WAVECOM

AT commands for PDA

Version :	**10.0**
Date :	**05th October, 2001**
Reference :	
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1 Aim of the document

This document will give the minimal set of AT commands to use in order to communicate with a PDA application.
This document is based on V430 AT commands firmware.

This document gives hints and recommandations to use AT commands.

Please note that this document is a complement to AT commands specification (**sii015.d89**). It does not replace it. It just gives hints for major AT commands used with PDA products.

2 Initialization

When module is ready to receive AT commands, CTS signal will be set to high value.

+WIND: 3

This means that AT commands can be received by the module.
(this indication will appear only if AT+WIND=4 has been set before)

AT+WIND=511
OK

All general indications are set. Please refer to AT commands specification to set only several indications.

AT+CFUN?
+CFUN: 1
OK

Check for current functionality level.

+WIND: 1

This means that the SIM has been detected by the module. When SIM is detected, the customer application can check the PIN state.

AT+CPIN?
+CPIN: READY

PIN is disabled.

or

+CPIN : SIM PIN

PIN is enabled and has to be entered. Only three tries are possible.

ⓘ Before receiving +WIND : 4, AT commands, which generates unsollicited AT commands, can be sent. AT commands to set unsollicited results are described in next chapter.

+WIND: 4

This means that mobile initialization is over. During initialization the module reads the SIM card files. This indication means that the user can now have a full access to phonebook, short messages and so on...

3 Enable unsolicited AT commands

3.1 USSD

AT+CUSD=1
OK

Allow USSD network notifications.

For example,

ATD#444#
OK

+CUSD: 2

3.2 Incoming calls

AT+CLIP=1
OK

Allows more informations about incoming calls. Number indication depends on network.

For example,

RING

+CLIP: "28240785",129

3.3 Signal strength

AT+CCED=1,8
OK

Used to get Automatic RxLev indication.

+CSQ: 22,99

The signal strength of the serving cell shall be read every 5 seconds in idle, and every 500 ms in dedicated mode (in communication). The response will be a +CSQ answer and not a +CCED answer.
During 5 seconds when entering dedicated mode, Wavecom's software will answer 99.

One **example** for antenna icons management is :
 /* -82 dBm */   15 (4 bars)
 /* -88 dBm */   12 (3 bars)

/* -94 dBm */   9 (2 bars)
/* -100 dBm */   6 (1 bars)
Less than 6 (0 bars)

+CSQ indications are still going on during communications (speech or data calls).
It allows continuing to indicate the signal strength during the communication.

It can be removed by AT+CCED=2.

3.4 Network registration

AT+CREG=1
OK

Set automatic network registration indication.

+CREG: 2
Module not registered

+CREG : 1
Home network found

+CREG : 5
registered in roaming

3.5 Call waiting

AT+CCWA=1
OK

Allows more informations about call waiting numbers. Number indication depends on network.

For example,

RING

ata
OK

+CCWA: "0926351278",129,1

3.6 Incoming calls

AT+CRC=1
OK

This command enables a more detailed ring indication.

For example,

+CRING: VOICE

+CRING : FAX

This command is useful to indicate the user to plug a data cable and so on...

3.7 Outgoing data calls

AT+CR=1
OK
Service reporting control

AT+DR=1
OK
V42 bis data compression report

For example,

ATD28240255
+CR: REL ASYNC

+DR: NONE

CONNECT 9600

To go from data mode to Command mode, use

- AT&D1 : on a drop of the DTR the modem switches data mode to command mode.

or

- Command mode is entered if the modem receives the proper escape code.

Nearly all modems default to using an escape code of 3 plus signs: +++
In order to prevent the modem from entering command mode - which stops data transmission - with normal data, the escape code must be surrounded by an interval during which no data is sent - the guard time. Most modems have a default value of 1 second for the guard time: unless there is a 1-second pause before and after the +++, the modem will not go into command mode.

ATH
OK

4 Communication state

4.1 Outgoing calls

ATD28240254 ;
OK

Please note the « ; » for speech calls

ATD28240255
CONNECT 9600

This command is for a data call

AT+FCLASS=1
OK

ATD28240255
CONNECT 9600

This command is for a fax call class 1.

4.2 Call features

AT+VGR=64
OK

Change the speaker volume

This command can be used during the outgoing call procedure. So in case of network announcements, volume can be increased.

AT+SPEAKER=1
OK

Selection of micro 2 and speaker 2

In case of headset, the customer's software will have to manage the hardware detection. In case of plug, send AT+SPEAKER=1. In case of unplug, send AT+SPEAKER=0.
This command can be used during the outgoing call procedure.

AT+VTD=3
OK

AT+VTS=1
OK

First command is to set the DTMF duration. The second one is to send the DTMF.
This command can be used during the outgoing call procedure. Some network services require to send DTMF when audio path is opened but call connection not realized.

AT+VGT=0
OK

Command to set the micro gain.

AT+ECHO=0
OK

AT+SIDET=1,1
OK

First command allows to modify echo cancellation parameters and the second one sidetone parameters. Those two AT commands can be useful but hardware checkings have to be done about speaker and micro choice.

4.3 Call failure

In case of call failure, AT+CEER shall be used to know the error cause type.

Atd3434385455;
NO CARRIER

at+ceer
+CEER: Error 1
OK

4.4 How to prompt a user that is in call waiting status.

AT+CCWA=1,1
OK

Enable call waiting for speech

RING

incoming call

ata
OK

answer to call

+CCWA: "0926351278",129,1

Another incoming call -> Call waiting

ath
OK

This fonctionnality depends on network features.

4.5 How to set BUSY tone, (the user want to reject the incoming call)

at+ccfc=1,2
+CCFC: 1,1,"+886931010026",145
OK

Check the call forwarding on busy is active

atd222;
OK

+CCWA: "0926351278",129,1

Waiting call

at+chld=0
OK

Waiting call is transfered to the previous number this functionnality is called UDUB (
User Determined User Busy)

4.6 How to prompt a user when he has been held.

AT+CSSN=1,1
OK

ATD0926351278;
OK

+CSSU: 2,,"0926351278",129

Call has been put on hold

+CSSU: 3,,"0926351278",129

Call has been retrieved

NO CARRIER

This fonctionnality depends on network notifications.

atdl
0926351278;
OK

at+chld=2
OK

Call is put on hold

+CSSU: 5

Call on hold has been released

NO CARRIER

4.7 How to get the list of current calls.

atd0926351278;
OK

at+chld=2
OK

First call is put on hold.

atd222;
OK

at+clcc
+CLCC: 1,0,1,0,0,"0926351278",129
+CLCC: 2,0,0,0,0,"222",129
OK

Two calls are present. One is active, one is on hold.

ath
OK

4.8 How to make a multiparty call

AT+CCWA=1,1
OK

Enable call waiting. This command can only be sent when network is found.

ATD97542004;
OK

Call setup was successful

...Conversation...

+CCWA: "27488333",129,1

Waiting call

ATA
OK

Put first call on hold and answer the second one.

...Conversation...

AT+CHLD=3
OK

Adds the held call to the conversation.

AT+CHLD=11
OK

Release the first call (i.e. 97542004) and recover the second call (i.e. 27488333)

...Conversation...

ATH

Release the second call.

4.9 Call melodies

For **incoming** calls, in a case of waiting call, the PDA application has to play the call waiting tone melody. To make a melody or tone, **AT+CRMP** (melody) or **AT+WTONE** (tone) are available.

For **outgoing** calls, if the module receives the information from the network that the calling party is alerting but no audio connection has been established then the module plays a local ring tone.

4.10 Call type

AT+WVR allows to modify the speech bearer type.
AT+WDR allows to modifiy the data bearer type.

These two commands have to be used carefully, especially when requesting half rate bearers. Networks might refuse the call.

4.11 Restrict phone number

AT+CLIR command allows control of the calling line identification restriction supplementary service.

at+clir?
+CLIR: 2,1
OK

Check CLIR network subscription. CLIR is here provisioned in permanent mode.

at+clir=2
OK

CLIR suppression

atd93076624;
+WIND: 5,1
ath
OK

So the number appears on remote unit.

at+clir=1
OK

CLIR invocation

atd93076624;
+WIND: 5,1
+WIND: 9
+WIND: 2
BUSY
+WIND: 6,1

So NO number appears on remote unit.

at+clir=0
OK

According to CLIR subscription.

atd93076624;
+WIND: 5,1
+WIND: 9
+WIND: 2
ath
OK

So the number appears on remote unit.

The following cases are for one shot calls :

atd93076624I;
+WIND: 5,1
+WIND: 9
+WIND: 2
BUSY
+WIND: 6,1

One shot CLIR invocation.
So <u>NO</u> number appears on remote unit.

atd93076624i;
+WIND: 5,1
+WIND: 9
+WIND: 2
OK

One shot CLIR suppression.
So the number appears on remote unit.

4.12 Incoming call examples

<u>First example:</u>
AT+WIND=32
OK

+CRING: VOICE

+CLIP: "97542004",129

Remote user hangs up.

+WIND: 6,1

Please note that "**NO CARRIER**" is not sent by the module.

<u>Second example:</u>
+CRING: VOICE

+CLIP: "98051087",129

ata
+WIND: 9

OK

+CCWA: "97542004",129,1

Call waiting call.

+WIND: 5,2

Call 2 created

+WIND: 6,2

Call 2 released

Please note that "AT+CLCC" can be use to get more informations about current calls.

Third example:
at+cssn=1,1
OK

+CRING: VOICE

+CLIP: "97542004",129

ata
+WIND: 9
OK

Answer to incoming call.

+CCWA: "98051087",129,1

+WIND: 5,2

Call waiting. Call 2 created.

ata
+WIND: 9
OK

Answer to call waiting. Current active call is set on hold.

+CSSU: 5

Remote hold call has hanged up.

+WIND: 6,1

Call 1 is released.

NO CARRIER

User has hang up.

4.13 Call failure

In case of call failure please give the following informations to Wavecom support team :
Use Moka traces (L3CC level 3 and 4).

1) Type AT+CMEE=1 to Report Mobile Equipement errors.

2) Type AT+FCLASS? to check the operation mode.

3) Type AT+WIND=511 to get general indications

4) AT+CR=1;+CRC=1;+DR=1 to allow options comparison during data calls.

(+CR is for Service reporting control , +CRC is for Cellular result codes, +DR is for V42 bis data compression report.)

5) AT+CBST?   to know the bearer used

6) When "NO CARRIER" appears type AT+CEER to know the failure cause.

7) AT+WDR ?   to know the data rate for data bearer

8) AT+WVR ?   to know the voice rate for voice bearer

9) AT+CLIR ?   to know the Calling line identification restriction status.

Send all the AT commands sequence including ATD and these commands.

