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**Universal Mobile Telecommunications System (UMTS);
LTE;
Service Level Interworking (SLI) for messaging services
(3GPP TS 29.311 version 14.0.0 Release 14)**



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Foreword

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1 Scope

The present document specifies the protocol details of service level interworking between Instant Message (OMA-TS-SIMPLE_IM [4]) or Chat Session (OMA-TS-CPM_Conv_Funct [17]) 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 Connectivity 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;
- Procedures to implement service level interworking between CPM and SM;
- Enhancement of the IP-SM-GW as an Application Server to support service selection, authorization and mapping between IM or CPM and SM protocols; and
- 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 OMA-TS-SIMPLE_IM-V1_0: "Instant Messaging using SIMPLE", <http://www.openmobilealliance.org/>.
- [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] OMA OMA-TS-CPM_Conv_Funct-V1_0: "CPM Conversation Functions", <http://www.openmobilealliance.org/>.
- [18] IETF RFC 4575: "A Session Initiation Protocol (SIP) Event Package for Conference State".
- [19] IETF RFC 4975: "The Message Session Relay Protocol (MSRP)".
- [20] OMA OMA-TS-CPM_System_Description-V1_0: "Converged IP Messaging System Description", <http://www.openmobilealliance.org/>.
- [21] 3GPP TS 31.102: "Characteristics of the Universal Subscriber Identity Module (USIM) application".
- [22] 3GPP TS 51.011: "Specification of the Subscriber Identity Module - Mobile Equipment (SIM-ME) interface".
- [23] IETF RFC 822: "Standard for the Format of ARPA Internet Text Messages".
- [24] 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)

For the purposes of the present document, the following terms and definitions given in OMA-TS-CPM_Conv_Funct [17] apply:

Participant Information

For the purposes of the present document, the following term and definition applies:

Chat Session: A session established between two or more participants that is used for exchanging messages.

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
CPIM	Common Profile for Instant Messaging
CPM	Converged IP Messaging
IM	Instant Message
IMDN	Instant Message Disposition Notification
IP-SM-GW	IP-Short-Message-Gateway
MSRP	Message Session Relay Protocol
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 or Chat Sessions and the Short Message to enable the communication between SM UE and Instant Message or CPM 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.

4.4 Service level interworking between SM and Chat Session

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

- Chat Session invitation request mapped to Short Message;
- Short Message mapped to Chat Session MSRP SEND request;
- Chat Session MSRP SEND request mapped to Short Message;
- Short Message mapped to Chat Session teardown request;
- Chat Session teardown request mapped to Short Message; and
- Event package for conference state information specified in IETF RFC 4575 [18] mapped to Short Message.

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;
- submitting an Instant Message as a (concatenated) Short Message in the originating network;
- delivering a Chat Session invitation as a Short Message;
- sending a Chat Session invitation response based on the contents of the received Short Message;
- delivering a Short Message as Chat Session MSRP SEND request;
- delivering a Chat Session MSRP SEND request as a Short Message;
- sending a Chat Session teardown request based on the contents of the received Short Message;
- delivering a Chat Session teardown request as a Short Message; and
- delivering information about Chat Session changes to the SMS user.

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 request containing an IMDN as described in subclause 6.1.5.5 and subclause 6.1.6.6.

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

- receiving a SIP INVITE request as described in subclauses 6.1.7 and 6.1.8;
- sending an SMS-DELIVER (MT-FORWARD-SHORT-MESSAGE) and receiving of SMS-DELIVER-REPORT as described in subclauses 6.1.7.2, 6.1.7.3, 6.1.14.2 and 6.1.14.3;
- receiving an SMS-DELIVER (MT-FORWARD-SHORT-MESSAGE) and sending of an SMS-DELIVER-REPORT as described in subclauses 6.1.9, 6.1.10, 6.1.13 and 6.1.15;
- sending an SMS-SUBMIT (MO-FORWARD-SHORT-MESSAGE) and receiving an SMS-SUBMIT-REPORT (MO-FORWARD-SHORT-MESSAGE) as described in subclauses 6.1.8 and 6.1.16;
- sending an MSRP SEND request as described in subclauses 6.1.9.2 and 6.1.10.3;
- receiving an MSRP SEND request as described in subclause 6.1.11;
- receiving an SMS-STATUS-REPORT (MT-FORWARD-SHORT-MESSAGE) as described in subclause 6.1.12;
- sending an MSRP Success or Failure REPORT as described in subclauses 6.1.11 and 6.1.12;
- sending a SIP BYE request as described in subclauses 6.1.13, 6.1.15 and 6.1.18.2;
- receiving a SIP BYE request as described in subclauses 6.1.14.1 and 6.1.16.1; and
- sending a SIP SUBSCRIBE request and receiving a SIP NOTIFY request as described in subclause 6.1.17.

6.1.2 Notification about registration status and UE capabilities

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

- send a SIP 200 (OK) response for the SIP REGISTER request;
- subscribe to the registration 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 SIP REGISTER request within the <service-info> XML element, then store the MSISDN.

Upon receipt of a SIP 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 field of the SIP 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 request 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 field in the Instant Message if the P-Asserted-Identity header field 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 request 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 IETF RFC 3841 [13], in order to ensure the SIP MESSAGE request 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 request based Instant Message, the IP-SM-GW shall send a SIP 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 SIP 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 IETF RFC 3841 [13], in order to ensure that the SIP INVITE request 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 SIP INVITE request to the S-CSCF.

Upon receipt of a SIP 2xx response to the SIP 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 the MSRP SEND request, e.g. a MSRP 200, the IP-SM-GW shall generate a SIP 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 SIP 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 SIP 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 SIP 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 SIP 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 SIP 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 6.1.4.6. If all retries fail, the IP-SM-GW shall apply the procedures defined in subclau 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 SIP 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 subclau 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 MSRP response to 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 subclau 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 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.

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 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 field 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 subclauses 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 request contains in a CPIM body a Disposition-Notification header field with the value of "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE request 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 field in the Instant Message if the P-Asserted-Identity header field contains a E.164 address;

NOTE 2: If no E.164 address is present in the P-Asserted-Identity header field, 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 remaining 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.

6.1.5.3.3 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 request 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 SIP 200 (OK) response to the associated SIP MESSAGE request 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

field with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE request 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 SIP 4xx or SIP 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.

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 SIP 200 (OK) response to the associated SIP MESSAGE request 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 field with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE request 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 SIP 4xx or SIP 5xx response to the associated SIP MESSAGE request 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.

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 an SMSIP MESSAGE with RP-ACK or RP-ERROR message in the body, the IP-SM-GW shall respond with a SIP 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 field with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE

request 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 request sender.

