V1.00 - January 2000

An introduction to the SMS in PDU mode GSM Recommendation phase 2)

WAVECOM

Contents

1. Introduction

This document gives only a very simple description of SMS in PDU mode. A basic definition of each item is given. For further details, it recommends to look the following standards.

2. GSM recommendation

GSM 03.40
GSM 03.38
GSM 03.41

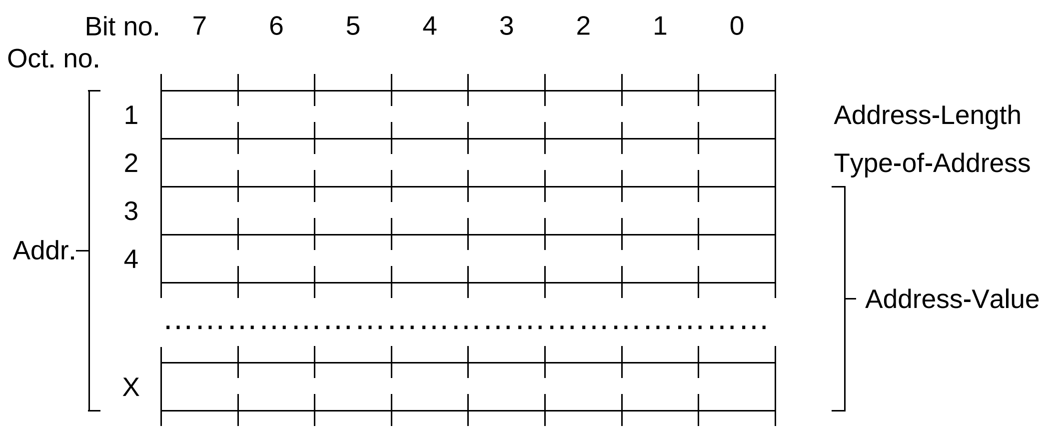
3. Send a SMS (SMS-SUBMIT)

```
AT+CMGF=0
AT+CMGS=<length> <CR>
<pdu> <Crtl/Z>
```

The length corresponds to the number of octets presented in the TPDU (i.e. SMSC address octets are excluded).

In GSM recommendation Phase 2, the PDU is composed of the address of the SMSC and the TPDU

3.1 Address of the SMSC



3.1.1 Address-Length

The Address-Length is a integer representation (see Appendix A) of *the number of octets* within the Type-of-Address and Address-Value fields.

3.1.2 Type-of-Address

The Type-of-Address field format is as follows:

1	Type-of-number	Numbering-plan-identification

a) Type-of-number:

Bits	6	5	4	
	0	0	0	Unknown[1]
	0	0	1	International number[2]
	0	1	0	National number[3]
	1	1	1	Reserved for extension

1- "Unknown" is used when the user or network has no a priori information about the numbering plan. In this case, the Address-Value field is organized according to the network dialling plan, e.g. prefix or escape digits might be present.

2- The international format shall be accepted also when the message is destined to a recipient in the same country as the MSC or as the SGSN.
3- Prefix or escape digits shall not be included.

b) Numbering-plan-identification (applies for Type-of-number = 000, 001, 010)

Bits 3	2	1	0	
0	0	0	0	Unknown
0	0	0	1	ISDN/telephone numbering plan (E.164/E.163)
1	1	1	1	Reserved for extension

