



# Reqs-LTE-SMS

Device Requirements

Issued: Mar-16

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# LTE SMS

Revision History			
Version	Author	Description of Changes	Date
1.0	Verizon Wireless	Initial Release	November 2009
1.1	Verizon Wireless	Update to section 4.2.1.2	December 2009
1.2	Verizon Wireless	Updates to sections 4.2.1.3.3, 4.2.1.3.10, 4.2.1.3.11, 5.1.1.1, 5.1.1.2.2.1, 5.1.1.5, 6.1, 7	February 2010
2.0	Verizon Wireless	Added section 5.1.1.11	May 2010
3.0	Verizon Wireless	Added section 5.1.1 Merged section 5.1.1.11 into section 5.1.1 Updates to sections 4.2.1.3.5, 4.2.1.3.9, 5.1.2.1, 6.1, 7	June 2010
4.0	Verizon Wireless	Updates to sections 4.2.1.3.3 and 7 to clarify IPSec requirements, Section 4.2.1.3.4 removed	August 2010
5.0	Verizon Wireless	Updates to sections 4.2.1.3.1, 4.2.1.3.2, 4.2.1.3.9, 4.2.1.3.10, 5.1.1.3.1, 5.1.1.3.2, 5.1.1.3.1.3, 5.1.1.3.2.2, 5.1.2.1, 5.1.2.3, 5.1.2.6, 5.1.2.10, 6.1	September 2010
6.0	Verizon Wireless	Updates to sections 1.2, 4.2.1.3.1, 5.1.1.1, 5.1.1.2, 5.1.2.1, 5.1.2.1.1, 5.1.2.1.2, 5.1.2.2.3, 5.1.2.3, 5.1.2.5, 5.1.2.10, 7 Updates to Release 9 throughout the document	December 2010
7.0	Verizon Wireless	Updates to sections 1, 5.1.2.2.1, 5.1.2.2.2, 5.1.2.2.2.2, 5.1.2.3, 5.1.2.4, 5.1.2.5, 7	March 2011
8.0	Verizon Wireless	Updates to sections 1.1, 4.2.1.3.11, 5.1.2.2.2.1, 5.1.2.3, 5.1.2.4	June 2011
9.0	Verizon Wireless	Updates to sections 4.2.1.3.2, 7	September 2011
10.0	Verizon Wireless	Updates to sections 4.2.1.3.1, 4.2.1.3.8, 5.1.2.1.1	December 2011

11.0	Verizon Wireless	Updates to sections 4.2.1.3.10, 5.1.1.3, 5.1.1.4	February 2012
12.0	Verizon Wireless	Updates to sections 5.1.1.3, 5.1.1.4, 5.1.1.5, 5.1.2.1, 5.1.2.9	April 2012
13.0	Verizon Wireless	Updates to sections 5.1.1.3.3, 5.1.1.3.5	July 2012
14.0	Verizon Wireless	Updates to section 5.1.2.2.3, 5.1.2.7  All IMS registration related requirements moved to the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements.	February 2013
15.0	Verizon Wireless	Update to section 5.1.2.1.6  P-Access-Network-Info header included in SIP MESSAGE method for any SMS message that is sent.	April 2014
16.0	Verizon Wireless	Update to section 5.1.2..2.2.2 for support of CDMALess devices	June 2015
17.0	Verizon Wireless	Added section 4.2.2 for support of SMS Over NAS	October 2015
18.0	Verizon Wireless	Added requirement for SMS Retry using SMS Over NAS	February 2016

## 1 INTRODUCTION VZ\_REQ\_LTESMS\_30206

This publication is part of Verizon Wireless' compliance with the FCC's rules for 700 MHz C Block (47 C.F.R. § 27.16), as explained in the FCC's Second Report and Order in WT Docket No. 06-150, "Service Rules for the 698-746, 747-762 and 777-792 MHz Bands" released on August 10, 2007.

In this document, the terms LTE (Long Term Evolution) and E-UTRA (Evolved Universal Terrestrial Radio Access) are considered equivalent.

### 1.1 APPLICABILITY VZ\_REQ\_LTESMS\_30219

These requirements apply to devices designed to operate on the Verizon Wireless LTE 3GPP Band 13 network. 3GPP Band 13 is per 3GPP TS 36.101: *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception.*

Support for user text SMS messages is optional for data-centric devices that are not held up to the head.

For any questions related to this document, please contact Verizon Wireless through the Verizon Wireless Open Development website.

**1.1.1** VZ\_REQ\_LTESMS\_29573

All devices shall support administrative SMS messages for the OTADM application and the SIM OTA application (Announcement 04-2011-2).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

**1.2 3GPP RELEASE 9 SPECIFICATIONS** VZ\_REQ\_LTESMS\_30221

Please refer to the *3GPP Release 9 Specifications* section of the *Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirement* Ref. [12].

**1.3** VZ\_REQ\_LTESMS\_30223

This section defines acronyms and terms used throughout the document.

Term [Abbreviation (if Applicable)]	Definition
3GPP	3 <sup>rd</sup> Generation Partnership Project, manages LTE, GSM, and UMTS standards
DNS	Domain Name System
FFS	For Future Study
FQDN	Fully Qualified Domain Name
IMS	IP Multimedia Subsystem
IMSI	International Mobile Station Identity
ISIM	IP Multimedia Services Identity Module
MDN	Mobile Directory Number



MO	Mobile Originated
MT	Mobile Terminated
P-CSCF	Proxy- CSCF server
SDP	Session Description Protocol
SIP	Session Initiation Protocol. Note that in this document the term SIP refers to Session Initiation Protocol, and it does not refer to Simple IP.
SMS	Short Message Service
UICC	Universal Integrated Circuit Card
USIM	Universal Subscriber Identity Module

Scope: [Branded, Open Development]

## 1.4 REQUIREMENTS LANGUAGE VZ\_REQ\_LTESMS\_30233

This document uses the following verbal forms in conjunction with requirements:

- "*Shall*" or "*Shall not*" indicates the requirement is mandatory
- "*Should*" indicates the requirement is recommended but not mandatory
- "*May*" indicates the requirement is optional

## 2 USER INTERFACE VZ\_REQ\_LTESMS\_30208

### 2.1 VZ\_REQ\_LTESMS\_29525

The user interface for SMS is provided by the device user interface or the connection manager user interface for tethered devices. For tethered data devices, the connection manager software runs on the host Personal Computer, and the PC is then connected to the LTE data device.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 3 HARDWARE SPECIFICATIONS VZ\_REQ\_LTESMS\_30210

### 3.1 VZ\_REQ\_LTESMS\_29526

For hardware related requirements see the document 'Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements.?'

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 4 SOFTWARE SPECIFICATIONS VZ\_REQ\_LTESMS\_30212

The requirements defined in this section provide SMS functionality for LTE devices operating on the Verizon Wireless LTE 3GPP Band 13 network.