If the SMSIP 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 field with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE request 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 request 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 request;
- 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 field shall be mapped from the stored Request-URI of the associated SIP MESSAGE request;
- d) an Accept-Contact header field shall contain the IM feature-tag "+g.oma.sip-im";
- e) the Content-Type header field 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 request;
- b) the P-Asserted-Identity header field shall be set to the value of the stored Request-URI of the associated SIP MESSAGE request;
- c) the Accept-Contact header field shall contain the IM feature tag "+g.oma.sip-im";
- d) the User-Agent header field shall indicate the IM release version as specified in OMA-TS-SIMPLE_IM [4];
- e) the Content-Type header field 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 send a SIP 415 (Unsupported Media Type) response and shall 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 SIP 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 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 SIP 202 (Accepted) response in accordance with 3GPP TS 24.229 [3];
- 2) store the values of the Request-URI, the P-Asserted-Identity header field 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 field with value "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE request 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 parameter 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 field with "header" or "user" or "id" and the operator policy allows sending of anonymous Short Message, 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 field, the value of the SM-RP-OA parameter shall be set based on the value of the P-Asserted-Identity header field 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 field 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 field value and the optional Date header field value;
 - e) TP-UDHI element set in accordance with 3GPP TS 23.040 [2];
 - f) if the SIP MESSAGE request contains in a CPIM body a Disposition-Notification header field with the value of "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE request 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 remaining 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 field with value "positive-delivery" or "negative-delivery" (i.e. the SIP MESSAGE request 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 field with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE request 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 request 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` matches 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-REPORT`s 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 field with value "positive-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "delivered" indication to the associated SIP MESSAGE request 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 field with value "negative-delivery", the IP-SM-GW shall send the Instant Message Delivery Notification with a "failed" indication to the associated SIP MESSAGE request 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 field in the CPIM body of the associated SIP MESSAGE request	Process of the IP-SM-GW
"00000000"	Include "positive-delivery"	Shall send Instant Message Delivery Notification to the associated SIP MESSAGE request sender
"00000001" to "00011111" or "01000000" to "11111111"	Include "negative-delivery"	Shall send Instant Message Delivery Notification to the associated SIP MESSAGE request 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 request;
- b) the P-Asserted-Identity header field shall be set to the value of the stored Request-URI of the associated SIP MESSAGE request;
- c) the Accept-Contact header field shall be set with the IM feature tag "+g.oma.sip-im";
- d) the User-Agent header field which shall be set with the IM release version as specified in OMA-TS-SIMPLE_IM [4];
- e) the Content-Type header field 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 SIP 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 SIP 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.

6.1.7 Receiving of the Chat Session invitation request in the terminating network

6.1.7.1 Receiving of the Chat Session SIP INVITE request

Upon receipt of a SIP INVITE request addressed to an SMS user, the IP-SM-GW shall assign an MSISDN to be used by the SMS user for the duration of this Chat session to reach the sender of the SIP INVITE request.

If the SIP INVITE request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this, the originator's identity shall not be revealed to the SMS user for this Chat Session.

If operator policy mandates the SMS user to be informed of the Chat Session invitation, the IP-SM-GW shall proceed with the procedures in subclauses 6.1.7.2, 6.1.7.3 and 6.1.7.4. Otherwise the IP-SM-GW shall proceed with the procedures in subclause 6.1.7.5.

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

Upon receipt of a SIP INVITE request that is to be delivered as a Short Message, the IP-SM-GW:

- 1) may attempt to deliver Chat Session invitation request as SMS over IP, if operator policy sets SMS over IP as highest priority for delivery attempts. If this attempt succeeds, then the IP-SM-GW shall skip subsequent steps;
- 2) shall query the routing information from HSS as described in subclause 6.1.3.2; and
- 3) if routing information is available (SGSN and/or MSC address), the IP-SM-GW shall attempt the delivery of a Short Message over IP, over CS, and PS. The priority order of these attempts is an operator policy.

For the delivery of a Chat Session invitation request as a Short Message over CS/PS, the IP-SM-GW shall send a MT_FORWARD_SHORT_MESSAGE to the MSC or SGSN as described in 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2]. The parameters of the MT_FORWARD_SHORT_MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.18.3.2.

For the delivery of a Chat Session invitation request as a Short Message over IP, the IP-SM-GW shall send an 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]. In addition parameters of the SMSIP MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.7.2.4.

For every attempt the TP-UD element shall contain operator defined data that should convey information to the SMS user that he is invited to send and receive messages in the context of a Chat Session, and include for example, instructions on how to accept, reject and leave the session. Since the TP-OA element is set to an MSISDN assigned by the IP-SM-GW the MSISDN of the original sender shall be included in the information sent to the SMS user unless the SIP INVITE request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this. For a one-to-one Chat Session, the original sender is carried in the P-Asserted-Identity header field of the SIP INVITE request, and for a group Chat Session, the original sender is carried in the Referred-By header field.

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

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

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

- proceed with the procedures in subclause 6.1.7.4; or
- attempt deliver the Short Message in the next domains as specified in subclause 6.1.7.2, if the MT_FORWARD_SHORT_MESSAGE_ACK message contains the User error parameter. If all retries fail, the IP-SM-GW shall send a SIP 4xx or SIP 5xx response to the associated SIP INVITE request. The SIP response 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 IP-SM-GW associated a specific MSISDN for the Chat Session, then the IP-SM-GW shall release that MSISDN.

Upon receipt of an MT_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-DELIVER-REPORT, and if the associated SIP INVITE 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:

- proceed with the procedures in subclause 6.1.7.4, if none of the MT_FORWARD_SHORT_MESSAGE_ACK messages contains the User error parameter; or
- attempt to deliver the Short Message in the next domains as specified in subclause 6.1.7.2, if at least one of the MT_FORWARD_SHORT_MESSAGE_ACK messages contains the User error parameter. If all retries fail, the IP-SM-GW shall send a SIP 4xx or SIP 5xx response to the associated SIP INVITE request. The SIP response 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 IP-SM-GW associated a specific MSISDN for the Chat Session, then the IP-SM-GW shall release that MSISDN.

6.1.7.3.2 Receiving of SMS-DELIVER-REPORT over IP

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

If the SMSIP MESSAGE contains an RP-ERROR message in the body, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.7.2. If all retries fail, the IP-SM-GW shall send a SIP 480 (Temporarily Unavailable) response to the associated SIP INVITE request received before and release the specific MSISDN assigned for this Chat Session.

