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Appendixes to AT Commands Interface Guide for X51

Revision: **005**
Date: **July 2005**

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PLUG IN TO THE WIRELESS WORLD




Appendixes to AT Commands Interface Guide for x51

Revision: **005**
Date: **6th July 2005**
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Overview

This document contains the technical appendixes for AT Commands Interface Guide for x51 document, second release (file WM_ASW_OAT_UGD_016-005.pdf).

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Document History

Revision	Date	History of the evolution	
001	15 July 2004	First edition for X50 AT software (this is the appendix part of the full document).	
002	18 Oct 2004	Second edition, add 539 error code	
003	9 Dec 2004	Updates for AT X50a revision. Correction in RS232 power down control	
004	22 Feb 2005	Updates for AT X50a software: WAP examples updates, add CME error code 42 and 44;+ifc value updated; +CME ERROR: 106 updated; § Command execution and dependence to SIM updated	
005	6 July 2005	Updates for AT X51 software	

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1 Codes and values

1.1 ME error result code: +CME ERROR

<error> is defined as below:

<error>	Meaning	Resulting from the following commands
3	Operation not allowed	All GSM 07.07 commands (+CME ERROR: 3)
4	Operation not supported	All GSM 07.07 commands (+CME ERROR: 4)
5	PH-SIM PIN required (SIM lock)	All GSM 07.07 commands (+CME ERROR: 5)
10	SIM not inserted	All GSM 07.07 commands (+CME ERROR: 10)
11	SIM PIN required	All GSM 07.07 commands (+CME ERROR: 11)
12	SIM PUK required	All GSM 07.07 commands (+CME ERROR: 12)
13	SIM failure	All GSM 07.07 commands (+CME ERROR: 13)
16	Incorrect password	+CACM, +CAMM, +CPUC, +CLCK, +CPWD, +CPIN, +CPIN2 (+CME ERROR: 16)
17	SIM PIN2 required	+CPBW (FDN), +CLCK (FDN),
18	SIM PUK2 required	+CACM, +CAMM, +CPUC, +CPBW (FDN), +CPIN, +CPIN2, +CLCK (FDN), +CPWD
20	Memory full	+CPBW
21	Invalid index	+CPBR, +CPBW, ATD>[mem]index, +WMGO, +WPGW
22	Not found	+CPBF, +CPBP, +CPBN, +CGSN, +WOPN, ATD>[mem]"name"
24	Text string too long	+CPBW, +CPIN, +CPIN2, +CLCK, +CPWD, +WPGW, +WCCS
26	Dial string too long	+CPBW, ATD, +CCFC
27	Invalid characters in dial string	+CPBW
30	No network service	+VTS, +COPS=?, +CLCK, +CCFC, +CCWA, +CUSD
32	Network not allowed – emergency calls only	+COPS
40	Network personalization PIN required (Network lock)	All GSM 07.07 commands (+CME ERROR: 40)
42	Network personalization PIN required (Network subset lock)	All GSM 07.07 commands (+CME ERROR: 42)
44	Network personalization PIN required (Service Provider lock)	All GSM 07.07 commands (+CME ERROR: 44)
46	Network personalization PIN required (Corporate lock)	All GSM 07.07 commands (+CME ERROR: 46)
103	Incorrect MS identity.	+CGATT
106	ME is blacklisted by the network.	+CGATT

<error>	Meaning	Resulting from the following commands
107	MS is not allowed to operate in GPRS.	+CGATT
111	MS is not allowed to operate in the requested PLMN.	+CGATT
112	MS is not allowed to make location updating in this area.	+CGATT
113	Roaming in this location area is not allowed.	+CGATT
132	service option not supported (#32)	+CGACT +CGDATA ATD*99
133	requested service option not subscribed (#33)	+CGACT +CGDATA ATD*99
134	service option temporarily out of order (#34)	+CGACT +CGDATA ATD*99
148	unspecified GPRS error	All GPRS commands
149	PDP authentication failure	+CGACT +CGDATA ATD*99
150	invalid mobile class	+CGCLASS +CGATT

1.2 Message service failure result code: +CMS ERROR

<er> is defined as below:

<er>	Meaning	Resulting from the following commands
1 to 127	Error cause values from the GSM recommendation 04.11 Annex E-2	+CMGS, +CMSS
301	SMS service of ME reserved	+CSMS (with +CMS: ERROR 301)
302	Operation not allowed	All SMS commands (+CMSS, +CMGL, +CPMS, +CSMP...)
303	Operation not supported	All SMS commands
304	Invalid PDU mode parameter	+CMGS, +CMGW
305	Invalid text mode parameter	+CMGS, +CMGW, +CMSS
310	SIM not inserted	All SMS commands
311	SIM PIN required	All SMS commands
312	PH-SIM PIN required	All SMS commands
313	SIM failure	All SMS commands
316	SIM PUK required	All SMS commands
317	SIM PIN2 required	All SMS commands
318	SIM PUK2 required	All SMS commands
321	Invalid memory index	+CMGR, +CMSS, +CMGD
322	SIM or ME memory full	+CMGW
330	SC address unknown	+CSCA?, +CMSS, +CMGS

<er>	Meaning	Resulting from the following commands
340	no +CNMA acknowledgement expected	+CNMA

1.3 Specific error result codes

<error>	Meaning	Resulting from the following commands
500	unknown error.	All commands
512	MM establishment failure (for SMS).	+CMGS, +CMSS (+CMS ERROR: 512)
513	Lower layer failure (for SMS)	+CMGS, +CMSS (+CMS ERROR: 513)
514	CP error (for SMS).	+CMGS, +CMSS (+CMS ERROR: 514)
515	Please wait, init or command processing in progress.	All commands (" +CME ERROR: 515" or "+CMS ERROR: 515") except ATH0, ATH1, AT+WIOR, AT+WIOW, AT+CFUN=1, AT+CLCC, AT+WAC, AT+CPAS, AT+VGR, AT+VTS, AT+SPEAKER.
517	SIM Toolkit facility not supported.	+STGI
518	SIM Toolkit indication not received.	+STGI
519	Reset the product to activate or change a new echo cancellation algorithm.	+ECHO, +VIP
520	Automatic abort about get PLMN list for an incoming call.	+COPS=?
526	PIN deactivation forbidden with this SIM card.	+CLCK
527	Please wait, RR or MM is busy. Retry your selection later.	+COPS
528	Location update failure. Emergency calls only.	+COPS
529	PLMN selection failure. Emergency calls only.	+COPS
531	SMS not sent: the <da> is not in FDN phonebook, and FDN lock is enabled. (for SMS)	+CMGS, +CMSS (+CMS ERROR: 531)
532	the embedded application is activated so the objects flash are not erased	+WOPEN
533	Missing or Unknown APN	ATD*99 +GACT +CGDATA
536	Class locked: a command has been launched from a port, the effect is to lock all commands belonging to the same class. If another port launches a command of this class, this error will occur as long as the class is not released (at first command's completion time)	All commands