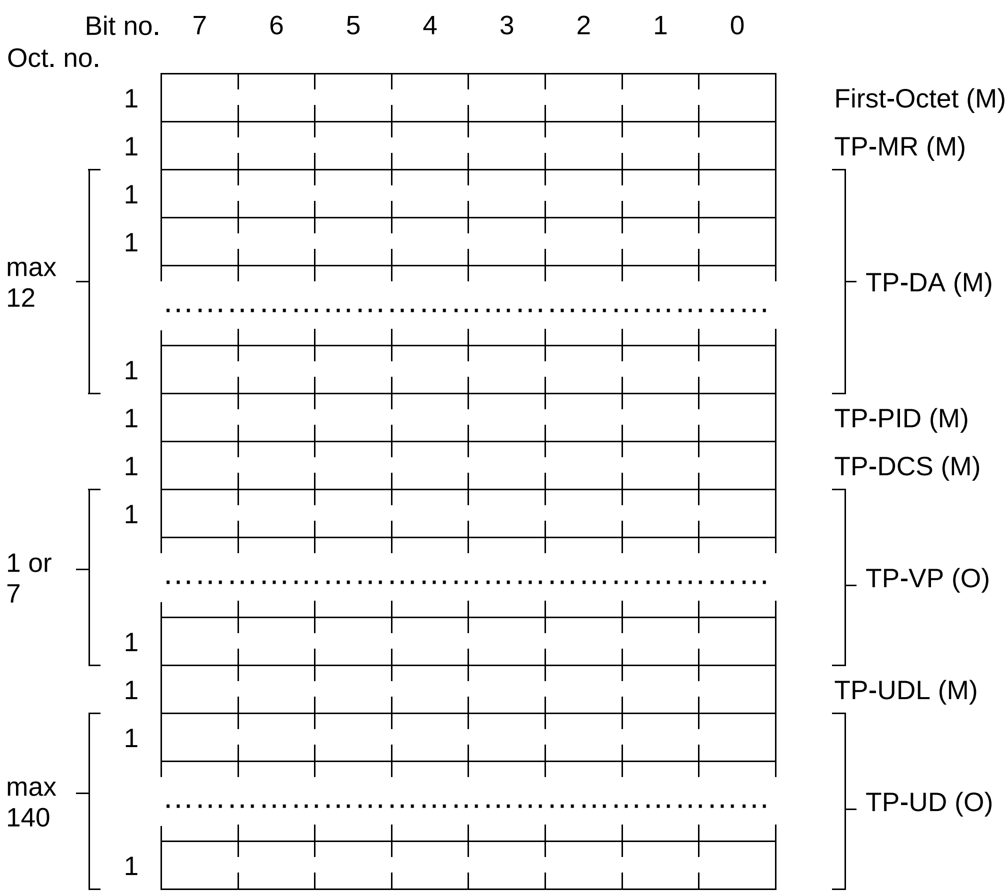
In most of the case, the octet of Type-of-Address will be set with the hexadecimal value "91".

Important remark:
When the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with command Service Centre Address +CSCA is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet

3.1.3 Address-Value

Within the Address-Value field, a semi-octet representation (see Appendix A) applies.

3.2 TPDU



3.2.1 First-Octet

The First-Octet field format is as follows:

TP-RP	TP-UDHI	TP-SRR	TP-VPF		TP-RD	TP-MTI	
0	0	0	0	0	0	0	1

All the value are given for the most simple case, for more details see the GSM 03.40 (section 9.2.3).

a) TP-Message-Type-Indicator (TP-MTI)
In the case of a SMS-SUBMIT, the two bits, bit 0 and bit 1, should be set with the values 0 and 1.

b) TP-Reject-Duplicates (TP-RD)
The bit 2 is set to 0, indicating the Service Center can accept an SMS-SUBMIT, which has the same TP-MR and the same TP-DA as a previously submitted from the same Originated Address.

c) TP-Validity-Period-Format (TP-VPF)
In the case of simplified SMS in PDU mode, we will consider that there is no validity period, in this case the TP-Validity-Period-Format value, represented by the bits 4 and 3, is 0.

d) TP-Status-Report-Request (TP-SRR)
To simplify, no status report is requested. In this case the bit 5 within the First-Octet is set to 0.

e) TP-User-Data-Header-Indicator (TP-UDHI)
To simplify, the PDU does not contain any Header in addition to the short message, also the bit 6 within the First-Octet is set to 0.

f) TP-Reply-Path (TP-RP)
To simplify, the reply path is not specified. In this case the bit 7 within the First-Octet is set to 0.

3.2.2 TP-MR: TP-Message-Reference

The TP-Message-Reference field gives an integer representation (see Appendix A) of a reference number of the SMS-SUBMIT. The TP-Message-Reference is incrementing by 1 for each SMS-SUBMIT.