If the associated SIP INVITE request received before was delivered as concatenated Short Messages and at least one of the SMSIP MESSAGEs contains an RP-ERROR message in the body for the concatenated Short Messages, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.7.2, if at least one of the MT_FORWARD_SHORT_MESSAGE_ACK messages contains the User error parameter. If all retries fail, the IP-SM-GW shall send a SIP 480 (Temporarily Unavailable) response to the associated SIP INVITE request and release the specific MSISDN assigned for this Chat Session.

6.1.7.4 Receiving of the SMS-DELIVER as a response to the Chat Session SIP INVITE request

After receiving a Short Message within an MT_FORWARD_SHORT_MESSAGE associated to the Chat Session where the Short Message contains the operator defined answer to the Chat Session invitation and

- if the answer indicates that the user accepts the Chat Session invitation, the IP-SM-GW shall send a SIP 200 (OK) response to the associated SIP INVITE request according to 3GPP TS 24.229 [3]. Otherwise
- the IP-SM-GW shall send a SIP 603 (Decline) response to the associated SIP INVITE request according to 3GPP TS 24.229 [3]. If the IP-SM-GW associated a specific MSISDN for the Chat Session, then the IP-SM-GW shall release that MSISDN.

6.1.7.5 Sending of the Chat Session SIP 200 (OK) response as a result of the response from the SMS user

The IP-SM-GW shall send a SIP 200 (OK) response to the associated SIP INVITE request according to 3GPP TS 24.229 [3].

6.1.8 Receiving of the Chat Session invitation request in the originating network

6.1.8.1 Receiving of the Chat Session SIP INVITE request

Upon receipt of a SIP INVITE request addressed to an SMS user, the IP-SM-GW shall assign an MSISDN to be used by the SMS user for the duration of this Chat session to reach the sender of the SIP INVITE request. Either a specific MSISDN shall be selected for this Chat Session or the MSISDN reflecting the identity of the originator shall be used. A specific MSISDN shall always be selected for group Chat Sessions, but whether or not a specific MSISDN shall be selected for one-to-one Chat Sessions depends on operator policy.

If the SIP INVITE request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this, a specific MSISDN shall be assigned, and the originator's identity shall not be revealed to the SMS user for this Chat Session.

If operator policy mandates the SMS user to be informed of the Chat Session invitation, the IP-SM-GW shall proceed with the procedures in subclauses 6.1.8.2, 6.1.8.3 and 6.1.8.4. Otherwise the IP-SM-GW shall proceed with the procedures in subclause 6.1.8.5.

6.1.8.2 Sending of the SMS-SUBMIT

The IP-SM-GW shall submit a Short Message to the SC as described in subclause 6.1.18.4 with the following addition:

- TP-UD element shall contain operator defined data that should convey information to the SMS user that he is invited to send and receive messages in the context of a Chat Session, and include for example, instructions on how to accept, reject and leave the session. When the TP-OA element is set to an MSISDN assigned by the IP-SM-GW the MSISDN of the original sender shall be included in the information sent to the SMS user unless the SIP INVITE request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this. For a one-to-one Chat Session, the original sender is carried in the P-Asserted-Identity header field of the SIP INVITE request, and for a group Chat Session, the original sender is carried in the Referred-By header field.

6.1.8.3 Receiving of SMS-SUBMIT-REPORT

Upon receipt of an MO_FORWARD_SHORT_MESSAGE_ACK with the SM-RP-UI parameter set to value SMS-SUBMIT-REPORT, containing the User error parameter, the IP-SM-GW shall send a SIP 480 (Temporarily Unavailable) response to the associated SIP INVITE request and release the specific MSISDN assigned for this Chat Session if one had been assigned.

If the associated SIP INVITE request was delivered as concatenated Short Messages as described in subclause 6.1.8.2, and one of the MO_FORWARD_SHORT_MESSAGE_ACKs for the concatenated Short Messages contains the User error parameter, the IP-SM-GW shall send a SIP 480 (Temporarily Unavailable) response to the associated SIP INVITE request and release the specific MSISDN assigned for this Chat Session if one had been assigned.

6.1.8.4 Receiving of the SMS-DELIVER as a response to the Chat Session invitation

After receiving a Short Message within an MT_FORWARD_SHORT_MESSAGE associated to the Chat Session where the Short Message contains the operator defined answer to the Chat Session invitation, then the IP-SM-GW shall acknowledge the Short Message as described in subclause 6.1.18.5 and

- if the answer indicates that the user accepts the Chat Session invitation, the IP-SM-GW shall send a SIP 200 (OK) response to the associated SIP INVITE request according to 3GPP TS 24.229 [3]. Otherwise
- the IP-SM-GW shall send a SIP 603 (Decline) response to the associated SIP INVITE request according to 3GPP TS 24.229 [3].

6.1.8.5 Sending automatic Chat Session SIP 200 (OK) response

The IP-SM-GW shall send a SIP 200 (OK) response to the associated SIP INVITE request according to 3GPP TS 24.229 [3].

6.1.9 Delivering a Short Message as an MSRP SEND in an ongoing Chat Session anchored in the terminating network

6.1.9.1 Receiving of SMS-DELIVER when recipient is an MSISDN assigned by the IP-SM-GW on the terminating side

When the IP-SM-GW receives a Short Message from the SMS-GMSC where the recipient address in SM-RP-DA was associated with a Chat Session, it shall:

- 1) determine if the Chat Session associated with the recipient address in SM-RP-DA is still active; and
- 2) determine if service level interworking is allowed for the received Short Message. Annex A specifies the transfer protocol level criteria that disallows service level interworking.

If the Chat Session associated with the recipient address in SM-RP-DA is not available anymore, the IP-SM-GW shall create an SMS-Deliver-Report indicating that messages to this recipient cannot be delivered. The procedures described in subclause 6.1.13 ensure that the SMS user is informed that this Chat Session is not available anymore.

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

If the received Short Message is a segment of a concatenated Short Message, the IP-SM-GW shall store and acknowledge all segments except the last segment of the concatenated Short Message.

After receiving either a single Short Message within one MT_FORWARD_SHORT_MESSAGE or a full set of concatenated Short Messages that is to be delivered as a Chat Session message, the IP-SM-GW shall proceed with the procedures in subclause 6.1.9.2.

6.1.9.2 Sending of MSRP SEND request

After receiving either a single Short Message within one MT_FORWARD_SHORT_MESSAGE or a full set of concatenated Short Messages that is to be delivered as a Chat Session message, the IP-SM-GW shall send an MSRP SEND request according to the procedures defined in IETF RFC 4975 [19]. In addition, the IP-SM-GW shall include in the MSRP SEND request:

- a) the To-path set to the MSRP address received in the SDP offer described in subclause 6.1.7;
- b) the From-path set to the MSRP address from the SDP answer described in subclause 6.1.7;
- c) the Message-ID generated according to the rules in IETF RFC 4975 [19];
- d) the Content-Type set to "message/cpim";
- f) Success-Report set to "no" and Failure-Report set to "yes"; and
- g) the body set to the contents of the Short Message(s) formatted in the appropriate MIME type based on received content in the Short Message.

