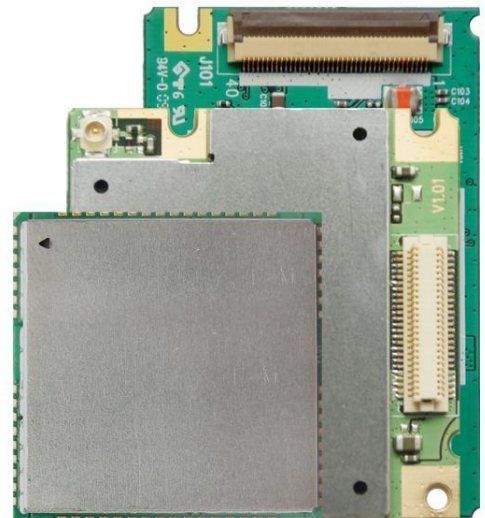




# Quectel Cellular Engine

## SMS Application Note

GSM\_SMS\_AN\_V1.1



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## 0. Revision history

Revision	Date	Author	Description
draft	2009-6-25	Willis YANG	Initial
1.0	2010-11-15	Joanna Li	Add details
1.1	2015-04-08	Jelly WANG	Added applicable modules

## 1. Introduction

This document describes how to use Point to Point Short Message Service (SMS) through Hyper Terminal by AT commands which Quectel's module provides. The Cell Broadcast Service (CBS) is not included in this document.

This document is applicable to all Quectel GSM modules.

### 1.1. Reference

**Table 1: Reference**

SN	Document name	Remark
[1]	Mxx_ATC	Mxx AT Commands Set
[2]	GSM 07.05	Equipment interface for SMS and CBS
[3]	GSM 03.38	Alphabets and language-specific information
[4]	GSM 03.40	Technical realization of the Short Message Service
[5]	GSM 07.07	AT command set for GSM Mobile Equipment (ME)
[6]	GSM 04.11	PP SMS support on mobile radio interface

**Table 2: Related AT commands**

AT command	Description	Reference
AT+CMGF	SELECT SMS MESSAGE FORMAT	GSM07.05
AT+CSCS	SELECT TE CHARACTER SET	GSM07.07
AT+CSCA	SMS SERVICE CENTER ADDRESS	GSM07.05
AT+CSMP	SET SMS TEXT MODE PARAMETERS	GSM07.05
AT+CNMI	NEW SMS MESSAGE INDICATIONS	GSM07.05
AT+CMGW	WRITE SMS MESSAGE TO MEMORY	GSM07.05
AT+CMSS	SEND SMS MESSAGE FROM STORAGE	GSM07.05
AT+CMGS	SEND SMS MESSAGE	GSM07.05
AT+CMGR	READ SMS MESSAGE	GSM07.05
AT+CMGL	LIST SMS MESSAGES FROM PREFERRED STORE	GSM07.05
AT+CMGD	DELETE SMS MESSAGE	GSM07.05
AT+QMGDA	DELETE ALL SMS MESSAGES	Quectel defined
AT+CSDH	SHOW SMS TEXT MODE PARAMETERS	GSM07.05
AT+CSAS	SAVE SMS SETTINGS	GSM07.05
AT+CRES	RESTORE SMS SETTINGS	GSM07.05
AT+CPMS	PREFERRED SMS MESSAGE STORAGE	GSM07.05
AT+QCLASS0	STORE CLASS 0 SMS TO SIM WHEN	Quectel defined

	RECEIVED CLASS 0 SMS	
AT+QSMSCODE	CONFIGURE SMS CODE MODE	Quectel defined
AT+QEXTUNSOL	ENABLE/DISABLE UNSOLICITED INDICATIONS	PROPRIETARY Quectel defined

**Table 3: Abbreviations**

Abbreviation	Description
SMS	Short Message Service
SME	Short Message Entity
SMSC/SC	Short Message Service Center
MO	Mobile Originated
MT	Mobile Terminated
ME	Mobile Equipment
MS	Mobile Station, Mobile Equipment plus a SIM card
TE	Terminal Equipment
TA	Terminal Adaptor
PDU	Protocol Data Unit
TP	Transfer Layer Protocol
URC	Unsolicited Result Code
TOA	Type of Address
TON	Type of Number
NPI	Numbering Plan Identification
FO	First Octet
MR	Message Reference
OA	Originator Address
DA	Destination Address
RA	Recipient Address
PID	Protocol Identifier
DCS	Data Coding Scheme. Refer to [3] GSM 03.38
SCTS	Service Center Time Stamp
DT	Discharge Time
VP	Validity Period
VPF	Validity Period Format
UDL	User Data Length
UD	User Data
UDHI	User Data Header Indicator
RP	Reply Path
SRI	Status Report Indication
SRR	Status Report Request
SRQ	Status Report Qualifier
RD	Reject Duplicate
ST	Status



PI	Parameter Identifier
MTI	Message Type Indicator
MMS	More Messages to Send
&b	Binary Format
&h	Hexadecimal Format
&d	Decimal Format

## 1.2. Overview

The SMS provides a way to transfer short messages between Mobile Stations (MS) via a Service Center (SC). The SM services comprise three basic services:

- SMS-Submit (SM-Mobile Originated): the module sends a SM to the SC.
- SMS-Deliver (SM-Mobile Terminated): the module receives a SM from the SC.
- SMS Status Report: the message which indicates whether a MO message is received by destination address correctly.

### Note:

#### Preparation before using Hyper Terminal:

1. Connect the EVB of the module to PC through a serial cable.
2. Start the Hyper Terminal procedure on computer, and set the same baud rate as the module's (Default is auto bauding for module).
3. Make sure the Quectel module and the SIM card are assembled on EVB, then power on the module.

#### Types of AT Commands and responses

Test Command	AT+<x>=?	This command returns the list of parameters and value ranges set with the corresponding Write Command or by internal processes.
Read Command	AT+<x>?	This command returns the currently set value of the parameter or parameters.
Write Command	AT+<x>=<...>	This command sets the user-definable parameter values.

- AT commands are case-insensitive, but the parameters may be case-sensitive. And press **Enter** (<CR>) to execute command.
- In the examples of this document, the **blue** text are the commands or parameters which user should input in Hyper Terminal, and text after “//” are descriptions, others are responses for your input or URC.
- Possible response maybe **ERROR**, **+CME ERROR: <err>**, or **+CMS ERROR: <err>**. Please refer to [1] Mxx\_ATC document for the meaning of error code <err>.

### 1.2.1. Select SMS Message Format (+CMGF)

There are two modes when using AT commands to send, receive, list, read and write message: text mode and PDU mode. In text mode, you can write your message as text and set parameters for sending and receiving by some AT commands. In PDU mode, you must write your messages in fixed hexadecimal format, which parameters are included in the PDU package.

The mode sets by command AT+CMGF. See table below.

**Table 4: AT+CMGF Syntax**

Command	Possible Response	Example	Comment
AT+CMGF=?	+CMGF: (list of supported <mode>s)	+CMGF: (0,1)	List of supported modes
AT+CMGF?	+CMGF: <mode>	+CMGF: 0	Return current mode
AT+CMGF=<mode>	OK	AT+CMGF=0	Set PDU mode. It's default.
		AT+CMGF=1	Set Text mode

Section 2 introduces how to send and read SM and status report in text mode. Section 3 introduces AT commands in PDU mode. Section 4 introduces other AT commands related with SM.

### 1.2.2. Select TE Character Set (+CSCS)

AT+CSCS sets character set <chset> used by the TE. The TA can then convert character strings correctly between the TE and ME. The character set will affect transmission and reception of SMS.

**Table 5: AT+CSCS Syntax**

Command	Possible Response	Example
AT+CSCS=?	+CSCS: (list of supported <chset>s)	+CSCS: ("GSM","HEX","IRA","PCCP437","UCS2","8859-1")
AT+CSCS?	+CSCS: <chset>	+CSCS: "GSM" (default)
AT+CSCS=<chset>	OK	AT+CSCS="GSM" OK

#### Parameter <chset>

"GSM"	GSM default alphabet, 7-bit coded ([3] GSM 03.38 subclause 6.2.1, or <a href="#">Appendix 5.3</a> in this document).
"HEX"	Character strings consist only of hexadecimal numbers from 00 to FF.
"IRA"	International reference alphabet (ITU-T T.50)
"PCCP437"	PC character set Code
"UCS2"	UCS2 alphabet. 16-bit universal multiple-octet coded character set (ISO/IEC 10646)
"8859-1"	ISO 8859 Latin 1 character set

**Note:**

- **For English message, recommend to select “GSM” in most cases. And for other languages, it’s better to select “UCS2”.** Unicode of characters can be found easily by some tools, for example, Windows charmap.exe, or Excel Symbol dialog. Please go to [unicode.org](http://unicode.org) for more information about Unicode and UCS2. Also you can find mappings from GSM/PCCP437/8859-1 to unicode.

**1.2.3. Set Service Center Address (+CSCA)**

Service Center (SC) is responsible for the relaying and store-and-forwarding of a short message. To use the SMS function you have to declare the number of the SMSC in the MS (Mobile Station). However, SMSC is provided by network provider, and saved in SIM card as factory setting. **It is highly recommended that you do NOT change it at any time. And it’s better to check it before sending short message.**

**Table 6: AT+CSCA Syntax**

Command	Possible Response
AT+CSCA=?	OK
AT+CSCA?	+CSCA: <sca>,<tosca>
AT+CSCA=<sca>[,<tosca>]	OK

**Parameters:**

<sca>	SC Address in string format
<tosca>	Type of SCA in integer format

<tosca> uses [<TOA>](#) (Type of Address) decimal format (see [4]GSM 03.40 sub clause 9.1.2.5).