The value to be used for each SMS-SUBMIT is obtained by reading the Last-Used-TP-MR value from the SMS Status data field in the SIM (see GSM 11.11) and incrementing this value by 1. After each SMS-SUBMIT has been submitted to the network, the Last-Used-TP-MR value in the SIM is updated with the TP-MR that was used in the SMS-SUBMIT operation. The reference number may possess values in the range 0 to 255.

The SC may discard an SMS-SUBMIT, which has the same TP-MR value as the previous SMS-SUBMIT received from the same originating address.

3.2.3 TP-DA: TP-Destination-Address

The TP-Destination-Address field is formatted following the formatting rules of the address of the SMSC fields (see § 3.1), excepted the Address-Length is an integer representation (see Appendix A) of *the number of useful semi-octets* within the Address-Value field, i.e. excludes any semi octet containing only fill bits.

3.2.4 TP-PID : TP-Protocol-Identifier

The TP-Protocol_identifier field format is as follows:

Bits 7-6	Bit 5	Bits 4...0

The SC may reject messages with a TP-Protocol-Identifier containing a reserved value or one which is not supported.

Bits	7	6	
	0	0	Assigns bits 0..5 as defined below
	0	1	See GSM 03.40 TP-PID complete definition
	1	0	Reserved
	1	1	Assigns bits 0-5 for SC specific use

To simplify, we will consider only the case where the bit 7 = 0 and bit 6 = 0.

The bit 5 indicates telematic interworking:
value = 0 : no interworking, but SME-to-SME protocol
value = 1 : telematic interworking

In the case that bit 5 = 1

Bits	4	3	2	1	0	
	0	0	0	0	0	Implicit
	0	0	0	0	1	telex (or teletex reduced to telex format)
	0	0	0	1	0	group 3 telefax
	0	0	1	0	0	voice telephone (i.e. conversion to speech)
	0	0	1	0	1	ERMES (European Radio Messaging System)
	0	0	1	1	0	National Paging system (known to the SC
	1	0	0	0	1	any public X.400-based message handling system
	1	0	0	1	0	Internet Electronic Mail

3.2.5 TP-DCS: TP-Data-Coding-Scheme

To simplify, the TP-Data-Coding-Scheme field indicates the data coding scheme of the TP-UD field.

The TP-Data-Coding-Scheme field format is as follows:

Bits 7.. 4	Bits 3 .. 0

The octet is used according to a coding group which is indicated in bits 7..4.

We will consider only the case of the General Data Coding indication where the bit 7 = 0 and bit 6 = 0. Other possibilities can be find in the GSM 03.38 recommendation.

Bits 5..0 indicate the following :

Bit 5, if set to 0, indicates the text is uncompressed
Bit 5, if set to 1, indicates the text is compressed using the GSM standard compression algorithm. (yet to be specified)

Bit 4, if set to 0, indicates that bits 1 to 0 are reserved and have no message class meaning
Bit 4, if set to 1, indicates that bits 1 to 0 have a message class meaning :

Bit 1	Bit 0	Message Class
0	0	Class 0
0	1	Class 1 Default meaning: ME-specific.
1	0	Class 2 SIM specific message
1	1	Class 3 Default meaning: TE specific (see GSM TS 07.05)

Bits 3 and 2 indicate the alphabet being used, as follows :

Bit 3	Bit2	Alphabet:
0	0	Default alphabet
0	1	8 bit
1	0	UCS2 (16bit)
1	1	Reserved

NOTE: The special case of bits 7..0 being 0000 0000 indicates the Default Alphabet as in Phase 2

Default alphabet indicates that the TP-UD is coded from the 7-bit alphabet given in Appendix B. When this alphabet is used, the characters of the message are packed in octets as shown in Appendix A, and the message can consist of up to 160 characters.

8-bit data indicates that the TP-UD has user-defined coding, and the message can consist of up to 140 octets.

UCS2 alphabet indicates that the TP-UD has a UCS2 coded message, and the message can consist of up to 140 octets, i.e. up to 70 UCS2 characters.

When a message is compressed, the TP-UD consists of the default alphabet or UCS2 alphabet compressed message, and the compressed message itself can consist of up to 140 octets in total.

3.2.6 TP-VP: TP-Validy-Period

We do not develop this part as we consider the case of simplified SMS in PDU mode. For further details, you can refer to the GSM 03.40 recommendation.