### 4.1 DEVICE BASED VZ\_REQ\_LTESMS\_30235

#### 4.1.1 SUPPORT FOR ISIM AND USIM VZ\_REQ\_LTESMS\_30247

##### 4.1.1.1 VZ\_REQ\_LTESMS\_29527

The SMS over IMS functionality requires that the device support the ISIM module and the USIM module on the UICC. The details on the ISIM, USIM, and UICC requirements are found in the Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements, Ref. [12].

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 4.2 NETWORK TO/FROM DEVICE VZ\_REQ\_LTESMS\_30236

#### 4.2.1 IMS VZ\_REQ\_LTESMS\_30253

VOID

**NOTE:** Please refer to the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements for all IMS registration related requirements.

## 4.2.1.1 SMS OVER IMS - OVERVIEW **VZ\_REQ\_LTESMS\_30258**

### 4.2.1.1.1 **VZ\_REQ\_LTESMS\_29575**

This section provides a high level description of how the SMS functionality is provided on the LTE device. Shortly after the device powers up and finds the LTE RF signal, the device attaches to the LTE network and gets an IPv6 address. The SMS over IMS client on the device then performs IMS registration with the network. If the IMS registration is successful, then the device is ready to transmit and receive SMS messages.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 4.2.1.1.2 **VZ\_REQ\_LTESMS\_29576**

For Mobile Originated SMS, the user enters the text for the SMS message on the device user interface or the connection manager software (which is running on the PC) for tethered devices. For tethered devices, the connection manager software then relays the text of the message to the device. Using the SMS over IMS method, the device generates the MO SMS as a SIP MESSAGE (containing the SMS text) and transmits the SIP MESSAGE over the LTE network.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 4.2.1.1.3 **VZ\_REQ\_LTESMS\_29578**

For Mobile Terminated SMS, the network pages the device and then delivers to the device the MT SMS in a SIP MESSAGE format. From the SIP MESSAGE, the device extracts the payload containing the text of the SMS message. It then determines whether the SMS is a text message for the end user or the SMS is an application directed message. When the SMS is for the end user, the device then displays the text using the device user interface or relays the text of the SMS message to the connection manager software for devices tethered to a PC.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 4.2.1.2 DEVICE- NETWORK ATTACHMENT **VZ\_REQ\_LTESMS\_30259**

VOID

## 4.2.1.3 IMS REGISTRATION **VZ\_REQ\_LTESMS\_30260**

VOID

**4.2.1.3.1 PROXY-CSCF DISCOVERY** VZ\_REQ\_LTESMS\_30262

VOID

**4.2.1.3.2 REGISTRATION WITH THE PROXY-CSCF AND S-CSCF** VZ\_REQ\_LTESMS\_30263

VOID

**4.2.1.3.3 AUTHENTICATION DURING REGISTRATION** VZ\_REQ\_LTESMS\_30265

VOID

**4.2.1.3.4 FEATURE TAG FOR IMS REGISTRATION ? VOID** VZ\_REQ\_LTESMS\_30266

Feature tag requirements for IMS registration have been removed.

**4.2.1.3.5 URI FORMATTING** VZ\_REQ\_LTESMS\_30269

VOID

**4.2.1.3.6 SUBSCRIPTION TO THE REG EVENT PACKAGE** VZ\_REQ\_LTESMS\_30270

VOID

#### 4.2.1.3.7 REREGISTRATION VZ\_REQ\_LTESMS\_30271

VOID

#### 4.2.1.3.8 DEREGISTRATION VZ\_REQ\_LTESMS\_30272

VOID

#### 4.2.1.3.9 DEVICE IDENTITY AND RELATED PARAMETERS VZ\_REQ\_LTESMS\_30273

VOID

**NOTE:** *Device identity and device identity related parameters are needed for both IMS registration and the implementation of the SMS over IMS service. Please refer to the IMS registration sections of the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements for requirements on the device identity and device identity related parameters for IMS.*

#### 4.2.1.3.10 DEVICE POWER DOWN PROCEDURE VZ\_REQ\_LTESMS\_30274

VOID

#### 4.2.1.3.11 SMS OVER IMS CONTROL VZ\_REQ\_LTESMS\_30275

VOID

**NOTE:** *Please refer to the IMS registration sections of the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements for requirements on SMS over IMS control.*

#### 4.2.1.4 SIP TIMER VALUES VZ\_REQ\_LTESMS\_30261

##### 4.2.1.4.1 SIP TIMERS FOR IMS VZ\_REQ\_LTESMS\_30276

VOID

**NOTE:** *The SIP timers for IMS apply to both SIP signaling for IMS registration and SIP signaling for the SMS over IMS service. Please refer to the IMS registration sections of the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements for requirements on the SIP timers for IMS.*

#### 4.2.2 SMS Over NAS VZ\_REQ\_LTESMS\_40090

##### 4.2.2.1 VZ\_REQ\_LTESMS\_40091

LTE devices

The planned Verizon low cost LTE Cat 1/0 device launch on existing LTE network requires a Non-IMS SMS service for device wakeup (a.k.a. shoulder tap). The planned NAS SMS service is based on 3GPP standards.

LTE data-centric devices which do not support IMS shall support SMS over NAS method, for handling MO and MT SMS messages.

All LTE devices shall support SMS over NAS method for outbound roaming when the roaming network does not support VoLTE, or when IMS registration fails.

IMS capable devices shall not be allowed to fall back to SMS over NAS when operating on the VzW network if IMS registration fails.

When operating in SMS over NAS mode, the device shall provide an interface to applications on the device to handle:

- Wakeup/shoulder tap
- Submit response (interim deliver status)
- Delivery receipt
- MO (device initiated) messages

When operating in SMS over NAS mode, the device shall send acknowledgement to the network (MME) in response to receipt of SMS wakeup message from OMA-DM server.

When operating in SMS over NAS mode, the maximum message size shall be 140 bytes. Multi-segmented messages are not supported in SMS over NAS mode.

Please refer to LTE 3GPP Band 13 Network Access Requirements and LTE Data Devices Requirements documents for additional SMS over NAS device requirements.

Scope: [Branded]

#### **4.2.2.2** VZ\_REQ\_LTESMS\_41132

LTE data-centric devices which do not support IMS and which support SMS over NAS method shall also support retry mechanism for sending MO SMS using SMS over NAS method. The device makes an initial attempt to send the MO SMS. The device shall support a retry mechanism where the device waits 30 seconds and then performs a second attempt to send the MO SMS using SMS over NAS.

If the second attempt to send MO SMS succeeds, then the device shall provide this feedback to the device user interface or the connection manager software for tethered devices.

If the second attempt to send MO SMS is a failure, then the device shall provide a failure indication to the device user interface or the connection manager software for tethered devices.