4.14 D.E.S algorithm

D.E.S algorithm can be used in such cases as wireless public phones. The customer application sends AT commands to Wismo module. To avoid any piracy such as removing the customer application, there is permanent data exchange between the module and customer application. During active communication, the customer application must answer every 30 seconds to random values sent by the module. In case of bad answer, the communication is stopped.

This command enables or disables the data ciphering (D.E.S algorithm) of the PIN and a random value sent periodically in order to insure a more secure communication.

AT+CRYPT=1
OK

This command is used to enter the key used in the D.E.S algorithm to cipher the data. In the way Application to GSM, a "h" character shall be added before the value.

To understand each other, the Wismo module and customer application must share the same D.E.S initialization key. Each initialization key must be different for each customer and is provided upon request by Wavecom.

AT+EXPKEY=h0111011101110111
OK

AT+EXPKEY?
+EXPKEY: READY

This command is used to get a random value from the mobile station and to reenter its codes by the DES algorithm. In the way Application to GSM, a "h" character shall be added before the value.

AT+ALEA?
AT+ALEA=1234567890123456

OK

The customer application requests a random value.

AT+ALEA=hA125B348ABCDEF9
+ALEA=9876543210FBCADE0
OK

The customer application computes the value through its D.E.S algorithm and sends back the value within 30 seconds.
If the value is correct, a new random value is sent.

AT+ALEA=h12335678902234AB
NO CARRIER

If the value sent back is false, the communication hangs up.

5 UCS2 format

The coding of the names in the SIM phonebooks can take one of three forms.

1)   If the first octet in the alpha string is '80', then the remaining octets are 16 bit UCS2 characters, with the more significant octet (MSO) of the UCS2 character coded in the lower numbered octet of the alpha field, and the less significant octet (LSO) of the UCS2 character is coded in the higher numbered alpha field octet, i.e. octet 2 of the alpha field contains the more significant octet (MSO) of the first UCS2 character, and octet 3 of the alpha field contains the less significant octet (LSO) of the first UCS2 character (as shown below). Unused octets shall be set to 'FF', and if the alpha field is an even number of octets in length, then the last (unusable) octet shall be set to 'FF'.

Example 1

Octet 1	Octet 2	Octet 3	Octet 4	Octet 5	Octet 6	Octet 7	Octet 8	Octet 9
'80'	$Ch1_{MSO}$	$Ch1_{LSO}$	$Ch2_{MSO}$	$Ch2_{LSO}$	$Ch3_{MSO}$	$Ch3_{LSO}$	'FF'	'FF'

2)   If the first octet of the alpha string is set to '81', then the second octet contains a value indicating the number of characters in the string, and the third octet contains an 8 bit number which defines bits 15 to 8 of a 16 bit base pointer, where bit 16 is set to zero, and bits 7 to 1 are also set to zero. These sixteen bits constitute a base pointer to a "half-page" in the UCS2 code space, to be used with some or all of the remaining octets in the string. The fourth and subsequent octets in the string contain codings as follows; if bit 8 of the octet is set to zero, the remaining 7 bits of the octet contain a GSM Default Alphabet character, whereas if bit 8 of the octet is set to one, then the remaining seven bits are an offset value added to the 16 bit base pointer defined earlier, and the resultant 16 bit value is a UCS2 code point, and completely defines a UCS2 character.

Example 2

Octet 1	Octet 2	Octet 3	Octet 4	Octet 5	Octet 6	Octet 7	Octet 8	Octet 9
'81'	'05'	'13'	'53'	'95'	'A6'	'XX'	'FF'	'FF'

In the above example;

- Octet 2 indicates there are 5 characters in the string

- Octet 3 indicates bits 15 to 8 of the base pointer, and indicates a bit pattern of 0hhh hhhh h000 0000 as the 16 bit base pointer number. Bengali characters for example start at code position 0980 (0*000 1001 1*000 0000), which is indicated by the coding '13' in octet 3 (shown by the italicised digits).

- Octet 4 indicates GSM Default Alphabet character '53', i.e. "S".

- Octet 5 indicates a UCS2 character offset to the base pointer of '15', expressed in binary as follows 001 0101, which, when added to the base pointer value results in a sixteen bit value of 0000 1001 1001 0101, i.e. '0995', which is the Bengali letter KA.

   Octet 8 contains the value 'FF', but as the string length is 5, this a valid character in the string, where the bit pattern 111 1111 is added to the base pointer, yielding a sixteen bit value of 0000 1001 1111 1111 for the UCS2 character (i.e. '09FF').

3)   If the first octet of the alpha string is set to '82', then the second octet contains a value indicating the number of characters in the string, and the third and fourth octets contain a 16 bit number which defines the complete 16 bit base pointer to a "half-page" in the UCS2 code space, for use with some or all of the remaining octets in the string. The fifth and subsequent octets in the string contain codings as follows; if bit 8 of the octet is set to zero, the remaining 7 bits of the octet contain a GSM Default Alphabet character, whereas if bit 8 of the octet is set to one, the remaining seven bits are an offset value added to the base pointer defined in octets three and four, and the resultant 16 bit value is a UCS2 code point, and defines a UCS2 character.

Example 3

Octet 1	Octet 2	Octet 3	Octet 4	Octet 5	Octet 6	Octet 7	Octet 8	Octet 9
'82'	'05'	'05'	'30'	'2D'	'82'	'D3'	'2D'	'31'

In the above example

- Octet 2 indicates there are 5 characters in the string

- Octets 3 and 4 contain a sixteen bit base pointer number of '0530', pointing to the first character of the Armenian character set.

- Octet 5 contains a GSM Default Alphabet character of '2D', which is a dash "-".

- Octet 6 contains a value '82', which indicates it is an offset of '02' added to the base pointer, resulting in a UCS2 character code of '0532', which represents Armenian character Capital BEN.

- Octet 7 contains a value 'D3', an offset of '53', which when added to the base pointer results in a UCS2 code point of '0583', representing Armenian Character small PIWR.

4)   Examples

AT+CPBW=14,"123456",129,"804E004E004E00FFFF"
OK

The following command is also correct.

AT+CPBW=15,"123456",129,"804E035F327621"
OK

AT+CPBR=14
+CPBR: 14,"789",129,"804E004E004E00FFFF
OK

AT+CPBR=15
+CPBR: 15,"789",129," 804E035F327621"
OK

AT+CPBW=?
+CPBW=(1-100),20,(129,145),14
OK

This means that 14 ascii characters can be used to store a name but of course only 7 UCS2 caracters.

6 How to send an SMS ?

6.1 Text Mode

at+cmgf=1
OK

The command selects the text mode.

at+csdh=1
OK

This command gives more informations in text mode result codes

at+csca?
+CSCA: "+85294985795",145
OK

Check that your service center address is correct.

at+csmp?
+CSMP: 1,173,0,0
OK

This command shall be used to select value for the <vp>, <pid>, the <dcs>.
These are the default value.

<dcs> is used to determine the way the information is encoded. Compressed text is not supported. Only GSM default alphabet, 8 bit data and UCS2 alphabet are supported. <dcs> values are defined in ETSI GSM 03.38 : Digital cellular telecommunications system (phase 2) ; Alphabets and language-specific information.

at&csav
OK

Parameters are saved.

at+cmgs=97542004
>Flowers

+CMGS: 44
OK

A Short Message is sent at destination address 97542004 with the text « Flowers ». For test purposes, 97542004 is in fact the number of the SIM card inserted in the module.

+CMTI: "SM",5

Message is received

at+cmgr=5
+CMGR: "REC UNREAD","+85297542004",,"00/09/01,15:03:07-28",145,4,0,0, "+85294980000",145,8
Flowers
OK

In this example the <dcs> value is 0 (default alphabet) and the text length is 8.

ⓘ In default alphabet up to 160 caracters can be sent.

6.2 PDU mode

PDU mode is useful when the customer application wants to have a total control on SMS. In PDU mode, the data sent to Wavecom module (except the message reference) are sent to the network without modifications.

PDU mode is mandatory in order to use Short Message compression. Short Message compression is not handled by Wavecom's module.

PDU data are explained in **GSM recommendation 03.40**.

at+cmgf=0
OK

Set PDU mode.

at+cmgr=1
+CMGR: 2,,126
07915892020430F111000B915892026415F10000A7808080604028180E888462C16
8381E90886442A9582E988C66C3E9783EA09068442A994EA8946AC56AB95EB0986
C46ABD96EB89C6EC7EBF97EC0A070482C1A8FC8A472C96C3A9FD0A8744AAD5AA
FD8AC76CBED7ABFE0B0784C2E9BCFE8B47ACD6EBBDFF0B87C4EAFDBEFF8BC7EC
FEFFBFF
OK

Read a SMS in PDU mode.

07915892020430F1
Service center address
11
MTI
SMS submit, Validity period present coded relative format
Message reference
0B915892026415F1
Destination address

00
Protocol Identifier
00
Data coding scheme
A7
Validity period
80
User Data Lenght
8080604028180E888462C168381E90886442A9582E988C66C3E9783EA09068442A9
94EA8946AC56AB95EB0986C46ABD96EB89C6EC7EBF97EC0A070482C1A8FC8A472
C96C3A9FD0A8744AAD5AAFD8AC76CBED7ABFE0B0784C2E9BCFE8B47ACD6EBBDF
F0B87C4EAFDBEFF8BC7ECFEFFBFF
User Data

This is an example of an SMS in PDU mode. PDU data are explained in **GSM recommendation 03.40**.

6.3 Default Alphabet GSM 03.38 for SMS

During FTA, a special SMS is sent to the module in order to display all characters in Default alphabet (7 bits per character) in **GSM recommendation 03.38**.

Character table:

b4	b3	b2	b1		0	1	2	3	4	5	6	7
				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
0	0	0	0	0	@	Δ	SP	0	¡	P	¿	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	Ñ	m	ñ
1	1	1	0	14	Å	ß	.	>	N	Ü	n	ü
1	1	1	1	15	å	É	/	?	O	§	o	à

1) This code is an escape to an extension of the 7 bit default alphabet table. A receiving entity which does not understand the meaning of this escape mechanism shall display it as a space character.

GSM 7bit default alphabet extension 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		0	1	2	3	4	5	6	7
0	0	0	0	0					|			
0	0	0	1	1								
0	0	1	0	2								
0	0	1	1	3								
0	1	0	0	4		^						
0	1	0	1	5							2)	
0	1	1	0	6								
0	1	1	1	7								
1	0	0	0	8			{					
1	0	0	1	9			}					
1	0	1	0	10	3)							
1	0	1	1	11		1)						
1	1	0	0	12				[				
1	1	0	1	13				~				
1	1	1	0	14				]				
1	1	1	1	15			\					

1)   This code value is reserved for the extension to another extension table. On receipt of this code, a receiving entity shall display a space until another extension table is defined.

2)   This code represents the EURO currency symbol. The code value is that used for the character 'e'. Therefore a receiving entity which is incapable of displaying the EURO currency symbol will display the character 'e' instead.