In the case that there is no TP-Validity-Period-field, the value of the two bits in the TP-VPF field within the first octet is set to 0.

3.2.7 TP-UDL:TP-User-Data-Length

If the TP-User-Data is coded using the GSM 7 bit default alphabet, the TP-User-Data-Length field gives an integer representation (see Appendix A) of the number of septets within the TP-User-Data field to follow.

If the TP-User-Data is coded using UCS2 data, the TP-User-Data-Length field gives an integer representation (see Appendix A) of the number of octets within the TP-User-Data field to follow.

If the TP-User-Data is coded using compressed GSM 7 bit default alphabet or compressed 8 bit data or compressed UCS2 data, the TP-User-Data-Length field gives an integer representation (see Appendix A) of the number of octets after compression within the TP-User-Data field to follow.

If this field is zero, the TP-User-Data field will not be present.

3.2.8 TP-UD: TP-User Data

Where the TP-UDHI value is set to 0 the TP-User-Data field comprises the short message only, where the user data can be 7 bit (default alphabet) data, 8 bit data, or 16 bit (UCS2) data.

All the information on the use of TP-User Data containing an Header (TP-UDHI=1) can be find in the GSM 03.40 under the section TP-User Data (TP-UD).

The number of octet of the TP-User-Data is limited at 140.

4. Read a SMS (SMS-DELIVER)

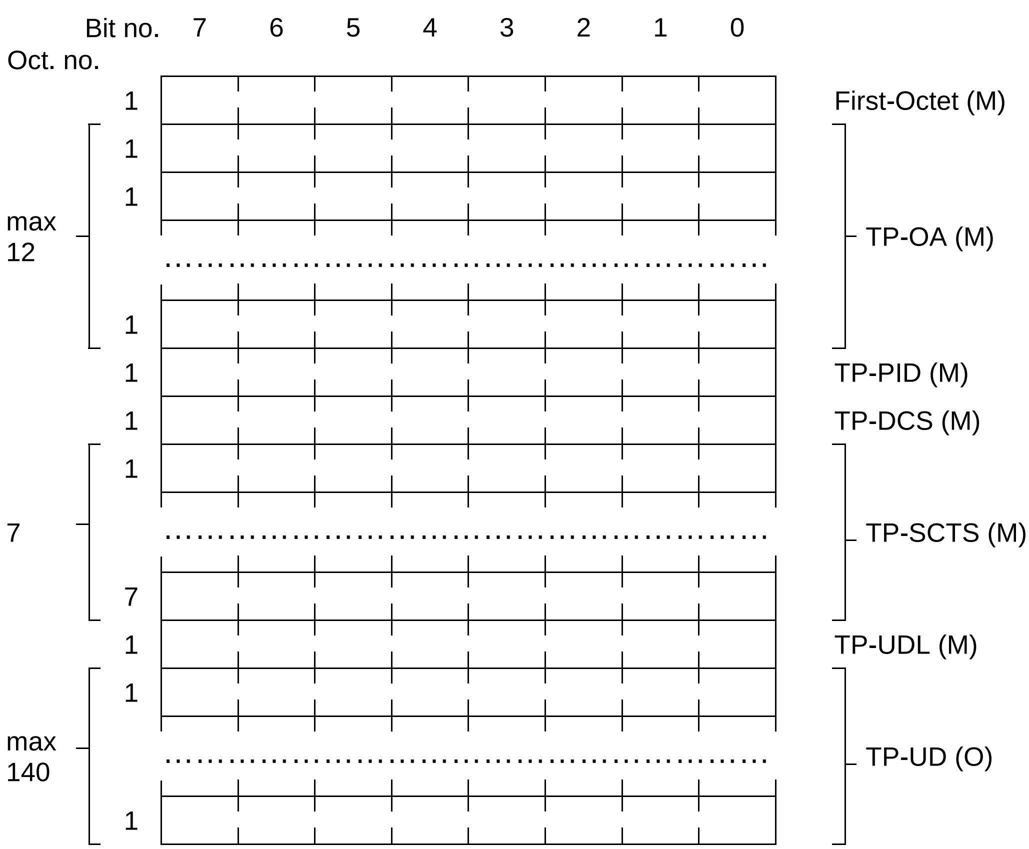
Once a SMS in PDU mode is received, the both <length> and <pdu> fields are received.