Scope: [Branded]

## **5 SCENARIOS** VZ\_REQ\_LTESMS\_30215

### **5.1 NETWORK & DEVICE** VZ\_REQ\_LTESMS\_30237

#### **5.1.1 IMS REGISTRATION** VZ\_REQ\_LTESMS\_30277

##### **5.1.1.1 NORMAL SMS OPERATION** VZ\_REQ\_LTESMS\_30279

VOID

##### **5.1.1.1.1 MSISDN AND MSISDN-BASED SIP URI VALIDITY** VZ\_REQ\_LTESMS\_30285

VOID

**5.1.1.2 LIMITED ACCESS SMS OPERATION** VZ\_REQ\_LTESMS\_30281

VOID

**5.1.1.3 IMS REGISTRATION ERRORS** VZ\_REQ\_LTESMS\_30282

**5.1.1.3.1 IMS REGISTRATION FAILURE OR REJECTION BY THE NETWORK (GENERAL CASE)** VZ\_REQ\_LTESMS\_30286

VOID

**5.1.1.3.1.1 NETWORK REJECTS THE IMS REGISTRATION WITH A ?SIP 404 ? NOT FOUND? MESSAGE** 14 VZ\_REQ\_LTESMS\_30296

VOID

**5.1.1.3.1.2 5.1.1.3.1.2 NETWORK REJECTS THE IMS REGISTRATION WITH A ?SIP 403 ? FORBIDDEN? MESSAGE** 14 VZ\_REQ\_LTESMS\_30297

VOID

**5.1.1.3.1.3 NETWORK FAILS TO RESPOND TO AN IMS REGISTRATION BEFORE THE SIP TIMEOUT TIMER EXPIRES OR NETWORK REJECTS THE IMS REGISTRATION WITH A ?SIP 503 ? SERVICE UNAVAILABLE? OR ?SIP 408 ? REQUEST TIMEOUT? MESSAGE** VZ\_REQ\_LTESMS\_30298

VOID



**5.1.1.3.2 IMS REREGISTRATION FAILURE OR REJECTION BY THE NETWORK (GENERAL CASE) VZ\_REQ\_LTESMS\_30287**

VOID

**5.1.1.3.2.1 NETWORK REJECTS THE IMS REREGISTRATION WITH A ?SIP 404 ? NOT FOUND? MESSAGE 14 VZ\_REQ\_LTESMS\_30299**

VOID

**5.1.1.3.2.2 NETWORK FAILS TO RESPOND TO AN IMS REREGISTRATION BEFORE THE SIP TIMEOUT TIMER EXPIRES OR NETWORK REJECTS THE IMS REREGISTRATION WITH A ?SIP 503 ? SERVICE UNAVAILABLE? OR ?SIP 408 ? REQUEST TIMEOUT? MESSAGE VZ\_REQ\_LTESMS\_30301**

VOID

**5.1.1.3.3 IMS REGISTRATION/RE-REGISTRATION RETRY ALGORITHM VZ\_REQ\_LTESMS\_30288**

VOID

**5.1.1.3.4 NETWORK REJECTS THE IMS REGISTRATION/RE-REGISTRATION WITH A 'SIP 400' OR 'SIP 402' MESSAGE VZ\_REQ\_LTESMS\_30289**

VOID

**5.1.1.3.5 NETWORK REJECTS THE IMS REGISTRATION/RE-REGISTRATION WITH A 'SIP 403' OR 'SIP 404' MESSAGE** VZ\_REQ\_LTESMS\_30290

VOID

**5.1.1.3.6 IMS REGISTRATION TIMER EXPIRES WHILE THROTTLING**  
VZ\_REQ\_LTESMS\_30291

VOID

**5.1.1.3.7 IMS REGISTRATION/RE-REGISTRATION THROTTLING ACROSS SYSTEM TRANSITIONS** VZ\_REQ\_LTESMS\_30292

VOID

**5.1.1.3.8 RESET OF THROTTLING COUNTERS AND TIMERS ON POWER CYCLE AND ON USIM/ISIM REPLACEMENT/REFRESH** VZ\_REQ\_LTESMS\_30293

VOID

**5.1.1.3.9 SIP 501 IN RESPONSE TO A DEREGISTRATION REQUEST**  
VZ\_REQ\_LTESMS\_30294

VOID

**5.1.1.4 IMS REGISTRATION ON SYSTEM TRANSITIONS** VZ\_REQ\_LTESMS\_30283

VOID

### 5.1.1.5 IMS REGISTRATION DUE TO NEW IMS PDN BEARER ACTIVATION

VZ\_REQ\_LTESMS\_30284

VOID

### 5.1.2 SMS OVER IMS VZ\_REQ\_LTESMS\_30278

#### 5.1.2.1 SIP FOR SENDING/RECEIVING SMS MESSAGES VZ\_REQ\_LTESMS\_30302

##### 5.1.2.1.1 USERS CANCELS MO SMS - VOID VZ\_REQ\_LTESMS\_30317

Requirement "User Cancels MO SMS" has been removed.

##### 5.1.2.1.2 DELIVERY ACKNOWLEDGEMENTS VZ\_REQ\_LTESMS\_30318

###### 5.1.2.1.2.1 VZ\_REQ\_LTESMS\_29536

Message Status Acknowledgements: The device shall support SMS acknowledgments that are sent as the payload of SMS over IMS messages.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

###### 5.1.2.1.3 VZ\_REQ\_LTESMS\_29529

The device shall support the use of SMS over IMS in sending Mobile Originated SMS messages and in receiving Mobile Terminated SMS messages using the SIP MESSAGE method.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### 5.1.2.1.4 VZ\_REQ\_LTESMS\_29530

The device shall support processing of MESSAGE requests including support for all mandatory headers listed in section A.2.1.4.7A of the 3GPP IMS Stage 3 standard Ref. [2].

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### 5.1.2.1.5 VZ\_REQ\_LTESMS\_29531

In addition the following optional Headers shall be supported:

User-Agent

Allow

Request-Disposition

The device shall support the header Content-Type application/vnd.3gpp2.sms when using the 3GPP2 SMS format and the Content-Type application/vnd.3gpp.sms when using the 3GPP SMS format for SMS. The media type 'application' indicates that the device must process the SIP MESSAGE payload before the message is displayed to the user (in other words, the payload content is not in an Ascii text format).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### 5.1.2.1.6 VZ\_REQ\_LTESMS\_29532

The following are the key rules in formatting the headers of the SIP MESSAGE:

- The Request-URI header and the To: header shall be set to the **tel URI** of the destination. The tel URI contains the digit string entered by the user as the destination. The digit string may equal the MDN of the destination mobile device or the digit string may correspond to a short code.
- The Request-Disposition header shall contain the "no-fork" directive
- The Content-Type header shall be set to application/vnd.3gpp2.sms when the format is 3GPP2.
- The From: header shall contain the IMS Public User Identify of the device. This is a SIP URI with the MDN of the device presented in an E.164 format.
- The P-Access-Network-Info header shall be included in SIP MESSAGE method for any SMS message that is sent. If the device is attached to IMS APN over LTE, "access-type" shall be set to "3GPP-E-UTRAN-FDD" and "access-info" to "utran-cell-id-3gpp", computed as per Section 7.2A.4.3 in Ref [2].