<error>	Meaning	Resulting from the following commands
537	Phonebook group full.	+CPBW
538	Not Enough Space to copy SMS	+WMCP
539	Invalid SMS	+CMGR
541	Open AT application and AT software version do not match	+WOPEN

1.4 Failure Cause from GSM 04.08 recommendation (+CEER)

Cause value	Diagnostic
1	Unassigned (unallocated) number
3	No route to destination
6	Channel unacceptable
8	Operator determined barring
16	Normal call clearing
17	User busy
18	No user responding
19	User alerting, no answer
21	Call rejected
22	Number changed
26	Non selected user clearing
27	Destination out of order
28	Invalid number format (incomplete number)
29	Facility rejected
30	Response to STATUS ENQUIRY
31	Normal, unspecified
34	No circuit/channel available
38	Network out of order
41	Temporary failure
42	Switching equipment congestion
43	Access information discarded
44	Requested circuit/channel not available
47	Resources unavailable, unspecified
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred with in the CUG
57	Bearer capability not authorized

Cause value	Diagnostic
58	Bearer capability not presently available
63	Service or option not available, unspecified
65	Bearer service not implemented
68	ACM equal to or greater than ACMmax
69	Requested facility not implemented
70	Only restricted digital information bearer capability is available
79	Service or option not implemented, unspecified
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination
91	Invalid transit network selection
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with protocol state
99	Information element non-existent or not implemented
100	Conditional IE error
101	Message not compatible with protocol state
102	Recovery on timer expiry
111	Protocol error, unspecified
127	Inter-working, unspecified
224	MS requested detach
225	NWK requested Detach
226	Unsuccessful attach cause NO SERVICE
227	Unsuccessful attach cause NO ACCESS
228	Unsuccessful attach cause GPRS SERVICE REFUSED
229	PDP Deactivation requested by NWK
230	PDP Deactivation because LLC link activation Failed
231	PDP Deactivation cause NWK reactivation with same TI
232	PDP Deactivation cause GMM abort
233	PDP Deactivation cause LLC or SNDSCP failure
234	PDP Unsuccessful activation cause GMM error
235	PDP Unsuccessful activation cause NWK reject
236	PDP Unsuccessful activation cause NO NSAPI available
237	PDP Unsuccessful activation cause SM refuse
238	PDP Unsuccessful activation cause MMI ignore
239	PDP unsuccessful activation cause Nb Max Session Reach

All other values in the range	will be treated as cause
[0,31]	31
[32,47]	47
[48,63]	63
[64,79]	79
[80,95]	95
[96,111]	111
[112,127]	127

1.5 Specific Failure Cause for +CEER

Cause value	Diagnostic
240	FDN is active and number is not in FDN
241	Call operation not allowed
252	Call barring on outgoing calls
253	Call barring on incoming calls
254	Call impossible
255	Lower layer failure

1.6 GSM 04.11 Annex E-2: Mobile originating SM-transfer

These error causes could appear for **SMS commands** (+CMGS, +CMSS, +CMGD...)

Error #	Error label	Description
1	Unassigned (unallocated) number	The destination requested by the Mobile Station cannot be reached because, although the number is in a valid format, it is not currently assigned (allocated).
8	Operator determined barring	The MS has tried to send a mobile originating short message when the MS's network operator or service provider has forbidden such transactions.
10	Call barred	The outgoing call barred service applies to the short message service for the called destination.
21	Short message transfer rejected	The equipment sending this cause does not wish to accept this short message, although it could have accepted the short message since the equipment sending. This cause is neither busy nor incompatible.
27	Destination out of service	The destination indicated by the Mobile Station cannot be reached because the interface to the destination is not functioning correctly. The term "not functioning correctly" indicates that a signaling message was unable to be delivered to the remote user; e.g., a physical layer or data link layer failure at the remote user, user equipment off-line, etc.
28	Unidentified subscriber	The subscriber is not registered in the PLMN (e.g.. IMSI not known)
29	Facility rejected	The facility requested by the Mobile Station is not supported by the PLMN.
30	Unknown subscriber	The subscriber is not registered in the HLR (e.g.. IMSI or directory number is not allocated to a subscriber).
38	Network out of order	The network is not functioning correctly and the condition is likely to last a relatively long period of time; e.g., immediately reattempting the short message transfer is not likely to be successful.
41	Temporary failure	The network is not functioning correctly and the condition is not likely to last a long period of time; e.g., the Mobile Station may wish to try another short message transfer attempt almost immediately.
42	Congestion	The short message service cannot be serviced because of high traffic.
47	Resources unavailable, unspecified	This cause is used to report a resource unavailable event only when no other cause applies.

Error #	Error label	Description
50	Requested facility not subscribed	The requested short message service could not be provided by the network because the user has not completed the necessary administrative arrangements with its supporting networks.
69	Requested facility not implemented	The network is unable to provide the requested short message service.
81	Invalid short message transfer reference value	The equipment sending this cause has received a message with a short message reference which is not currently in use on the MS-network interface.
95	Invalid message, unspecified	This cause is used to report an invalid message event only when no other cause in the invalid message class applies.
96	Invalid mandatory information	The equipment sending this cause has received a message where a mandatory information element is missing and/or has a content error (both cases are undistinguishable).
97	Message type non-existent or not implemented	The equipment sending this cause has received a message with a message type it does not recognize either because this is a message not defined or defined but not implemented by the equipment sending this cause.
98	Message not compatible with short message protocol state	The equipment sending this cause has received a message such that the procedures do not indicate that this is a permissible message to receive while in the short message transfer state.
99	Information element non-existent or not implemented	<p>The equipment sending this cause has received a message which includes unrecognized information elements because the information element identifier is not defined or it is defined but not implemented by the equipment sending the cause.</p> <p>However, the information element is not required to be present in the message so that the equipment sends the cause to process the message.</p>
111	Protocol error, unspecified	This cause is used to report a protocol error event only when no other cause applies.
127	Inter-working, unspecified	There has been inter-working with a network which does not provide causes for actions it takes; thus, the precise cause for a message which is being sent cannot be ascertained.

All values other than specified should be treated as error #41.