3)   This code is defined as a Page Break character and may be used for example in compressed CBS messages. Any mobile which does not understand the 7 bit default alphabet table extension mechanism will treat this character as Line Feed

at+cmgf=0
OK

Set PDU mode

at+cmgw=126

```
>0011000B915892026415F10000A780808060402818 0E888462C168381E90886442
A9582E988C66C3E9783EA09068442A994EA8946AC56AB95EB0986C46ABD96EB89
C6EC7EBF97EC0A070482C1A8FC8A472C96C3A9FD0A8744AAD5AAFD8AC76CBED7
ABFE0B0784C2E9BCFE8B47ACD6EBBDFF0B87C4EAFDBEFF8BC7ECFEFFBFF
+CMGW: 2
OK
```

This SMS is tested in FTA. So the application should check that all 128 characters are correctly displayed.

```
at+cmgf=1
OK
```

```
at+cscs="PCCP437"
OK
```

PC character set code page 437

```
at+cmgr=2
+CMGR: "STO UNSENT","+85292046511",
@œ$ Š,— •  †         _èâ         êã         äé                      ''á              !"#
%&'()*+,./0123456789:;<=>?-ABCDEFGHIJKLMNOPQRSTUVWXYZŽ™¥š ¨abcdefghijkl
mnopqrstuvwxyz„"¤ …
OK
```

Due to the use of Windows Word fonts, the display is not correct. Below is a picture taken from Windows HyperTerminal.


```
at+cscs="HEX"
OK
```

Hexadecimal mode set

```
at+cmgr=2
+CMGR: "STO UNSENT","+85292046511",
000102030405060708090A0B0C0D0E0F101112131415161718191A1B1C1D1E1F20
2122232425262728292A2B2C2D2E2F303132333435363738393A3B3C3D3E3F4041
42434445464748494A4B4C4D4E4F505152535455565758595A5B5C5D5E5F606162
636465666768696A6B6C6D6E6F707172737475767778797A7B7C7D7E7F
OK
```

ⓘ Some networks modify the characters sent in default alphabet GSM 03.38.
Due to the problem of displaying default alphabet GSM 03.38, it is wise to use PDU mode or Text Mode (Hex format) especially for the extension table.

Here is an example whith the GSM 7bit default alphabet extension table :

```
at+cmgw=16
>0011000B915892026415F10000A7029B72
+CMGW: 2
```

OK

This SMS displays the Euro character.

at+cscs="HEX"
OK

Hexadecimal mode set

at+cmgr=2
+CMGR: "STO UNSENT","+85292046511",
1B65
OK

7 How to send an SMS in UCS2 ?

at+csmp=1,173,0,8
OK

This command shall be used to select value for the <vp>, <pid>, the <dcs>.

at+cmgs=97542004
>4e004e0d
+CMGS: 45
OK

A Short Message is sent at destination address 97542004 with the text « 4e004e0d ».
This text is 2 Chinese characters.

+CMTI: "SM",6

Message is received

at+cmgr=6
+CMGR: "REC UNREAD","+85297542004",,"00/09/01,15:03:5328",145,4,0,
8,"+85294980000",145,2
4E004E0D
OK

In this example the <dcs> value is 8 (UCS2 alphabet) and the text length is 2.

(i) In UCS2 alphabet up to 70 caracters can be sent.

8 How to manage the SMS status report

The aim of the status report is to convey a report from the Service Center to the mobile.

AT+CNMI=0,1,1,1,0
OK

This to allow +CDS indications.

AT+CSMP=33,167,0,0
OK

This to set SRR to 1 (check AT commands specifications for more details)

Also the SMS status report depends on networks. Some networks don't support this feature.

Full example :

at+cnmi?
+CNMI: 0,1,1,1,0
OK

at+csmp?
+CSMP: 33,169,0,0
OK

at+cmgs=92046511
> bonjour_
+CMGS: 4
OK

+CDS: 6,4,"85292046511",129,"00/09/20,16:56:00-28","00/09/20,16:56:00-28",0

9 How to manage Cell Broadcast

Here is a sequence of AT commands to receive and read Cell Broadcast messages.

Cell Broadcast feature is depending on network capabilities.

1)

at+cnmi=0,1,1,0,0
OK

This command sets the rules for storing received CBMs (Cell Broadcast Message). The syntax for this command is AT+CNMI=<mode>,<mt>,<bm>, <ds>,<bfr>. Default for <bm> is 0.

<bm>	
0	No CBM indications are routed to the TE. The CBMs are stored.
1	The CBM is stored and an indication of the memory location is routed to the customer application using unsolicited result code: +CBMI: "BM", <index>
2	New CBMs are routed directly to the TE using unsolicited result code. +CBM : <length><CR><LF><pdu> (PDU mode) or +CBM :<sn>,<mid>,<dcs>,<page>,<pages>(Text mode) <CR><LF> <data>

Check Wavecom document about AT commands to learn more about the other parameters of AT+CNMI.

2)

at+cscb=0
OK

Activation of CBM reception for all Message Identifiers.

3)

+CBMI: "BM",1

A cell broadcast has been received and store in position 1.

+CBMI: "BM",2

An another one in position 2.

4)

at+cpms="BM"
+CPMS: 2,20,6,20
OK

This command allows defining the message storage area to be used for reading, writing...
This command has selected CBM message storage. 2 cell broadcast messages are stored. 20 are the maximum number of cell broadcast that can be stored. 6,20 are for short messages.

at+cpms?
+CPMS: "BM",2,20,"SM",6,20
OK

5)

at+cmgr=1
+CMGR: "REC UNREAD",12240,882,1,1,1
HSI 17710 +0
14:44
PLS CALL "19010" FOR DETAILS
OK

at+cmgr=2
+CMGR: "REC UNREAD",9221,883,72,1,1
62C6606F53485E025FAE5347FF0C9694591CFF15002EFF18FF17FF15FF05FF0C4E09
500B6708FF16
002EFF12FF15FF05FF0C7F8E96FB63015E73002E002E8A7360C58ACB96FB0023003
1003000300023
000D
OK

First cell broadcast is in english. Second one is in Chinese UCS2.
Check for the dcs (data coding scheme) to know the alphabet used with the cell broadcast text.

In text mode (+CMGF=1) and for cell broadcast storage, format for +CMGR is :
+CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data>

<stat> : same as for short messages

<stat> 0 : "REC UNREAD" (received unread message)
      1 : "REC READ" (received read message)
      2 : "STO UNSENT" (stored unsent message)
      3 : "STO SENT" (stored sent message)
      4 : "ALL" (all messages)

<sn> : Cell Broadcast serial number
<mid> : Cell Broadcast message identifier
<dcs> : Cell Broadcast data coding scheme in integer format
<page> : current page
<pages> : total number of pages.

---

6)

+CBMI: "BM",3
New cell broadcast received.

at+cmgl="ALL"
+CMGL: 1,"REC READ",12240,882,1,1,1
HSI 17710 +0
14:44
PLS CALL "19010" FOR DETAILS

+CMGL: 2,"REC READ",9221,883,72,1,1
62C6606F53485E025FAE5347FF0C9694591CFF15002EFF18FF17FF15FF05FF0C4E09
500B6708FF16

002EFF12FF15FF05FF0C7F8E96FB63015E73002E002E8A7360C58ACB96FB0023003
1003000300023
000D

+CMGL: 3,"REC UNREAD",9223,883,72,1,1
8B4976E367034FC38ACB62958CC78005FF0C5728907864C78B4952384FDD8B4991
D1878D8CC74EBA
66425FC598085C0F5FC35BE9614E002E002E8A7360C58ACB96FB00230031003000
300023000D000D
000D

OK

Command AT+CMGL can be used to read all cell broadcast messages.

7)

at+cnmi=0,1,2,0,0
OK

Cell broadcast won't be saved but will be routed directly.

+CBM: 9225,883,64,1,1
<NEWS>TYPHOON ALERT ONE TOMORROW IN HONG KONG

8)

The command **AT+CSCB** allows choosing the cell broadcast types that the module has to listen. Also the command **AT+WCBM** allows writing Cell Broadcast Message Identifiers in the SIM if a specific file called EF-CBMI is present in the SIM.

Check Wavecom document about AT commands to learn more about the syntax.

9)

Cell broadcast can also be received in PDU mode.
Cell broadcast format is described in GSM 04.80.

at+cmgf=0
OK

+CBM: 88
24010373481162C6606F534A65E565367A69FF0C9694591CFF15002EFF17FF15FF0
5FF0C4E09500B6708FF16FF05FF0C7F8E96FB63015E73002E002E8A7360C58ACB96
FB0023003100300030023000D000D000D000D000D

+CBM: 88
2EE003720111C8691214A3D96A37D02A876B2862311D8DD650409953D030C8648
244B11C2C0613818C4F298858A40693CC6943D168341A8D46A3D168341A8D46A3
D168341A8D46A3D168341A8D46A3D168341A8D46A3D100

10   USSD

atd*147#
OK

OK doesn't means it has been accepted by the network. It means that the syntax of the USSD sequence is correct.

To get answers from the network, the user shall set AT+CUSD=1

at+cusd=1
OK

10.1 Operation not supported

Test with a Chinese card :

atd*147#
OK

+CUSD: 4
(Operation not supported. Chinese network doesn't support USSD)

10.2 Terminated by network

Tests with C&W HKT card

atd*147#
OK

+CUSD: 2
(USSD terminated by network. This sequence is not supported by the network)

10.3 No answer from user

atd#100#
OK

+CUSD: 1,"i.Menu
0:What's New
   1:Customer Svc
   2:MoneyLine
   3:WinningLine/ Info
   4:Ringtone/ Graphic
   5:e-Shopping
   6:Dictionary
   7:Fortune
   8:Bank/Credit Card
   9:Setup",0

+CUSD: 4

No answer from the user. USSD terminated

10.4 Full transaction

atd#100#
OK

+CUSD: 1,"i.Menu
0:What's New
   1:Customer Svc
   2:MoneyLine
   3:WinningLine/ Info
   4:Ringtone/ Graphic
   5:e-Shopping
   6:Dictionary
   7:Fortune
   8:Bank/Credit Card
   9:Setup",0

at+cusd=1,"4"
OK

User selects item 4.

+CUSD: 1,"1:Graphics
      2:Mobile e-Card
      3:Ringing Tone
      *:Previous Menu (Apply to Nokia Handsets)",0

at+cusd=1,"3"
OK

User selects item 3

+CUSD: 1,"1:What's Hot
      2:Folk-song
      3:Classics
      4:Festival
      5:Others
      6:Send Ringing Tone to other handset
    *:Previous Menu
    **:Main Menu (Apply to Nokia Handsets except 5110",0

at+cusd=1,"**"
OK

User selects item **.

