-SM-GW shall send a 415 (Unsupported Media Type) response and shall also include an Accept header field listing the types of text media supported by SM as decribed in 3GPP TS 26.141 [16]. For service level interworking of Instant Message to Short Message, only text shall be supported.

- Otherwise a 488 (Not Acceptable Here) response shall be returned.

6.1.6.8 Partial interworking from Instant Message to Short Message

If an Instant Message contains other media than text content, the IP-SM-GW may remove the unsupported content.

Based on Operator policy the IP-SM-GW may insert text warning the receiver that non-text content has been removed from the message.

Annex A (normative): Impacts of TP parameters in a Short Message on service level interworking

A.1 Scope

The present annex defines how the TP parameters in a short message impact the possibility of service level interworking. If any of the criteria defined in this annex indicate that service level interworking is not allowed then the procedure in subclause 6.1.4.5 shall be followed.

A.2 TP-Data-Coding-Scheme (TP-DCS)

Table A.2.1 describes whether or not service level interworking is allowed based on the value of the TP-DCS parameter of a Short Message.

Table A.2.1: Impact of the TP-DCS parameter on service level interworking

TP-DCS Coding Group TP-DCS Bits 7..4	**TP-DCS Description** Depends on the use of TP-DCS bits 3..0	**Service Level Interworking allowed** **(Y/N)**

<table>
<tr><th>TP-DCS Coding Group

TP-DCS Bits 7..4</th><th>TP-DCS Description

Depends on the use of TP-DCS bits 3..0</th><th>Service Level Interworking allowed

(Y/N)</th></tr>
<tr><td>00xx</td><td>General Data Coding indication
Bits 5..0 indicate the following:

Bit 5, if set to 0, indicates the text is uncompressed
Bit 5, if set to 1, indicates the text is compressed using the compression algorithm defined in 3GPP TS 23.042 [14]</td><td>n/a</td></tr>
<tr><td></td><td>Bit 4, if set to 0, indicates that bits 1 to 0 are reserved and have no message class meaning</td><td>Y</td></tr>
<tr><td></td><td>Bit 4, if set to 1, indicates that bits 1 to 0 have a message class meaning::

<table><tr><th>Bit 1</th><th>Bit 0</th><th>Message Class</th></tr><tr><td>0</td><td>0</td><td>Class 0</td></tr><tr><td>0</td><td>1</td><td>Class 1 Default meaning: ME-specific.</td></tr><tr><td>1</td><td>0</td><td>Class 2 (U)SIM specific message</td></tr><tr><td>1</td><td>1</td><td>Class 3 Default meaning: TE specific (see 3GPP TS 27.005 [15])</td></tr></table></td><td><table><tr><td>Y</td></tr><tr><td>Y</td></tr><tr><td>N</td></tr><tr><td>Y</td></tr></table></td></tr>
<tr><td></td><td>Bits 3 and 2 indicate the character set being used, as follows :

<table><tr><th>Bit 3</th><th>Bit2</th><th>Character set:</th></tr><tr><td>0</td><td>0</td><td>GSM 7 bit default alphabet</td></tr><tr><td>0</td><td>1</td><td>8 bit data</td></tr><tr><td>1</td><td>0</td><td>UCS2 (16bit)</td></tr><tr><td>1</td><td>1</td><td>Reserved</td></tr></table></td><td><table><tr><td>Y</td></tr><tr><td>N</td></tr><tr><td>Y</td></tr><tr><td>n/a</td></tr></table></td></tr>
<tr><td></td><td>NOTE: The special case of bits 7..0 being 0000 0000 indicates the GSM 7 bit default alphabet with no message class</td><td>Y</td></tr>
<tr><td>01xx</td><td>Message Marked for Automatic Deletion Group

This group can be used by the SM originator to mark the message (stored in the ME or (U)SIM) for deletion after reading irrespective of the message class.
The way the ME will process this deletion should be manufacturer specific but shall be done without the intervention of the End User or the targeted application. The mobile manufacturer may optionally provide a means for the user to prevent this automatic deletion.