1.7 Unsolicited result codes

Verbose result code	Numeric (VO set)	Description
+CALA: < time string>,<index>	As verbose	Alarm notification
+CBM: <length><pdu> (PDU) or +CBM:<sn>,<mid>,<dcs>,<page>,<pages>... (Text mode)	As verbose	Cell Broadcast Message directly displayed
+CBMI: "BM",<index>	As verbose	Cell Broadcast Message stored in mem at location <index>
+CCCM: <ccm>	As verbose	Current Call Meter value
+CCED: <values>	As verbose (specific)	Cell Environment Description indication
+CCWA:<number>,<type>, <class> [,<alpha>]	As verbose	Call Waiting number
+CDS: <fo>, <mr>... (text mode) or +CDS: <length>,... (PDU)	As verbose	SMS status report after sending a SMS
+CDSI: <mem>,<index>	As verbose	Incoming SMS Status Report after sending a SMS, stored in <mem> ("SR") at location <index>
+CKEV: <keynb>	As verbose	Key press or release
+CLIP: <number>, <type> [,,<alpha>]	As verbose	Incoming Call Presentation
+CMT: <oa>... (text mode) or +CMT: [<alpha>,...] (PDU)	As verbose	Incoming message directly displayed
+CMTI: <mem>,<index>	as verbose	Incoming message stored in <mem> ("SM") at location <index>
+CREG:<mode>,<stat>[,<lac>,<ci>]	As verbose	Network registration indication
+CRING: <type>	As verbose	Incoming call type (VOICE, FAX ...)
+CSQ: <RxLev>,99	As verbose	Automatic RxLev indication with AT+CCED=1,8 command
+CSSU: <code2>[<number>,<type>]	As verbose	Supplementary service notification during a call
+STIN: <ind>	As verbose (specific)	SIM Toolkit Indication
+WIND: <IndicationNb> [,<CallId>]	As verbose (specific)	Specific unsolicited indication (SIM Insert/Remove, End of init, Reset, Alerting, Call creation/release)
+WVMI: <LinId>,<Status>	As verbose (specific)	Voice Mail Indicator notification (cf. +CPHS command)

Verbose result code	Numeric (VO set)	Description
+WDCI: <LineId>,<Status>	As verbose (specific)	Diverted call indicator
RING	2	Incoming call signal from network
+WBCI	As Verbose (specific)	Battery charge indication
+CIEV	As Verbose (specific)	Indicator event reporting
+WAGI: <date string>, <time string>, <category> <alarm_offset>, <frequency>, <description>, <index>	As verbose	Appointment notification
+CUSD: <m>,<str>,<dcs>]	As verbose	USSD unsolicited response

1.8 Final result codes

Verbose result code	Numeric (VO set)	Description
+CME ERROR: <err>	As verbose	Error from GSM 07.05 commands
+CMS ERROR: <err>	As verbose	Error from SMS commands (07.07)
BUSY	7	Busy signal detected
ERROR	4	Command not accepted
NO ANSWER	8	Connection completion timeout
NO CARRIER	3	Connection terminated
OK	0	Acknowledges correct execution of a command line
RING	2	Incoming call signal from network

1.9 Intermediate result codes

Verbose result code	Numeric (VO set)	Description
+COLP:<number>,<type>	as verbose	Outgoing Call Presentation
+CR: <type>	as verbose	Outgoing Call report control
+ILRR: <rate>	as verbose	Local TA-TE data rate
CONNECT 300	10	Data connection at 300 bauds
CONNECT 1200	11	Data connection at 1200 bauds
CONNECT 1200/75	12	Data connection at 1200/75 bauds
CONNECT 2400	13	Data connection at 2400 bauds
CONNECT 4800	14	Data connection at 4800 bauds
CONNECT 9600	15	Data connection at 9600 bauds
CONNECT 14400	16	Data connection at 14400 bauds
+CSSI: <code1>,<index>]	As verbose	Supplementary service notification during a call setup

1.10 Parameters storage

Parameters storage mode					
Command	AT&W (E2P)	Command (E2P)	AT+CSAS (SIM, E2P)	AT&F (SIM, E2P)	Default values

General commands					
+CMEE	X			X	0
+CRSL		X		X	6
+CSCS	X			X	"PCCP437"
+WPCS	X			X	"TRANSPARENT"

Call Control commands					
%D		X		X	0
ATSO	X			X	0 (no auto-answer)
+CICB	X			X	2 (speech)
+CSNS	X			X	0 (voice)
+ECHO		X		X	For WISMO 2 and 3 ,1,0,3,10,7 (Algo ID 1) ,3,30,8000,256 (Algo ID 3) For WISMO 5: ,3,30,8000,256 (Algo ID 3)
+SIDET	X			X	1,1
+SPEAKER	X			X	0 (Speaker 1 & Micro 1)
+VGR	X			X	64 (speaker 1) 32 (speaker 2)
+VGT	X			X	64 (mic 1 & ctrl 1) 0 (others)

Network Service commands					
+COPS	X	X		X	0,2
+CREG	X			X	0

Phonebook commands					
+CSVM		X		X	0
+WAIP	X			X	0
+WCOS		X			0

Parameters storage mode					
Command	AT&W (E2P)	Command (E2P)	AT+CSAS (SIM, E2P)	AT&F (SIM, E2P)	Default values

SMS commands					
+CNMI			X	X	0,1,0,0,0
+CMGF	X			X	1 (text)
+CMMS					0
+CSCA			X		SIM dependant (phase 2)
+CSDH	X			X	0
+CSMP			X	X	1,167,0,0
+CSMS		X			0
+WUSS		X		X	0

Supplementary Services commands					
+CCUG		X			0,0,0
+CCWA	X			X	0
+CLIP	X			X	0
+COLP	X			X	0
+CSSN	X			X	0,0
+CUSD		X		X	0

Data commands					
%C	X			X	0
\N	X			X	0
+CBST	X			X	0,0,1
+CR	X			X	0
+CRC	X			X	0
+CRLP	X			X	61,61,48,6,1
+DOPT	X			X	1,1
+DS	X			X	3,0,2048,20
+DR	X			X	0
+ILRR	X			X	0

Fax Class 2 commands					
+FBOR	X			X	0
+FCQ	X			X	0
+FCR	X			X	1
+FDCC,+FDIS	X			X	0,5,0,0,2,0,0,0,0
+FPHCTO	X			X	30

Parameters storage mode					
Command	AT&W (E2P)	Command (E2P)	AT+CSAS (SIM, E2P)	AT&F (SIM, E2P)	Default values
V24 - V25 commands					
&C	X				1
&D	X				2
&S	X				1
E	X				1
Q	X			X	0
V	X			X	1
+ICF	X				3,4
+IFC	X				2,2
+IPR	X				115200
+WMUX	X			X	0