+CUSD: 1,"i.Menu
0:What's New
   1:Customer Svc
   2:MoneyLine
   3:WinningLine/ Info
   4:Ringtone/ Graphic
   5:e-Shopping
   6:Dictionary
   7:Fortune

8:Bank/Credit Card
          9:Setup",0

at+cusd=1,"4"
OK

+CUSD: 1,"1:Graphics
          2:Mobile e-Card
          3:Ringing Tone
          *:Previous Menu (Apply to Nokia Handsets)",0

at+cusd=1,"3"
OK

+CUSD: 1,"1:What's Hot
          2:Folk-song
          3:Classics
          4:Festival
          5:Others
          6:Send Ringing Tone to other handset
        *:Previous Menu
        **:Main Menu (Apply to Nokia Handsets except 5110",0

at+cusd=1,"2"
OK

User selects item 2.

+CUSD: 1,"1:Ah Li San Ji Koh
            2:Cho Yuen Ching Koh
            3:Mei Lai Dik Koo Leung
            4:Pau Ma Lau Lau Dik San Shang
            5:Lim Koo Heung
            6:Home, Sweet Home
            *:Previous Menu
          **:Main Menu",0

at+cusd=1,"2"
OK

User selects item 2.

+CUSD: 1,"U will receive the Ringing Tone soon.
          Press
          *:Previous Menu
        **:Main Menu",0

+CMTI: "SM",1
Ringing tone received by Short Message.

at+cusd=2
OK

The session is cancelled by user

10.5 Phase I or II

The command AT+CUSD (used to send USSD) doesn't allow choosing USSD phase I or II. USSD requests are always sent in phase II. In case of network rejection, the module sends USSD sequence back in phase I.

With the 7 bits alphabet (the one use by default in Wismo module) the module can send USSD sequence up to 182 characters.
It is only when the network rejects the USSD phase II, that the MS sends back the message in using the phase I and the IA5 alphabet.

AT+CUSD = <n> [,<str> [<dcs>]]

If no DCS value is set, then the default alphabet is used (DCS set to 0x0F).

11 Sim Tool Kit

11.1 Terminal profile

AT+STSF allows to activate, deactivate or configure the SIM ToolKit facilities.

```
at+stsf?
+STSF: 0,"160060C0",3
OK

at+stsf=2,"5fffffff7"
OK

at+stsf=1
OK

at+cfun=1
OK
```

ⓘ In V420 firmware, the terminal profile includes one more byte. Check chapter "Sim Tool Kit evolutions in V420".

11.2 Examples

11.2.1 Example 1

This example includes:
- SELECT_ITEM
- DISPLAY_TEXT
- SEND_SMS
- PLAY_TONE

```
at+stgi=0
+STGI: "SMARTMENU"
+STGI: 1,2,"SmartGuide",0
+STGI: 2,2,"Menu Setup",0
OK
```

Read main menu.

```
at+stgr=0,1,1
OK
```

Select item 1.

```
+STIN: 6

at+stgi=6
+STGI: 0,"SmartGuide"
+STGI: 1,7,"Dining",0
+STGI: 2,7,"Leisure",0
+STGI: 3,7,"Automobile",0
+STGI: 4,7,"Bank",0
+STGI: 5,7,"Shopping",0
```

+STGI: 9,7,"Useful tips",0
+STGI: 10,7,"Messages",0
OK

Read new sub menu

at+stgr=6,1,1
OK

Select item 1.

+STIN: 6

at+stgi=6
+STGI: 0,"Dining"
+STGI: 1,5,"Chinese",0
+STGI: 2,5,"Japanese",0
+STGI: 3,5,"Western",0
+STGI: 4,5,"Others",0
+STGI: 5,5,"Fast Food",0
OK

Read new sub menu

at+stgr=6,1,1
OK

Select item 1.

+STIN: 6

at+stgi=6
+STGI: 0,"Select Location"
+STGI: 1,4,"Current Loc.",0
+STGI: 2,4,"HK Island",0
+STGI: 3,4,"Kowloon",0
+STGI: 4,4,"N.T.",0
OK

Read new sub menu

at+stgr=6,1,1
OK

Select item 1.

+STIN: 1

at+stgi=1
+STGI: 1,"Info. for ref. only",0
OK

Display text

+STIN: 9

at+stgi=9
+STGI: ""
OK

Send Short message

+STIN: 99

End of session

A SMS Download is received and managed internally by Wavecom's software.

+STIN: 5

at+stgi=5
+STGI: ,,,,""
OK

ⓘ Tone has to be played locally by the PDA.

+STIN: 1

at+stgi=1
+STGI: 1,"SmartGuide Message Received",1
OK

Display text

at+stgr=1
OK

Confirm text has been read.

+STIN: 1

at+stgi=1
+STGI: 1,"Super Star,4/F., The Gateway 2, 21 Canton Road"23660878" Jade Garden Chinese Rest,Star House,TST"27306888" ",1
OK

Read text.

at+stgr=1
OK

Confirm text has been read.

+STIN: 6

at+stgi=6
+STGI: 0,"Option"
+STGI: 1,4,"More",0
+STGI: 2,4,"Make Call",0
+STGI: 3,4,"Save",0
+STGI: 4,4,"Del. & Exit",0
OK

Read new sub menu

at+stgr=6,1,4
OK

Read item 4.

+STIN: 99

End of session

11.2.2 Example 2

This example includes:
        - SELECT_ITEM

at+stgi=0
+STGI: "SMARTMENU"
+STGI: 1,2,"SmartGuide",0
+STGI: 2,2,"Menu Setup",0
OK

Read main menu

at+stgr=0,1,1
OK

Select item 1

+STIN: 6

at+stgi=6
+STGI: 0,"SmartGuide"
+STGI: 1,7,"Dining",0
+STGI: 2,7,"Leisure",0
+STGI: 3,7,"Automobile",0
+STGI: 4,7,"Bank",0
+STGI: 5,7,"Shopping",0
+STGI: 9,7,"Useful tips",0
+STGI: 10,7,"Messages",0
OK

Read sub menu

at+stgr=6,3
OK

Back to previous menu.

+STIN: 99

Sim Tool Kit session is ended.

ⓘ There is no way to go back from the SELECT ITEM to the MAIN MENU. The SIM card doesn't send back the MAIN MENU (except special cases : i.e. language modification).
The customer MMI software doesn't need to store it because the module provides it with AT+STGI=0

at+stgi=0
+STGI: "SMARTMENU"
+STGI: 1,2,"SmartGuide",0
+STGI: 2,2,"Menu Setup",0
OK

Read main menu

at+stgr=0,1,1
OK

Select item 1

+STIN: 6

at+stgi=6
+STGI: 0,"SmartGuide"
+STGI: 1,7,"Dining",0
+STGI: 2,7,"Leisure",0
+STGI: 3,7,"Automobile",0
+STGI: 4,7,"Bank",0
+STGI: 5,7,"Shopping",0
+STGI: 9,7,"Useful tips",0
+STGI: 10,7,"Messages",0
OK

Read sub menu

at+stgr=6,1,5
OK

Select item 5

+STIN: 6

at+stgi=6
+STGI: 0,"Shopping"
+STGI: 1,4,"Store",0
+STGI: 2,4,"Fashion",0
+STGI: 3,4,"Jewellery",0
+STGI: 4,4,"Household",0
OK

Read sub menu

at+stgr=6,3
OK

Go backward

+STIN: 6

at+stgi=6
+STGI: 0,"SmartGuide"
+STGI: 1,7,"Dining",0
+STGI: 2,7,"Leisure",0
+STGI: 3,7,"Automobile",0
+STGI: 4,7,"Bank",0
+STGI: 5,7,"Shopping",0
+STGI: 9,7,"Useful tips",0
+STGI: 10,7,"Messages",0
OK

Read main menu

at+stgr=6,3
OK

Go backward

+STIN: 99

Session ended.

11.2.3 Example 3

This example includes:
- SELECT_ITEM
- GET_INPUT

at+stgi=0
+STGI: "MoviStar"
+STGI: 1,8,"Noticias",0
+STGI: 2,8,"Economia",0
+STGI: 3,8,"Deportes",0
+STGI: 6,8,"Sorteos",0
+STGI: 4,8,"Trafico",0
+STGI: 5,8,"Tiempo",0
+STGI: 7,8,"Despertador",0
+STGI: 8,8,"E-Mail",0
OK

Read main menu

at+stgr=0,1,4
OK

Select item 4

+STIN: 6

at+stgi=6
+STGI: 0,"Trafico"
+STGI: 1,3,"Por Carreteras",0
+STGI: 2,3,"Por Provincias",0
+STGI: 3,3,"DGT",0
OK

Read sub menu

at+stgr=6,1,2
OK

Select item 2

+STIN: 3

at+stgi=3
+STGI: 1,1,1,2,0,"Provincia?"
OK

at+stgr=99
OK

User abort

+STIN: 99

End of session

11.2.4 Example 4

This example includes:
- SELECT_ITEM
- SEND_USSD

at+stgi=0
+STGI: "80906050B3670D52D95340FFFF"
+STGI: 2,2,"805F978A0A901FFFFF",1
+STGI: 3,2,"805A1B6A029AD8624BFFFF",1
OK

Read main menu

at+stgr=0,1,2
OK

Select item 2

+STIN: 6

at+stgi=6
+STGI: 0,"805F978A0A901FFFFF"
+STGI: 1,5,"8053F0706380A15E02FFFF",0
+STGI: 2,5,"80570B969B80A15E02FFFF",0
+STGI: 3,5,"8059165E63532F7387FFFF",0
+STGI: 4,5,"80671F8CA863076578FFFF",0
+STGI: 5,5,"804ECA65E565B0805EFFFF",0
OK

Read sub-menu

at+stgr=6,1,1
OK

Select item 1

+STIN: 6

at+stgi=6
+STGI: 0,"8053F0706380A15E02FFFF"
+STGI: 1,3,"8052A06B0A63076578FFFF",0
+STGI: 2,3,"804E0A6AC363076578FFFF",0
+STGI: 3,3,"80500B80A1884C60C5FFFF",0
OK

Read sub-menu

at+stgr=6,1,1
OK

Select item 1

+STIN: 10

Send USSD done automatically by the module.

at+stgi=10
+STGI: "80865574064E2DFF0C8ACB7A0D5F8CFFFF"
OK

Get text info related to USSD.