**Example:**

```
AT+CSCS?
```

```
+CSCS: "GSM"
```

```
OK
```

```
AT+CSCA?
```

```
+CSCA: "+8613800210500",145
```

```
OK
```

```
AT+CSCS="UCS2"
```

```
OK
```

```
AT+CSCA?
```

```
+CSCA: "002B0038003600310033003800300030003200310030003500300030",145
```

```
OK
```

**Note:**

- Recommended to store every address in International numbering format to avoid problems while roaming!
- Ask your local network provider for the right SMSC number.
- **It is highly recommended that you do NOT change it at any time. And it's better to check it before sending short message.**

**1.2.4. Set Preferred Message Storage (+CPMS)**

AT+CPMS selects memory storages to be used for reading, writing, receiving and etc.

**Table 7: AT+CPMS Syntax**

Command	Possible Response	Example
AT+CPMS=?	+CPMS: (list of supported <mem1>s),(list of supported <mem2>s) ,(list of supported <mem3>s)	+CPMS: ("SM", "ME", "MT"), ("SM", "ME", "MT"), ("SM", "ME", "MT")
AT+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>	+CPMS: "SM",10,50,"SM",10,50,"SM",10,50
AT+CPMS=[<mem1>,<mem2>,<mem3>]	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>	

**Parameters**

<mem1>/<mem2>/<mem3>	<b>Memory storage &lt;memx&gt;:</b> Messages to be read and deleted from <mem1>. Messages will be written and sent to <mem2>. Received messages will be placed in <mem3> if routing to PC is not set (see <a href="#">+CNMI</a> ) <memx>'s value can be storage of "SM" (SIM), "ME", or "MT"(SM+ME).
<used1>/<used2>/<used3>	Number of messages currently stored in <memx> in integer format
<total1>/<total2>/<total4>	Maximum number of messages that can be stored in <memx> in integer format

**Note:**

- The maximum number of short messages is 300, and the maximum number in module is 200, and SIM card is preferred. So if SIM card can store 150 messages, the module can only store 150 messages.

## 2. SMS in text mode

### 2.1. Write and Send Short Message

Two methods can be used to send a short message. The first method is to send message directly by [+CMGS](#), the second is to write message to storage ([+CMGW](#)), then forward it to destination by [+CMSS](#). Before sending short message, some parameters should be set by AT command [+CSMP](#).

#### 2.1.1. Set Text Mode Parameter (+CSMP)

AT +CSMP sets SMS parameters for text mode.

**Table 8: AT+CSMP Syntax in text mode**

Command	Possible Response	Example
AT+CSMP=?	+CSMP: (list of supported <fo>s),(list of supported <vp>s), (list of supported <pid>s), (list of supported <dc>s)	+CSMP: (17,49),(0-255),(0-255),(0-255)
AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dc>	+CSMP: 17,167,0,241
AT+CSMP=[<fo>[<vp>[,<pid>[,<dc>]]]]	OK	

#### Recommended [+CSCS](#) and <dc> in text mode:

	English	other language
want to store message	+CSCS="GSM" <dc>=241	+CSCS="UCS2" <dc>=25
want to immediately display message and not store message	+CSCS="GSM" <dc>=240	+CSCS="UCS2" <dc>=24

#### Note:

- When writing message, [+CSCS](#) and <dc> should match each other. For example, if you select UCS2 character set by [+CSCS](#), but set 7-bit coding schema in <dc>, then messy code may be gotten by SMS receiver.
- The meaning of parameter <fo>,<vp>,<pid>,<dc> is the same as which is in the PDU mode. Their value and meaning are listed in the following [section 3.5 Basic elements of the PDU](#). And the difference is that decimal format is used in the parameters of +CSMP in text mode while hexadecimal format is used in PDU mode.

### 2.1.2. Send Message directly from Terminal (+CMGS)

**Table 9: AT+CMGS Syntax in text mode**

Command	Possible Response	Example
AT+CMGS=?	OK	
AT+CMGS=<da>[,<today>]<CR> >text is entered <ctrl-Z/ESC>	+CMGS: <mr> or +CMS ERROR: <err>	<p><b>Send English characters “TEST” to 13795403834:</b></p> <pre>AT+CSCS="GSM" AT+CMGS="13795403834" &gt;TEST &lt;Ctrl+Z&gt;</pre> <p><b>Send Chinese characters “测试” to 13795403834:</b></p> <pre>AT+CSCS="UCS2" AT+CMGS=" 003100330037003900350034003000330038 00330034" &gt;6D4B8BD5 &lt;Ctrl+Z&gt;</pre>

**Parameters:**

<da>	[3]GSM 03.40 TP-Destination-Address in string format
<today>	Type of <da> in integer format, see <a href="#">Type Of Address</a>
<mr>	See below <a href="#">section 3.5 Basic elements of the PDU</a>

<Ctrl+Z> (Press Ctrl and Z simultaneously) is used to finish the inputting and begin to send short message. Esc is used to cancel the operation.

**Note:**

- If [+CSCS="UCS2"](#), <da> should be input in UCS2 format.

### 2.1.3. Write Short Message to Storage (+CMGW)

**Table 10: AT+CMGW Syntax in text mode**

Command	Possible Response
AT+CMGW=?	OK
AT+CMGW=<oa/da>[,<tooa/toda>[,<stat>]]<CR> > <text is entered > <ctrl-Z/ESC>	+CMGW: <index> or +CMS ERROR: <err>

**Parameters:**

- <da> <today> and message text are the same as the AT command [+CMGS](#).
- <stat>: By default message status will be set to “STO UNSENT”, but parameter <stat> allows “STO SENT” to be given.

The message written by +CMGW will be stored in <mem2> (see [+CPMS](#)). The correct write command will return the index in <mem2>, and then this message can be sent by AT command [+CMSS](#) as below.

#### 2.1.4. Send Short Message from Storage (+CMSS)

**Table 11: AT+CMSS Syntax in text mode**

Command	Possible Response
AT+CMSS=?	OK
AT+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr> OK or +CMS ERROR: <err>

**Example:**

```

AT+CMGW="15021012496"
> treset <Ctrl+Z>
+CMGW: 54           //Write message successfully and the index is 54

OK
AT+CMSS=54         //Send message to <da> "15021012496" which set in CMGW
+CMSS: 122

OK
AT+CMSS=54,"13795403834" //Send message to new <da> "13795403834" instead of the
                           one stored with the message
+CMSS: 123

OK

```

**Note:**

- If <da> is given in this command, it shall be used instead of the one stored with the message, that is, the message will be sent to <da> in this command.
- No difference in PDU mode and text mode for +CMSS.

## 2.2. Receive and Read Short Message

When short message is received, how to handle it (how to display URC, where to save) will be decided by AT command [+CNMI](#) and message class type defined in <dc>. User can read message content from URC or [+CMGR/+CMGL](#) if saved. [+CSDH](#) will decide which information will be displayed in text mode.

### 2.2.1. Show Text Mode Parameters (+CSDH)

**Table 12: AT+CSDH Syntax in text mode**

Command	Possible Response	Example
AT+CSDH=?	+CSDH: (list of supported <show>s)	+CSDH: (0, 1)
AT+CSDH?	+CSDH: <show>	+CSDH: 0
AT+CSDH=[<show>]	OK	

#### Parameter <show> value

0	not show (default)
1	show

<show> defines whether to show header values defined in AT commands [+CSCA](#) and [+CSMP](#) (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, [+CMGL](#), [+CMGR](#) result codes for SMS-DELIVERs and SMS-SUBMITs in text mode

#### Note:

- This command only affects text mode.

### 2.2.2. New Message Indication (+CNMI)

**Table 13: AT+CNMI Syntax**

Command	Possible Response	Example
AT+CNMI=?	+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s)	+CNMI: (0-3), (0-3), (0,2,3), (0,1), (0,1)
AT+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>	+CNMI: 2,1,0,0,0 (default)
AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK or ERROR	

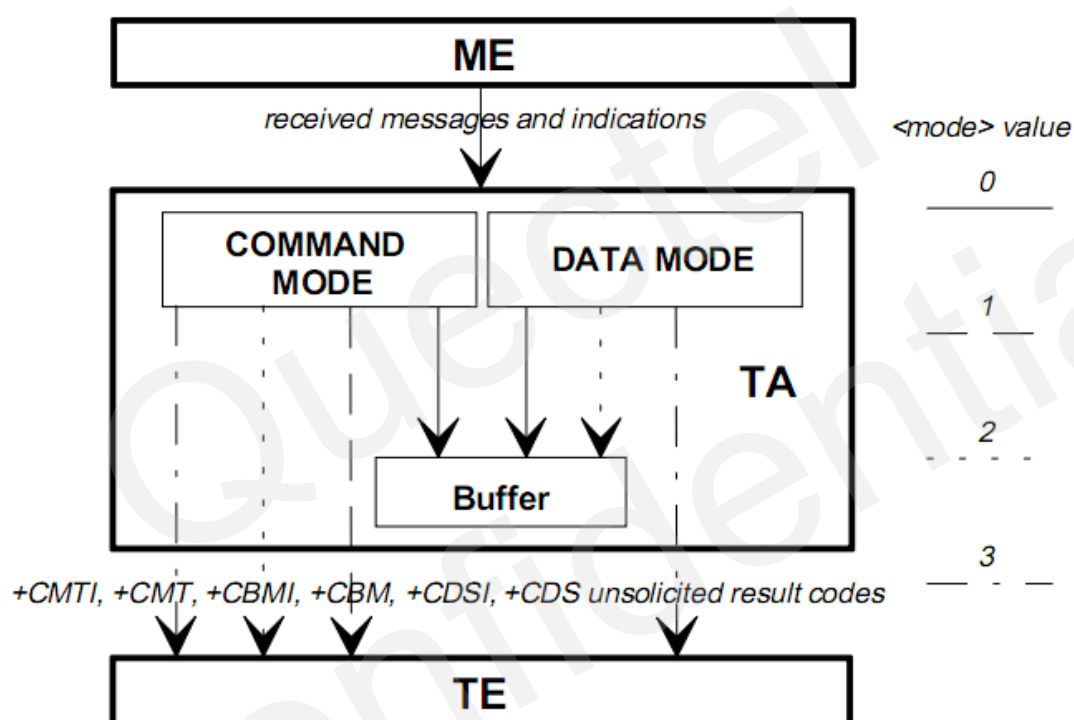
TA selects the procedure for how the receiving of new messages from the network is indicated to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in GSM 03.38.