The SMS device shall be able to process the following SIP responses:

202 Accepted

200 OK

4xx

5xx

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### 5.1.2.1.7 VZ\_REQ\_LTESMS\_29533

For a success scenario, the (originating end) SMS device in a Mobile Originated SMS (MO-SMS) scenario will

receive a 200 OK response or a 202 Accepted response from the network.

Note that the Transport Layer parameter "Bearer Reply Option" for a 3GPP2 format SMS message (as defined in 3GPP2 C.S0015-A, Ref. [5]) shall not be used.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.1.8** VZ\_REQ\_LTESMS\_29534

The maximum SMS message size (SMS payload) that can be supported is 256 bytes and the total size of the SIP message shall not exceed 1300 bytes. The device shall support MO and MT concatenated short messages (see 3GPP TS 23.040, Ref. [11]). The individual segments shall be sent as separate SIP MESSAGES.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.1.9** VZ\_REQ\_LTESMS\_29535

The device shall not use SigComp to compress the SIP messages.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.1.10** VZ\_REQ\_LTESMS\_29574

The device shall support W3c Specification Extensible Markup Language (XML) 1.0 (Fifth Edition) (<http://www.w3.org/TR/REC-xml>) for XML format of SIP messages. Double quotes and single quotes shall be supported for text strings in SIP notify messages received by the device.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### **5.1.2.2 SMS MESSAGE FORMAT** VZ\_REQ\_LTESMS\_30303

#### **5.1.2.2.1 MT SMS MESSAGES** VZ\_REQ\_LTESMS\_30320

##### **5.1.2.2.1.1** VZ\_REQ\_LTESMS\_29538

The device shall be capable of receiving SMS messages in both 3GPP and 3GPP2 SMS formats. The device shall inspect the incoming SMS message, determine the SMS format, decode the SMS format, and respond per the applicable standard.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

##### **5.1.2.2.1.2** VZ\_REQ\_LTESMS\_29539

The 3GPP2 SMS format and response is per 3GPP2 C.S0015-A, Ref. [5], and the 3GPP2 'SMS over IMS' standard, Ref. [4]. The 3GPP SMS format and response is per 3GPP TS 23.204 (?Support of Short Message

Service (SMS) over generic 3GPP Internet Protocol (IP) access; Stage 2?), Ref. [6].  
Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.2.2 MO SMS MESSAGES** VZ\_REQ\_LTESMS\_30322

##### **5.1.2.2.2.1 3GPP2 MESSAGE FORMAT FOR MO SMS MESSAGES** VZ\_REQ\_LTESMS\_30326

##### **5.1.2.2.2.2** VZ\_REQ\_LTESMS\_29540

The device shall support the device configurable parameter smsformat which can have the value 3gpp2 or the value 3gpp. This parameter shall be stored on the device in non-volatile memory and shall be configurable over-the-air using OTADM procedures (refer to the OTADM and Factory LTE Programming sections of the LTE 3GPP Band 13 Network Access requirements document, Ref. [12] for additional details). For Type 3 and Type 4 CDMA Less devices, the value of the smsformat parameter shall always be configured to '3gpp'. For all other devices, the default value is 3gpp2.  
Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

##### **5.1.2.2.2.3** VZ\_REQ\_LTESMS\_29541

When the parameter smsformat is set to the value '3gpp2?', the format of the MO SMS message is based on 3GPP2 C.S0015-A, Ref. [5]. The device shall take the 3GPP2 C.S0015-A transport layer message (including the SMS teleservices layer information) and use this in a binary format as the payload of the SIP MESSAGE. This method for constructing the SIP MESSAGE is described in the 3GPP2 'SMS over IMS' standard, Ref. [4].  
Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

##### **5.1.2.2.2.4** VZ\_REQ\_LTESMS\_29542

The Content-Type header of the SIP MESSAGE shall be set to the value application/vnd.3gpp2.sms to indicate that the payload format is 3GPP2 SMS.  
Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

##### **5.1.2.2.2.5 3GPP MESSAGE FORMAT FOR MO SMS MESSAGES** VZ\_REQ\_LTESMS\_30328

##### **5.1.2.2.2.6** VZ\_REQ\_LTESMS\_29543

When the parameter smsformat is set to the value '3gpp?', or when constructing the Delivery Report for the received 3GPP MT SMS, or when constructing SIP message for the received SMS from UICC, the format of the MO SMS message is based on 3GPP and the SIP MESSAGE is constructed and sent as defined in 3GPP TS 23.204 (?Support of Short Message Service (SMS) over generic 3GPP Internet Protocol (IP) access; Stage 2?), Ref. [6].  
Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.2.2.7** **VZ\_REQ\_LTESMS\_29544**

The Content-Type header of the SIP MESSAGE shall be set to the value application/vnd.3gpp.sms to indicate that the payload format is 3GPP SMS.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### **5.1.2.2.3 CHARACTER SETS** **VZ\_REQ\_LTESMS\_30324**

#### **5.1.2.2.3.1** **VZ\_REQ\_LTESMS\_29545**

The device shall support the following character sets for both MO and MT SMS messages:

7-bit ASCII (ANSI X3.4)

GSM 7-bit (3gpp TS 23.038)

UCS-2 (ISO/IEC 10646-1)

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.2.3.2** **VZ\_REQ\_LTESMS\_29546**

In addition, the device shall support the following character sets for MT SMS messages:

IA5 (ITU-T T.50, International Reference Alphabet)

Latin(ISO 8859-1)

GSM 8-bit (3gpp TS 23.038)

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.2.4** **VZ\_REQ\_LTESMS\_29537**

The device shall support the SMS message format as defined in 3GPP2, and it shall also support the SMS message format as defined in 3GPP. A configurable parameter, defined below, shall be used to select the SMS message format as either 3GPP2 format or 3GPP format for MO SMS messages.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### **5.1.2.3 STORAGE OF SMS MESSAGES** **VZ\_REQ\_LTESMS\_30304**

#### **5.1.2.3.1** **VZ\_REQ\_LTESMS\_29547**

Void

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.3.2 **VZ\_REQ\_LTESMS\_29548**

Void  
Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 5.1.2.4 RETRY REQUIREMENTS FOR MO SMS USING SMS OVER IMS

### VZ\_REQ\_LTESMS\_30305

### 5.1.2.4.1 **VZ\_REQ\_LTESMS\_29549**

The device makes an initial attempt to send the MO SMS. The initial attempt is considered to have failed when the device either receives a SIP error code response from the network (a 4xx series or 5xx series error code) or a SIP timer expiration occurs.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.4.2 **VZ\_REQ\_LTESMS\_29550**

The device shall support a retry mechanism where it waits 30 seconds and then performs a second attempt to send the MO SMS.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.4.3 **VZ\_REQ\_LTESMS\_29551**

If the MO SMS is in 3gpp format, device shall in the second attempt use the same TP-Message-Reference (TP-MR) as in the initial attempt and set the TP-Reject-Duplicates (TP-RD) bit to 1 (see 3GPP TS 23.040, Ref. [11]).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.4.4 **VZ\_REQ\_LTESMS\_29552**

If the MO SMS is in 3gpp2 format, device shall in the second attempt use the same MESSAGE\_ID as in the initial attempt.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.4.5 **VZ\_REQ\_LTESMS\_29553**

If the second attempt to send the MO SMS succeeds, then the device shall provide this feedback to the device user interface or the connection manager software for tethered devices. If the second attempt to send the MO SMS is a failure, then if the device has successfully completed Combined EPS/IMSI Attach for SMS (see LTE 3GPP Band 13 Network Access Requirements document) the device shall make a third attempt to send MO SMS using SMS over NAS method. If the third attempt to send MO SMS is a failure, the device shall provide a failure indication to the device user interface or the connection manager software for tethered devices.