6.1.9.3 Sending of SMS-DELIVER-REPORT

When the final delivery outcome of the MSRP SEND request is known from either a negative or a positive MSRP response, the IP-SM-GW shall create an SMS-Deliver-Report and the IP-SM-GW 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 MSRP response code is not a MSRP 2xx response, then the value of the User error parameter shall be mapped from the MSRP Response Code as described in Table 6.1.9.3.1;

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

Table 6.1.9.3.1: Mapping from MSRP response code to User error parameter

MSRP response code	Value of the user error parameter
400 - Request Unintelligible	System Failure
403 - Action not allowed	System Failure
408 - Request Timeout	System Failure
413 - MSRP Undesired Message	System Failure
415 - Unsupported Media type	System Failure
423 - MSRP parameter out of bounds	System Failure
481 - MSRP session does not exist	System Failure
501 - Request Method not understood	System Failure
506 - Session bound to another connection	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 MSRP response code is not a MSRP 2xx response, then the value of the TP-FCS element shall be mapped from the MSRP response code as described in Table 6.1.9.3.2.

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

Table 6.1.9.3.2: Mapping from MSRP response code to TP-FCS element

MSRP response code	Value of the TP-FCS element
400 - Request Unintelligible	FF Unspecified error cause
403 - Action not allowed	FF Unspecified error cause
408 - Request Timeout	FF Unspecified error cause
413 - MSRP Undesired Message	FF Unspecified error cause
415 - Unsupported Media type	FF Unspecified error cause
423 - MSRP parameter out of bounds	FF Unspecified error cause
481 - MSRP session does not exist	FF Unspecified error cause
501 - Request Method not understood	FF Unspecified error cause
506 - Session bound to another connection	FF Unspecified error cause

6.1.10 Delivering a Short Message as an MSRP SEND request in an ongoing Chat Session anchored in the originating network

6.1.10.1 Receiving of SMS-DELIVER when recipient address is actual MSISDN of recipient

For one-to-one Chat Sessions anchored in the originating network, the procedures described in subclause 6.1.8 have the option to inform the SMS user that this user should use the actual MSISDN of the CPM user to send messages to this Chat Session. The IP-SM-GW shall be able to recognize that such an MSISDN is associated with a Chat Session.

The procedure for receiving a Short Message from an SMS-GMSC are otherwise identical for Chat Sessions anchored in the originating network and for Chat Sessions anchored in the terminating network; the IP-SM-GW shall follow the procedure described in subclause 6.1.9.1.

6.1.10.2 Receiving of SMS-DELIVER when recipient is an MSISDN assigned by the IP-SM-GW on the originating side

The procedure for receiving a Short Message from an SMS-GMSC are identical for Chat Sessions anchored in the originating network and for Chat Sessions anchored in the terminating network; the IP-SM-GW shall follow the procedure described in subclause 6.1.9.1.

6.1.10.3 Sending of MSRP SEND request

The procedure for sending of MSRP SEND requests are identical for Chat Sessions anchored in the originating network and for Chat Sessions anchored in the terminating network; the IP-SM-GW shall follow the procedure described in subclause 6.1.9.2.

6.1.10.4 Sending of SMS-DELIVER-REPORT

The procedure for sending of SMS-DELIVER-REPORT are identical for Chat Sessions anchored in the originating network and for Chat Sessions anchored in the terminating network; the IP-SM-GW shall follow the procedure described in subclause 6.1.9.3.

6.1.11 Delivering an MSRP SEND request in an ongoing Chat Session anchored in the terminating network as a (concatenated) Short Message

6.1.11.1 Receiving of the MSRP SEND request

This subclause describes the procedure when the IP-SM-GW located in the terminating network receives an MSRP SEND request as part of an ongoing Chat Session.

Upon receipt of one or more MSRP SEND requests, which constitute one chat message, the IP-SM-GW shall proceed with the procedures in subclauses 6.1.11.2, 6.1.11.3 and 6.1.11.4.

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

Upon receipt of one or more MSRP SEND request(s), which constitute one chat message that is to be delivered as a Short Message, the IP-SM-GW:

- 1) may attempt to deliver the MSRP SEND request(s) as SMS over IP, if operator policy sets SMS over IP as highest priority for delivery attempts. If this attempt succeeds, then the IP-SM-GW shall skip subsequent steps;
- 2) shall query the routing information from HSS as described in subclause 6.1.3.2; and,
- 3) if routing information is available (SGSN and/or MSC address), the IP-SM-GW shall attempt the delivery of a Short Message over IP, over CS, and PS. The priority order of these attempts is an operator policy.

For the delivery of a chat message, received in one or more MSRP SEND requests as a Short Message over CS/PS, the IP-SM-GW shall send a MT_FORWARD_SHORT_MESSAGE to the MSC/SGSN as described in 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2]. The parameters of the MT_FORWARD_SHORT_MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.18.3.2.

And in addition, the TP-UD element shall contain the content of the MSRP SEND request(s). When the TP-OA element is set to an MSISDN assigned by the IP-SM-GW, the MSISDN of the original sender shall be included in the information sent to the SMS user (unless the Chat Session SIP request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this). For a one-to-one Chat Session, the original sender is carried in the P-Asserted-Identity header field of the SIP request, and for a group Chat Session, the original sender is carried in the Referred-By header field.

For the delivery of a chat message, received in one or more MSRP SEND requests, as a Short Message over IP, the IP-SM-GW shall send one or more SIP MESSAGE request(s) 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]. Each SMSIP MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.18.3.3.

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

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

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

- send an MSRP 200 response to the associated MSRP SEND request sender, if the MT_FORWARD_SHORT_MESSAGE_ACK message does not contain the User error parameter. If the associated MSRP SEND request received before contains a request for Success-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender; or
- attempt to 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 retries fail, the IP-SM-GW shall send an MSRP SEND error response. The response code to be sent is determined by examining the value of the User error parameter. Table 6.1.11.3.1.1 specifies the mapping of the User error parameter as described in 3GPP TS 29.002 [7], to MSRP SEND response codes. If the associated MSRP SEND request received before contains a request for Failure-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request 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 MSRP SEND 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 an MSRP 200 response to the associated MSRP SEND request sender, if none of the MT_FORWARD_SHORT_MESSAGE_ACK messages contains the User error parameter. If the associated MSRP SEND request received before contains a request for Success-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender; or
- attempt to 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 an MSRP error response to the associated MSRP SEND request sender. The MSRP response code to be sent is determined by examining the value of the User error parameter. Table 6.1.11.3.1.1 specifies the mapping of the User error parameter as described in 3GPP TS 29.002 [7], to MSRP response codes. If the associated MSRP SEND request received before contains a request for Failure-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender.