<mode> controls the processing of URC specified within this command.

<mode> values: refer to below figure ([2]GSM07.05 Section 3 Figure 2)



0	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.
2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE. (Recommended, default)
3	Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode.



**Figure 2: <mode> parameter**

**<mt> values:**

The rules for storing received SMs depend on [<dc>](#), preferred memory storage [<mem3>](#) setting ([+CPMS](#)) and this value

0	No SMS-DELIVER indications are routed to the TE.
1	If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index>

2	<p>SMS-DELIVERs (except class 2) are routed directly to the TE using unsolicited result code: +CMT: [&lt;alpha&gt;],&lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt; (PDU mode enabled) or +CMT: &lt;oa&gt;, [&lt;alpha&gt;],&lt;scts&gt; [,&lt;toa&gt;,&lt;fo&gt;,&lt;pid&gt;,&lt;dcs&gt;,&lt;sca&gt;,&lt;tosca&gt;,&lt;length&gt;]&lt;CR&gt;&lt;LF&gt;&lt;data&gt; (text mode enabled; about parameters in italics, refer Command Show Text Mode Parameters +CSDH).</p> <p>Class 2 messages result in indication as defined in &lt;mt&gt;=1: +CMTI</p>
3	<p>Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in &lt;mt&gt;=2: +CMT Messages of other classes result in indication as defined in &lt;mt&gt;=1: +CMTI</p>

<bm> value affects CBMs and so be ignored in this document.

<ds> value sets whether routing SMS-STATUS-REPORT.

0	No SMS-STATUS-REPORTs are routed to the TE.
1	<p>SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt; (PDU mode enabled) or +CDS: &lt;fo&gt;,&lt;mr&gt;,[&lt;ra&gt;],[&lt;tora&gt;],&lt;scts&gt;,&lt;dt&gt;,&lt;st&gt; (Text mode enabled)</p>

<bfr> values:

0	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes).
1	TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered

Note:

- It's strongly recommended to set <mode> as 2, in this way, the message indication will not be lost. It's the default setting.
- As to <mt>, if user wants to store the message, set it as 1 (AT+CNMI=2,1 default), then get URC +CMTI: <mem>,<index> and read the message AT+CMGR=<index>. If user wants to read the message directly, set it as 2 (AT+CNMI=2,2), then get the message content from URC +CMT.
- Please refer to [2]GSM 07.05 Clause 3 Figure 3 or [appendix 5.2](#) in this document for message receiving procedures.

### 2.2.3. Read Short Message (+CMGR)

Table 14: AT+CMGR Syntax in text mode

Command	Possible Response in Text Mode
AT+CMGR=?	OK

AT+CMGR=<index>[,<mode>]	<b>for SMS-DELIVER in Text Mode:</b> +CMGR: <stat>,<oa>,[<alpha>],<scts>[,<toa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data>
	<b>for SMS-SUBMIT in Text Mode:</b> +CMGR: <stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>

TA returns short message with location value <index> from message storage <mem1> ([+CPMS](#)) to the TE.

<index>	Integer type; value in the range of location numbers supported by the associated memory	
<mode>	0	Normal. If status of the message is 'received unread', status in the storage changes to 'received read'.
	1	Not change status of the specified SMS record

#### Example:

	AT+CSDH=0	AT+CSDH=1
<b>Write and read SM:</b> AT+CMGW > test<CTRL+Z> +CMGW: 6  OK	AT+CMGR=6 +CMGR: "STO UNSENT", "", "" test  OK	AT+CMGR=6 +CMGR: "STO UNSENT", "", "", 0,49,0,0,71, "", 0,4 test  OK
<b>Receive and read SM:</b> AT+CNMI=2,1,0,0, 0	+CMTI: "SM",3 AT+CMGR=3 +CMGR: "REC UNREAD", "+86150210124 96", "", "2010/08/18 17:29:12+32" test  OK	+CMTI: "SM",4 AT+CMGR=4 +CMGR: "REC UNREAD", "+8615021012496", "", "201 0/08/18 17:37:23+32", 145,4,0,241, "+86138002 10500", 145,4 test
<b>Receive and display SM directly:</b> AT+CNMI=2,2,0,0, 0	+CMT: "+8615021012496", "2010/0 8/18 17:32:02+32" test	+CMT: "+8615021012496", "2010/08/18 17:26:52+32", 145,4,0,0, "+8613800210 500", 145,4 test

#### Note:

- The difference of text mode and PDU mode: only the response format.

## 2.2.4. List Short Messages from Preferred Storage (+CMGL)

**Table 15: AT+CMGL Syntax in text mode**

Command	Possible Response
AT+CMGL=?	OK or +CMS ERROR: <err>
AT+CMGL=<state>[,<mode>]	for SMS-SUBMITs and/or SMS-DELIVERs: +CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>],[<tooa/toda>,<length>]<CR> <LF><data>[<CR><LF> +CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>],[<tooa/toda>,<length>]<CR> <LF><data>[...]]

The execution command AT+CMGL returns messages with status value <stat> from preferred message storage <mem1> to the TE.

### Parameters:

	Text value	PDU value	Description
<state>	"REC UNREAD"	0	Received unread messages (default)
	"REC READ"	1	Received read messages
	"STO UNSENT"	2	Stored unsent messages
	"STO SENT"	3	Stored sent messages
	"ALL"	4	All messages
<mode>	0	0	Normal
	1	1	Not change status of the specified SMS record

### Example:

<pre>AT+CSDH=0 OK AT+CMGL="ALL" +CMGL: 1,"STO UNSENT","15021012496","", test  +CMGL: 2,"STO SENT","15021012496","", test  +CMGL: 3,"REC READ","+8615021012496","",2010/08/18 17:29:12+32"</pre>	<pre>AT+CSDH=1 OK AT+CMGL="ALL" +CMGL: 1,"STO UNSENT","15021012496","",129,4 test  +CMGL: 2,"STO SENT","15021012496","",129,4 test  +CMGL: 3,"REC READ","+8615021012496","",2010/08/18 17:29:12+32",145,4"</pre>
---	--

test	test
+CMGL: 4,"REC READ","+8615021012496",",", "2010/08/18 17:37:23+32"	+CMGL: 4,"REC READ","+8615021012496",",", "2010/08/18 17:37:23+32",145,4
test	test
OK	OK

**Note:**

- The difference of text mode and PDU mode: the parameter <state> value and response format.

**2.3. Status Report**

Status report can be used to get information whether a short message is received by the target address after it's sent. If status report is needed, two parameters should be set in text mode:

- 1) AT+[CNMI](#)=2,1,0,1,0 //The forth parameter <ds> must be equals to 1
- 2) AT+[CSMP](#)=49,167,0,241 //The first parameter <fo> must be equals to 49

When the message is received, sender will get URC in text mode as below:

+CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>

Please refer to [section 2.5](#) for example.

**2.4. Delete Short Messages****2.4.1. Delete One or all Short Message (+CMGD)****Table 16: AT+CMGD Syntax**

Command	Possible Response	Example
AT+CMGD=?	+CMGD:(Range of SMS on preferred storage <mem1> can be deleted)	+CMGD: (1-50)
AT+CMGD=<index>[,<delflag>]	OK +CMS ERROR:<err>	

TA deletes message(s) from preferred message storage <mem1> ([+CPMS](#)). If <delflag> is omitted or equals to 0, it will delete message of location <index>. If <delflag> is present and not set to 0, <index> is ignored and TA deletes all messages of one or more types. See table below.

**Parameter <delflag>:**

0 or omitted	Delete the message specified in <index>
1	Delete all read messages
2	Delete all read and sent messages
3	Delete all read, sent, and unsent messages
4	Delete all messages

**Note:**

- No difference for text mode and PDU mode.

**2.4.2. Delete All Short Messages (+QMGDA)****Table 17: AT+QMGDA Syntax in text mode**

Command	Possible Response	Example
AT+QMGDA=?	+QMGDA: (listed of supported <type>s) +CMS ERROR: <err>	<b>Text mode:</b> +QMGDA:("DEL READ","DEL UNREAD","DEL SENT","DEL UNSENT","DEL INBOX","DEL ALL")  <b>PDU mode:</b> +QMGDA:(1-6)
AT+QMGDA=<type>	OK ERROR +CMS ERROR:<err>	

TA deletes all messages with type value <type> from preferred message storage <mem1> ([+CPMS](#)).

**<type> parameters:**

Text mode	PDU mode	Description
"DEL READ"	1	Delete all read messages
"DEL UNREAD"	2	Delete all unread messages
"DEL SENT"	3	Delete all sent SMS
"DEL UNSENT"	4	Delete all unsent SMS
"DEL INBOX"	5	Delete all received SMS
"DEL ALL"	6	Delete all SMS

**Note:**

- The difference of text mode and PDU mode: the parameter <type> value.

## 2.5. Examples in text mode

User can send the short message in TEXT mode as follows.