+STIN: 99

End of session

11.2.5　　Example 5

This example includes:
- SELECT_ITEM
- GET_INPUT
- DISPLAY_TEXT
- SEND SMS

at+stgi=0
+STGI: "TCC Menu"
+STGI: 1,3,"805BCC90A6884C52D59280884CFFFF",0
+STGI: 2,3,"808CC78A0A670D52D9FFFF",0
+STGI: 3,3,"8096FB5B5090F54EF6FFFF",0
OK

Read main menu

at+stgr=0,1,1
OK

Select item 1

+STIN: 6

at+stgi=6
+STGI: 0,"805BCC90A6884C52D59280884CFFFF"
+STGI: 1,6,"805B586B3E9918984D67E58A62FFFF",0
+STGI: 2,6,"808F495E33670D52D9FFFF",0
+STGI: 3,6,"804FE1752853616D888CBB984DFFFF",0
+STGI: 4,6,"8096FB8A715BC678BC8B8A66F4FFFF",0
+STGI: 5,6,"808B8053D69280884C8A0A606FFFFF",0
+STGI: 6,6,"808F4963A5670D52D94EBA54E1FFFF",0
OK

Read sub menu

at+stgr=6,1,1
OK

Select item 1

+STIN: 3

at+stgi=3
+STGI: 0,1,12,12,0,"808F3851655E33865FFFFF"

OK

Read input text

at+stgr=3,1
> 033220072628
OK

Input data. Data shall end with CTRL-Z.

+STIN: 3

at+stgi=3
+STGI: 0,0,4,4,0,"808F3851655BC678BCFFFF"
OK

Read input text

at+stgr=3,1
> 0000
OK

Input data. Data shall end with CTRL-Z.

+STIN: 1

at+stgi=1
+STGI:
1,"805E33865F0030003300330032003200300030003700320036003200038FFFF",1
OK

Read text. Option "Wait for user to clear message" is set.

at+stgr=1
OK

Confirm text.

+STIN: 9

Send SMS done automatically by the module.

at+stgi=9
+STGI: "808CC78A0A865574064E2DFFFF"
OK

Get text info related to SMS.

+STIN: 1

at+stgi=1
+STGI: 1,"8000530065006E0074002000530075006300630065007300730066
0075006 C006C0079FFFF",0
OK

Read text.

+STIN: 99

End of session

After a while, the module receives a SMS download. This is done automatically by the module.

+STIN: 1

at+stgi=1
+STGI: 1,"800050006C006500610073006500200057006100690074FFFF",0
OK

Read text.

+STIN: 1

at+stgi=1
+STGI: 1,"8000500072006F00630065007300730069006E00670020004D00
6500730073006100670065FFFF",0
OK

Read text

+STIN: 1

at+stgi=1
+STGI: 1,"8065B077ED8A0AFFFF",1
OK

Read text. Option "Wait for user to clear message" is set.

at+stgr=1
OK

Confirm text.

+STIN: 99

End of session

11.2.6   Example 6

This example includes:
- SELECT_ITEM
- GET_INKEY
- DISPLAY_TEXT

at+stgi=0
+STGI: "DeLaRue   "
+STGI: 1,2,"Beta Tests   ",0
+STGI: 2,2,"Javdebug   ",0
OK

Read main menu

at+stgr=0,1,1
OK

Select item 1

+STIN: 6

at+stgi=6
+STGI: 0,"Beta Tests   "
+STGI: 1,11,"Profile   ",0
+STGI: 2,11,"Display   ",0
+STGI: 3,11,"Get Inkey   ",0
+STGI: 4,11,"Get Input   ",0
+STGI: 5,11,"Play Tone   ",0
+STGI: 6,11,"Refresh   ",0
+STGI: 7,11,"Message   ",0
+STGI: 8,11,"Sup Services   ",0
+STGI: 9,11,"SetUpCall   ",0
+STGI: 10,11,"LocalInfo   ",0
+STGI: 11,11,"Unicode UCS2   ",0
OK

Read sub-menu

at+stgr=6,1,3
OK

Select item 3

+STIN: 2

at+stgi=2
+STGI: 0,0,"DIGIT ?"
OK

Get information about GET INKEY command

at+stgr=2,1,"6"
OK

Key "6" is pressed

+STIN: 1

at+stgi=1
+STGI: 1,"6",1
OK

Read text.

11.2.7   Example 7

This example includes:
        - SELECT_ITEM
        - DISPLAY_TEXT
        - REFRESH

at+stgi=0
+STGI: "DeLaRue   "
+STGI: 1,2,"Beta Tests   ",0
+STGI: 2,2,"Javdebug   ",0
OK

Read main menu

at+stgr=0,1,1
OK

Select item 1

+STIN: 6

at+stgi=6
+STGI: 0,"Beta Tests   "
+STGI: 1,11,"Profile   ",0
+STGI: 2,11,"Display   ",0
+STGI: 3,11,"Get Inkey   ",0
+STGI: 4,11,"Get Input   ",0
+STGI: 5,11,"Play Tone   ",0
+STGI: 6,11,"Refresh   ",0
+STGI: 7,11,"Message   ",0
+STGI: 8,11,"Sup Services   ",0
+STGI: 9,11,"SetUpCall   ",0
+STGI: 10,11,"LocalInfo   ",0
+STGI: 11,11,"Unicode UCS2   ",0
OK

Read sub-menu

at+stgr=6,1,6
OK

Select item 6

+STIN: 6

at+stgi=6
+STGI: 0,"Refresh   "
+STGI: 1,5,"Init Ref Al   ",0
+STGI: 2,5,"Ref Files   ",0
+STGI: 3,5,"Init Ref Files ",0
+STGI: 4,5,"Init SIM   ",0
+STGI: 5,5,"Reset SIM   ",0
OK

Read sub-menu

at+stgr=6,1,1
OK

Select item 1

+STIN: 1

at+stgi=1
+STGI: 0,"Refresh…",0
OK

Read text

+STIN: 7

Refresh done automatically by module.

+STIN: 1

at+stgi=1
+STGI: 1,"Vodafone Toolkit TestSIM",0
OK

Read text.

+STIN: 99

End of session

11.2.8 Example 8

This example includes:
- SELECT_ITEM
- SEND_SS

at+stgi=0
+STGI: "Vodafone TestSIM"
+STGI: 1,11,"Test DisplayText",0
+STGI: 2,11,"Test SENDSMS",0
+STGI: 3,11,"Test SENDSS",0
+STGI: 4,11,"Test SETUPCALL",0
+STGI: 5,11,"Test PLAYTONE",0
+STGI: 6,11,"Test Polling",0
+STGI: 7,11,"Test PROVLocInfo",0
+STGI: 8,11,"Test USSD",0
+STGI: 9,11,"Test ProfDownload",0
+STGI: 10,11,"Test GetInput",0
+STGI: 11,11,"Test GetInputForm",0
OK

Read main menu

at+stgr=0,1,3
OK

Select item 3

+STIN: 6

at+stgi=6
+STGI: 0,"Test SENDSS"
+STGI: 1,2,"No alpha",0
+STGI: 2,2,"With alpha",0
OK

Read sub-menu

at+stgr=6,1,2
OK

Select item 2

+STIN: 8

Send SS done automatically by module.

at+stgi=8

+STGI: "Sending SS..."
OK

Get text info related to SS.

+STIN: 99

End of session

11.2.9 Example 9

This example includes:
      - SELECT_ITEM
      - SETUP_CALL

at+stgi=0
+STGI: "Orange Info"
+STGI: 1,7,"Menu Set Up",0
+STGI: 2,7,"Account Info",0
+STGI: 3,7,"Finance",0
+STGI: 4,7,"News&Weather",0
+STGI: 5,7,"Horse Racing",0
+STGI: 6,7,"Mark Six",0
+STGI: 7,7,"Hut Hotlines",0
OK

Read main menu.

at+stgr=0,1,4
OK

Select sub menu 4.

+STIN: 6

at+stgi=6
+STGI: 0,"News&Weather"
+STGI: 1,2,"News Report",0
+STGI: 2,2,"Weather",0
OK

Read sub menu.

at+stgr=6,1,1
OK

Select item 1.

+STIN: 4

at+stgi=4
+STGI: 0,"+85293289389",,0
OK

at+stgr=4,1
OK

Accept call.

❶ Successful call

+WIND: 5,1

Indication about a call creation.

+WIND: 9

+STIN: 99

SIM Tool Kit session finished because call is successful.

ath
OK

End call.

❷ Unsuccessful call

+WIND: 5,1

NO CARRIER

+WIND: 6,1

+STIN: 99

SIM Tool Kit session finished because call is unsuccessful.

11.2.10   Example 10

This example includes:
        - SELECT_ITEM
        - SEND_SMS

+STIN: 0

at+stgi=0
+STGI: "C&W HKT"
+STGI: 1,4,"HSBC",0
+STGI: 2,4,"Hang Seng",0
+STGI: 3,4,"C&W HKT Info",0
+STGI: 4,4,"Language",0
OK

+STIN: 99

at+stgr=0,1,3
OK

Selection of third item in main menu.

+STIN: 6

at+stgi=6
+STGI: 0," "
+STGI: 1,2,"Stock Price",0
+STGI: 2,2,"Stock Index",0
OK

Read new sub menu.

at+stgr=6,1,1
OK

Get item number 1.

+STIN: 6

at+stgi=6
+STGI: 0," "
+STGI: 1,3,"Local Stock",0
+STGI: 2,3,"Top 10 Stock",0
+STGI: 3,3,"LDN HK Stock",0
OK

Read new sub menu.

at+stgr=6,1,2
OK

+STIN: 6

at+stgi=6
+STGI: 0," "
+STGI: 1,4,"By Volume",0
+STGI: 2,4,"By Turnover",0
+STGI: 3,4,"By % Rise",0
+STGI: 4,4,"By % Drop",0
OK

Read new sub menu.

at+stgr=6,1,3
OK

Get item number 3.

+STIN: 9

at+stgi=9
+STGI: "Sending message"
OK

Send SMS.

+STIN: 99

Session ended

+CMTI: "SM",8
+CMTI: "SM",9

11.2.11   Example 11

This example includes:
        - SELECT_ITEM
        - DISPLAY_TEXT

at+stgi=0
+STGI: "C&W HKT"
+STGI: 1,4,"HSBC",0
+STGI: 2,4,"Hang Seng",0
+STGI: 3,4,"C&W HKT Info",0
+STGI: 4,4,"Language",0
OK

Read main menu.

at+stgr=0,1,4
OK

Select item 4.

+STIN: 6

at+stgi=6
+STGI: 0," "
+STGI: 1,2,"English",0
+STGI: 2,2,"Chinese",0
OK

Read new sub menu

at+stgr=6,1,2
OK

Select item 2

+STIN: 0

at+stgi=0
+STGI: "8099996E2F96FB8A0AFFFF"
+STGI: 1,4,"80532F8C50FFFF",0
+STGI: 2,4,"806052751F9280884CFFFF",0
+STGI: 3,4,"8099996E2F96FB8A0A8CC78A0AFFFF",0
+STGI: 4,4,"80907864C78A9E8A00FFFF",0
OK

Read main menu

+STIN: 1

at+stgi=1
+STGI: 1,"805DF28F4970BA4E2D6587FFFF",0
OK

Display Text

+STIN: 99

11.2.12   Example 12

This example includes:
        - SELECT_ITEM

at+stgi=0

+STGI: "Orange Info"
+STGI: 1,7,"Menu Set Up",0
+STGI: 2,7,"Account Info",0
+STGI: 3,7,"Finance",0
+STGI: 4,7,"News&Weather",0
+STGI: 5,7,"Horse Racing",0
+STGI: 6,7,"Mark Six",0
+STGI: 7,7,"Hut Hotlines",0
OK

Get main menu.

at+stgr=0,1,5
OK

Select item 5.