The length corresponds to the number of octets presented in the TPDU (i.e. SMSC address octets are excluded).
In GSM recommendation Phase 2, the PDU is composed of the address of the SMSC and the TPDU

4.1 Address of the SMSC

The complete description of the Service Center Address field is given in section 3.1 of this document.

4.2 TPDU



4.2.1 First-Octet

The First-Octet field format is as follows:

TP-RP	TP-UDHI	TP-SRI			TP-MMS	TP-MTI	
0	0	0	0	0	x	0	0

All the value are given for the most simple case, for more details see the GSM 03.40 (section 9.2.3).

a) TP-Message-Type-Indicator (TP-MTI)

In the case of a SMS-DELIVER, the two bits, bit 0 and bit 1, should be set with the values 0 and 0.

b) TP-More-Messages-to-Send (TP-MMS)

The TP-More-Messages-to-Send is a 1-bit field, located within bit no 2 of the First-Octet of SMS-DELIVER, and to be given the following values:

Bit	2	Definition
	0	More messages are waiting for the MS in this SC
	1	No more messages are waiting for the MS in this SC

c) TP-Status-Report-Indication (TP-SRI)

For simplified SMS, the PDU does not contain any Status report, also the bit no. 5 of the first octet is given 0.

d) TP-User-Data-Header-Indicator (TP-UDHI)

For simplified SMS, the PDU does not contain any Header in addition to the short message, also the bit 6 within the First-Octet is equal to 0.

e) TP-Reply-Path (TP-RP)

For simplified SMS, the reply path is not specified. In this case the bit 7 within the First-Octet is equal to 0.

4.2.2 TP-OA: TP- Originating-Address

The TP-Destination-Address field is formatted following the formatting rules of the address of the SMSC fields (see § 3.1), excepted the Address-Length is an <u>integer representation</u> (see Appendix A) of *the number of useful semi-octets* within the Address-Value field, i.e. excludes any semi octet containing only fill bits.

4.2.3 TP-PID : TP-Protocol-Identifier

The TP-Protocol_identifier field format is as follows:

Bits 7-6	Bit 5	Bits 4...0

Bits	7	6	
	0	0	Assigns bits 0..5 as defined below
	0	1	See GSM 03.40 TP-PID complete definition
	1	0	Reserved
	1	1	Assigns bits 0-5 for SC specific use

For simplified SMS, the bit 7 = 0 and bit 6 = 0.

The bit 5 indicates telematic interworking:
value = 0 : no interworking, but SME-to-SME protocol
value = 1 : telematic interworking

In the case that bit 5 = 1

Bits	4	3	2	1	0	
	0	0	0	0	0	Implicit
	0	0	0	0	1	telex (or teletex reduced to telex format)
	0	0	0	1	0	group 3 telefax
	0	0	1	0	0	voice telephone (i.e. conversion to speech)
	0	0	1	0	1	ERMES (European Radio Messaging System)
	0	0	1	1	0	National Paging system (known to the SC
	1	0	0	0	1	any public X.400-based message handling system
	1	0	0	1	0	Internet Electronic Mail

4.2.4 TP-DCS: TP-Data-Coding-Scheme

To simplify, the TP-Data-Coding-Scheme field indicates the data coding scheme of the TP-UD field.

The TP-Data-Coding-Scheme field format is as follows:

Bits 7.. 4	Bits 3 .. 0

The octet is used according to a coding group which is indicated in bits 7..4.

We will consider only the case of the General Data Coding indication where the bit 7 = 0 and bit 6 = 0. Other possibilities can be find in the GSM 03.38 recommendation.