Bit 5..0 are coded exactly the same as Group 00xx</td><td>See Group 00xx</td></tr>
<tr><td>1000..1011</td><td>Reserved coding groups</td><td>n/a</td></tr>
<tr><td>1100</td><td>Message Waiting Indication Group: Discard Message</td><td>N</td></tr>
</table>

TP-DCS Coding Group TP-DCS Bits 7..4	TP-DCS Description Depends on the use of TP-DCS bits 3..0	Service Level Interworking allowed (Y/N)
	The specification for this group is exactly the same as for Group 1101, except that: - after presenting an indication and storing the status, the ME may discard the contents of the message. The ME shall be able to receive, process and acknowledge messages in this group, irrespective of memory availability for other types of Short Message.	
1101	Message Waiting Indication Group: Store Message This Group defines an indication to be provided to the user about the status of types of message waiting on systems connected to the GSM/UMTS PLMN. The ME should present this indication as an icon on the screen, or other MMI indication. The ME shall update the contents of the Message Waiting Indication Status on the SIM (see 3GPP TS 51.011 [18]) or USIM (see 3GPP TS 31.102 [17]) when present or otherwise should store the status in the ME. In case there are multiple records of EF_{MWIS} this information shall be stored within the first record. The contents of the Message Waiting Indication Status should control the ME indicator. For each indication supported, the mobile may provide storage for the Origination Address. The ME may take note of the Origination Address for messages in this group and group 1100. Text included in the user data is coded in the GSM 7 bit default alphabet. Where a message is received with bits 7..4 set to 1101, the mobile shall store the text of the SMS message in addition to setting the indication. The indication setting should take place irrespective of memory availability to store the Short Message. Bits 3 indicates Indication Sense: Bit 3 0 Set Indication Inactive 1 Set Indication Active Bit 2 is reserved, and set to 0 Bit 1 Bit 0 Indication Type: 0 0 Voicemail Message Waiting 0 1 Fax Message Waiting 1 0 Electronic Mail Message Waiting 1 1 Other Message Waiting* * Mobile manufacturers may implement the "Other Message Waiting" indication as an additional indication without specifying the meaning.	N
1110	Message Waiting Indication Group: Store Message The coding of bits 3..0 and functionality of this feature are the same as for the Message Waiting Indication Group above, (bits 7..4 set to 1101) with the exception that the text included in the user data is coded in the uncompressed UCS2 character set.	N

A.3 TP-User-Data Header Information Elements (UDH-IE)

If a Short Message contains a Header in the TP-User-Data field, then the Header may include multiple Information Elements. Table A.3.1 describes whether or not service level interworking is allowed based on the occurrence of different Information Elements. The Information Elements are listed by Information Element Identifier in the table.

Table A.3.1: Impact of the TP-UDH information elements on service level interworking

UDH-IEI Value (hex)	UDH-IE Description	Service Level Interworking allowed (Y/N)
00	Concatenated Short Messages, 8-bit reference number	Y
01	Special SMS Message Indication	N
02	Reserved	n/a
03	Value not used to avoid misinterpretation as <LF> character	n/a
04	Application port addressing scheme, 8 bit address	N
05	Application port addressing scheme, 16 bit address	N
06	SMSC Control Parameters	Y
07	UDH Source Indicator	Y
08	Concatenated Short Message, 16-bit reference number	Y
09	Wireless Control Message Protocol	N
0A	Text Formatting	Y
0B	Predefined Sound	Y
0C	User Defined Sound (iMelody max 128 bytes)	Y
0D	Predefined Animation	Y
0E	Large Animation (16*16 times 4 = 32*4 =128 bytes)	Y
0F	Small Animation (8*8 times 4 = 8*4 =32 bytes)	Y
10	Large Picture (32*32 = 128 bytes)	Y
11	Small Picture (16*16 = 32 bytes)	Y
12	Variable Picture	Y
13	User prompt indicator	Y
14	Extended Object	Y
15	Reused Extended Object	Y
16	Compression Control	Y
17	Object Distribution Indicator	Y
18	Standard WVG object	Y
19	Character Size WVG object	Y
1A	Extended Object Data Request Command	Y
1B-1F	Reserved for future EMS features (see subclause 3.10)	n/a
20	RFC 822 E-Mail Header	N
21	Hyperlink format element	Y
22	Reply Address Element	N
23	Enhanced Voice Mail Information	N
24 – 6F	Reserved for future use	n/a
70 – 7F	(U)SIM Toolkit Security Headers	N
80 – 9F	SME to SME specific use	N
A0 – BF	Reserved for future use	n/a
C0 – DF	SC specific use	N
E0 – FF	Reserved for future use	n/a