+STIN: 6

at+stgi=6
+STGI: 0,"Horse Racing"
+STGI: 1,2,"Odds Info",0
+STGI: 2,2,"Result Info",0
OK

Read sub menu.

at+stgr=99
OK

Stop SIM tool kit session accepted.

+STIN: 99

at+stgi=0
+STGI: "Orange Info"
+STGI: 1,7,"Menu Set Up",0
+STGI: 2,7,"Account Info",0
+STGI: 3,7,"Finance",0
+STGI: 4,7,"News&Weather",0
+STGI: 5,7,"Horse Racing",0
+STGI: 6,7,"Mark Six",0
+STGI: 7,7,"Hut Hotlines",0
OK

at+stgr=99
+CME ERROR: 3

Stop SIM tool kit session refused. The session is already stopped.
When main menu is asked, the answer is provided by WM software and not the SIM Java applet.

at+stgi=0
+STGI: "Orange Info"
+STGI: 1,7,"Menu Set Up",0
+STGI: 2,7,"Account Info",0
+STGI: 3,7,"Finance",0
+STGI: 4,7,"News&Weather",0
+STGI: 5,7,"Horse Racing",0
+STGI: 6,7,"Mark Six",0

+STGI: 7,7,"Hut Hotlines",0
OK

at+stgr=0,1,5
OK

Select item 5

+STIN: 6

at+stgi=6
+STGI: 0,"Horse Racing"
+STGI: 1,2,"Odds Info",0
+STGI: 2,2,"Result Info",0
OK

Read sub menu.

at+stgr=95
OK

Move backward

+STIN: 99

SIM Tool Kit session finished.

11.3 Sim Tool Kit evolutions in V420

11.3.1 Evolution 1

Extension of AT+STSF command to support automatic acknowledge (for PLAY TONE, REFRESH, SEND SS and SENS USSD functionality) in case of application with no MMI.

AT+ STSF=2,"5FFFFFFF7F",10,1,1
OK

...

AT+STGI=0
+STGI: "80548C4FE1670D52D9FFFF"
+STGI: 1,7,"800032003800388CA17D9353F0FFFF",0
+STGI: 2,7,"80003300380038751F6D3B53F0FFFF",0
+STGI: 3,7,"800036003800386B616A0253F0FFFF",0
+STGI: 4,7,"80003800350030884C52D54FDD5168FFFF",0
+STGI: 5,7,"80003800350037884C52D55B575178FFFF",0
+STGI: 6,7,"80548C4FE15C087DDAFFFF",0
+STGI: 7,7,"8076EE93048A2D5B9AFFFF",0
OK

Read main menu

AT+STGR=0,1,1
OK

Select item 1

+STIN: 6

AT+STGI=6
+STGI: 0,"800032003800388CA17D9353F0FFFF"
+STGI: 1,2,"8091D1878D7C218A0A67E58A62FFFF",0
+STGI: 2,2,"8091D1878D8A9E97F367E58A62FFFF",0
OK

Read sub menu

AT+STGR=6,1,1
OK

Select item 1

+STIN: 9

ⓘ No need to send AT+STGI=9

+STGI: "808CC78A0A865574064E2DFFFF"
OK

11.3.2 Evolution 2

The module is powered on.

+STIN: 0

When the terminal profile is sent to the SIM card, this latter sends back the SIM tool kit main menu and ends the session.

AT+STGI=0
+STGI: "80906050B3670D52D95340FFFF"
+STGI: 1,1,"8052A0503C670D52D9FFFF",0
OK

+STIN: 99

So when reading for the first time the main menu, the +STIN:99 is sent. This is due to the SIM card, which has ended the session when sending back the SIM tool kit main menu to the application.

AT+STGI=0
+STGI: "80906050B3670D52D95340FFFF"
+STGI: 1,1,"8052A0503C670D52D9FFFF",0
OK

So the AT+STGI=0 has to be sent again by the application in order to read the main menu.

AT+STGR=0,1,1
OK

+STIN: 6

11.3.3 Evolution 3

Using a handset, the user enters the SIM tool Kit main menu, so the application shall send AT+STGI=0. If the user exits the SIM tool kit main menu and enters it again, the application doesn't need to enter AT+STGI=0 if +STIN:98 or +STIN:99 haven't been received.

```
AT+STGI=0
+STGI: "80906050B3670D52D95340FFFF"
+STGI: 1,1,"8052A0503C670D52D9FFFF",0
OK
```

The user exits the SIM tool kit main menu.

```
AT+STGI = 0
ERROR
```

The previous request AT+STGI=0 is still active. (no unsolicited +STIN 99 or 98 has been received).

For a SETUP MENU, AT+STGR=95 to 99 are only authorized on +STIN: 0.
After a AT+STGI=0, AT+STGR=95 to 99 is not authorized.
AT+STGR=95 to 99 are available when a dialog is started with the SIM card.

When AT+STGI=0 is sent, no SIM session is started with the SIM card. The main menu is stored in AT task.

```
AT+STGI=0
+STGI: "80906050B3670D52D95340FFFF"
+STGI: 1,1,"8052A0503C670D52D9FFFF",0
OK

...

+STIN: 98

AT+STGI=0
+STGI: "80906050B3670D52D95340FFFF"
+STGI: 1,1,"8052A0503C670D52D9FFFF",0
OK
```

The only way to send a new AT+STGI=0 is to wait that the previous one is not active anymore, i.e. reception of unsolicited +STIN 99 or 98.

11.3.4 Evolution 4

The Terminal profile now includes 5 bytes.

```
at+stsf=?
+STSF: (0-2),(160060C01F-5FFFFFFF7F),(1-255),(0-1)
OK

AT+STSF=2,"5FFFFFFF7F",10,0
OK

AT+STSF=1
OK

at+stsf?
+STSF: 1,"5FFFFFFF7F",10,0
```

OK

Please note that any modification of terminal profile is taken into account after PIN input. In the current case, the user must reboot the Wismo module in order that modifications are taken into account.

12 Phonebooks

12.1 FDN

Fixed dialing numbers. This is a SIM phonebook.

+WIND: 4

Initialization phase finished.

at+clck?
+CLCK: ("PS",0), ("SC",1), ("FD",0), ("PN",0)
OK

EF_FDN is desactivated.

at+cpbs?
+CPBS: "SM",1,50
OK

at+cpbr=?
+CPBR: (1-50),20,14
OK

at+cpbr=1,50
+CPBR: 1,"28240254",129,"WAPAC"
OK

One item in EF_ADN.

at+cpbs="FD"
OK

Select EF_FDN. When EF_FDN is desactivated, both EF_ADN and EF_FDN can be read. Only EF_ADN can be modified.

at+cpbr=?
+CPBR: (1-20),20,14
OK

at+cpbr=1,20
+CPBR: 1,"3699",129,"H"
+CPBR: 2,"28245224",129,"BUREAU"
+CPBR: 3,"+7777",145,"SC"
OK

3 items in EF_FDN.

at+cpin2?
+CPIN2: SIM PIN2

Check PIN2

at+cpin2=0000
OK

Enter PIN2

at+cpbw=4,"123456",145,"rty"
OK

Write an item at location 4

at+cpbr=1,10
+CPBR: 1,"3699",129,"H"
+CPBR: 2,"28245224",129,"BUREAU"
+CPBR: 3,"+85225495005",145,"HOME"
+CPBR: 4,"+123456",145,"rty"
OK

Read EF_FDN

at+clck?
+CLCK: ("PS",0), ("SC",1), ("FD",0), ("PN",0)
OK

EF_FDN is still desactivated.

At+clck="FD",1,0000
OK

EF_FDN is activated.

At+cfun=1
OK

Reset of module

at+clck?
+CLCK: ("PS",0), ("SC",1), ("FD",1), ("PN",0)
OK

EF_FDN is desactivated.

at+cpbr=1,10
+CPBR: 1,"3699",129,"H"
+CPBR: 2,"28245224",129,"BUREAU"
+CPBR: 3,"+85225495005",145,"HOME"
+CPBR: 4,"+7777",145,"SC"
OK

Read EF_FDN.

at+cpbw=5,"123456",129,"TOTO"
+CME ERROR: 17

PIN2 required

at+cpin?
+CPIN: SIM PIN2

at+cpin2=0000
OK

PIN2 entered.

at+cpbw=5,"123456",129,"TOTO"

OK

at+cpbw=6,"98765",129,"TITI"
OK

Write items at local 5 and 6.

at+cpbr=1,10
+CPBR: 1,"3699",129,"H"
+CPBR: 2,"28245224",129,"BUREAU"
+CPBR: 3,"+85225495005",145,"HOME"
+CPBR: 4,"+7777",145,"SC"
+CPBR: 5,"123456",129,"TOTO"
+CPBR: 6,"98765",129,"TITI"
OK

Read EF_FDN.

at+cpbw=5
OK

at+cpbw=6
OK

Delete item 5 and 6.

at+cpbr=1,10
+CPBR: 1,"3699",129,"H"
+CPBR: 2,"28245224",129,"BUREAU"
+CPBR: 3,"+85225495005",145,"HOME"
+CPBR: 4,"+7777",145,"SC"
OK

Read EF_FDN.

at+cpbs="SM"
+CME ERROR: 3

No access to EF_ADN.

at+clck="FD",0,0000
OK

Desactivate EF_FDN.

+WIND: 4

Swap between EF_ADN and EF+FDN finished.

at+clck?
+CLCK: ("PS",0), ("SC",1), ("FD",0), ("PN",0)
OK

EF_FDN desactivated.

at+cpbs?
+CPBS: "SM",0,50
OK

EF_AND activated.

```
at+cpbr=1,50
+CPBR: 1,"28240254",129,"WAPAC"
OK
```

Read EF_ADN.