Bits 5..0 indicate the following :

Bit 5, if set to 0, indicates the text is uncompressed
Bit 5, if set to 1, indicates the text is compressed using the GSM standard compression algorithm. (yet to be specified)

Bit 4, if set to 0, indicates that bits 1 to 0 are reserved and have no message class meaning
Bit 4, if set to 1, indicates that bits 1 to 0 have a message class meaning :

Bit 1	Bit 0	Message Class
0	0	Class 0
0	1	Class 1 Default meaning: ME-specific.
1	0	Class 2 SIM specific message
1	1	Class 3 Default meaning: TE specific (see GSM TS 07.05)

Bits 3 and 2 indicate the alphabet being used, as follows :

Bit 3	Bit2	Alphabet:
0	0	Default alphabet
0	1	8 bit
1	0	UCS2 (16bit)
1	1	Reserved

NOTE: The special case of bits 7..0 being 0000 0000 indicates the Default Alphabet as in Phase 2

Default alphabet indicates that the TP-UD is coded from the 7-bit alphabet given in Appendix B. When this alphabet is used, the characters of the message are packed in octets as shown in Appendix A, and the message can consist of up to 160 characters.

8-bit data indicates that the TP-UD has user-defined coding, and the message can consist of up to 140 octets.

UCS2 alphabet indicates that the TP-UD has a UCS2 coded message, and the message can consist of up to 140 octets, i.e. up to 70 UCS2 characters.

When a message is compressed, the TP-UD consists of the default alphabet or UCS2 alphabet compressed message, and the compressed message itself can consist of up to 140 octets in total.

4.2.5 TP-SCTS: TP-Service-Centre-Time-Stamp

The TP-Service-Centre-Time-Stamp field is given in semi-octet representation (see Appendix A), and represents the local time in the following way:

	Year	Month	Day	Hour	Minute	Second	Time Zone
Digits: (Semi-octets)	2	2	2	2	2	2	2

The Time Zone indicates the difference, expressed in quarters of an hour, between the local time and GMT. In the first of the two semi-octets, the first bit (bit 3 of the seventh octet of the TP-Service-Centre-Time-Stamp field) represents the algebraic sign of this difference (0 : positive, 1 : negative).

4.2.6 TP-UDL:TP-User-Data-Length

If the TP-User-Data is coded using the GSM 7 bit default alphabet, the TP-User-Data-Length field gives an integer representation (see Appendix A) of the number of septets within the TP-User-Data field to follow.

If the TP-User-Data is coded using UCS2 data, the TP-User-Data-Length field gives an integer representation (see Appendix A) of the number of octets within the TP-User-Data field to follow.

If the TP-User-Data is coded using compressed GSM 7 bit default alphabet or compressed 8 bit data or compressed UCS2 data, the TP-User-Data-Length field gives an integer representation (see Appendix A) of the number of octets after compression within the TP-User-Data field to follow.

If this field is zero, the TP-User-Data field will not be present.

4.2.7 TP-UD: TP-User Data

Where the TP-UDHI value is set to 0 the TP-User-Data field comprises the short message only, where the user data can be 7 bit (default alphabet) data, 8 bit data, or 16 bit (UCS2) data.

All the information on the use of TP-User Data containing an Header (TP-UDHI=1) can be find in the GSM 03.40 under the section TP-User Data (TP-UD).

Appendix A

Numeric and alphanumeric representation

4.3 Integer representation

Wherever the bits from a number of octets, complete or in fractions, are to represent an integer, the interpretation will be according to the following:

1- Between octets: The octets with the lowest octet numbers will contain the most significant bits.
2- Within an octet: The bits with the highest bit numbers will be the most significant.

Below is given an example of octet and bit representation and transmission order of an integer represented field.

Let the 2 rightmost bits of octet no 5, the complete octet no 6 and 7, and the 3 leftmost bits of octet no 8 represent an integer, as shown in figure A1.

a)

Oct. no. \ Bit no.	7	6	5	4	3	2	1	0
5							5_{b1}	5_{b0}
6	6_{b7}	6_{b6}	6_{b5}	6_{b4}	6_{b3}	6_{b2}	6_{b1}	6_{b0}
7	7_{b7}	7_{b6}	7_{b5}	7_{b4}	7_{b3}	7_{b2}	7_{b1}	7_{b0}
8	8_{b7}	8_{b6}	8_{b5}					

b)

5_{b1} 5_{b0} 6_{b7} 6_{b6} . . . . 6_{b1} 6_{b0} 7_{b7} 7_{b6} . . . . 7_{b1} 7_{b0} 8_{b7} 8_{b6} 8_{b5}

Figure A1: 21 bits from the octets 5, 6, 7, and 8 in a short message a) will represent an integer as shown in b).