### 2.5.1. Send English short message(GSM coding) and not require status report

For example: send “Hello” to +8613795403834

Sender: +8613651979176	Receiver: +8613795403834
<p><b>//Step 1: Check service center address</b>  <b>AT+CSCS="GSM"</b> //Set the character mode as GSM mode.            OK  <b>AT+CSCA?</b> //Check the address of short message service center. For china mobile in Shanghai, the CSA is "+8613800210500". If this address is wrong, the short message can NOT be sent successfully. And so this address should be set to the correct one by AT+CSCA=&lt;sca&gt; and save it by AT+CSAS.<sup>1</sup>            +CSCA: "+8613800210500",145            OK</p>	<p><b>//Step 1: Check service center address (same as step 1 of sender)</b>  <b>AT+CSCS="GSM"</b>            OK  <b>AT+CSCA?</b>            +CSCA: "+8613800210500",145            OK</p>
<p><b>//Step 2: Set for sending English short message in text mode</b>  <b>AT+CMGF=1</b> // Set the short message mode as TEXT mode:            OK  <b>AT+CSCS="GSM"</b> // (Optional because it has been set in above step 1). Set the character mode as GSM mode.            OK  <b>AT+CSMP=17,167,0,241</b> // Set the related parameters for sending short message in text mode: FO, VP, PID and DCS<sup>2</sup>. DCS and +CSCS should match each other. To send English message, set +CSCS as “GSM” and &lt;dc&gt; as GSM 7-bit coding.            OK  <b>AT+CNMI=2,1,0,0,0</b> // Not require status report: &lt;FO&gt; of +CSMP = 17 or &lt;ds&gt; of +CNMI =0            OK</p>	<p><b>//Step 2: Set for receiving English short message in text mode</b>  <b>AT+CMGF=1</b> // Set the short message mode as TEXT mode:            OK  <b>AT+CSCS="GSM"</b> //Set the character mode as GSM mode. If it sets as “UCS2”, the message content will be displayed in UCS2 format.            OK  <b>AT+CNMI=2,1,0,0,0</b> // Set parameters for new message indication. 1 – get indication +CMTI            OK  <b>AT+CPMS?</b> //Check if short message storage is full. If it has been full, delete some messages by AT command <b>+CMGD</b> or <b>+QMGDA</b>.            +CPMS: "SM",0,50,"SM",0,50,"SM",0,50            OK</p>

	<p><b>AT+CSDH=1</b> //More information will be displayed if it equals 1.</p> <p>OK</p>
<p><b>//Step 3: Send English short message</b>  <b>AT+CMGS="13795403834"</b> // Send SMS: Enter the mobile phone number directly. Enter message content after "&gt;" and end the input by pressing Ctrl and "Z" simultaneously.</p> <p>&gt;Hello&lt;Ctrl+Z&gt;  +CMGS: 140</p> <p>OK</p>	
	<p><b>//Step 3: Receive and read short message</b>  +CMTI: "SM",1  <b>AT+CMGR=1</b>  +CMGR: "REC UNREAD", "+8613651979176", "", "2010/09/01 11:11:47+32", 145,4,0,241, "+8613800210500", 145,5  Hello</p> <p>OK  <b>AT+CSCS="UCS2"</b> //if set character set as "UCS2", the message content will be displayed in UCS2 format.</p> <p>OK  <b>AT+CMGR=1</b>  +CMGR: "REC READ", "002B003800360031003300360035031003900370039003100370036", "", "2010/09/01 11:11:47+32", 145,4,0,241, "002B0038003600310033003800300030003200310030003500300030", 145,5  00480065006C006C006F</p> <p>OK</p>

**Note 1:**

The short message service center is provided by network provider, and saved in SIM card as factory setting. **It is highly recommended that you do not change it at any time. And it's better to check it before sending short message.**



**Note 2:**

The meaning represented by them is the same as the PDU mode parameters. The difference is that the parameter must be input in decimal mode. The parameter **241** means that the short message content is default in GSM coding and sent to <mem3> to store. If changed into **240**, means that the short message content is in GSM coding and sent to the destination terminal directly.

**2.5.2. Send Chinese short message(UCS2 coding) and require status report**

**For example: send “您好” (UCS2 coding “60A8597D”) to 13795403834**

Sender: 13651979176	Receiver: 13795403834
<p><b>//Step 1: Check service center address</b>  <b>AT+CSCS="GSM"</b>            OK  <b>AT+CSCA?</b>            +CSCA: "+8613800210500",145            OK</p>	<p><b>//Step 1: Check service center address</b>  <b>AT+CSCS="GSM"</b>            OK  <b>AT+CSCA?</b>            +CSCA: "+8613800210500",145            OK</p>
<p><b>//Step 2: Set for sending Chinese short message in text mode</b>  <b>AT+CMGF=1</b> // Set the short message mode as TEXT mode:            OK  <b>AT+CSCS="UCS2"</b> //Set the character mode as UCS2 mode.            OK  <b>AT+CSMP=49,167,0,25</b> // Set the related parameters for sending short message in text mode: FO, VP, PID and DCS<sup>1</sup>.DCS and +CSCS should match each other. To send Chinese message, set +CSCS as “UCS2” and &lt;dcs&gt; as UCS2 coding.            OK  <b>AT+CNMI=2,1,0,1,0</b> // Require status report: &lt;FO&gt; of +CSMP = 49, &lt;ds&gt; of +CNMI = 1            OK</p>	<p><b>//Step 2: Set for receiving Chinese short message in text mode</b>  <b>AT+CMGF=1</b> // Set the short message mode as TEXT mode:            OK  <b>AT+CNMI=2,2,0,0,0</b> // Set parameters for new message indication. 2 – get indication +CMT with message content            OK  <b>AT+CPMS?</b> //Check if short message storage is full. If it has been full, delete some messages by AT command <b>+CMGD</b> or <b>+QMGDA</b>.            +CPMS: "SM",1,50,"SM",1,50,"SM",1,50            OK  <b>AT+CSDH=0</b> //Less information will be displayed when it equals 0.            OK</p>
<p><b>//Step 3: Send Chinese short message</b>  <b>AT+CMGS="0031003300370039003500340300033003800330034"</b> //            Send SMS: Enter the mobile phone number in UCS2 coding as set in +CSCS. Enter message content in UCS2 format after “&gt;” and end the</p>	

input by pressing Ctrl and "Z" simultaneously. > 60A8597D <Ctrl+Z> +CMGS: 141  OK	
	<b>//Step 3: Receive and read short message</b> +CMT: "+8613651979176",,"2010/09/01 11:14:52+32" 60A8597D AT+CPMS? //The short message is not saved +CPMS: "SM",1,50,"SM",1,50,"SM",1,50  OK
<b>//Step4: Get status report</b> +CDS: 6,141,"+8613795403834",145,"2010/09/01 11:25:55+32","2010/09/01 11:25:55+32",0	

**Note 1:**

The meaning represented by them is the same as the PDU mode parameters. And the difference is that the parameters must be input in decimal mode. The parameter **25** means that the short message content is UCS2 coding and sends to <mem3> to store. If changed into **24**, means that the short message content is UCS2 coding and sends to destination terminal directly.

## 3. SMS in PDU mode

### 3.1. Write and Send Short Message

#### 3.1.1. Send Message direct from Terminal (+CMGS)

**Table 18: AT+CMGS Syntax in PDU mode**

Command	Possible Response	Example
AT+CMGS=?	OK	
AT+CMGS=<length> <CR> PDU is given <ctrl-Z/ESC>	+CMGS: <mr> or +CMS ERROR: <err>	Send English characters “TEST” to 13795403834: AT+CMGS=19 > 0011000D91683197453038F400F10104D4E29 40A<Ctrl+Z>  Send Chinese characters “测试” to 13795403834: AT+CMGS=19 >0011000D91683197453038F4000801046D4B 8BD5 <Ctrl+Z>

**Note:**

- <pdu> includes all parameters for sending a message, such as the target address, type of address, message content and settings of [+CSMP](#) in text mode. The structure of <pdu> is represented in section 3.5.1 [SMS-Submit PDU Packet \(MO\)](#)
- <length> must match the actual length of <pdu>.
- <length> equals to the number of octets of <pdu> excluding <SCA>. See [section 3.5.1 Submit PDU packet](#).

#### 3.1.2. Write Short Message to Storage (+CMGW)

**Table 19: AT+CMGW Syntax in PDU mode**

Command	Possible Response
AT+CMGW=?	OK
AT+CMGW=<length>[,<stat>]<CR> PDU is given <ctrl-Z/ESC>	+CMGW: <index> +CMS ERROR: <err>

The parameter and <pdu> content are the same as above command [+CMGS](#), but the message will be saved to storage <mem2> ([+CPMS](#)) and not be sent.

The stored message can be sent by AT command [+CMSS](#). There is no difference between PDU

mode and text mode.

### 3.2. Receive and Read Short Message

For PDU mode, the command syntax of +CNMI and +CMGR are the same as text mode. The difference is response format of URC +CMTI, +CMT, +CDS, +CMGR.

The AT command +CSDH is invalid for pdu mode because these text mode parameters will be included in <pdu>. Refer to section 3.5.2 [SMS-Deliver PDU Packet \(MT\)](#) for <pdu> structure and meaning.

#### 3.2.1. Read Short Messages (+CMGR)

**Table 20: AT+CMGR Syntax in PDU mode**

Command	Possible Response	Example
AT+CMGR=<index>[, <mode>]	+CMGR: <stat>,[<alpha>],<length> ><CR><LF><pdu>	AT+CMGR=5 +CMGR: 0,,24 0891683108200105F0040D916851200 12194F600F10180817144302304F4F2 9C0E  OK

See next AT command [+CMGL](#) for <stat> and <mode> value and meaning in PDU mode.

#### 3.2.2. List Short Messages from Preferred Storage (+CMGL)

**Table 21: AT+CMGL Syntax in PDU mode**

Command	Possible Response
AT+CMGL=?	OK Or +CMS ERROR: <err>
AT+CMGL=<sta >[,<mode>]	+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu><CR><LF> +CMGL: <index>,<stat>,[alpha],<length><CR><LF><pdu>[...]