If the second attempt to send the MO SMS is a failure, and the device has not successfully completed Combined EPS/IMSI Attach for SMS (see LTE 3GPP Band 13 Network Access Requirements) then the device shall provide a failure indication to the device user interface or the connection manager software for tethered devices.



Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 5.1.2.5 RECEIVING A MT SMS USING SMS OVER IMS **VZ\_REQ\_LTESMS\_30306**

### 5.1.2.5.1 **VZ\_REQ\_LTESMS\_29555**

If the device has an active IMS registration, then it shall be ready to accept MT SMS that are received using the SMS over IMS method.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.5.2 **VZ\_REQ\_LTESMS\_29556**

When a SMS text message for the end user arrives, it shall be written to the API that is used by the device's user interface or the API that is used by the connection manager software (for tethered devices) to access the text of the SMS messages. In addition, the SMS message shall be written to the device or UICC card according to the rules defined in "Storage of SMS Messages" specification in section 5.1.2.3.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.5.3 **VZ\_REQ\_LTESMS\_29557**

If it successfully receives the MT SMS, then the device shall generate and send the network a 200 OK response.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.5.4 **VZ\_REQ\_LTESMS\_29558**

If the MT SMS is in the 3GPP format, the device shall send the Delivery report. If requested, the device shall send the Status report.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.5.5 **VZ\_REQ\_LTESMS\_29559**

For MT application directed SMS, see section 5.1.2.10, 'Application Directed SMS.'

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 5.1.2.6 FORMAT OF INCOMING MT SMS **VZ\_REQ\_LTESMS\_30308**

### 5.1.2.6.1 **VZ\_REQ\_LTESMS\_29560**

The device shall support both the 3GPP2 and the 3GPP message formats, and shall be able to receive MT messages in either format. The format of the MT SMS can be determined from the Content-Type header. If the Content-Type header has a value of 'application/vnd.3gpp2.sms?', then the device shall decode the message using the 3GPP2 format.

If the Content-Type header has a value of 'application/vnd.3gpp.sms?', then the device shall decode the message using the 3GPP format.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### **5.1.2.7 VALIDATION TEST FOR MT SMS** VZ\_REQ\_LTESMS\_30309

OBSOLETE requirement

### **5.1.2.8 USER NOTIFICATIONS/ USER INTERFACE** VZ\_REQ\_LTESMS\_30310

#### **5.1.2.8.1** VZ\_REQ\_LTESMS\_29561

The user interface and the user notifications for this SMS feature are handled by the device user interface or the connection manager software for tethered devices. The device shall use the appropriate mechanism to exchange SMS information with the connection manager software (for tethered devices).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### **5.1.2.9 CALL FLOWS** VZ\_REQ\_LTESMS\_30311

#### **5.1.2.9.1 MOBILE ORIGINATED 3GPP2 SMS (MO-SMS)** VZ\_REQ\_LTESMS\_30330

##### **5.1.2.9.1.1** VZ\_REQ\_LTESMS\_29563

The device shall support the Mobile Originated call flow for 3GPP2 format SMS over IMS. A typical call flow is shown in Figure 1. Note that in step 6, the network will either send a 200 OK response (shown in the drawing) or a 202 Accepted response as an acknowledgement