12.2 LND

Last dialed numbers.
No write command (**AT+CPBW**) for this phonebook. This is a SIM/ME phonebook.

```
at+cpbs="LD"
OK

at+cpbr=?
+CPBR: (1-10),20,14
OK

at+cpbr=1,10
+CPBR: 1,"##55**",129,""
+CPBR: 2,"96***5*7#",129,""
+CPBR: 3,"5*4#",129,""
+CPBR: 4,"+85225295225",145,"HOME"
+CPBR: 5,"28245224",129,"BUREAU"
+CPBR: 6,"+7777",145,"SC"
+CPBR: 7,"+85225295225",145,"HOME"
+CPBR: 8,"28245224",129,"BUREAU"
+CPBR: 9,"28245224",129,"BUREAU"
+CPBR: 10,"25295225",129,"HOME"
OK
```

12.3 MC

Missed calls.
No write command (**AT+CPBW**) for this phonebook. This is a ME phonebook.

```
at+cpbs="MC"
OK

at+cpbr=?
+CPBR: (1-10),20,30
OK

at+cpbr=1,10
+CPBR: 1,"25295225",129,"HOME"
+CPBR: 2,"28240785",129,""
OK
```

12.4 RC

Received calls.
No write command (**AT+CPBW**) for this phonebook. This is a ME phonebook.

at+cpbs="RC"
OK

at+cpbr=?
+CPBR: (1-10),20,30
OK

at+cpbr=1,10
+CPBR: 1,"93111419",129,"CHRIS GSM"
+CPBR: 2,"98051087",129,""
OK

13 Important remarks

13.1   Battery management

There is no charging battery software in AT commands software.
AT+CBC is not supported.

AT+ADC=0
+ADC: ADC_A, ADC_B
OK

2 results.

AT+ADC=1
+ADC: ADC_A, ADC_B, ADC_C
OK

3 results.

AT+ADC command allows to get the (DC level * 1024) of ADC A and ADC B (those voltages are coded on 10 bits) or the (DC level * 1024) of ADC A, ADC B and ADC C (voltages coded on 10 bits) depending on the ADC mode. For ADC A, the value returned includes the resistor bridge. Those values are updated every 10 seconds.

Where:

ADC_A = Vbatt (in Volt) x 1024

ADC_B = VBat_Temp (in Volt) x 1024   with $0 \leq VBat\_Temp \leq 2,5V$ (1)

 ADC_C = VAux_V0 (in Volt) x 1024   with $0 \leq VAux\_V0 \leq 2,5V$ (1)

Note:
1- The 2,5V limit will be changed to 2,8V on Wismo2C-2 module

13.2   Error results

AT+CMEE=1
OK

Allow extented error report.

For example,

AT+CMEE=0
OK

AT+CMGR=1
ERROR

Record 1 for SMS is empty.

AT+CMEE=1
OK

AT+CMGR=1
+CMS ERROR: 321

So this command allows to get more informations about errors.

13.3　　Power Saving mode

AT+WRIM=1;%D0&D1;+W32K=1
OK

Both **power saving mode** and **RI management** are activated with this command.

When you switch on the module, the chip One C doesn't allow making the 32 Khz calibration during several minutes.
During this period, module cannot enter power saving mode.
Once this period is finished, it will work normally.

If the module is reset with AT+CFUN=1, it will work immediately. The delay only appears after a switch on.
So this delay is not a bug or problem but it is due to the One C chip's characteristics.

Module can enter power saving mode only when already in idle mode.

To be sure that power saving mode is working, a supplementary file shall be downloaded. This file depends on the hardware version.

at+whwv
Hardware Version 4.15
OK

Hardware version	File to download
V4.00	v400.dwl
V4.01	v400.dwl
V4.10	v400.dwl
V4.15	v400.dwl
V4.27	v417.dwl
V5.00	v500.dwl

13.4 Store in E2P

AT&W

OK

AT+CSAS
OK

Those two commands are used to save parameters in E2P. Second is used especially for SMS AT commands.

13.5 Turn off module

AT+CFUN=0 will be accepted during initialization phase. It can be useful to stop the module in such places like a plane where GSM phones are prohibited. Then the user can still use the PDA part.

13.6 Automatic power off

V420 software contains a new feature called "Automatic CPOF on interrupt". This feature is allowing to perform an automatic CPOF on hardware interrupt.

at+cfun=1
OK

Module reset

+WIND: 3
+WIND: 1
+WIND: 7
+CREG: 2
+CREG: 1
+WIND: 4

at+cfun?
+CFUN: 1
OK

Full functionnality is set.

OK

Pin interrupt is activated on the module. So an automatic AT+CPOF is launched internally.
This OK is the answer to the AT+CPOF

at+cfun?
+CFUN: 0
OK

Mimimal functionnality is set.

13.7 GPIO

The WISMO2C provides 6 General Purpose I/O, 3 General Purpose Outputs and 1 General Purpose Input.

The following GPIOs are not available (reserved) in case of module running with the AT commands firmware :

- GPIO1 (pin 52): FLASH LED
- GPIO2 (pin 54): RI
- GPIO3 (pin 51): DCD
- GPO0 (pin 26) : SIM 3V/5V detection

So with AT command:

AT+WIOR=
0 --> GPIO0
1 --> N/A
2 --> N/A
3 --> GPI
4 --> GPIO4

AT+WIOW=x,y
where x=
0 --> GPIO0
1--> GPO1
2 --> GPO2
3 --> N/A
4 --> GPIO4

14 FAX

14.1 Classes

In Fax **class 1** the PC application manages T30 protocol. In Fax **class 2** T30 protocol is embedded in the module and Wavecom software manages it.

Selecting a transmission fax **class 1** or fax **class 2** is a matter for the modem, which makes the outgoing call.
The remote fax doesn't care about the fax class chosen by the local modem. If a fax transmission works with fax **class 1**, it should work with fax **class 2**.

The network is not aware if the fax call is a fax **class 1** or fax **class 2**. From the network point of view, a fax call is a data call in transparent mode, which requires the management of special frames.

Once a fax call is started in fax **class 2**, there is no way to go back to fax **class 1**. Only going back to lower speeds is available in case of transmission problem or training problem. Only the fax application can choose the fax class.

If an application supports fax **class 1** and fax **class 2**, making an outgoing fax call **class 2** is less restricting for the application.
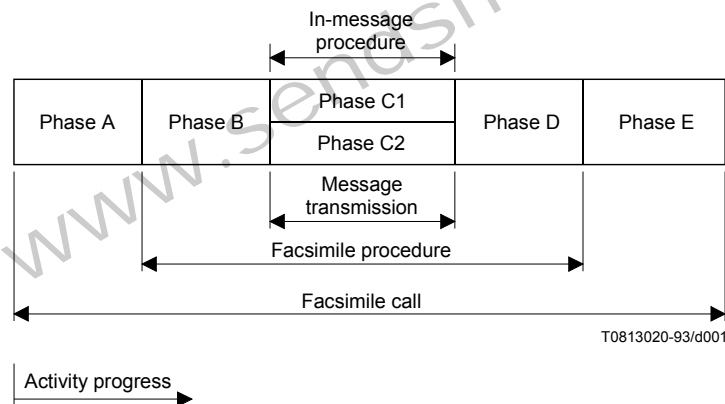
FIGURE 1/T.30

- Phase A – Call establishment

- Phase B – Pre-message procedure
    o Capabilities identification;
    o Confirmation for reception
    o Capabilities command
    o Training
    o Synchronization

- Phase C1 – In-message procedure
It controls the complete signaling for in-message procedure, e.g. in-message synchronization, error detection and correction and line supervision.

- Phase C2 – Message transmission
Recommendation T.4 covers the message transmission procedure.

- Phase D – Post-message procedure

- o End-of-message signaling
- o Confirmation signaling
- o Multipage signaling
- o End-of-facsimile procedure signaling

- Phase E – Call release

14.1.1 FAX CLASS 1:

AT commands supported are:
- +FTM: transmit speed
- +FRM: receive speed
- +FTH: HDLC protocol transmit speed
- +FRH: HDLC protocol receive speed
- +FTS: stop transmit
- +FRS: receive silence

In Fax **class 1,** each data T30 signalization frame are preceded with **AT+FTH=3**. Data are sent with AT command **AT+FTM=96**.

14.1.2 FAX CLASS 2:

AT commands supported are:
- +FDT: transmit data
- +FDR: receive data
- +FET: transmit page punctuation
- +FPTS: page transfer status parameters
- +FK: terminate session
- +FBOR: page transfer bit order
- +FBUF: buffer size report
- +FCQ: copy quality checking
- +FCR: capability to receive
- +FDIS: DTE capabilities for current session
- +FDCC: DTE capabilities for all session
- +FLID: local ID string
- +FPHCTO: page transfer timeout parameter
- +FCON: connexion with fax machine
- +FDCS: current session capabilities
- +FHNG: hangup cause

During a fax call there is a negotiation between the two faxes.
First receptor fax indicates its capabilities: **+FDIS**.
Then emitter fax decides the parameters to use because he knows his capabilities and the remote fax capabilities: **+FDCS**. The emitter sends these parameters to the remote fax. Each page is acknowledged by AT command **+FPTS**.

+FHNG should always be folllowed by OK.

14.2 Win Fax Pro and Spy software

Wavecom recommended fax application is Delrina WinFax v8.0 or **WinFax Pro 10.0** (Delrina new marketing name).

How to use Win Fax Pro 10.0:

- Set the module W2C in autobauding mode
AT+IPR=0

OK

- Have a standard 19200 bps modem activated (in Windows configuration defined in Control Panel / Modems)

- Open Win Fax Pro 10.0

- Go in Menu Message Manager / Tools / Program setup / Modems and communication devices / Properties
- Standard 19200 bps modem selected with port: COM1
- Click on properties to set the port and the fax class.

The software **Portmon**.exe is serial port spy software. It is used to get the AT commands sent for WinFax Pro 10.0 to the module.

Recommended filter options are:
- o Include: *ReadComm;*WriteComm
- o Exclude:
- o Highlight: *ReadComm

The software **CommLite** is also recommended.

14.3 Hints

14.3.1 Hint 1

Wavecom recommends implementing RTS/CTS flow control.

14.3.2 Hint 2

In Fax transmission there are an alternating of data mode and command mode.
So **HyperTerminal** cannot be used.
During communication state there is **NO** local echo for fax commands because this is not useful for a fax application.

14.3.3 Hint 3

For an outgoing fax, the module sends at the same time:
    - a pattern to the network (corresponding to fax carrier)
    - a CONNECT and a "0x11h" to the PC on the serial link There are no delays between the "CONNECT" and "0x11h" (means that fax application can start to send the data).

14.3.4 Hint 4

Outgoing fax calls fail if there is a lack of data on serial link compared to the fax rate on radio link.
It means if 1 byte / hour is received on serial link but the fax page sould be sent at 9600 bps, a problem will happen.
To send a fax at 9600 bps the serial link speed should be 14400 bps or even 19200 bps.

The SIM card must have an outgoing fax subscription.

14.3.5 Hint 5

Wismo module can detect the type of incoming call if the network indicates it.
AT+CR has to be used. This feature works in all digital networks.
But when a call is made from a PSTN, the information is not transmitted.
So networks often give three numbers:

      - A voice numer
      - A data number
      - A fax number

Fax number has to be used for incoming fax calls.
The SIM card must have an incoming fax subscription.