Specific commands					
+ADC		X		X	0
+CMER	X			X	,0,,0
+CPHS		X		X	1,0 for VMI 2,0 for MBN 4,0 for DCI
+WBCM		X		X	0,0,4200,3300,100,5000,0
+WBHV		X		X	0,0 1,0 2,0
+WBM		X			0,0 for SPI bus 0,4 for I2C Soft bus
+WCCS		X			CUSTOM table is the same as PCCP437 to GSM table.
+WCDM		X		X	0,0
+WCDP		X		X	0
+WDR		X			0,1 for P51xx 2,1 (according to voice CODEC capabilities) for Q24xx and Q2501
+WIND		X		X	0
+WIOM		X			1023,0 (for Q2xxx and P3xxx) 0,0 (for Q31 and P51 modules)
+WRIM		X		X	0
+WSVG		X		X	0
+WVR		X			5,0
+WMFM		X			1: UART1 is activated, other ports are deactivated. 0: data flow is directed to UART1

Parameters storage mode					
Command	AT&W (E2P)	Command (E2P)	AT+CSAS (SIM, E2P)	AT&F (SIM, E2P)	Default values

SIM Toolkit commands					
+STSF		X			0,"1F6BFFFF1F",3,1

GPRS commands					
+CGAUTO	X			X	3
+CGCLASS		X			"B"
+CGDCONT		x			
+CGEREP	X			X	0
+CGREG	X			X	0
+CGSMS		X			1
+WGPRS		X			0,1 1,0 3,0 5,0 6,0

1.11 GSM sequences list

In accordance with **GSM 02.30**, the product supports the following GSM sequences, which can be used through the ATD and the +CKPD commands.

1.11.1 Security

Change PIN code	**04* <i>OLDPIN</i> * <i>NEWPIN</i> * <i>NEWPIN</i> #
Change PIN2 code	**042* <i>OLDPIN2</i> * <i>NEWPIN2</i> * <i>NEWPIN2</i> #
Unlock PIN code	**05* <i>PUK</i> * <i>NEWPIN</i> * <i>NEWPIN</i> #
Unlock PIN2 code	**052* <i>PUK2</i> * <i>NEWPIN2</i> * <i>NEWPIN2</i> #
Show the IMEI number	*#06#

1.11.2 Call forwarding

Please refer to SC and BS values below in this paragraph.

Activate <i>or</i>	*SC# *SC**BS#
Register and activate <i>or</i> <i>or</i> <i>or</i> <i>or</i> <i>or</i>	**SC* PhoneNumber# **SC* PhoneNumber*BS# **SC* PhoneNumber*[BS]*T# *SC* PhoneNumber# *SC* PhoneNumber*BS# *SC* PhoneNumber*[BS]*T#
Check status <i>or</i>	*#SC# *#SC**BS#
Deactivate <i>or</i>	#SC# #SC**BS#
Unregister and deactivate <i>or</i>	##SC# ##SC**BS#

Service Codes (SC)	
002	all call forwarding
004	all conditional call forwarding
21	call forwarding unconditional
61	call forwarding on no answer
62	call forwarding on not reachable
67	call busy

Network Service Codes (BS)	
<i>No code</i>	All tele and bearer services
10	All tele-services
11	Telephony
12	All data tele-services
13	Fax services
16	Short Message Services
17	Voice Group Call Service
18	Voice Broadcast Service
19	All tele-services except SMS
20	All bearer services
21	All asynchronous services
22	All synchronous services
24	All data circuit synchronous
25	All data circuit asynchronous

Note: The no-reply condition timer (T), is only used for SC = 002, 004 or 61.

6th July 2005

1.11.3 Call barring

Please refer to SC values below in this paragraph. BS values are the same as above, see §1.11.2.

Activate <i>or</i>	*SC* Password# *SC* Password*BS#
Check status <i>or</i>	*#SC# *#SC**BS#
Deactivate <i>or</i>	#SC* Password# #SC* Password*BS#
Change password for call barring <i>or</i> <i>or</i> <i>or</i>	**03*330*OLDPWD*NEWPWD*NEWPWD# **03**OLDPWD*NEWPWD*NEWPWD# *03*330*OLDPWD*NEWPWD*NEWPWD# *03**OLDPWD*NEWPWD*NEWPWD#

Service Codes (SC)	
33	call barring of outgoing call
330	all barring service (only for deactivation)
331	call barring of outgoing international call
332	call barring of outgoing international calls except to HPLMN
333	all outgoing barring service (only for deactivation)
35	call barring of incoming calls
351	call barring of incoming calls if roaming
353	all incoming barring service (only for deactivation)

1.11.4 Call waiting

BS values are the same as above, see §1.11.2.

Activate	*43*BS#
Check status	*#43*BS#
Deactivate	#43*BS#

1.11.5 Number presentation

CLIP check status	*#30#
CLIR check status	*#31#
Suppress CLIR for a voice call	*31#<i>PhoneNumber</i>
Invoke CLIR for a voice call	#31#<i>PhoneNumber</i>
COLP check status	*#76#

1.12 Operator names

This list is extracted from the SE13 (May 11th 2004 edition) and the NAPRD_10_2_6_2 documents. Note that Country Initials may vary for the same MCC (Mobile Country Code) without any impact. The following list is sorted by MCC and MNC.

Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
GRC	202	1	GR COSMOTE	C-OTE
GRC	202	5	vodafone GR	voda GR
GRC	202	9	GR Q-TELECOM	Q-TELCOM
GRC	202	10	TIM GR	TIM
NLD	204	4	vodafone NL	voda NL
NLD	204	8	NL KPN	NL KPN
NLD	204	12	NL Telfort	NL Tifrt
NLD	204	16	T-Mobile NL	TMO NL
NLD	204	20	Orange NL	Orange
BEL	206	1	BEL PROXIMUS	PROXI
BEL	206	10	B mobistar	mobi*
BEL	206	20	BASE	BASE
FRA	208	1	Orange F	Orange
FRA	208	3	Orange	Orange
FRA	208	10	F SFR	SFR
FRA	208	20	F - BOUYGUES TELECOM	BYTEL
AND	213	3	STA-MOBILAND	M-AND
ESP	214	1	vodafone ES	voda ES
ESP	214	3	E AMENA	AMENA
ESP	214	7	MOVISTAR	MSTAR
HUN	216	1	H PANNON GSM	PANNON
HUN	216	30	T-Mobile H	TMO H
HUN	216	70	vodafone HU	voda HU
BIH	218	3	BA-ERONET	ERONET
BIH	218	5	MOBI'S	MOBI'S
BIH	218	90	BH GSMBIH	GSMBIH
HRV	219	1	HTmobile HR	HTmobile
HRV	219	10	HR VIP	VIP
SCG	220	1	YU MOBTEL	MOBTEL
SCG	220	2	ProMonte	ProMonte
SCG	220	3	YUG 03	SCGTS
SCG	220	4	MONET	MONET
ITA	222	1	I TIM	TIM
ITA	222	10	vodafone IT	voda IT