4.4 Octet representation

A field which is octet represented, will always consist of a number of complete octets. Each octet within the field represents one decimal digit. The octets with the lowest octet numbers will contain the most significant decimal digits.

4.5 Semi-octet representation

A field which is semi-octet represented, will consist of a number of complete octets and - possibly - one half octet. Each half octet within the field represents one decimal digit. The octets with the lowest octet numbers will contain the most significant decimal digits. Within one octet, the half octet containing the bits with bit numbers 0 to 3, will represent the most significant digit.

In the case where a semi-octet represented field comprises an odd number of digits, the bits with bit numbers 4 to 7 within the last octet are fill bits and shall always be set to "1111".

Within each semi octet, the bits with the highest bit numbers will be the most significant.

Below is given an example:

<table>
<tr><th>Oct. no. \ Bit no.</th><th>7</th><th>6</th><th>5</th><th>4</th><th>3</th><th>2</th><th>1</th><th>0</th></tr>
<tr><td>N</td><td colspan="4">Digit 2</td><td colspan="4">Digit 1</td></tr>
<tr><td>N+1</td><td colspan="4">Digit 4</td><td colspan="4">Digit 3</td></tr>
<tr><td>N+2</td><td>1</td><td>1</td><td>1</td><td>1</td><td colspan="4">Digit 5</td></tr>
</table>

4.6 Alphanumeric representation

A field, which uses alphanumeric representation, will consist of a number of 7-bit characters represented as the default alphabet defined below.

Packing of 7bit characters

If a character number X is noted in the following way:

X_{b6} X_{b5} X_{b4} X_{b3} X_{b2} X_{b1} X_{b0}

The packing of the 7-bits characters in octets is done by completing the octets with zeros on the left.

For examples, packing X:

- One character in one octet

Oct. no. \ Bit no.	7	6	5	4	3	2	1	0
1	0	1_{b6}	1_{b5}	1_{b4}	1_{b3}	1_{b2}	1_{b1}	1_{b0}

- Two characters in two octets

Oct. no. \ Bit no.	7	6	5	4	3	2	1	0
1	2_{b0}	1_{b6}	1_{b5}	1_{b4}	1_{b3}	1_{b2}	1_{b1}	1_{b0}
2	0	0	2_{b6}	2_{b5}	2_{b4}	2_{b3}	2_{b2}	2_{b1}

- Three characters in three octets

Oct. no. \ Bit no.	7	6	5	4	3	2	1	0
1	2_{b0}	1_{b6}	1_{b5}	1_{b4}	1_{b3}	1_{b2}	1_{b1}	1_{b0}
2	3_{b1}	3_{b0}	2_{b6}	2_{b5}	2_{b4}	2_{b3}	2_{b2}	2_{b1}
3	0	0	0	3_{b6}	3_{b5}	3_{b4}	3_{b3}	3_{b2}

- Seven characters in seven octets

Oct. no. \ Bit no.	7	6	5	4	3	2	1	0
1	2_{b0}	1_{b6}	1_{b5}	1_{b4}	1_{b3}	1_{b2}	1_{b1}	1_{b0}
2	3_{b1}	3_{b0}	2_{b6}	2_{b5}	2_{b4}	2_{b3}	2_{b2}	2_{b1}
3	4_{b2}	4_{b1}	4_{b0}	3_{b6}	3_{b5}	3_{b4}	3_{b3}	3_{b2}
4	5_{b3}	5_{b2}	5_{b1}	5_{b0}	4_{b6}	4_{b5}	4_{b4}	4_{b3}
5	6_{b4}	6_{b3}	6_{b2}	6_{b1}	6_{b0}	5_{b6}	5_{b5}	5_{b4}
6	7_{b5}	7_{b4}	7_{b3}	7_{b2}	7_{b1}	7_{b0}	6_{b6}	6_{b5}
7	0	0	0	0	0	0	0	7_{b6}