14.3.6 Hint 6

The use of autobauding, AT+IPR=0, is recommended.
An autobauding is provided which operates from 2400 to 19200 baud.

14.3.7 Hint 7

The some remote fax refuses the transmission because it does not agree with a parameter sent by the module.

at+fdis=?
(0,1),(0-5),(0-2),(0-2),(0,3),(0),(0),(0-7)
OK

Eight capabilities parameters are defined:

- Vertical Resolution
- Bit Rate
- Page Width
- Page Length
- Data Compression Format
- Error Correction
- Binary File Transfer
- Scan Time per line

In case of failure, some different values have to be used.

In case of failure, a comparison can be done on the same network with another GSM modem. A normal modem is not confronted to problems linked to the network such as synchronization.

WinFax pro 10.0 can be used to modify **vertical resolution** and **page length**.
Data compression format can also be changed in Win Fax Pro (High Speed compression 2D).
Please note that Data compression format is managed on Fax application side.

Wavecom module doesn't support values 1 and 2 for Data compression format.
ⓘ This is a bug, which will is solved in V421.

For **Error correction**, the module manages it only.
Due to technical reasons, Wavecom module supports only 0 (Disable Fax ECM).
!!! So if a remote fax requires a value different than 0, the outgoing fax call will fail.
ⓘ A machine that cannot accept a value equal to 0 is out of FAX specifications.

ⓘ A bug in outgoing faxes calls class 2 has been solved in V421 software. It happened only with some Canon machines.

14.3.8   Hint 8

Win Fax Pro 10.0 doesn't support international calls such as ATD+85228240255. ATD0085228240255 has to be used instead.

It is more convenient to disable the PIN while using Win Fax Pro 10.0

14.3.9   Hint 9

Coding of fax pages (T4, T2 or even JPEG) is totally independent of fax protocol.
A modem in class 1 or in class 2 does not look for T4 protocol pattern. For modems in class 1 or 2, all data received after "AT+FTM=96/CONNECT" in class 1 or "AT+FDT/CONNECT<XON>" in class 2 are considered as user data flow after having been filtered in modem like this : The module shall filter the data stream from the PDA and remove all characters pairs beginning with <DLE>.

The module shall recognise any command characters :
<DLE><ETX> : end of stream
<DLE><DLE> : single 0x10h in data

Before the PDA sends the T4 compressed data, it must shield any single <DLE> which occur in the data stream with another <DLE>. This includes the RTC.
Vice -Versa, when the PDA receives the T4 compressed data from the WISMO, during decoding of T4 compression, the PDA will treat <DLE><DLE> as a single <DLE>.
This behavior is described in T31 ITU recommendation (chapter 6.11).

14.3.10   Hint 10

If the PDA receive multiple +FDCS, the PDA doesn't have to send again AT+FDT. The module has autonomy and manages the Fax communication.

In a case of a failed training sequence the PDA must instruct the modem to drop to a lower speed in class 1 but not in class 2. In class 2 the module has autonomy. If training sequence is bad, speed is dropped down by module. PDA can do nothing. W2C is autonomous. If there is a problem because speed is too fast, W2C tries to fall back itself speed (and you will see other "+FDCS:..." after AT+FTD with the new speed)

If negotiation had a problem (negotiation DIS/DCS or training sequence TCF/CFR), module starts again negotiation phase B.
So the module sends back the negotiated parameters.

It is often a problem due to transmitting lines (network problem, problem on analogical line). If the PDA has a timeout, sending ATH followed by AT+FCLASS=0 is the only recommended step.

14.3.11   Hint 11

For retransmission page, the PDA SW shall only check the +FPTS: response to see whether to resend the previous page (2 and 4) or proceed to next page (1,3,5)

    +FPTS: 1 = W2C has received MCF T30 frame
    +FPTS: 2 = W2C has received RTN T30 frame

+FPTS: 3 = W2C has received RTP T30 frame
+FPTS: 4 = W2C has received PIN T30 frame
+FPTS: 5 = W2C has received PIP T30 frame

Wavecom advices:
+FPTS: 1 = proceed to next page (as recommendation T30 behavior)
+FPTS: 2 = retrain previous page (as recommendation T30 behavior)
+FPTS: 3 = retrain previous page (as recommendation T30 behavior)
+FPTS: 4 = retrain previous page (recommendation T30 behavior devices to stop call)
+FPTS: 5 = retrain previous page (recommendation T30 behavior devices to stop call)

Example:

AT+FET=0   (or AT+FET=2)
+FPTS: 3   (or 2,4,5)
+FDCS: 0,3,0,0,0,0,0,5
+FDCS: 0,3,0,0,0,0,0,5
CONNECT

AT+FET=0

If a CONNECT has been received, no need to send AT+FDT. Only send back the page.

If a OK is received after +FPTS, the PDA must send AT+FDT.

14.3.12   Hint 12

Please note that AT+WDR has no effect because outgoing fax calls always start at 9600 bps. No half rate is possible.

Please note that the PDA application should use hardware flow control and ignore <XON> <XOFF>. In fact, for information, Wismo sends <XON> <XOFF> characters to be compliant with Microsoft WinFax (PC fax application) which have a bad management of hardware flow control. Therefore, if PDA use CTS/RTS, all is right about flow control !

14.3.13   Hint 13

In case of problem, Wavecom needs some traces in order to investigate. When using a starter kit, please do the following procedure:

THE PROCEDURE IS FULLY EXPLAINED IN DOCUMENT "MOKALIGHT_04.DOC"

14.3.14   Hint 14

Sometimes, the following case can happen:
- The network is sending the beginning of the page (few bytes)
- Then the network acknowledges that it has sent the whole page, therefore Wismo module is waiting for a new signaling frame.
- Then the network starts to send again the page. The WISMO sends +FDCS: xxxxxxxxx and CONNECT as the module is trying to send the new page to the network with the character <DC2> from the PDA.

If the network jams to send the page at any time, therefore as soon as the customer application receives +FDCS:xxxxxxxx and CONNECT, it should start again the procedure to send the page.

14.4 Outgoing example Fax class 1

AT+FCLASS=1   Select fax class 1
OK

AT+FTM=?
(24,48,72,73,74,96,97,98,121,122,145,146)
OK

AT+FRM=?
(24,48,72,73,74,96,97,98,121,122,145,146)
OK

ATE0V1M1L1
OK
ATX4DP3959999
CONNECT

...data...

OK   Back to command mode

AT+FRH=3
CONNECT

...data...   Receive T30 signalization frame

OK   Back to command mode

AT+FRH=3
CONNECT

...data...   Receive T30 signalization frame

OK   Back to command mode

AT+FTH=3
CONNECT

...data...   Send T30 signalization frame

OK   Back to command mode

AT+FTM=96
CONNECT

...data...   Send data (T4)

OK   Back to command mode

ATH0   End of communication
OK

14.5 Outgoing example Fax class 2

ATE0V1	no echo
OK	
AT+FDCC=1,5,0,0,0,0,0,0	Capabilities for all session
OK	
AT+FCLASS=2	Select fax class 2
OK	
AT+FLID="LocalFax"	Define local ID
OK	
AT+FDIS=1,5,0,0,0,0,0,0	Current session capabilities
OK	
ATD92046516	Call establishement
+FCON	Connexion OK
+FCSI:"RemoteFax"	
+FDIS:0,3,0,2,0,0,0,0	Remote fax capabilities
OK	

The first OK after ATD92046516 means that synchronisation and training sequences have happened successfully.
Now the fax software can send the data to be transmitted.

AT+FDT	Begin of data
+FDCS:0,3,0,2,0,0,0,0	Current session capabilities
CONNECT	
<0x11h>	Send carrier
First page data terminated by	
<0x10h><0x03h>	
OK	Page transmitted
AT+FET=0	Send another page
+FPTS:1	First page acquitted
OK	
AT+FDT	
CONNECT	
<0x11h>	Send carrier
Second page data terminated by	
<0x10h><0x03h>	
OK	Page transmitted
AT+FET=2	No more page
+FPTS:1	First page acquitted
+FHNG:0	Normal end of connection
OK	

14.6 Incoming example Fax class 2

ATE0V1	no echo
OK	
ATS0=0	no automatic answer
OK	

| AT+FCR=1 | Accept incoming fax calls |
| OK | |

| AT+FLID="LocalFax" | Define local ID |
| OK | |

| AT+FBOR=0 | Same bit order |
| OK | |

| AT+FDCC=1,5,0,0,0,0,0,0 | Capabilities for all session |
| OK | |

RING	Incoming call
ATA	Off hook
+FCON	Connexion OK
+FTSI:"RemoteFax"	
+FDCS:0,3,0,2,0,0,0,0	Current session capabilities
OK	

AT+FDR	
+FCFR	Confirmation to receive
+FDCS:0,3,0,2,0,0,0,0	
CONNECT	
<0x12h>	Receive page carrier
First page data terminated by	
<0x10h><0x03h>	

OK	Page received
+FPTS:1	First page acquitted
+FET:0	To receive another page

OK	
AT+FDR	
+FDCS:0,3,0,2,0,0,0,0	
CONNECT	
<0x12h>	Receive page carrier

| Second page data terminated by | |
| <0x10h><0x03h> | |

OK	Page received
+FPTS:1	First page acquitted
+FET:2	No more page to receive

OK	
AT+FDR	
+FHNG:0	Normal end of connection
OK	

15 GPRS

Two documents are available:
- *gprsATcmdv10.pdf*

This preliminary AT commands document gives the AT commands list used in GPRS.

- *gprs_at_cmd_v13.PDF*

This more complete document gives full parameters explanation about AT commands for GPRS.

16 History

Document history		
10[h] November, 2000	Version 1.0	Regis MADEC
15th December, 2000	Version 2.0 Restrict phone number, cell broadcast PDU, history added, GPRS updated New examples added for Sim Tool Kit	Regis MADEC
20th December, 2000	Version 3.0 Phonebook chapter added	Regis MADEC
09th February, 2001	Version 4.0 Incoming call examples, automatic power off, power saving mode updated	Regis MADEC
12th March, 2001	Version 5.0 SMS PDU mode, Default alphabet GSM 03.38 SMS	Regis MADEC
23th March, 2001	Version 6.0 New STK examples, PCB versions updated	Regis MADEC
28th May, 2001	Version 7.0 STK examples detailed. Terminal profile updated.	Regis MADEC
06th June, 2001	Version 8.0 Fax management added	Regis MADEC
09th July, 2001	Version 9.0 Fax chapter updated (Hint 7, 9, 10, 11, 12, 13), signal strength chapter Outgoing data calls chapter updated (+++ sequence) Chapter about call failure added	Regis MADEC
05th Oct, 2001	Version 10.0 GPIO, USSD phase I and II, Sim Tool kit evolutions, Fax chapter Hint 14, DES	Regis MADEC