The execution command +CMGL returns messages with status value <stat> from preferred message storage <mem1> to the TE.

#### Parameters:

	Text value	PDU value	Description
<state>	"REC UNREAD"	0	Received unread messages (default)
	"REC READ"	1	Received read messages

	"STO UNSENT"	2	Stored unsent messages
	"STO SENT"	3	Stored sent messages
	"ALL"	4	All messages
<mode>	0	0	Normal
	1	1	Not change status of the specified SMS record

**Example:**

```
AT+CMGL=4
```

```
+CMGL: 1,2,,18
```

```
0011FF0B815120012194F600004704F4F29C0E
```

```
+CMGL: 2,3,,18
```

```
00117E0B815120012194F600004704F4F29C0E
```

```
+CMGL: 3,1,,24
```

```
0891683108200105F0040D91685120012194F600F10180817192212304F4F29C0E
```

```
+CMGL: 4,1,,24
```

```
0891683108200105F0040D91685120012194F600F10180817173322304F4F29C0E
```

```
OK
```

**3.3. Status Report**

If status report is needed, two parameters should be set:

- 1) AT+CNMI=2,1,0,1,0 //The forth parameter <ds> must be equals to 1
- 2) <SRR> in <FO> field of pdu package must be set as 1.

When the message is received, sender will get URC in PDU mode as below:

```
+CDS:<length><CR><LF><pdu>
```

Please refer to [section 3.6](#) for example.

**3.4. Delete Short Messages**

Same as text mode, user can delete one or more short messages by AT command [+CMGD](#), or delete all short messages with <type> by AT command [+QMGDA](#). The difference is <type> value in command [+QMGDA](#), see above section 2.4.

**3.5. Basic elements of the PDU**

Please refer to [4]GSM 03.40 subclause 9 for details except element <DCS><UDL><UD> which are defined in [3]GSM 03.38.

&b/&h/&d is appended to the digital number to stand for binary/hexadecimal/decimal format in this document.

### 3.5.1. SMS-Submit PDU Packet (MO)

**Table 22: SMS-SUBMIT Packet**

number of octets	1-12	1	1	2-12	1	1	0,1 or 7	1	0-140
Element	SCA	FO	MR	DA	PID	DCS	VP	UDL	UD

### 3.5.2. SMS-Deliver PDU Packet (MT)

**Table 23: SMS-DELIVER Packet**

number of octets	1-12	1	2-12	1	1	7	1	0-140
Element	SCA	FO	OA	PID	DCS	SCTS	UDL	UD

### 3.5.3. SMS-Status Report Packet

**Table 24: Status-Report Packet**

number of octets	1-12	1	1	2-12	7	7	1	1	1	1	1	0-140
Element	SCA	FO	MR	RA	SC TS	DT	ST	PI	PID	DC S	UD L	UD

The last elements from PI to UD are optional.

### 3.5.4. Element descriptions

#### 3.5.4.1. Type of Address <TOA>

**Table 25: <TOA>**

&b			&h	&d	Description
1	TON	NPI			
1	000	0001	81	129	Unknown
1	001	0001	91	145	International number, beginning with “+” continued with the country code.
1	010	0001	A1	161	National number

Please refer to GSM 04.08 subclause 10.5.4.7 Called party BCD number for details of TON (Type of Number) and NPI (Numbering plan identification).

#### 3.5.4.2. Service Center Address <SCA>

**Table 26: <SCA>**

Element	SCA length	TOA	SCA
Example(&h)	08	91	683108200105F0

Above example shows <sca> address "+8613800210500" (SCA of China Mobile in Shanghai).

#### Parameters:

SCA length = 8 = 1 (octets length of TOA) + 7 (octets length of SCA)

TOA = 91: The address is international number (Begin with "+").

SCA = 683108200105F0: Service Center Address. Number formatting rule:

- 1) One octet includes two BCD-digit Fields.
- 2) If the digits number is odd, the last digit shall be filled with "F&h".
- 3) Switch every two digits from beginning.

Original number	86 13 80 02 10 05 0(F)
after formatting	68 31 08 20 01 05 F0

#### Note:

When sending message (SMS-Submit), if <SCA> sets as "00", the address of AT command <+CSCA> will be used. **It is highly recommended that you do NOT change it at any time.**

**And it's better to check it before sending short message.**

#### 3.5.4.3. Originator/Destination/Recipient Address <OA>/<DA>/<RA>

**Table 27: <OA>/<DA>/<RA>**

Element	Address length	TOA	OA/DA/RA
Example(&h)	0D	91	683197453038F4

#### Parameters:

Address length = 0D&h = 13&d = number of digits of <OA>/<DA>/<RA> (8613795403834)

<OA>/<DA>/<RA>: the address format is the same as above field <SCA>

#### Note:

- If TOA does not match with address, short message maybe fail to send.
- Recommended to store every address in International numbering format to avoid problems while roaming!

#### 3.5.4.4. First Octet <FO>

First Octet includes some properties of the message, for example, the message type (MTI) – It's a SMS Submit, SMS Deliver or SMS Status report; request status report or not ([SRR](#)) when send a message; present [VP](#)(Validity Period) or not and its format(VPF), etc.

**Table 28: <FO> elements**

Bit	7	6	5	4	3	2	1	0
SMS-Submit	RP	UDHI	SRR	VPF		RD	MTI	
SMS-Deliver	RP	UDHI	SRI	-		MMS	MTI	

SMS-Status Report	RP	UDHI	SRQ	-	MMS	MTI
-------------------	----	------	-----	---	-----	-----

**<FO> parameters**

Parameter		Value (bit)	Meaning
RP	Reply Path	0	Reply Path is not set
		1	Reply Path is set
UDHI	User Data Header Indicator	0	The UD (User Data) field contains only the short message
		1	The beginning of the UD field contains a Header in addition to the short message
SRI	Status Report Indication	0	A status report will not be returned to the SME
		1	A status report will be returned to the SME
SRR	Status Report Request	0	A status report is not requested
		1	A status report is requested
SRQ	Status Report Qualifier	0	The SMS-Status-Report is the result of a SMS-Submit
		1	The SMS-Status-Report is the result of a SMS-Command, e.g. an Enquiry
VPF	Validity Period Format	00	VP field not present
		01	Enhanced VP format
		10	Relative VP format, VP comprises 1 octet, an integer represented
		11	Absolute VP format, VP comprises 7 octets
MMS	More Messages to Send	0	More messages are waiting for the MS in this SC
		1	No more messages are waiting for the MS in this SC
RD	Reject Duplicates	0	Instruct the SC to accept a SMS-SUBMIT for an SM still held in the SC which has the same TP-MR and the same TP-DA as a previously submitted SM from the same OA.
		1	Instruct the SC to reject an SMS-SUBMIT for an SM still held in the SC which has the same MR and the same DA as the previously submitted SM from the same OA. In this case an appropriate FCS value will be returned in the SMS-SUBMIT-REPORT.
MTI	Message Type Indicator	00	SMS-Deliver (in the direction SC to MS)
		01	SMS-Submit (in the direction MS to SC)
		10	SMS-Status Report (in the direction SC to MS)
		11	SMS-Command (in the direction MS to SC)

**Example of <FO> for SMS-Submit:**

When sending short message in text mode, we should set <fo> as 17 or 49 in AT command [+CSMP](#). The following table shows their meanings:

&b	&h	&d	Bit 7	6	5	4	3	2	1	0
			RP	UDHI	SRR	VPF		RD	MTI	



00010001	11	17	0	0	0	10	0	01
				No header in UD	not request status report	VP relative format		SMS-Submit
00110001	31	49	0	0	1	10	0	01
				No header in UD	request status report	VP relative format		SMS-Submit

### 3.5.4.5. Message Reference <MR>

MR is an integer (0..255) for representing a reference number of the SMS-submit submitted to the SMSC by the MS, used to identify whether the received SMS is duplicated or not.

### 3.5.4.6. Protocol Identifier <PID>

The PID is the information element by which the transport layer either refers to the higher layer protocol being used, or indicates interworking with a certain type of telematic device.

**Table 29: <PID>**

<PID> value		Protocol
&h	&d	
00	0	The SMS has to be treat as a short message
01	1	The SMS has to be treat as a telex

### 3.5.4.7. Data Coding Scheme <DCS>

<DCS> identifies the coding scheme within the User Data (UD). It comprises one octet and may indicate the message class, alphabet, etc. Please refer to [3] GSM 03.38 for details.

**Table 30: <DCS>**

bit7-4	5	4	3	2	1	0	Meanings	
00xx ( general data coding indication)	0						the text is uncompressed	
	1						the text is compressed using the GSM standard compression algorithm	
		0					bit 1,0 are reserved and have no message class	
		1					bit 1,0 have a message class meaning	
				0	0		default alphabet	
				0	1		8 bit alphabet	
				1	0		UCS2 (16 bit)	
				1	1		Reserved	
						0	0	class 0 immediate display
						0	1	class 1 default meaning: ME specific
						1	0	class 2 SIM specific message
						1	1	class 3 default meaning: TE specific
1111			0				reserved	

(data coding message class)			0			default alphabet
			1			8-bit data
				0	0	class 0 immediate display
				0	1	class 1 default meaning: ME specific
				1	0	class 2 SIM specific message
				1	1	class 3 default meaning: TE specific

Message Class indicates how to store message when it's received. Class 0 message is displayed directly in the destination terminal, not stored. If you want to store it in SIM, you can use AT command [+QCLASS0](#).

Default alphabet indicates the user data is coded from the [7-bit alphabet](#).

#### Example

&b	&h	&d	character coding	message class
00000000	00	0	7-bit	no class
00001000	08	8	UCS2	no class
00011000	18	24	UCS2	class 0 (immediate display)
00011001	19	25	UCS2	class 1 (ME-specific)
11110000	F0	240	7-bit	class 0 (immediate display)
11110001	F1	241	7-bit	class 1 (ME-specific)

In text mode, module uses relative decimal format in [+CSMP](#).