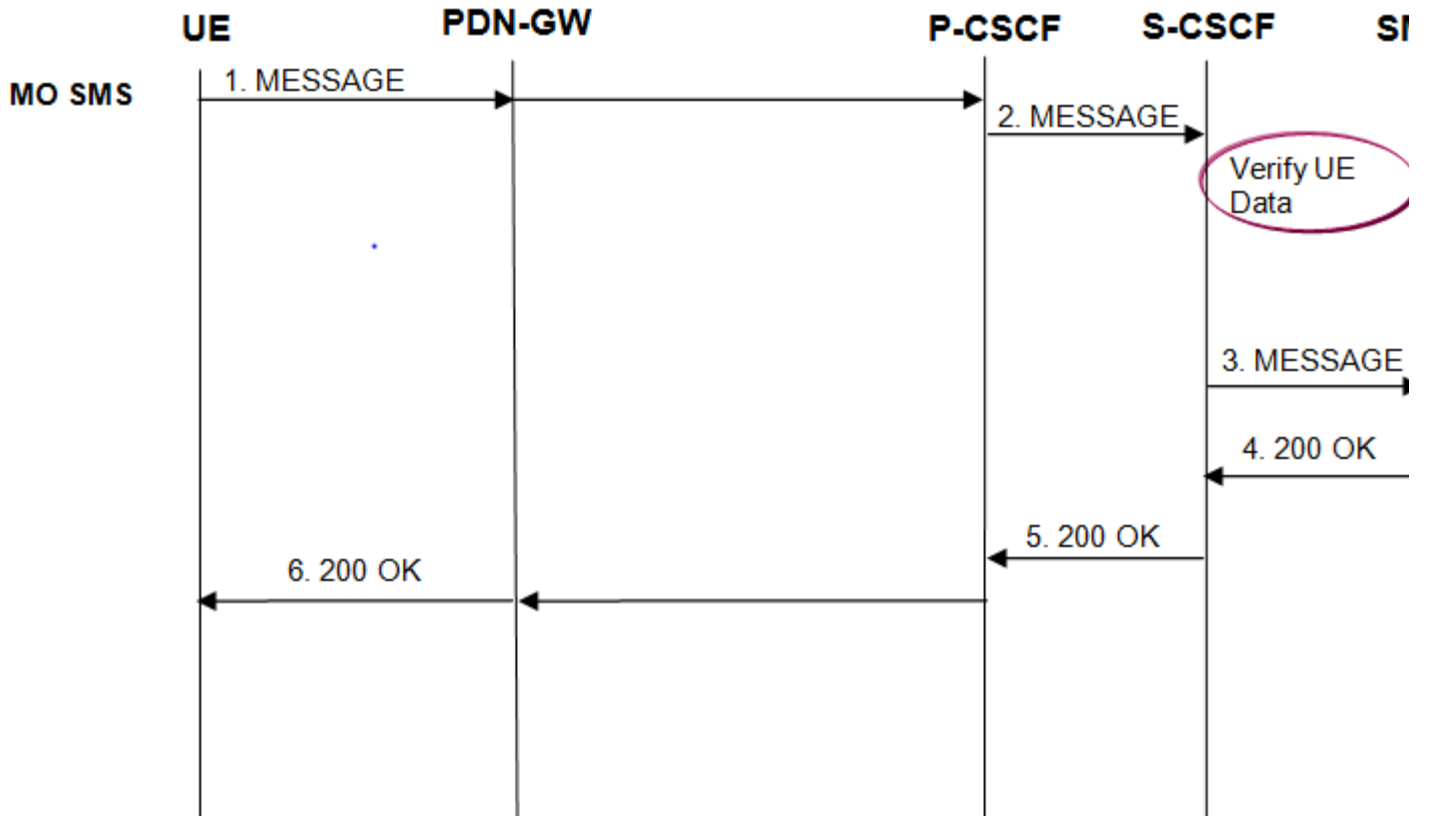


Figure1: Mobile Originated 3GPP2 SMS Call Flow

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

**5.1.2.9.1.2** VZ\_REQ\_LTESMS\_29564

MESSAGE request in step 1 of Mobile Originated 3GPP2 SMS Call Flow in Figure 1 shall contain vnd.3gpp2.sms payload. The payload shall contain a binary encoded SMS transport layer SMS Point-to-Point message (refer to 3gpp2 C.S0015)  
 Device shall not include Transport Layer "Bearer Reply Option" parameter in 3gpp2 MO SMS message (MESSAGE request in step 1).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

**5.1.2.9.2 MOBILE TERMINATED 3GPP2 SMS (MT-SMS)** VZ\_REQ\_LTESMS\_30331

**5.1.2.9.2.1** VZ\_REQ\_LTESMS\_29565

The device shall support the Mobile Terminated call flow for 3GPP2 format SMS over IMS. A typical call flow is shown in Figure 2.

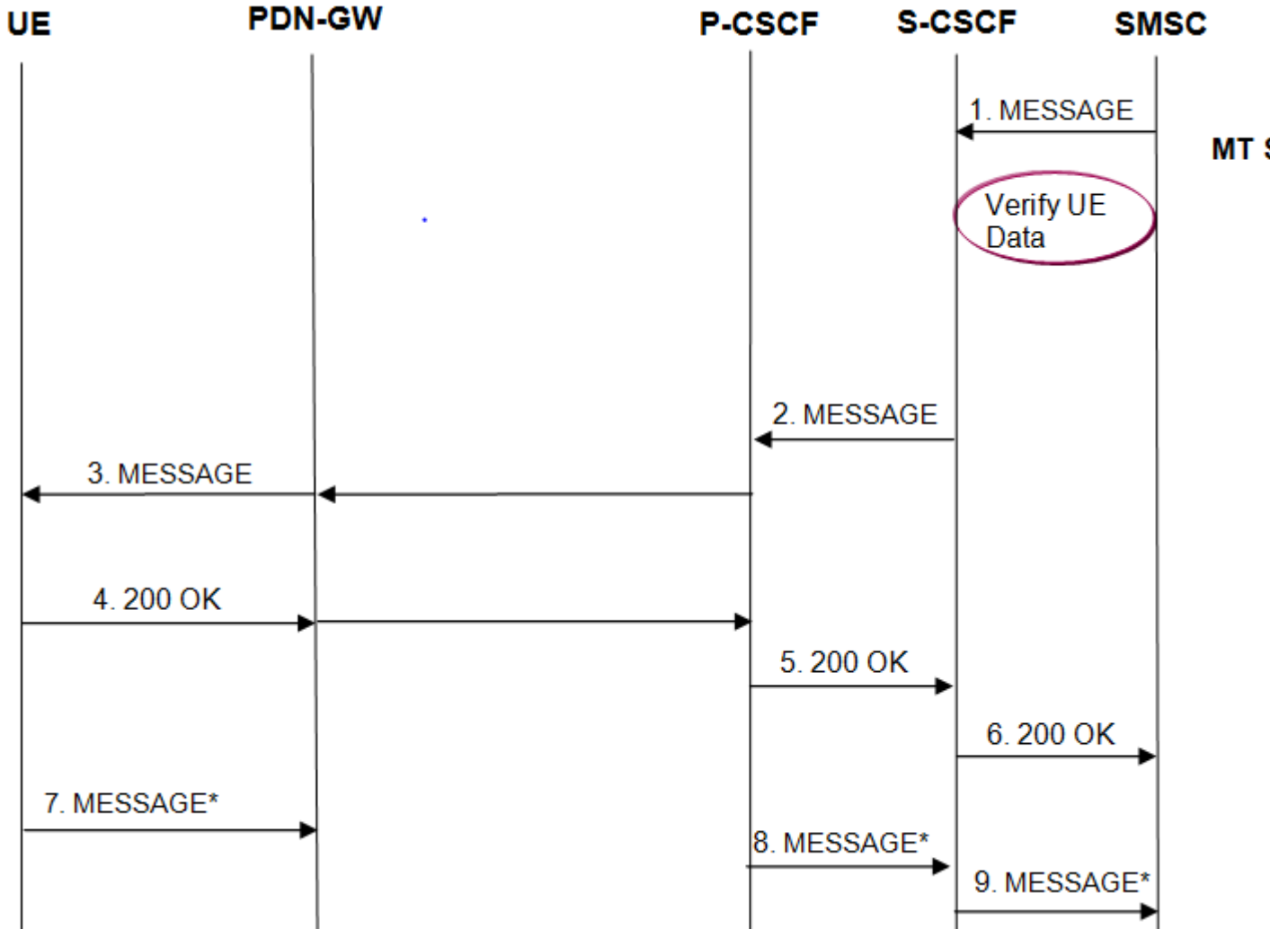


Figure 2: Mobile Terminated 3GPP2 SMS Call Flow

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

**5.1.2.9.2.2** VZ\_REQ\_LTESMS\_29566

MESSAGE request in step 1 of Mobile Terminated 3GPP2 SMS Call Flow in Figure 2 contains vnd.3gpp2.sms payload. The payload shall contain SMS 'Deliver' message, including the SMS Transport layer and SMS Teleservice layer information and encoded in binary (refer to 3gpp2 C.S0015).

Device shall send MESSAGE request in step 7 of Mobile Terminated 3GPP2 SMS Call Flow in Figure 2 containing an encapsulated "SMS Acknowledge" message only if the Transport Layer "Bearer Reply Option" parameter was included in SMS "Deliver" message contained in MESSAGE request in step 1.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

**5.1.2.9.3 MOBILE ORIGINATED 3GPP SMS (MO-SMS)** VZ\_REQ\_LTESMS\_30332

5.1.2.9.3.1 VZ\_REQ\_LTESMS\_29567

The device shall support the Mobile Originated call flow for 3GPP format SMS over IMS. A typical call flow is show in Figure 3. Note that in step 6, the network will either send a 200 OK response (shown in the drawing) or a 202 Accepted response as an acknowledgement.