Table 6.1.11.3.1.1: Mapping from User error parameter to MSRP response

Value of the User error parameter	MSRP response code
Unidentified subscriber	413
Absent Subscriber SM	408
Subscriber busy for MT SMS	408
Facility Not Supported	501
Illegal Subscriber indicates that delivery of the mobile terminated Short Message failed because the mobile station failed authentication	501
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;	501
System Failure	501
SM Delivery Failure with cause memory capacity exceeded in the mobile equipment	408
SM Delivery Failure with cause protocol error	501
SM Delivery Failure with cause mobile equipment does not support the mobile terminated Short Message service	501
Unexpected Data Value	501
Data Missing	501

6.1.11.3.2 Receiving of SMS-DELIVER-REPORT over IP

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

If the SMSIP MESSAGE contains an RP-ACK message in the body, and the associated MSRP SEND request received before contains a request for Success-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender. If the associated MSRP SEND request received before was delivered as concatenated Short Messages and all the SMSIP MESSAGEs contain RP-ACK message in the body for the concatenated Short Messages, and the associated MSRP SEND request received before contains a request for a Success-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender.

If the SMSIP MESSAGE contains an RP-ERROR message in the body, the IP-SM-GW shall attempt to deliver the Short Message in the next domains as specified in subclause 6.1.5.6. If all retries fail and the associated MSRP SEND request received before contains a request for a Failure-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender. If the associated MSRP SEND 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, and the associated MSRP SEND request received before contains a request for a Failure-Report, a REPORT shall be sent according to subclause 6.1.11.4 to the associated MSRP SEND request sender.

6.1.11.4 Sending of the MSRP REPORT request

If a positive SMS-DELIVER-REPORT has been received and an MSRP Success REPORT was requested in the MSRP SEND, then the IP-SM-GW shall send a Success REPORT in accordance with RFC 4975 [19].

If a negative SMS-DELIVER-REPORT has been received and an MSRP Failure REPORT was requested in the MSRP SEND, then the IP-SM-GW shall send a Failure REPORT in accordance with RFC 4975 [19].

6.1.12 Submitting an MSRP SEND request in an ongoing Chat Session anchored in the originating network as a (concatenated) Short Message

6.1.12.1 Receiving of the MSRP SEND request

This subclause describes the procedure when the IP-SM-GW located in the originating network receives an MSRP SEND request as part of an ongoing Chat Session.

Upon receipt of one or more MSRP SEND requests, which constitute one chat message, the IP-SM-GW shall proceed with the procedures in subclauses 6.1.12.2, 6.1.12.3 and 6.1.12.4.

6.1.12.2 Sending of the SMS-SUBMIT

The IP-SM-GW shall submit a Short Message to the SMS-SC as described in subclause 6.1.18.4 with the following addition:

- TP-UD element shall contain the content of the MSRP SEND request(s). When the TP-OA element is set to an MSISDN assigned by the IP-SM-GW the MSISDN of the original sender shall be included in the information sent to the SMS user (unless the SIP INVITE request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this). For a one-to-one Chat Session, the original sender is carried in the P-Asserted-Identity header field of the SIP request, and for a group Chat Session, the original sender is carried in the Referred-By header field.

6.1.12.3 Receiving of SMS-SUBMIT-REPORT (over CS/PS or IP)

Upon receipt of an MO_FORWARD_SHORT_MESSAGE_ACK with the SM-RP-UI parameter set to value SMS-SUBMIT-REPORT, containing a positive SMS-SUBMIT-REPORT, and if the associated MSRP SEND request received before contains a request for a Success-Report, a REPORT shall be sent according to subclause 6.1.12.4 to the associated MSRP SEND request sender.

Upon receipt of an 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 MSRP SEND request received before contains a request for a Failure-Report, a REPORT shall be sent according to subclause 6.1.12.4 to the associated MSRP SEND request sender. If the associated MSRP SEND 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, and if the associated MSRP SEND request received before contains a request for a Failure-Report, a REPORT shall be sent according to subclause 6.1.12.4 to the associated MSRP SEND request sender.

6.1.12.4 Sending of the MSRP REPORT request

If a positive SMS-SUBMIT-REPORT has been received and an MSRP Success REPORT was requested in the MSRP SEND, then the IP-SM-GW shall send a Success REPORT in accordance with RFC 4975 [19].

If a negative SMS-SUBMIT-REPORT has been received and an MSRP Failure REPORT was requested in the MSRP SEND, then the IP-SM-GW shall send a Failure REPORT in accordance with RFC 4975 [19].

6.1.13 Handling of the Chat Session teardown request received as a Short Message in the terminating network

6.1.13.1 General

This subclause describes the procedure when the IP-SM-GW located in the terminating network interworks a Short Message requesting to leave a Chat Session to a Chat Session BYE request.

IP-SM-GW procedures at the reception of the Short Message are described in subclause 6.1.13.2.

The creation of the Short Message delivery report is described in subclause 6.1.13.3.

IP-SM-GW procedures to send a BYE request to the Chat Session are described in subclause 6.1.18.2.

6.1.13.2 Receiving of SMS-DELIVER containing a Chat Session teardown request

When the IP-SM-GW in the terminating networks receives a Short Message from the SMS-GMSC it shall determine if the message from a served SM user is a Chat Session teardown request, i.e. the SM user intends to leave a group Chat Session or to tear down a one-to-one Chat Session. The received Short Message is a Chat Session teardown request if:

- 1) the Short Message is sent to a Chat Session where the SM user participates as described in subclause 6.1.18.1; and
- 2) the Short Message contains operator defined text indicating a teardown request.

If the received Short Message is a Chat Session teardown request, then the IP-SM-GW shall acknowledge the Short Message as described in subclause 6.1.18.5 and leave the Chat Session as described in subclause 6.1.18.2.

6.1.14 Handling of the Chat Session teardown request received as a Chat Session BYE in the terminating network

6.1.14.1 Receiving of the Chat Session BYE request

This subclause describes the procedure when the IP-SM-GW located in the terminating network receives a Chat Session SIP BYE request to tear down a Chat Session.