#### 3.5.4.8. Validity Period <VP>

<VP> identifies the time period for which the short message is valid in the SMSC. Its format is defined in <VPF> of <FO> field.

When <VPF> is relative format (<VPF>=10&b), <VP> comprises 1 octet, which illustrates the period between the time when SC receives the SM and SC discards the SM.

**Table 31: <VP> relative format**

<VP> value		Validity period value	
&h	&d		
00 to 8F	0 to 143	(VP+1)*5 minutes	5 minutes to 12 hours
90 to A7	144 to 167	12 hours + (VP-143)*30 minutes	12.5 hours to 24 hours
A8 to C4	168 to 196	(VP-166)*1 day	2 days to 30 days
C5 to FF	197 to 255	(VP-192)*1 week	5 weeks to 63 weeks

In text mode, module uses relative decimal format in [+CSMP](#).

When <VPF> is absolute format (<VPF>=11&b), <VP> comprises 7 octets, it defines the absolute expire time when SC discards the SM. The representation is identical to the representation of the [TP-SCTS](#) (Service Center Time Stamp).

### 3.5.4.9. Service Centre Time Stamp <SCTS>

<SCTS> indicates time when the SMSC received the message. It's given in semi-octet representation in the following way.

**Table 32: <SCTS>**

	Year	Month	Day	Hour	Minute	Second	Time Zone
Digits(Semi-octets)	2	2	2	2	2	2	2
Example	01	80	12	41	14	80	23

The Time Zone expressed in quarters of an hour, between the local time and GMT. The above example shows time 10-08-21 14:41:08+32, GMT +08.

### 3.5.4.10. Discharge Time <DT>

The TP-Discharge-Time field indicates the time at which a previously submitted SMS-SUBMIT was successfully delivered to or attempted to deliver to the recipient SME or disposed of by the SC.

### 3.5.4.11. Length of User Data <UDL>

UDL indicates the length of UD. It depends of alphabet defined in [<DCS>](#).

<dc>	bits per character	SMS UDL meaning	character table
Default(GSM 7-bit)	7	Number of characters	see [3]GSM03.38
8-bit data	8	Number of octets	user specific
UCS2	16	Number of octets	ISO/IEC10646 "Universal Multiple-Octet Coded Character Set (UCS)"

**Note:**

For GSM 7-bit coding, UDL equals to the number of characters, it does NOT equal to the number of octets.

### 3.5.4.12. User Data <UD>

If <UDHI> equals 0 (no header in <UD>) and message is not compressed, the maximum individual Short Message sizes of 160 7-bit characters, 140 8-bit characters, or 70 16-bit characters (1120 bits = 160\*7 = 140\*8 = 70\*16).

General characters in English can be found in GSM alphabet table ([3] GSM 03.08 subclause 6.2.1 Default alphabet or [appendix 5.3](#) in this document), and so can be encoded using GSM 7-bit encoding. Characters in languages such as Arabic, Chinese, Korean, Japanese or Cyrillic alphabet languages (e.g. Russian, Serbian, Bulgarian, etc) must be encoded using the 16-bit UTF-16 character encoding.

Please refer to [3] GSM 03.08 subclause 6.1.2.1.1 for SMS point-to-point packing of 7-bit characters.

**Example: SMS point-to-point packing of 7-bit characters**
**User data: 12345678**

Character	1	2	3	4	5	6	7	8
GSM coding(hex)	31	32	33	34	35	36	37	38
GSM coding(bit)	0110 001	0110 010	0110 011	0110 100	0110 101	0110 110	0110 111	0111 000
Transfer last bits to previous character	0011 0001	1101 1001	1000 1100	0101 0110	1011 0011	1101 1101	0111 0000	
Result in hex format	31	D9	8C	56	B3	DD	70	

So for string “12345678”, UD = “31D98C56B3DD70” and UDL=8 (note it’s the number of characters, not number of octets).

**3.5.4.13. Status <ST>**

ST indicates the status of a previously submitted SMS-SUBMIT when a status report has been requested. It consists of one octet. If it equals to “00”&h, that means short message has been received.

**3.6. Examples in PDU mode**

User can send the English and Chinese short message in PDU mode as follows.

**3.6.1. Send English short message(GSM coding) and not require status report**
**For example: send “Hello” to +8613795403834**

Sender: +8613651979176	Receiver: +8613795403834
<b>//Step 1: Check service center address</b> <b>AT+CSCS="GSM"</b> //Set the character mode as GSM mode. OK <b>AT+CSCA?</b> //Check the address of short message service center. For china mobile in Shanghai, the CSA is "+8613800210500". If this address is wrong, the short message can NOT be sent successfully. And so this address should be set to the correct one by AT+CSCA=<sca> and save it by AT+CSAS. +CSCA: "+8613800210500",145 OK	<b>//Step 1: Check service center address (same as step 1 of sender)</b> <b>AT+CSCS="GSM"</b> OK <b>AT+CSCA?</b> +CSCA: "+8613800210500",145 OK
<b>//Step 2: Set PDU mode</b> <b>AT+CMGF=0</b> // Set the short message	<b>//Step 2: Set PDU mode and parameters for receiving messages</b>

<p>mode as PDU mode.</p> <p>OK</p>	<p><b>AT+CMGF=0</b> // Set the short message mode as PDU mode.</p> <p>OK</p> <p><b>AT+CNMI=2,1,0,0,0</b> // Set parameters for new message indication. 1 – get indication +CMTI</p> <p>OK</p> <p><b>AT+CPMS?</b> //Check if short message storage is full. If it has been full, delete some messages by AT command <b>+CMGD</b> or <b>+QMGDA</b>.</p> <p>+CPMS: "SM",1,50,"SM",1,50,"SM",1,50</p> <p>OK</p>
<p><b>//Step 3: Send English short message</b></p> <p><b>AT+CMGS=20</b></p> <p>&gt;</p> <p><b>0011000D91683197453038F400000105C8329BFD06</b> &lt;Ctrl+Z&gt;</p> <p>+CMGS: 146</p> <p>OK //See below <a href="#">Note 1</a> for descriptions</p>	
	<p><b>//Step 3: Receive and read short message</b></p> <p>+CMTI: "SM",2</p> <p><b>AT+CMGR=2</b></p> <p>+CMGR: 0,,25</p> <p>0891683108200105F0040D91683156919771F600000190102191252305C8329BFD06</p> <p>OK //See below <a href="#">Note 2</a> for descriptions</p>

**Note 1: Descriptions for SMS-SUBMIT PDU:**

**AT+CMGS=20**

> **0011000D91683197453038F400000105C8329BFD06** <Ctrl+Z>

**SMS-SUBMIT PDU:**

number of octets	1-12	1	1	2-12	1	1	0,1 or 7	1	0-140
Element	<a href="#">SCA</a>	<a href="#">FO</a>	<a href="#">MR</a>	<a href="#">DA</a>	<a href="#">PID</a>	<a href="#">DCS</a>	<a href="#">VP</a>	<a href="#">UDL</a>	<a href="#">UD</a>
Example	00	11	00	0D91683197453038F4	00	00	01	05	C8329BFD06

20 = octets of (<pdu>-<sca> = **11000D91683197453038F400000105C8329BFD06**)

SCA = 00: Service center address is defined in AT command +CSCA.

[FO](#) = 11&h = 17&d:

&b	&h	&d	Bit 7	6	5	4	3	2	1	0
			RP	UDHI	SRR	VPF		RD	MTI	
00010001	11	17	0	0	0	10		0	01	
				No header in UD	not request status report	VP relative format			SMS-Sub mit	

SRR = 0: A status report is not requested

VPF = 10, VP = 01: validity period is (VP+1)\*5 = 10 minutes

DA = 0D91683197453038F4: Receiver is +8613795403834

DCS = 00: GSM 7-bit coding.

UDL = 05: length of characters "Hello"

UD = C8329BFD06:

Character	H	e	l	l	o
GSM coding(hex)	48	65	6C	6C	6F
GSM coding(bit)	1001000	1100101	1101100	1101100	1101111
Transfer last bits to previous character	11001000	00110010	10011011	11111101	00000110
Result in hex format	C8	32	9B	FD	06

#### Note 2: Descriptions for SMS-Deliver PDU

**AT+CMGR=2**

**+CMGR: 0,,25**

**0891683108200105F0040D91683156919771F600000190102191252305C8329BFD06**

**OK**

#### SMS-DELIVER PDU:

number of octets	1-12	1	2-12	1	1	7	1	0-140
Element	<u>SCA</u>	<u>FO</u>	<u>OA</u>	<u>PID</u>	<u>DCS</u>	<u>SCTS</u>	<u>UDL</u>	<u>UD</u>
Example	0891683108 200105F0	04	0D9168315 6919771F6	00	00	0190102 1912523	05	C832 9BFD 06

SCA = 0891683108200105F0: Service center address is +8613800210500

OA = 0D91683156919771F6: Sender is +8613651979176

FO = 04:

Bit	7	6	5	4	3	2	1	0
SMS-Deliver	RP	UDHI	SRI	-		MMS	MTI	
Example	0	0	0	00		01	00	

UDHI = 0: no header in UD

MMS = 1: No more messages are waiting for the MS in this SC

### 3.6.2. Send Chinese short message(UCS2 coding) and require status report

For example: send “您好” (UCS2 coding “60A8597D”) to 13795403834

Sender: +8613651979176	Receiver: +8613795403834
<p><b>//Step 1: Check service center address</b>  <b>AT+CSCS="GSM"</b>            OK  <b>AT+CSCA?</b>            +CSCA: "+8613800210500",145             OK</p>	<p><b>//Step 1: Check service center address</b>  <b>AT+CSCS="GSM"</b>            OK  <b>AT+CSCA?</b>            +CSCA: "+8613800210500",145             OK</p>
<p><b>//Step 2: Set PDU mode</b>  <b>AT+CMGF=0</b> // Set the short message mode as PDU mode.            OK  <b>AT+CNMI=2,1,0,1,0</b> // Require status report: &lt;SRR&gt; in &lt;FO&gt; field of pdu package must be set as 1 and &lt;ds&gt; of +CNMI = 1             OK</p>	<p><b>//Step 2: Set PDU mode and parameters for receiving messages</b>  <b>AT+CMGF=0</b> // Set the short message mode as PDU mode.            OK  <b>AT+CNMI=2,2,0,0,0</b> // Set parameters for new message indication. 2 – get indication +CMT with message content            OK  <b>AT+CPMS?</b> //Check if short message storage is full. If it has been full, delete some messages by AT command +CMGD or +QMGDA.            +CPMS: "SM",2,50,"SM",2,50,"SM",2,50             OK</p>
<p><b>//Step 3: Send Chinese short message</b>  <b>AT+CMGS=19</b>            &gt;  <b>0031000D91683197453038F40008010460A8597D</b> &lt;Ctrl+Z&gt;            +CMGS: 147             OK //See below <a href="#">Note 1</a> for descriptions</p>	
	<p><b>//Step 3: Receive and read short message</b>            +CMT: ,24            0891683108200105F0240D91683156919771            F60008019010314241230460A8597D            //See below <a href="#">Note 2</a> for descriptions  <b>AT+CPMS?</b> //The short message is not saved            +CPMS: "SM",2,50,"SM",2,50,"SM",2,50</p>

	OK
<b>//Step4: Get status report</b> +CDS: 26 0891683108200105F006930D916831974530 38F4019010314291230190103142912300 //See below <a href="#">Note 3</a> for descriptions	

**Note 1: Descriptions for SMS-SUBMIT PDU:****AT+CMGS=19**> **0031000D91683197453038F40008010460A8597D** <Ctrl+Z>**SMS-SUBMIT PDU:**

number of octets	1-12	1	1	2-12	1	1	0,1 or 7	1	0-140
Element	<a href="#">SCA</a>	<a href="#">FO</a>	<a href="#">M</a> <a href="#">R</a>	<a href="#">DA</a>	<a href="#">PID</a>	<a href="#">DCS</a>	<a href="#">VP</a>	<a href="#">UDL</a>	<a href="#">UD</a>
Example	00	31	00	0D916831974 53038F4	00	08	01	04	60A8597 D

19 = octets number of (<pdu>-<sca> = **31000D91683197453038F40008010460A8597D**)

SCA = 00: Service center address is defined in AT command +CSCA.

FO = 31&amp;h = 49&amp;d:

&b	&h	&d	Bit 7	6	5	4	3	2	1	0
			RP	UDHI	SRR	VPF		RD	MTI	
			0	0	1	10		0	01	
00110001	31	49		No header in UD	request status report	VP relative format			SMS-Submit	

SRR = 1: A status report is requested

VPF = 10, VP = 01: validity period is (VP+1)\*5 = 10 minutes

DA = 0D91683197453038F4: Receiver is +8613795403834

DCS = 08: UCS2 coding.

UDL = 04: number of UD octets "60A8597D"

UD = 60A8597D: UCS2 coding for "您好"

**Note 2: Descriptions for SMS-Deliver PDU****+CMT: ,24****0891683108200105F0240D91683156919771F60008019010314241230460A8597D****SMS-DELIVER PDU:**

number of octets	1-12	1	2-12	1	1	7	1	0-140
Element	<a href="#">SCA</a>	<a href="#">FO</a>	<a href="#">OA</a>	<a href="#">PID</a>	<a href="#">DC</a> <a href="#">S</a>	<a href="#">SCTS</a>	<a href="#">UD</a> <a href="#">L</a>	<a href="#">UD</a>



Example	08916831082 00105F0	24	0D9168315 6919771F6	00	08	0190103 1424123	04	60A859 7D
---------	------------------------	----	------------------------	----	----	--------------------	----	--------------

24 = octets number of <pdu> - <SCA>

(240D91683156919771F60008019010314241230460A8597D)

SCA = 0891683108200105F0: Service center address is +8613800210500

OA = 0D91683156919771F6: Sender is +8613651979176

**FO** = 24:

Bit	7	6	5	4	3	2	1	0
SMS-Deliver	RP	UDHI	SRI	-		MMS	MTI	
Example	0	0	1	00		01	00	

UDHI = 0: no header in UD

SRI = 1: A status report will be returned to the SME

MMS = 1: No more messages are waiting for the MS in this SC

### Note 3: Descriptions for SMS-Status Report PDU

+CDS: 26

**0891683108200105F006930D91683197453038F4019010314291230190103142912300**

#### SMS-Status Report PDU:

number of octets	1-12	1	1	2-12	7	7	1
Element	<a href="#">SCA</a>	<a href="#">FO</a>	<a href="#">MR</a>	<a href="#">RA</a>	<a href="#">SCTS</a>	<a href="#">DT</a>	<a href="#">ST</a>
Example	0891683108 200105F0	06	93	0D9168319745 3038F4	01901031 429123	01901031 429123	00

26= octets number of <pdu> - <SCA>

(06930D91683197453038F4019010314291230190103142912300)

SCA = 0891683108200105F0: Service center address is +8613800210500

MR = 93 & h = 147: same as response <MR> of AT command +CMGS

RA = 0D91683197453038F4: Receiver is +8613795403834

ST = 0: short message has been received.

**FO** = 06:

Bit	7	6	5	4	3	2	1	0
SMS-Status report	RP	UDHI	SRQ	-		MMS	MTI	
Example	0	0	0	00		01	10	

UDHI = 0: no header in UD

SRQ = 0: The SMS-Status-Report is the result of a SMS-Submit

MMS = 1: No more messages are waiting for the MS in this SC

## 4. Other Commands with SMS

### 4.1. Save and Restore SMS Settings

The settings of [+CSCA](#) and [+CSMP](#) can be saved to SIM card by AT command [+CSAS](#) and restored by AT command [+CRES](#). Other commands are described in section 4.1.3.

#### 4.1.1. Save SMS Settings (+CSAS)

**Table 33: AT+CSAS syntax**

Command	Possible Response	Example
AT+CSAS=?	+CSAS: (list of supported <profile>s)	+CSAS: (0-3)
AT+CSAS=[<profile>]	OK ERROR	

#### Parameter:

<profile>	0-3	Manufacturer specific profile number where settings are to be saved
-----------	-----	---

Execution command saves active message service settings to a non-volatile memory. A TA can contain several profiles of settings. Settings specified in AT commands Service Centre Address [+CSCA](#) and Set Message Parameters [+CSMP](#) are saved.

#### 4.1.2. Restore SMS Settings (+CRES)

**Table 34: AT+CRES syntax**

Command	Possible Response	Example
AT+CRES=?	+CRES: (list of supported <profile>s)	+CRES: (0-3)
AT+CRES=[<profile>]	OK ERROR	

TA restores SMS settings from non-volatile memory to active memory.

#### 4.1.3. Save other settings

+CPMS is saved automatically.

+QCLASS0 and +QSMSCODE are not able to save.

The following settings can be saved by command AT&W, restored by command ATZ, and return to manufacturer defaults by command AT&F.

- +CMGF
- +CNMI

- +CSDH
- +CSCS

## 4.2. Concatenated Short Message

Quectel module supports concatenated short message. User is able to send and receive concatenated short messages using the same normal format in text mode. Message will be divided to 1 ~ 5 short messages when sending and merged to one message when receiving. Every short message sets UDHL as 1 in <FO> field and adds header information in the UD field. See [4] GSM 03.40 subclause 9.2.3.24.1 for more details. See the example below.

### Example:

```
//Send a long message
AT+CMGF=1 // Set the short message mode as TEXT mode
OK
AT+CSCS="GSM" // Set the character mode as GSM mode.
OK
AT+CSMP=17,167,0,241 // Set parameters for sending short message in text mode
OK
AT+CMGS="13795403834"
> Focusing on the wireless M2M market sector, Quectel designs and manufactures variety wireless modules to fulfill different industrial standards and requirements. The Quectel products have been applied in the wireless M2M sectors like telematics, telemetry, remote control and monitoring, fleet management, wireless POS, security, healthcare, etc.
//The message length is 347, larger than the maximum length of a single short message 152. So it will be divided to three messages (length 152+152+43) to send, and merged when receiving.
+CMGS: 156
OK
//Receive a long message
+CMTI: "SM",3 //Indication of receiving three messages, saved to SIM card
+CMTI: "SM",4
+CMTI: "SM",5
AT+CMGF=1
OK
AT+CMGR=3
+CMGR: "REC UNREAD", "+8613651979176", "", "2010/09/01 15:01:54+32"
Focusing on the wireless M2M market sector, Quectel designs and manufactures variety wireless modules to fulfill different industrial standards and requirements. The Quectel products have been applied in the wireless M2M sectors like telematics, telemetry, remote
```

control and monitoring, fleet management, wireless POS, security, healthcare, etc.  
 //Three parts are merged to display in the first message.

OK

**AT+CMGR=4**

+CMGR: "REC READ","+8613651979176","", "2010/09/01 15:01:52+32"

irements. The Quectel products have been applied in the wireless M2M sectors like telematics, telemetry, remote control and monitoring, fleet management

//Second part, 152 characters

OK

**AT+CMGR=5**

+CMGR: "REC READ","+8613651979176","", "2010/09/01 15:01:54+32"

, wireless POS, security, healthcare, etc. //Third part, 43 characters

OK

**AT+CMGD=3**

//If delete the first message, three messages of this long message will be deleted

OK

**AT+CPMS?**

+CPMS: "SM",2,50,"SM",2,50,"SM",2,50

OK

### 4.3. Store Class 0 SMS to <mem3> When Received Class 0 SMS (+QCLASS0)

As normal class0 message (set in <dc>) will be displayed immediately in the terminal. Using AT command +QCLASS0, Quectel module can store this kind of message.