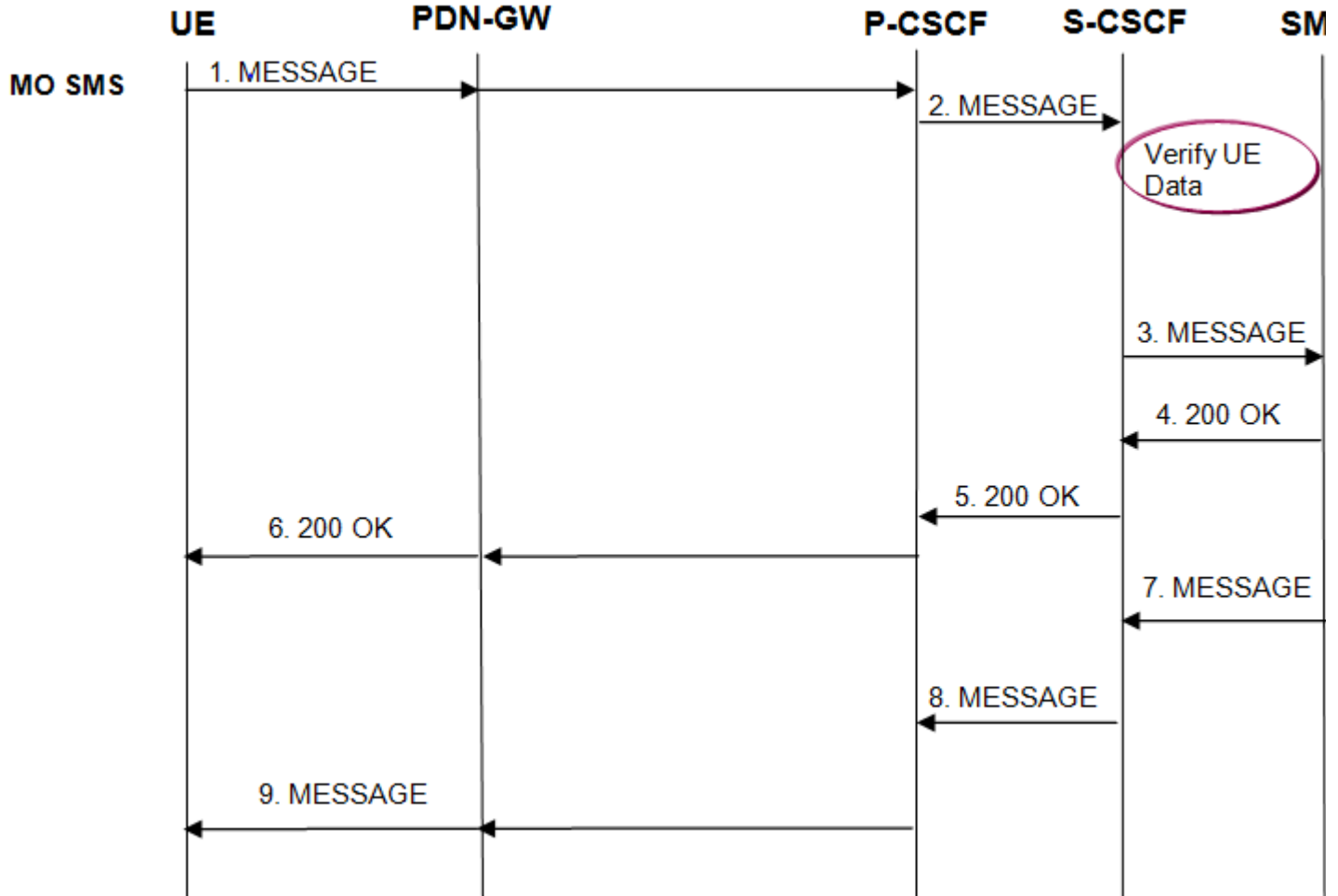


Figure 3: Mobile Originated 3GPP SMS Call Flow

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

5.1.2.9.3.2 VZ\_REQ\_LTESMS\_29568

MESSAGE request in step 1 of Mobile Originated 3GPP SMS Call Flow in Figure 3 shall contain vnd.3gpp.sms payload that includes the short message and routing information to forward the message. The payload shall contain the RP-DATA message with RP-User-Data information element that includes a TPDU of type SMS-SUBMIT (refer to 3GPPTS24.011).

MESSAGE request in step 7 of Mobile Originated 3GPP SMS Call Flow in Figure 3 shall contain vnd.3gpp.sms payload that includes the short message submission report from SMSC. The payload shall contain the RP-ACK

message with RP-User-Data information element that includes a TPDU of type SMS-SUBMIT-REPORT (refer to 3GPP TS 24.011).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

### 5.1.2.9.4 MOBILE TERMINATED 3GPP SMS (MT-SMS) VZ\_REQ\_LTESMS\_30333

#### 5.1.2.9.4.1 VZ\_REQ\_LTESMS\_29569

The device shall support the Mobile Terminated call flow for 3GPP format SMS over IMS. A typical call flow is shown in Figure 2