If operator policy mandates the SMS user to be informed of the Chat Session teardown, then the IP-SM-GW shall proceed with the procedures in subclauses 6.1.14.2, 6.1.14.3 and 6.1.14.4. Otherwise the IP-SM-GW shall proceed with the procedures in subclause 6.1.14.4.

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

Upon receipt of a Chat Session teardown request as a SIP BYE request that is to be delivered as a Short Message, the IP-SM-GW:

- 1) may attempt to deliver Chat Session teardown request as SMS over IP, if operator policy sets SMS over IP as highest priority for delivery attempts. If this attempt succeeds, then the IP-SM-GW shall skip subsequent steps;
- 2) shall query the routing information from HSS as described in subclause 6.1.3.2; and,
- 3) if routing information is available (SGSN and/or MSC address), the IP-SM-GW shall attempt the delivery of a Short Message over IP, over CS, and PS. The priority order of these attempts is an operator policy.

For the delivery of a Chat Session teardown request as a Short Message over CS/PS, the IP-SM-GW shall send a MT_FORWARD_SHORT_MESSAGE to the MSC/SGSN as described in 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2]. The parameters of the MT_FORWARD_SHORT_MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.18.3.2.

For the delivery of a Chat Session teardown request as a Short Message over IP, the IP-SM-GW shall send an 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 subclauses 6.1.18.3.1 and 6.1.18.3.3.

For every attempt the TP-UD element shall contain operator defined data that should convey information to the SMS user that (s)he is removed from a Chat Session. Since the TP-OA element is set to an MSISDN assigned by the IP-SM-GW the MSISDN of the original sender shall be included in the information sent to the SMS user (unless the Chat Session SIP request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this). For a one-to-one Chat Session, the original sender is carried in the P-Asserted-Identity header field of the SIP request, and for a group Chat Session, the original sender is carried in the Referred-By header field.

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

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

Upon receipt of an MT_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-DELIVER-REPORT the IP-SM-GW shall proceed with the procedures in subclause 6.1.14.4.

NOTE: It is assumed that the associated SIP BYE request received before was delivered as a single Short Message.

6.1.14.3.2 Receiving of SMS-DELIVER-REPORT over IP

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

NOTE: It is assumed that the associated SIP BYE request received before was delivered as a single Short Message.

6.1.14.4 Sending of the SIP 200 (OK) response to a BYE request for a Chat Session

The IP-SM-GW shall send a SIP 200 (OK) response to the SIP BYE request. If the IP-SM-GW associated a specific MSISDN for the Chat Session, then the IP-SM-GW shall release that MSISDN.

6.1.15 Handling of the Chat Session teardown request received as a Short Message in the originating network

This section describes the procedure when the IP-SM-GW located in the originating network interworks a Short Message requesting to leave a Chat Session to a Chat Session BYE request.

IP-SM-GW procedures at the reception of the Short Message are described in subclause 6.1.13.2.

The creation of the Short Message delivery report is described in subclause 6.1.13.3.

IP-SM-GW procedures to send a BYE request to the Chat Session are described in subclause 6.1.18.2.

6.1.16 Handling of the Chat Session teardown request received as a Chat Session BYE in the originating network

6.1.16.1 Receiving of the Chat Session BYE request

This section describes the procedure when the IP-SM-GW located in the originating network receives a Chat Session BYE request to tear down a Chat Session.

If operator policy mandates the SMS user to be informed of the Chat Session teardown, then the IP-SM-GW shall proceed with the procedures in subclauses 6.1.16.2, 6.1.16.3 and 6.1.14.4. Otherwise the IP-SM-GW shall proceed with the procedures in subclause 6.1.14.4.

6.1.16.2 Sending of the SMS-SUBMIT

The IP-SM-GW shall submit a Short Message to the SC as described in subclause 6.1.18.4 with the following addition:

- TP-UD element shall contain operator defined data that should convey information to the SMS user that (s)he is removed from a Chat Session. When the TP-OA element is set to an MSISDN assigned by the IP-SM-GW the MSISDN of the original sender shall be included in the information sent to the SMS user (unless the SIP INVITE request contains the Privacy header field with "header" or "user" or "id" and the operator policy allows this). For a one-to-one Chat Session, the original sender is carried in the P-Asserted-Identity header field of the SIP request, and for a group Chat Session, the original sender is carried in the Referred-By header field.

6.1.16.3 Receiving of SMS-SUBMIT-REPORT (over CS/PS or IP)

Upon receipt of an MT_FORWARD_SHORT_MESSAGE_ACK message with the SM-RP-UI parameter set to value SMS-SUBMIT-REPORT the IP-SM-GW shall proceed with the procedures in subclause 6.1.14.4.

NOTE: It is assumed that the associated SIP BYE request received before was delivered as a single Short Message.

6.1.17 Handling of Participant Information

6.1.17.1 General

When a group Chat Session has been established and operator policy mandates that the SMS user is informed of changes in the participation of group Chat Sessions then the IP-SM-GW shall follow the procedures:

- in subclause 6.1.17.2, 6.1.17.3 and 6.1.17.4 when interworking in the terminating network; or
- in subclause 6.1.17.2, 6.1.17.3 and 6.1.17.5 when interworking in the originating network.

6.1.17.2 Subscribing to Participant Information

The IP-SM-GW, acting as CPM Client on behalf of the SMS user, shall subscribe to receive Participant Information as described in OMA-TS-CPM_Conv_Funct [17].

6.1.17.3 Receiving of a Participant Information Notification

When the IP-SM-GW receives a SIP NOTIFY request that is part of the same SIP dialog as the previously sent SIP SUBSCRIBE request for subscribing to Participant Information, the IP-SM-GW shall follow the procedures in OMA-TS-CPM_Conv_Funct [17] with the following exception:

- to display the current Participant Information of the group Chat Session to the SMS user the IP-SM-GW shall proceed with the procedure in subclause 6.1.17.4 when interworking in the terminating network; and
- to display the current Participant Information of the group Chat Session to the SMS user the IP-SM-GW shall proceed with the procedures in subclause 6.1.17.5 when interworking in the originating network.

The frequency of sending Participant Information to the SMS user is subject to operator policy.

6.1.17.4 Sending Participant Information as SMS-Deliver when interworking in the terminating network

To deliver Participant Information to the SMS user when interworking in the terminating network the IP-SM-GW:

- 1) may attempt to deliver the Participant Information as SMS over IP, if operator policy sets SMS over IP as highest priority for delivery attempts. If this attempt succeeds, then the IP-SM-GW shall skip subsequent steps;
- 2) shall query the routing information from HSS as described in subclause 6.1.3.2; and
- 3) if routing information is available (SGSN and/or MSC address), the IP-SM-GW shall attempt the delivery of a Short Message over IP, over CS, and PS. The priority order of these attempts is an operator policy.