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
ITA	222	88	I WIND	I WIND
ITA	222	99	3 ITA	3 ITA
ROU	226	1	RO CONNEX	CONNEX
ROU	226	3	RO Cosmorum	Cosmorum
ROU	226	10	RO ORANGE	ORANGE
CHE	228	1	Swisscom	SWISS
CHE	228	2	sunrise	sunrise
CHE	228	3	orange CH	ORANGE
CHE	228	7	In&Phone	In&Phone
CZE	230	1	T-Mobile CZ	TMO CZ
CZE	230	2	EUROTEL - CZ	ET - CZ
CZE	230	3	OSKAR	OSKAR
SVK	231	1	Orange SK	Orange
SVK	231	2	EUROTEL-SK	ET-SK
AUT	232	1	A1	A1
AUT	232	3	T-Mobile A	TMO A
AUT	232	5	one	one
AUT	232	7	A tele.ring	telering
AUT	232	10	3 AT	3 AT
GBR	234	10	O2 - UK	O2 -UK
GBR	234	15	vodafone UK	voda UK
GBR	234	20	3 UK	3 UK
GBR	234	30	T-Mobile UK	TMO UK
GBR	234	31	T-Mobile UK	TMO UK
GBR	234	32	T-Mobile UK	TMO UK
GBR	234	33	Orange	Orange
GBR	234	50	JT GSM	JT GSM
GBR	234	55	Cable & Wireless Guernsey	C&W
GBR	234	58	Manx Pronto	Pronto
DNK	238	1	TDC MOBIL	DK TDC
DNK	238	2	DK SONOFON	SONO
DNK	238	6	3 DK	3 DK
DNK	238	20	TELIA DK	TELIA
DNK	238	30	Orange	Orange
SWE	240	1	TELIA S	TELIA
SWE	240	2	3 SE	3 SE
SWE	240	4	SWEDEN	SWE
SWE	240	5	Sweden 3G	Sweden3G
SWE	240	7	S COMVIQ	IQ
SWE	240	8	vodafone SE	voda SE
SWE	240	10	SpringMobil SE	Spring
NOR	242	1	N Telenor	TELENOR

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
NOR	242	2	N NetCom GSM	N COM
FIN	244	3	FINNET	FINNET
FIN	244	5	FI elisa	elisa
FIN	244	12	FINNET	FINNET
FIN	244	14	FI AMT	FI AMT
FIN	244	91	FI SONERA	SONERA
LTU	246	1	OMNITEL LT	OMT
LTU	246	2	LT BITE GSM	BITE
LTU	246	3	TELE2	TELE2
LVA	247	1	LV LMT GSM	LMT GSM
LVA	247	2	LV TELE2	TELE2
EST	248	1	EE EMT GSM	EMT
EST	248	2	EE RLE	RLE
EST	248	3	TELE2	TELE2
RUS	250	1	MTS-RUS	MTS
RUS	250	2	MegaFon RUS	MegaFon
RUS	250	4	SIBCHALLENGE RUS	RUS_SCN
RUS	250	5	SCS RUS	SCS
RUS	250	7	RUS SMARTS	SMARTS
RUS	250	10	RUS DTC	DTC
RUS	250	11	ORENSOT	ORENSOT
RUS	250	12	RF FAR EAST	RF FEast
RUS	250	13	RUS Kuban-GSM	KUGSM
RUS	250	14	RUS Di-ex	Di-ex
RUS	250	15	RUS SMARTS	SMARTS
RUS	250	16	RUS16	NTC
RUS	250	17	RUS 17	ERMAK
RUS	250	19	RUS_BASHCELL	BASHCELL
RUS	250	20	RUS 20	MOTIV
RUS	250	28	Bee Line	Bee Line
RUS	250	39	Uraltel	RUS39
RUS	250	44	RUS North Caucasian GSM	NC-GSM
RUS	250	92	Primetefone RUS	Printel
RUS	250	99	Bee Line	Bee Line
UKR	255	1	UA UMC	UMC
UKR	255	2	UKR-WellCOM	WellCOM
UKR	255	3	UA-KYIVSTAR	UA-KS
UKR	255	5	UA-GT	GT
BLR	257	1	BY VELCOM	VELCOM
BLR	257	2	MTS BY	MTS
MDA	259	1	MD VOXTEL	VOXTEL
MDA	259	2	MD MOLDCELL	MDCELL

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
POL	260	1	Plus GSM	PLUS
POL	260	2	Era	Era
POL	260	3	PL IDEA	IDEA
DEU	262	1	T-Mobile D	TMO D
DEU	262	2	Vodafone.de	voda DE
DEU	262	3	E-Plus	E-Plus
DEU	262	7	o2 - de	o2 - de
GIB	266	1	GIBTEL GSM	GIBTEL
PRT	268	1	vodafone P	voda P
PRT	268	3	P OPTIMUS	OPTIM
PRT	268	6	P TMN	TMN
LUX	270	1	L LUXGSM	LUXGSM
LUX	270	77	L TANGO	TANGO
LUX	270	99	L-VOX.mobile	VOX.LU
IRL	272	1	vodafone IE	voda IE
IRL	272	2	02 - IRL	02 -IRL
IRL	272	3	IRL - METEOR	METEOR
ISL	274	1	IS SIMINN	SIMINN
ISL	274	2	Og Vodafone	Vodafone
ISL	274	3	Og Vodafone	Vodafone
ISL	274	4	Viking	Viking
ALB	276	1	AMC - AL	A M C
ALB	276	2	vodafone AL	voda AL
MLT	278	1	vodafone MT	voda MT
MLT	278	21	go mobile	gomobile
CYP	280	1	CY CYTAGSM	CY-GSM
CYP	280	10	areeba	areeba
GEO	282	1	GEO-GEOCELL	GCELL
GEO	282	2	MAGTI-GSM-GEO	MAGTI
ARM	283	1	RA-ARMGSM	ARMMO1
ARM	283	4	RA 04	RA 04
BGR	284	1	M-TEL GSM BG	M-TEL
BGR	284	5	BG GLOBUL	GLOBUL
TUR	286	1	TR TURKCELL	TCELL
TUR	286	2	TR TELSIM	TELSIM
TUR	286	3	AVEA	AVEA
TUR	286	4	TR AYCELL	AYCELL
FRO	288	1	Føroya Tele	FT-GSM
FRO	288	2	KALL	KALL
GRL	290	1	TELE Greenland	TELE GRL
SVN	293	40	SI vodafone	SI voda
SVN	293	41	MOBITEL	MOBITEL