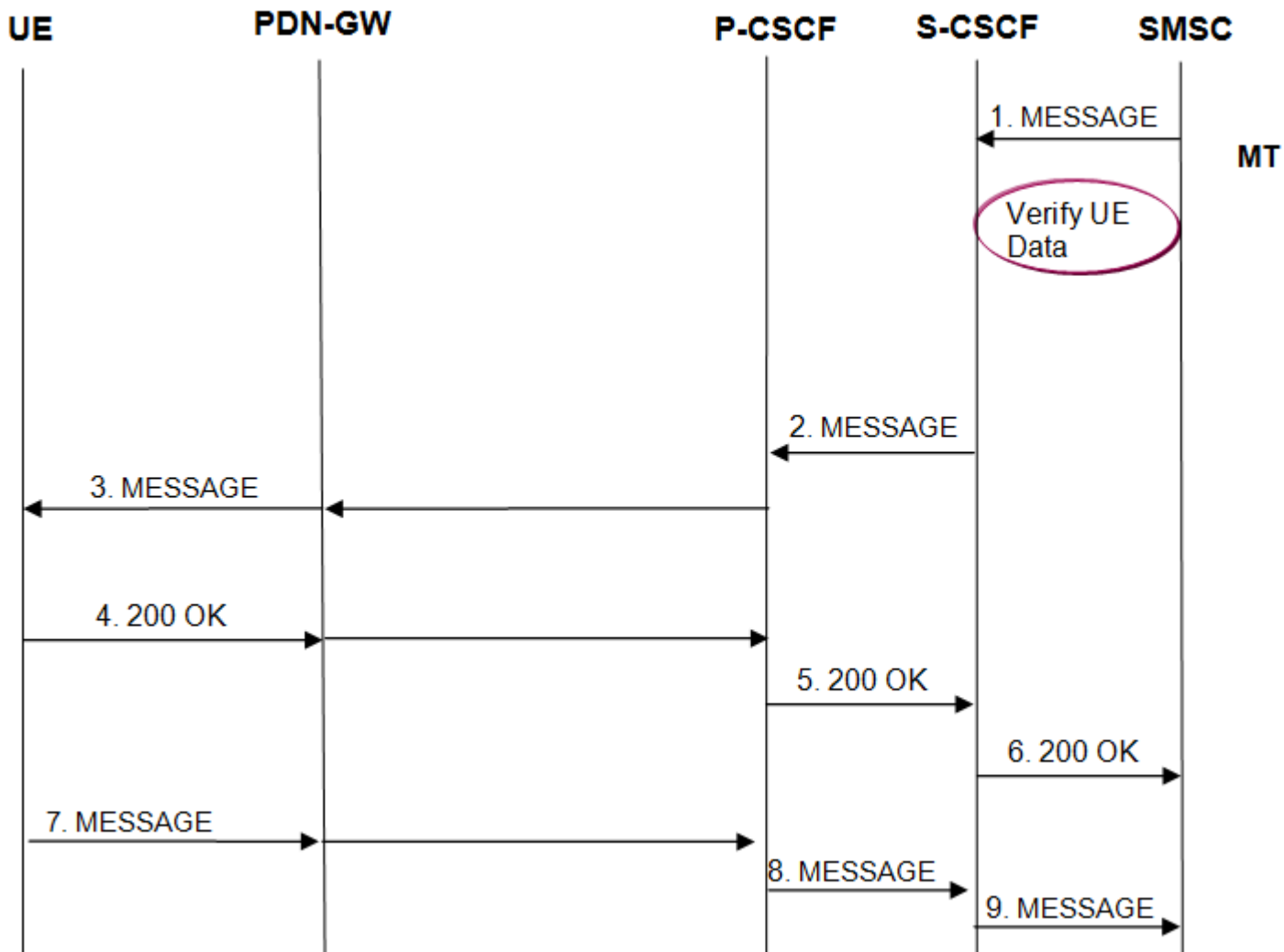


Figure 4: Mobile Terminated 3GPP SMS Call Flow

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### 5.1.2.9.4.2 VZ\_REQ\_LTESMS\_29570

MESSAGE request in step 1 of Mobile Terminated 3GPP SMS Call Flow in Figure 4 shall contain vnd.3gpp.sms payload that includes the short message and routing information to forward the message. The payload shall contain the RP-DATA message with RP-User-Data information element that includes a TPDU of type SMS-DELIVER (refer to 3GPPTS24.011).

MESSAGE request in step 7 of Mobile Terminated 3GPP SMS Call Flow in Figure 4 shall contain vnd.3gpp.sms payload that include the SMS-DELIVER-REPORT and routing information to forward the delivery report sent by UE. The payload shall contain an RP-ACK message with RP-User-Data information element that includes a TPDU of type SMS-DELIVER-REPORT (refer to 3GPP TS 24.011).

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.9.5** **VZ\_REQ\_LTESMS\_29562**

Call flows are provided in this section for Mobile Originated SMS transaction and a Mobile Terminated SMS transaction.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

#### **5.1.2.10 APPLICATION DIRECTED SMS** **VZ\_REQ\_LTESMS\_30314**

##### **5.1.2.10.1** **VZ\_REQ\_LTESMS\_29571**

When a MT SMS message arrives via the SMS over IMS method, the device shall remove the SIP headers and decode the binary content that is in the payload of the SIP MESSAGE. The device shall then check to see if this SMS is an application directed SMS. If yes, then the application directed SMS shall be passed to the intended application.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

##### **5.1.2.10.2** **VZ\_REQ\_LTESMS\_29572**

If the device receives a MO SMS from the UICC, the device shall accept the 3GPP formatted SMS message from the UICC, and the device shall construct the SIP MESSAGE per the 3GPP Message Format for MO SMS Messages section of this document regardless of the current setting of the smsformat parameter.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

##### **5.1.2.11** **VZ\_REQ\_LTESMS\_29528**

The SMS over IMS application shall be used to provide Short Message Service (SMS) to the device when it is operating in LTE mode.

The requirements in this section assume the device has performed IMS registration.

Scope: [Branded, LRA (LTE in Rural America), Open Access, Open Development, Wholesale]

## 6 PROVISIONING VZ\_REQ\_LTESMS\_30216

### 6.1 PROVISIONING VZ\_REQ\_LTESMS\_30241

VOID

**NOTE:** Please refer to the provisioning section of the Verizon Wireless LTE 3GPP Band 13 Network Access Requirements for provisioning requirements for IMS and SMS related parameters.

### 6.2 OTA VZ\_REQ\_LTESMS\_30243

For the OTADM requirements see the document *Verizon Wireless LTE OTADM Requirements*, Ref. [13].

## 7 REFERENCES VZ\_REQ\_LTESMS\_30217

### Industry Standards References

Change requests may cause modification to the specifications listed below. Please refer to [www.3gpp.org](http://www.3gpp.org) for the latest version of the 3GPP specifications. Verizon Wireless LTE 3GPP Band 13 specifications are available at [opennetwork.verizonwireless.com](http://opennetwork.verizonwireless.com).

1. 3GPP TS 36.101: *Evolved Universal Terrestrial Radio Access (E-UTRA); User Equipment (UE) radio transmission and reception*, Release 9
2. 3GPP TS 24.229: *Internet Protocol (IP) multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3*, Release 9
3. 3GPP TS 23.228: *IP Multimedia Subsystem (IMS); Stage 2*, Release 9
4. 3GPP2 X.S0048-0 v1.0, "Short Message Service over IMS"

3GPP2 C.S0015-A v1.0 "Short Message Service (SMS) for Wideband Spread Spectrum Systems"

3GPP TS 23.204: *Support of Short Message Service (SMS) over generic 3GPP Internet Protocol (IP) access; Stage 2*, Release 9

3GPP TS 24.167: *3GPP IMS Management Object (MO); Stage 3*, Release 9.

3GPP TS 31.103: *Characteristics of the IP Multimedia Services Identity Module (ISIM) application*, Release 9

3GPP TS 24.301: *Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS); Stage 3*, Release 9

3GPP TS 33.203: *3G security; Access security for IP-based services*, Release 9

3GPP TS 23.040: *Technical realization of the Short Message Service (SMS)*, Release 9.

### Verizon Specific Documentation References

12. Verizon Wireless LTE 3GPP Band 13 Network Access Device Requirements



13. Verizon Wireless LTE OTADM Requirements

14. Verizon Wireless LTE Data Retry Requirements