For the delivery Participant Information as a Short Message over CS/PS, the IP-SM-GW shall send a MT_FORWARD_SHORT_MESSAGE to the MSC or SGSN as described in 3GPP TS 29.002 [7] and 3GPP TS 23.040 [2]. The parameters of the MT_FORWARD_SHORT_MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.18.3.2. In addition the TP-UD element shall contain operator defined data that conveys Participant Information (e.g. users who have joined or left) to the SMS user.

For the delivery of Participant Information as a Short Message over IP, the IP-SM-GW shall send a SIP MESSAGE request 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]. In addition parameters of the SMSIP MESSAGE shall be set as described in subclauses 6.1.18.3.1 and 6.1.18.3.3. In addition the TP-UD element shall contain operator defined data that conveys Participant Information (e.g. users who have joined or left) to the SMS user.

The IP-SM-GW shall proceed with receiving of an SMS-DELIVER-REPORT in accordance with 3GPP TS 23.040 [2]. If this MT_FORWARD_SHORT_MESSAGE_ACK contains the User error parameter the IP-SM-GW shall attempt to deliver in the next domains as specified in subclause 6.1.7.3 for a Chat Session INVITE request. No further procedures are defined on reception of the SMS-DELIVER-REPORT as interworking of this message is not required for Participant Information.

6.1.17.5 Sending Participant Information as SMS-SUBMIT when interworking in the originating network

To deliver Participant Information to the SMS user when interworking in the originating network the IP-SM-GW shall submit a Short Message to the SMS-SC as described in subclause 6.1.18.4. In addition the TP-UD element shall contain operator defined data that conveys Participant Information (e.g. users who have joined or left) to the SMS user.

The IP-SM-GW shall proceed with receiving of an SMS-SUBMIT-REPORT in accordance with 3GPP TS 23.040 [2]. No further procedures are defined on reception of the SMS-SUBMIT-REPORT as interworking of this message is not required for Participant Information.

6.1.18 Common procedures for chat session interworking

6.1.18.1 Determining if a received Short Message is associated to a Chat Session

When the IP-SM-GW receives a Short Message from the SMS-GMSC, it shall determine if the message is associated with a Chat Session. The received Short Message is associated with a Chat Session if:

- 1) the Short Message is addressed to the MSISDN assigned to the Chat Session, as described in subclauses 6.1.7.1 and 6.1.8.1; and
- 2) the originator of the Short Message is the SM user invited to the Chat Session using that MSISDN.

6.1.18.2 Leaving a Chat Session

After sending the SMS-DELIVER-REPORT for the Chat Session teardown request the IP-SM-GW shall send a SIP BYE request to leave a group Chat Session or to tear down a one-to-one Chat Session as described in OMA-TS-CPM_System_Description [20].

If the IP-SM-GW associated a specific MSISDN for the Chat Session, then the IP-SM-GW shall release that MSISDN.

6.1.18.3 Sending SMS-DELIVER – common procedures

6.1.18.3.1 General

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. 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 0;
- f) TP-OA element set to the E.164 address used by the IP-SM-GW for the duration of the Chat Session;
- 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 SIP INVITE request; and
- j) TP-UDL element set in accordance with 3GPP TS 23.040 [2].

NOTE 2: Contents of the TP-UD element defined separately for each procedure.

If the content of the operator defined text or chat message to be sent 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 the case of receiving an 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 remaining segments.

3GPP TS 23.040 [2] specifies that a Short Message supports GSM 7-bit and UCS2 encoded text. The IP-SM-GW shall ensure the operator defined text is encoded using the appropriate data coding scheme.

6.1.18.3.2 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 INVITE request 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.

6.1.18.3.3 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 INVITE 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;
 - d) RP-Destination Address element shall be set to the MSISDN of the associated SIP INVITE request receiver, retrieved by the IP-SM-GW as part of the subscriber data from the HSS at registration; and
 - e) RP-User Data set to SMS-DELIVER.

6.1.18.4 Sending SMS-SUBMIT – common procedures

NOTE 1: The sender is either the MSISDN of the CPM user or an MSISDN assigned by the IP-SM-GW for this particular Chat Session as described in subclause 6.1.8.1.

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 parameter 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;
- SM-RP-OA parameter set based on the MSISDN assigned in section 6.1.8.1;
- 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) TP VPF element set to 00 (TP VP field not present);
 - d) TP-UDHI element set in accordance with 3GPP TS 23.040 [2];
 - e) TP-SRR element shall be set to 0 (A status report is not requested);
 - f) TP-MR element set in accordance with 3GPP TS 23.040 [2];
 - g) TP-RP element set to 0 (TP Reply Path parameter is not set in this SMS SUBMIT);
 - h) TP-DA element set based on the value of the Request-URI in the SIP INVITE request as long as the Request-URI contains an E.164 address;
 - i) TP-PI element set to 00000000 (SME-to-SME protocol);
 - j) TP-DCS element set in accordance with 3GPP TS 23.040 [2]; and
 - k) TP-UDL element set in accordance with 3GPP TS 23.040 [2].

NOTE 2: Contents of the TP-UD element defined separately for each procedure.

If the content of the operator defined text or chat message to be sent 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 the case of receiving an 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 remaining segments.

3GPP TS 23.040 [2] specifies that a Short Message supports GSM 7-bit and UCS2 encoded text. The IP-SM-GW shall ensure the operator defined text is encoded into an appropriate data coding scheme supported for Short Messages.

6.1.18.5 Sending SMS-DELIVER-REPORT

If the IP-SM-GW decided to send an SMS-DELIVER-REPORT, the IP-SM-GW 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];

NOTE 1: The User error parameter is not contained in the MT-FORWARD-SHORT-MESSAGE-ACK message.

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

NOTE 2: The TP-FCS element is not contained in the SMS-DELIVER-REPORT.