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
SVN	293	70	SI VEGA 070	VEGA 070
MKD	294	1	MKD-MOBIMAK	MOBI-M
MKD	294	2	MKD COSMOFON	COSMOFON
LIE	295	1	FL GSM	FLGSM
LIE	295	2	Orange FL	OFL
LIE	295	5	FL1	FL1
LIE	295	77	LI TANGO	TANGO
CAN	302	370	Fido	Fido
CAN	302	720	Rogers AT&T Wireless	ROGERS
USA	310	20	US - Union Telephone	Union Tel
USA	310	26	T-Mobile	TMO
USA	310	30	Centennial Communications	CENT USA
USA	310	31	T-Mobile	TMO
USA	310	40	USATX	CONCHO
USA	310	46	USA SIMMETRY	SIMMETRY
USA	310	50	DIGICEL	JAM DC
USA	310	70	Highland	HIGHLAND
USA	310	80	USA 080	Corr
USA	310	90	Edge Wireless	Edge
USA	310	100	US PLATEAU	PLATEAU
USA	310	150	Cingular	Cingular
USA	310	160	T-Mobile	T-Mobile
USA	310	170	Cingular	Cingular
USA	310	180	West Central Wireless	West Central
USA	310	190	USA Duch Harbor	D-HARBOR
USA	310	200	T-Mobile	T-Mobile
USA	310	210	T-Mobile	T-Mobile
USA	310	220	T-Mobile	T-Mobile
USA	310	230	T-Mobile	T-Mobile
USA	310	240	T-Mobile	T-Mobile
USA	310	250	T-Mobile	T-Mobile
USA	310	260	T-Mobile	T-Mobile
USA	310	270	T-Mobile	T-Mobile
USA	310	310	T-Mobile	T-Mobile
USA	310	311	FARMERS	FARMERS
USA	310	320	USA - CellularOne	Cell
USA	310	340	USA 340	WestLink
USA	310	350	Carolina Phone	Carolina
USA	310	380	AT&T Wireless	AT&T
USA	310	390	Yorkville Telephone	Yorkville
USA	310	400	USA i CAN	iCAN_GSM
USA	310	410	Cingular	Cingular

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
USA	310	420	Cincinnati Bell Wireless	CBW
USA	310	450	Cell One of NE Colorado	NECCI
USA	310	460	USA ONELINK	ONELINK
USA	310	490	SunCom	SunCom
USA	310	500	PSC Wireless	PSC
USA	310	530	USA-WVA WIRELESS	WVW
USA	310	560	Cellular One DCS	Cell One
USA	310	580	T-Mobile	T-Mobile
USA	310	590	USA - Extended Area	ROAMING
USA	310	610	Epic Touch	EpicTouch
USA	310	630	USA AmeriLink PCS	AMERLINK
USA	310	640	USA AE Airadigm	ARDGMC
USA	310	660	T-Mobile	T-Mobile
USA	310	670	Wireless 2000 PCS	W 2000 PCS
USA	310	680	NPI Wireless	NPI
USA	310	690	USA - Immix Wireless	IMMIX
USA	310	740	TELEMETRIX	TLXT
USA	310	760	PTSI	PTSI
USA	310	770	Iowa Wireless USA	IWS
USA	310	780	AirLink PCS	AirLink
USA	310	790	USA Pinpoint	Pinpoint
USA	310	800	T-Mobile	T-Mobile
USA	310	870	US	PACE
USA	310	880	USAACSI	ACSIAC
USA	310	900	Texas cellular	TXCELL
USA	310	910	USAFCS	FCSI
USA	310	940	Digital Cellular	DCT
USA	310	950	USA XIT Cellular	XIT
USA	310	980	AT&T Wireless	AT&T
USA	311	0	Wilkes USA	WILKES
USA	311	1	Wilkes USA	WILKES
USA	311	5	Wilkes USA	WILKES
USA	311	30	Indigo	Indigo
USA	311	70	USAEC	EASTER
USA	311	80	Pine Cellular	PINECell
USA	311	90	USASXLP	SXLP
USA	311	110	High Plains	HPW
USA	311	130	Cell One Amarillo	C1AMARIL
USA	311	140	Sprocket	Sprocket
USA	311	160	EMW	EMW
USA	311	170	PetroCom	PetroCom
USA	311	180	Cingular	Cingular

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
USA	311	190	USAC1ECI	C1ECI
USA	311	210	FARMERS	FARMERS
USA	311	250	USA i CAN	ICAN_GSM
USA	332	11	Blue Sky	Blue Sky
MEX	334	3	MX MOVISTAR GSM	MOVISTAR
MEX	334	20	Mx Telcel GSM	TELCEL
JAM	338	5	JM DIGICEL	DIGICEL
JAM	338	180	C&W	C&W
FRA	340	1	F-Orange	Orange
GLP	340	8	AMIGO	AMIGO
FRA	340	20	BOUYGTEL-C	BOUYG-C
BRB	342	50	JM Digicel	Digicel
BRB	342	600	C&W	C&W
BRB	342	810	AT&T Wireless	AT&T
ATG	344	30	APUA-PCS ANTIGUA	APUA-PCS
ATG	344	920	C&W	C&W
ATG	344	930	AT&T Wireless	AT&T
CYM	346	140	C&W	C&W
VGB	348	570	CCT Boatphone	CCTBVI
BMU	350	2	BTC MOBILITY LTD.	MOBILITY
BMU	350	10	AT&T Wireless	AT&T
GRD	352	30	AT&T Wireless	AT&T
GRD	352	50	Digicel	DIGICEL
GND	352	110	C&W	C&W
GRD	352	130	TWTCGN	TWTCGN
MS	354	860	C&W	C&W
KNA	356	110	C&W	C&W
LCA	358	30	AT&T Wireless	AT&T
SLU	358	110	C&W	C&W
VCT	360	10	AT&T Wireless	AT&T
VCT	360	110	C&W	C&W
ANT	362	51	Telcell GSM	Telcell
ANT	362	69	ANT CURACAO TELECOM GSM	CT GSM
ANT	362	91	UTS Wireless Curacao N.V.	UTS
ABW	363	1	SETAR GSM	SETARGSM
BHS	364	39	BaTelCell	BaTelCel
AIA	365	840	C&W	C&W
DMA	366	20	AT&T Wireless	AT&T
DMA	366	110	C&W	C&W
CUB	368	1	CU/C_COM	C_COM
DOM	370	1	ORANGE	ORANGE
TTO	374	12	TSTT	TSTT