A.4 TP-Protocol-Identifier (TP-PID)

Table A.4.1 describes whether or not service level interworking is allowed based on the value of the TP-PID parameter in an SMS-DELIVER.

Table A.4.1: Impact of the TP-PID parameter on service level interworking

<table>
<tr><th>TP-PID Bits 76</th><th>TP-PID Description</th><th>Service Level Interworking Allowed (Y/N)</th></tr>
<tr><td>00</td><td>bit 5 indicates telematic interworking:

If bit 5 has value 1 in an SMS-DELIVER PDU, it indicates that the SME is a telematic device of a type which is indicated in bits 4..0.

If bit 5 has value 0 in an SMS-DELIVER PDU, the value in bits 4..0 identifies the SM-AL protocol being used between the SME and the MS.</td><td>Y</td></tr>
<tr><td>01</td><td>bits 5..0 are used as defined below

<table>
<tr><th>Bit 5..0</th><th></th></tr>
<tr><td>000000</td><td>Short Message Type 0</td><td>Y</td></tr>
<tr><td>000001</td><td>Replace Short Message Type 1</td><td>Y</td></tr>
<tr><td>000010</td><td>Replace Short Message Type 2</td><td>Y</td></tr>
<tr><td>000011</td><td>Replace Short Message Type 3</td><td>Y</td></tr>
<tr><td>000100</td><td>Replace Short Message Type 4</td><td>Y</td></tr>
<tr><td>000101</td><td>Replace Short Message Type 5</td><td>Y</td></tr>
<tr><td>000110</td><td>Replace Short Message Type 6</td><td>Y</td></tr>
<tr><td>000111</td><td>Replace Short Message Type 7</td><td>Y</td></tr>
<tr><td>001000..011101</td><td>Reserved</td><td>n/a</td></tr>
<tr><td>011110</td><td>Enhanced Message Service (Obsolete)</td><td>n/a</td></tr>
<tr><td>011111</td><td>Return Call Message</td><td>Y</td></tr>
<tr><td>100000..111011</td><td>Reserved</td><td>n/a</td></tr>
<tr><td>111100</td><td>ANSI-136 R-DATA</td><td>N</td></tr>
<tr><td>111101</td><td>ME Data download</td><td>N</td></tr>
<tr><td>111110</td><td>ME De-personalization Short Message</td><td>N</td></tr>
<tr><td>111111</td><td>(U)SIM Data download</td><td>N</td></tr>
</table>
</td><td></td></tr>
<tr><td>10</td><td>reserved</td><td>n/a</td></tr>
<tr><td>11</td><td>Assigns bit 0-5 for SC specific use</td><td>undefined</td></tr>
</table>

Annex B (normative): Anonymous SMS

B.1 Scope

The present annex defines how the sending party's address (SM-RP-OA parameter in case of SMS-SUBMIT, TP-OA element in case of SMS-DELIVER), which is mandatory in SMS, is set to anonymise the sender's identity and to clearly indicate that for the receiver of the SMS at the same time.