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 Description Depends on the use of TP-DCS bits 3..0	Service Level Interworking allowed (Y/N)															
00xx	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]	n/a															
	Bit 4, if set to 0, indicates that bits 1 to 0 are reserved and have no message class meaning	Y															
	Bit 4, if set to 1, indicates that bits 1 to 0 have a message class meaning::																
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Bit 1</th> <th style="width: 25%;">Bit 0</th> <th style="width: 50%;">Message Class</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td>Class 0</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>Class 1 Default meaning: ME-specific.</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td>Class 2 (U)SIM specific message</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td>Class 3 Default meaning: TE specific (see 3GPP TS 27.005 [15])</td> </tr> </tbody> </table>	Bit 1	Bit 0	Message Class	0	0	Class 0	0	1	Class 1 Default meaning: ME-specific.	1	0	Class 2 (U)SIM specific message	1	1	Class 3 Default meaning: TE specific (see 3GPP TS 27.005 [15])	Y
	Bit 1	Bit 0	Message Class														
	0	0	Class 0														
	0	1	Class 1 Default meaning: ME-specific.														
	1	0	Class 2 (U)SIM specific message														
	1	1	Class 3 Default meaning: TE specific (see 3GPP TS 27.005 [15])														
			Y														
		N															
		Y															
Bits 3 and 2 indicate the character set being used, as follows :																	
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Bit 3</th> <th style="width: 25%;">Bit2</th> <th style="width: 50%;">Character set:</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td>GSM 7 bit default alphabet</td> </tr> <tr> <td style="text-align: center;">0</td> <td style="text-align: center;">1</td> <td>8 bit data</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">0</td> <td>UCS2 (16bit)</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">1</td> <td>Reserved</td> </tr> </tbody> </table>	Bit 3	Bit2	Character set:	0	0	GSM 7 bit default alphabet	0	1	8 bit data	1	0	UCS2 (16bit)	1	1	Reserved	n/a	
Bit 3	Bit2	Character set:															
0	0	GSM 7 bit default alphabet															
0	1	8 bit data															
1	0	UCS2 (16bit)															
1	1	Reserved															
NOTE: The special case of bits 7..0 being 0000 0000 indicates the GSM 7 bit default alphabet with no message class		Y															
01xx	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	See Group 00xx															
	Reserved coding groups	n/a															
1000..1011	Reserved coding groups	n/a															

TP-DCS Coding Group	TP-DCS Description Depends on the use of TP-DCS bits 3..0	Service Level Interworking allowed (Y/N)
TP-DCS Bits 7..4 1100	<p>Message Waiting Indication Group: Discard Message</p> <p>The specification for this group is exactly the same as for Group 1101, except that:</p> <ul style="list-style-type: none"> - after presenting an indication and storing the status, the ME may discard the contents of the message. <p>The ME shall be able to receive, process and acknowledge messages in this group, irrespective of memory availability for other types of Short Message.</p>	N
1101	<p>Message Waiting Indication Group: Store Message</p> <p>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 [22]) or USIM (see 3GPP TS 31.102 [21]) 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.</p> <p>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.</p> <p>Bits 3 indicates Indication Sense:</p> <p>Bit 3</p> <p>0 Set Indication Inactive 1 Set Indication Active</p> <p>Bit 2 is reserved, and set to 0</p> <p>Bit 1 Bit 0 Indication Type:</p> <p>0 0 Voicemail Message Waiting 0 1 Fax Message Waiting 1 0 Electronic Mail Message Waiting 1 1 Other Message Waiting*</p> <p>* Mobile manufacturers may implement the "Other Message Waiting" indication as an additional indication without specifying the meaning.</p>	N
1110	<p>Message Waiting Indication Group: Store Message</p> <p>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.</p>	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	IETF RFC 822 [23] 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

TP-PID Bits 76	TP-PID Description	Service Level Interworking Allowed (Y/N)	
00	<p>bit 5 indicates telematic interworking:</p> <p>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.</p> <p>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.</p>	Y	
01	bits 5..0 are used as defined below		
	Bit 5..0		
	000000	Short Message Type 0	Y
	000001	Replace Short Message Type 1	Y
	000010	Replace Short Message Type 2	Y
	000011	Replace Short Message Type 3	Y
	000100	Replace Short Message Type 4	Y
	000101	Replace Short Message Type 5	Y
	000110	Replace Short Message Type 6	Y
	000111	Replace Short Message Type 7	Y
	001000..011101	Reserved	n/a
	011110	Enhanced Message Service (Obsolete)	n/a
	011111	Return Call Message	Y
	100000..111011	Reserved	n/a
	111100	ANSI-136 R-DATA	N
	111101	ME Data download	N
	111110	ME De-personalization Short Message	N
111111	(U)SIM Data download	N	
10	reserved	n/a	
11	Assigns bit 0-5 for SC specific use	undefined	

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 [24].

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
2009-12	TSG#46				Automatic upgrade from previous Release	8.1.0	9.0.0
2010-03	TSG#47	CP-100092	002	1	Miscellaneous correction and alignments	9.0.0	10.0.0
2010-03	TSG#47	CP-100092	006	2	Modifications to the general sections	9.0.0	10.0.0
2010-03	TSG#47	CP-100092	013	1	CPM-SMS interworking	9.0.0	10.0.0
2010-06	TSG#48	CP-100324	014		Terminology alignment for SMSIP MESSAGE	10.0.0	10.1.0
2010-06	TSG#48	CP-100324	015	1	Correction of references	10.0.0	10.1.0
2010-06	TSG#48	CP-100324	016	1	Handling of Session Information during Chat Session	10.0.0	10.1.0
2010-06	TSG#48	CP-100324	017		Miscellaneous corrections	10.0.0	10.1.0
2010-06	TSG#48	CP-100324	018		Missing continuation in 6.1.9.1	10.0.0	10.1.0
2010-06	TSG#48	CP-100324	019		MSRP SEND mapping to Short Message during Chat Session	10.0.0	10.1.0
2010-09	TSG#49	CP-100560	020	2	Correcting errors in 3GPP TS 29.311	10.1.0	10.2.0
2010-09	TSG#49	CP-100560	021		Removal of an editor's note about cpim	10.1.0	10.2.0
2011-03	TSG#51	CP-110115	022		Minor corrections	10.2.0	10.3.0
2011-03	TSG#51	CP-110115	023		Remove unexplained NOTES	10.2.0	10.3.0
2011-09	TSG#53	CP-110606	026		Correction of SMS delivery creation in IP-SM-GW	10.3.0	10.4.0
2011-09	TSG#53	CP-110606	029	1	Anonymous SMS	10.3.0	10.4.0
2012-09	TSG#57				Automatic upgrade from previous Release version 10.4.0	10.4.0	11.0.0
2013-06	TSG#60	CP-130314	033		Correcting an invalid reference	11.0.0	11.1.0
2014-10					Automatic upgrade from previous Release	11.1.0	12.0.0
2015-03	TSG#67	CP-150096	038	2	Bugfix: do not send negative-delivery IMDN after sending SIP 4xx/5xx response	12.0.0	12.1.0
2015-12					Automatic upgrade from previous Release	12.1.0	13.0.0
Change history							
Date	TSG #	TSG Doc.	CR	Rev	Cat	Subject/Comment	New
2017-03	CT#75					Automatic upgrade from previous Release	14.0.0

History

Document history		
V14.0.0	April 2017	Publication