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
TCA	376	350	C&W	C&W
AZE	400	1	AZE - AZERCELL GSM	ACELL
AZE	400	2	BAKCELL GSM 2000	BKCELL
KAZ	401	1	KZ K-MOBILE	K-MOBILE
KAZ	401	2	KZ KCELL	KCELL
BTN	402	11	BT B-Mobile	B-Mobile
IND	404	1	Hutch	Hutch
IND	404	2	AirTel	AirTel
IND	404	3	AirTel	AirTel
IND	404	4	IDEA	IDEA
IND	404	5	Hutch	Hutch
IND	404	7	IDEA	IDEA
IND	404	10	AirTel	AirTel
IND	404	11	Hutch	Hutch
IND	404	12	IDEA	IDEA
IND	404	13	Hutch	Hutch
IND	404	14	INA SPICE	SPICE
IND	404	15	Hutch	Hutch
IND	404	19	IDEA	IDEA
IND	404	20	Orange	Orange
IND	404	21	BPL MOBILE	BPL MOBILE
IND	404	22	IDEA	IDEA
IND	404	24	IDEA	IDEA
IND	404	27	BPL MOBILE	BPL MOBILE
IND	404	30	Hutch	Hutch
IND	404	31	AirTel	AirTel
IND	404	34	CellOne	CellOne
IND	404	38	CellOne	CellOne
IND	404	40	IND AIRTEL	AIRTEL
IND	404	41	INA RPG	RPG
IND	404	42	INA AIRCEL	AIRCEL
IND	404	43	BPL MOBILE	BPL MOB
IND	404	44	INA SPICE	SPICE
IND	404	45	AirTel	AirTel
IND	404	46	BPL MOBILE	BPL MOB
IND	404	49	AirTel	AirTel
IND	404	51	CellOne	CellOne
IND	404	53	CellOne	CellOne
IND	404	54	CellOne	CellOne
IND	404	55	CellOne	CellOne
IND	404	56	IDEA	IDEA
IND	404	57	CellOne	CellOne

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
IND	404	58	CellOne	CellOne
IND	404	59	CellOne	CellOne
IND	404	60	Hutch	Hutch
IND	404	62	CellOne	CellOne
IND	404	64	CellOne	CellOne
IND	404	66	CellOne	CellOne
IND	404	68	IN-DOLPHIN	DOLPHIN
IND	404	69	IN-DOLPHIN	DOLPHIN
IND	404	70	INDH1	Oasis
IND	404	71	CellOne	CellOne
IND	404	72	CellOne	CellOne
IND	404	73	CellOne	CellOne
IND	404	74	CellOne	CellOne
IND	404	75	CellOne	CellOne
IND	404	76	CellOne	CellOne
IND	404	77	CellOne	CellOne
IND	404	78	IDEA	IDEA
IND	404	79	CellOne	CellOne
IND	404	80	CellOne	CellOne
IND	404	81	CellOne	CellOne
IND	404	84	Hutch	Hutch
IND	404	86	Hutch	Hutch
IND	404	88	Hutch	Hutch
IND	404	90	AirTel	AirTel
IND	404	92	AirTel	AirTel
IND	404	93	AirTel	AirTel
IND	404	94	AirTel	AirTel
IND	404	95	AirTel	AirTel
IND	404	96	AirTel	AirTel
IND	404	97	AirTel	AirTel
IND	404	98	AirTel	AirTel
IND	405	51	IND Airtel	AIRTEL
IND	405	52	IND Airtel	AIRTEL
IND	405	53	IND Airtel	AIRTEL
IND	405	54	IND Airtel	AIRTEL
IND	405	55	IND Airtel	AIRTEL
IND	405	66	Hutch	Hutch
PAK	410	1	PK MK	PMCL
PAK	410	3	PK-UFONE	UFONE
PAK	410	4	PAK - PL	PAKTEL
AFG	412	1	AF AWCC	AWCC
AFG	412	20	ROSHAN	ROSHAN

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
SRI	413	1	Mobitel	MOBITEL
SRI	413	2	SRI DIALOG	DIALOG
SRI	413	3	SRI - CELLTEL	CELLTEL
MMR	414	1	MM 900	MPTGSM
LBN	415	1	RL Cellis	CLLIS
LBN	415	3	RL MTC Lebannon	MTC LIBAN
JOR	416	1	Fastlink	FSTLNK
JOR	416	77	JO MobCom	MobCom
SYR	417	1	SYRIATEL	SYRIATEL
SYR	417	2	areeba	areeba
SYR	417	9	SYR MOBILE SYR	MOBILE
IRQ	418	0	ASIACELL	ASIACELL
IRQ	418	2	SanaTel	SanaTel
IRQ	418	5	ASIACELL	ASIACELL
IRQ	418	8	SanaTel	SanaTel
IRQ	418	20	Atheer Iraq	ATHEER
IRQ	418	30	IRAQNA	IRAQNA
KWT	419	2	KT MTCNet	MTC
KWT	419	3	KT WATANIYA	WATANIYA
KSA	420	1	ALJAWAL	KSA
YEM	421	1	SabaFon	SABAFON
YEM	421	2	SPACETEL	SPACETEL
OMN	422	2	OMAN MOBILE	OMAN
UAE	424	2	UAE ETISALAT	ETSLT
ISR	425	1	IL ORANGE	ORANGE
ISR	425	2	IL Cellcom	Cellcom
ISR	425	5	JAWWAL-PALESTINE	JAWWAL
BHR	426	1	BATELCO	BATELCO
BHR	426	2	MTC VODAFONE BH	MTC-VFBH
QAT	427	1	QAT QATARNET	Q-NET
MNG	428	99	MN MobiCom	MobiCom
IRN	432	11	IR-TCI	432 11
IRN	432	14	IR KISH	KIFZO
IRN	432	19	IR MTCE	MTCE
UZB	434	2	UZMACOM	UZMGSM
UZB	434	4	UZB DAEWOO-GSM	DW-GSM
UZB	434	5	UZB CSOCOM GSM	COSCOM
UZB	434	7	UZB-UZD	UZDGSM
TJK	436	1	Somoncom	Somoncom
TJK	436	2	Indigo-T	INDIGO
TJK	436	3	TJK MLT	MLT
TJK	436	4	Babilon-M	Babilon