- Eight characters in seven octets

Oct. no. \ Bit no.	7	6	5	4	3	2	1	0
1	2_{b0}	1_{b6}	1_{b5}	1_{b4}	1_{b3}	1_{b2}	1_{b1}	1_{b0}
2	3_{b1}	3_{b0}	2_{b6}	2_{b5}	2_{b4}	2_{b3}	2_{b2}	2_{b1}
3	4_{b2}	4_{b1}	4_{b0}	3_{b6}	3_{b5}	3_{b4}	3_{b3}	3_{b2}
4	5_{b3}	5_{b2}	5_{b1}	5_{b0}	4_{b6}	4_{b5}	4_{b4}	4_{b3}
5	6_{b4}	6_{b3}	6_{b2}	6_{b1}	6_{b0}	5_{b6}	5_{b5}	5_{b4}
6	7_{b5}	7_{b4}	7_{b3}	7_{b2}	7_{b1}	7_{b0}	6_{b6}	6_{b5}
7	8_{b6}	8_{b5}	8_{b4}	8_{b3}	8_{b2}	8_{b1}	8_{b0}	7_{b6}

Therefore, in 140 octets, it is possible to pack (140x8)/7=160 characters.

Appendix B

Character table

				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	Hex	0	1	2	3	4	5	6	7
0	0	0	0	0	@	Ä	SP	0	¡	P	¿	p
0	0	0	1	1	£	_	!	1	A	Q	a	q
0	0	1	0	2	$	Ö	“	2	B	R	b	r
0	0	1	1	3	¥	Ã	#	3	C	S	c	s
0	1	0	0	4	è	Ë	¤	4	D	T	d	t
0	1	0	1	5	é	Ù	%	5	E	U	e	u
0	1	1	0	6	ù	Ð	&	6	F	V	f	v
0	1	1	1	7	ì	Ø	‘	7	G	W	g	w
1	0	0	0	8	ò	Ó	(	8	H	X	h	x
1	0	0	1	9	ç	È	)	9	I	Y	i	y
1	0	1	0	A	LF	Î	*	:	J	Z	j	z
1	0	1	1	B	Ø	1)	+	;	K	Ä	k	ä
1	1	0	0	C	ø	Æ	,	<	L	Ö	l	ö
1	1	0	1	D	CR	æ	-	=	M	Ñ	m	ñ
1	1	1	0	E	Å	ß	.	>	N	Ü	n	ü
1	1	1	1	F	å	É	/	?	O	§	o	à

Appendix C

Examples

4.7 Example of 7-bits packing

Text to pack:
WAVECOM ASIA PACIFIC LIMITED
2nd Floor, Shui On Centre
6-8 Harbour Road
Wan Chai, HONG KONG

7-bits packing text:
D7A0B5387C3641C16932088206874963720862269B496A91D850C8DC649091FD7ECB59A029BA9E063DD
DA061D94D97971B0A5B0B074286E5E2775D0E92BEC3E486E21A768386E8709A05423E9D47D0F2E93C02

4.8 Example of address field

Address of an SMSC
If the address of the SMSC is the following: +852 90288000
Once coding, in the PDU, this address will be in hexadecimal format:: 07915892208800F0

Destination address
If the destination address is the following: +852 94281388
Once coding, in the PDU, this destination address will be in hexadecimal format: 0B915892241883F8

4.9 Example of received SMS

SMS-DELIVER:
+CMT: 22
07915892208800F0040B915892241883F800009921810170002B0341E211

Description:

The length of the PDU excluding the Service Center Address is 22 octets (show on the first line)

The Service Center Address field is given by the octets: 07915892208800F0 ("+852 9028 8000")

The First Octet field is given by the octet: 04 (one more message is waiting in the Service Center)

The Originating Address fields is given by the octets: 0B915892241883F8 ("+852 9428 1388")

The Protocol Identifier field is given by the octet: 00 (No telematic interworking)

The Data Coding Scheme is given by the octet: 00 (No class meaning, GSM 7bit alphabet)

The User Data Length is given by the octet:: 03 (3 characters in the TP-UD field (message))

The User Data message is given by the octets: 41E211 (message = "ADG")