**Table 35: AT+QCLASS0 syntax**

Command	Possible Response
AT+QCLASS0=?	+QCLASS0: (0, 1)
AT+QCLASS0?	+QCLASS0: <mode>
AT+QCLASS0=[<mode>]	OK ERROR

#### Parameter <mode>

0	Disable to store Class 0 SMS to <mem3> when received Class 0 SMS (default)
1	Enable to store Class 0 SMS to <mem3> when received Class 0 SMS

#### Example:

//Send class 0 message

**AT+CMGF=1** // Set the short message mode as TEXT mode

OK

```

AT+CSCS="GSM" // Set the character mode as GSM mode.
OK
AT+CSMP=17,167,0,240 // Set parameters for sending short message in text mode.
                        <DCS>=240 stands for a class0 message
OK
AT+CMGS="13795403834"
>TEST CLASS0 MESSAGE<Ctrl+Z>
+CMGS: 160

OK

//Receive Class0 message when QCLASS0=0
AT+QCLASS0?
+QCLASS0: 0

OK
AT+CMGF=1
OK
AT+CNMI?
+CNMI: 2,1,0,0,0

OK

+CMT: "+8613651979176", "2010/09/01 15:35:34+32"
TEST CLASS0 MESSAGE //Message is displayed directly and not stored

//Receive Class0 message when QCLASS0=1 (Send the same message as above)
AT+QCLASS0=1
OK

+CMTI: "SM",3 //Message is stored.
AT+CMGR=3
+CMGR: "REC UNREAD", "+8613651979176", "", "2010/09/01 15:37:56+32"
TEST CLASS0 MESSAGE

OK

```

#### 4.4. Configure SMS code mode (+QSMSCODE)

Some special characters are not included in the GSM alphabet table. Quectel module provides AT command +QSMSCODE to code special characters in GSM 7-bit coding in text mode.

**Table 36: AT+QSMSCODE syntax**

Command	Possible Response
---------	-------------------

AT+QSMSCODE=?	+QSMSCODE:(0,1)
AT+QSMSCODE?	+QSMSCODE:<mode>
AT+QSMSCODE=<mode>	OK ERROR

**Parameter <mode>**

0	Code mode according with NOKIA
<u>1</u>	Code mode according with SIEMENS (default)

**Note:**

- Set AT+[CMGF](#)=1, AT+[CSCS](#)="GSM", <dc> (+[CSMP](#)) as GSM-7-bit coding before using this command.
- Use the same setting for sender and receiver.
- This command is still not able to make sure all special characters are shown correctly. The best method is to use UCS2 coding.

**4.5. Notify for SMS full (+QEXTUNSOL)**

+QEXTUNSOL is provided to enable/disable proprietary unsolicited indications. User can use this command to get the notification for SMS full as the following format.

**AT+QEXTUNSOL="SM",<mode>**

<SM> stands for additional SMS Information. Displays additional information about SMS events in the form of Unsolicited messages of the following format.

**+TSMINFO: <CMS error info>**

where <CMS error info> is a standard CMS error in the format defined by the AT+CMEE command i.e. either a number or a string.

**<mode> parameter**

0	Disable (default)
1	Enable
2	Query

**Example:**

```
AT+QEXTUNSOL="SM",1
```

```
OK
```

```
AT+CPMS?
```

```
+CPMS: "SM",49,50,"SM",49,50,"SM",49,50
```

```
OK
```

```
+CMTI: "SM",50
```

```
//Short messages are full, get below URC:
```

```
GSM_SMS_AN_V1.1
```

```
+TSMINFO: 322 // memory full

//Restart module
+TSMINFO: 322 // memory full

+TSMINFO: 3513 //unread records on SIM
```

## 5. Appendix

### 5.1. Message service send and write procedures

[2] GSM 07.05 clause 3 Figure 4.

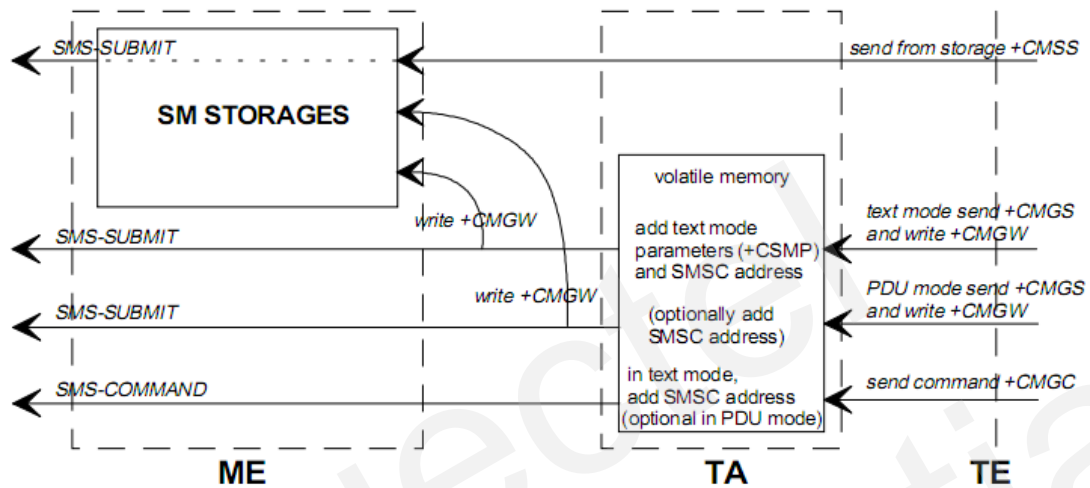


Figure 4: Message service send and write procedures



## 5.2. Message receiving procedures

Refer to [2] GSM 07.05 Clause 3 Figure 3.

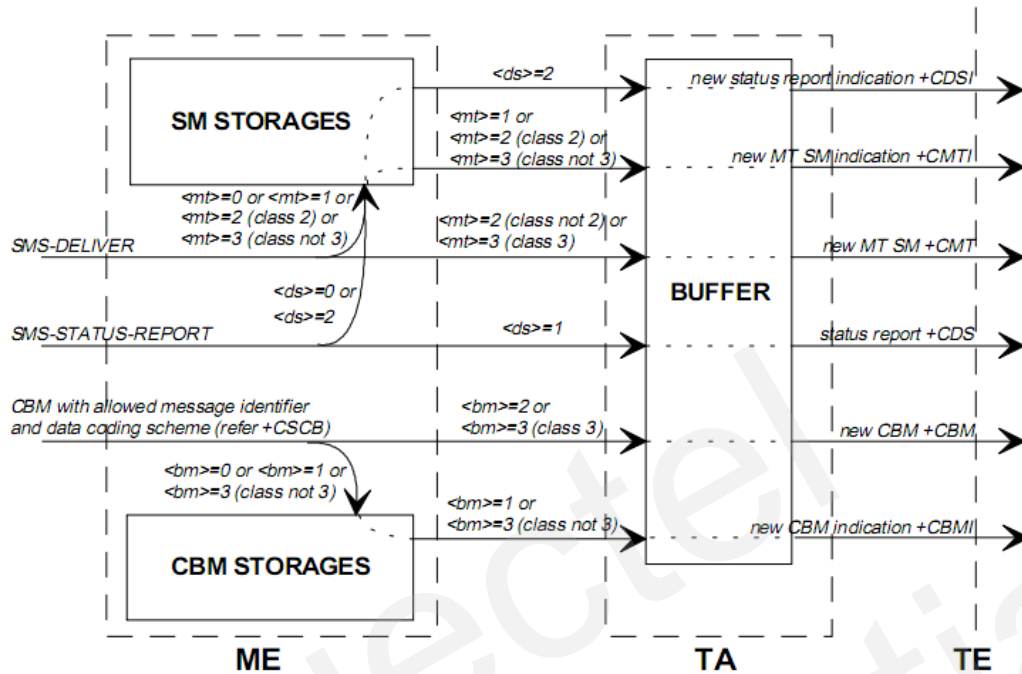


Figure 3: Message receiving procedures

## 5.3. Default GSM alphabet

Refer to [3] GSM 03.08 subclause 6.2.1 Default alphabet.

					b7	0	0	0	0	1	1	1	1
					b6	0	0	1	1	0	0	1	1
					b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1			0	1	2	3	4	5	6	7
0	0	0	0	0	@	Δ	SP	0	i	P	ı	p	
0	0	0	1	1	£	_	!	1	A	Q	a	q	
0	0	1	0	2	\$	Φ	"	2	B	R	b	r	
0	0	1	1	3	¥	Γ	#	3	C	S	c	s	
0	1	0	0	4	è	Λ	¤	4	D	T	d	t	
0	1	0	1	5	é	Ω	§	5	E	U	e	u	
0	1	1	0	6	ù	Π	&	6	F	V	f	v	
0	1	1	1	7	ì	Ψ	'	7	G	W	g	w	
1	0	0	0	8	ò	Σ	(	8	H	X	h	x	
1	0	0	1	9	ç	Θ	)	9	I	Y	i	y	
1	0	1	0	10	LF	Ξ	*	:	J	Z	j	z	
1	0	1	1	11	Ø	1)	+	;	K	Ä	k	ä	
1	1	0	0	12	ø	Æ	,	<	L	Ö	l	ö	
1	1	0	1	13	CR	æ	-	=	M	Ë	m	ë	
1	1	1	0	14	Å	ß	.	>	N	Ü	n	ü	
1	1	1	1	15	å	É	/	?	O	Ş	o	ş	

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