B.2 Anonymous address in SMS

To indicate anonymous sender the address field representing the SM-RP-OA parameter in case of an SMS-SUBMIT or the TP-OA element in case of SMS-DELIVER should be set as follows:

- length of address is set to 18;
- type of number is set to alphanumerical;
- numbering plan identification is set to ISDN/telephone numbering plan; and
- the address value is set to "Anonymous" with the 7 bit character representation, as the default alphabet defined in 3GPP TS 23.038 [17].

As an alternative, country specific text may be defined with the only restriction that it must fit to the 10 character limit of the alphanumerical type.

The recommended encoding of the "Anonymous" alphanumeric address is shown in Figure B.2-1.

Octet #	bit 7	bit 6	bit 5	bit 4	bit 3	bit 2	bit 1	bit 0	Explanation
1	0	0	0	1	0	0	0	0	length of address parameter (16 semi octets)
2	1	1	0	1	0	0	0	1	ext / type of number 101 indicates alphanumeric / Numbering plan id: 0001 indicates ISDN/telephone numbering plan
3	0	1	0	0	0	0	0	1	x41 for ASCII 65 of "A"
4	1	1	1	1	0	1	1	1	"o" / x6E for ASCII 110 of "n"
5	1	1	0	1	1	0	1	1	110 of "n" / x6F for ASCII 111 of
6	1	0	0	1	1	1	0	1	ASCII 121 of "y" / x6E for ASCII
7	0	1	1	0	1	1	1	1	ASCII 109 of "m" / x79 for
8	1	0	1	1	1	1	1	1	x6F for ASCII 111 of "o" / x6D for
9	1	1	1	0	1	0	1	1	x75 for ASCII 117 of "u"
10	0	1	1	1	0	0	1	1	x73 for ASCII 115 of "s"

Figure B.2-1: Address field with "Anonymous" alphanumeric value

Annex C (informative): Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2008-04					Rapporteur input for the skeleton	-	0.0.0
2008-05					Implemented C3-080683, C3-080684, C3-080685, C3-080687, C3-080689, C3-080776, C3-080777, C3-080692.	0.0.0	0.1.0
2008-06					New TS Number TS 29.311 assigned after CT#40	0.1.0	0.1.1
2008-06					Implemented C3-081088, C3-081089, C3-081193, C3-081094, C3-081092, C3-081194, C3-081195, C3-081091.	0.1.1	0.2.0
2008-08					Implemented C3-081555, C3-081554, C3-081556, C3-081557, C3-081558, C3-081559, C3-081561, C3-081312, C3-081562, C3-081314, C3-081563, C3-081564, C3-081565, C3-081566, C3-081567, C3-081568.	0.2.0	0.3.0
2008-09					Version 1.0.0 created for presentation to TSG by MCC	0.3.0	1.0.0
2008-10					Implemented C3-081961, C3-081956, C3-081957, C3-082108, C3-081959, C3-081960, C3-082109, C3-081963, C3-081972, C3-081973, C3-081974, C3-081975, C3-081816, C3-081976, C3-081818, C3-081819, C3-081977, C3-081978.	1.0.0	1.1.0
2008-11					Implemented C3-082250, C3-082251, C3-082256, C3-082291, C3-082421, C3-082422, C3-082423, C3-082424.	1.1.0	1.2.0
2008-11					v2.0.0 was produced by MCC for Approval in CT#42	1.2.0	2.0.0
2008-12	TSG#42				v8.0.0 was produced by MCC	2.0.0	8.0.0
2009-03	TSG#43	CP-090091	001	1	Cleanup of editor's notes	8.0.0	8.1.0
2011-09	TSG#53	CP-110606	024		Correction of SMS delivery creation in IP-SM-GW	8.1.0	8.2.0
2011-09	TSG#53	CP-110606	027	1	Anonymous SMS	8.1.0	8.2.0
2013-06	TSG#60	CP-130314	030		Correcting an invalid reference	8.2.0	8.3.0

History

Document history		
V8.0.0	February 2009	Publication
V8.1.0	April 2009	Publication
V8.2.0	October 2011	Publication
V8.3.0	July 2013	Publication