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
TJK	436	5	TJT - Tajik Tel	TajikTel
KGZ	437	1	BITEL KGZ	BITEL
JPN	440	10	JP DoCoMo	DoCoMo
JPN	440	20	Vodafone JP	Voda JP
KOR	450	2	KR KTF	KTF
KOR	450	8	KR KTF	KTF
VNM	452	1	VN MOBIFONE	VMS
VNM	452	2	VN VINAPHONE	GPC
VNM	452	4	VNM and VIETTEL	VIETTEL
HKG	454	0	CSL	CSL
HKG	454	3	3 HK	3
HKG	454	4	3 - DUALBAND	3
HKG	454	6	SmarTone	SmarTone
HKG	454	10	HK NEW WORLD	NWPCS
HKG	454	12	HK PEOPLES	PEOPLES
HKG	454	15	SmarTone 3G	SMC 3G
HKG	454	16	HK SUNDAY	SUNDAY
HKG	454	18	HK CSL	CSL
MAC	455	0	SmarTone	SmarTone
MAC	455	1	MAC-CTMGSM	CTMGSM
MAC	455	3	Hutchison MAC	HT Macau
KHM	456	1	MOBITEL - KHM	MT-KHM
KHM	456	2	KHM>Hello GSM	KHM-SM
KHM	456	18	CAMBODIA SHINAWATRA	CAMSHIN
LAO	457	1	LAO GSM	LAO GSM
LAO	457	2	ETL MOBILE NETWORK	ETLMNW
LAO	457	3	45703	LATMOBIL
LAO	457	8	TANGO LAO	TANGO
CHN	460	0	CHINA MOBILE	CMCC
CHN	460	1	CHN-CUGSM	CU-GSM
TWN	466	1	Far EasTone	FET
TWN	466	6	TWN Tuntex GSM 1800	TUNTEX
TWN	466	68	ACeS	ACeS
TWN	466	88	KGT-Online	KGT
TWN	466	89	T3G	T3G
TWN	466	92	Chunghwa	CHT
TWN	466	93	TWN MOBITAI	TW MOB
TWN	466	97	TWN GSM 1800	TCC
TWN	466	99	TransAsia	TransAsi
PRK	467	3	KP SUN	SUNNET
BGD	470	1	BGD-GP	GP
BGD	470	2	BGD AKTEL	AKTEL

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
BGD	470	3	BD ShebaWorld	SHEBA
MDV	472	1	MV DHIMOBILE	D-MOBILE
MYS	502	12	MY MAXIS	MY MAXIS
MYS	502	16	DiGi	DiGi
MYS	502	19	MY CELCOM	CELCOM
AUS	505	1	Telstra Mobile	Telstra
AUS	505	2	YES OPTUS	Optus
AUS	505	3	vodafone AU	voda AU
AUS	505	6	3 AUS	3 AUS
IDN	510	0	ACeS	ACeS
IDN	510	1	IND INDOSAT	INDOSAT
IDN	510	8	LIPPO TEL	LIPPOTEL
IDN	510	10	IND TELKOMSEL	T-SEL
IDN	510	11	IND - Excelcom	proXL
IDN	510	21	IND INDOSAT	INDOSAT
TLS	514	2	TLS-TT	TT
PHL	515	1	ISLACOM	ISLACOM
PHL	515	2	Globe Telecom-PH	GLOBE
PHL	515	3	SMART	SMART
PHL	515	5	PH Sun Cellular	SUN
PHL	515	11	ACeS	ACeS
THA	520	1	TH GSM	TH GSM
THA	520	15	TH ACT 1900	ACT-1900
THA	520	18	TH-DTAC	DTAC
THA	520	20	ACeS	ACeS
THA	520	23	TH GSM 1800	GSM 1800
THA	520	99	Orange Th	Orange
SGP	525	1	SingTel	SingTel
SGP	525	2	SingTel-G18	SingTel
SGP	525	3	SGP-M1-3GSM	M1-3GSM
SGP	525	5	STARHUB-SGP	STARHUB
BRN	528	11	BRU - DSTCom	DSTCom
NZL	530	1	vodafone NZ	voda NZ
PNG	537	1	PNGBMobile	BMobile
TON	539	1	U-CALL	U-CALL
VUT	541	1	VUT SMILE	SMILE
FJI	542	1	FJ VODAFONE	VODAFONE
AS	544	11	Blue Sky	Blue Sky
KIR	545	9	KL-Frigate	KI-FRIG
NCL	546	1	NCL MOBILIS	MOBNCL
FRA	547	20	F-VINI	VINI
COK	548	1	CK KOKANET	KOKANET

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
FSM	550	1	FSM Telecom	FSMTC
EGY	602	1	EGY MobiNiL	MobiNiL
EGY	602	2	vodafone EG	voda EG
DZA	603	1	ALGERIAN MOBILE NETWORK	AMN
DZA	603	2	Djezzy	Djezzy
DZA	603	3	DZA-WTA	WTA
MOR	604	0	MOR MEDITEL	MEDITEL
MOR	604	1	MOR IAM	IAM
TUN	605	2	TUNISIE TELECOM	TUNTEL
TUN	605	3	TUNISIANA	TUNSIANA
GMB	607	1	GAMCEL	GAMCEL
GMB	607	2	AFRICELL	AFRICELL
SEN	608	1	SN ALIZE	ALIZE
SEN	608	2	SN-SENTEL SG	SENTEL
MRT	609	1	MR MATTEL	MATTEL
MRT	609	10	MAURITEL	MAURITEL
MLI	610	1	MALITEL ML	MALITEL
MLI	610	2	IKATEL ML	IKATEL
GIN	611	2	GN LAGUI	LAGUI
CIV	612	3	Orange CI	Orange
CIV	612	5	TELECEL-CI	TELCEL
BFA	613	2	BF Celtel	celtel
NER	614	1	SAHELCOM	SAHELCOM
NER	614	2	NE CELTEL	NECELTEL
NER	614	3	NE TELECEL	TELECEL
TGO	615	1	TG-TOGO CELL	TGCELL
BEN	616	2	TELECEL BENIN	TLCL-BEN
BEN	616	3	BJ BENINCELL	BENCELL
BEN	616	4	BELL BENIN COMMUNICATION	BBCOM
MRU	617	1	CELLPLUS-MRU	CELL +
MRU	617	10	EMTEL-MRU	EMTEL
LBR	618	1	LBR Lonestar Cell	LoneStar
LBR	618	2	LIBERCELL	LIBERCEL
SLE	619	1	CELTEL SL	CELTEL
SLE	619	2	MILLICOM SL	MILLICOM
GHA	620	1	GH SPACEFON	SPACE
GHA	620	2	GH ONEtouch	ONEtouch
GHA	620	3	GH-MOBITEL	mobitel
NGA	621	20	ECONET NG	ECONET
NGA	621	30	MTN - NG	MTN-NG
NGA	621	40	NG Mtel	Mtel
NGA	621	50	Glo NG	glo

Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
TCD	622	1	CELTEL TCD	CELTEL
TCD	622	2	TD LIBERTIS	LIBERTIS
CMR	624	1	MTN CAM	62401
CMR	624	2	Orange CAM	Orange
CPV	625	1	CPV MOVEL	CMOVEL
STP	626	1	STP CSTmovel	CSTmovel
GNQ	627	1	GNQ01	GETESA
GAB	628	1	628 01/LIBERTIS	LIBERTIS
GAB	628	2	GAB TELECEL	TELECEL
GAB	628	3	CELTEL GA	CELTEL
COG	629	1	CELTEL	CELTEL RC
COG	629	10	COG LIBERTIS	LIBERTIS
COD	630	1	VODACOM CD	VODACOM
COD	630	2	CELTEL DRC	CELTEL
COD	630	4	CELLCO GSM	CELLCO
COD	630	89	CD OASIS	OASIS
AGO	631	2	UNITEL	UNITEL
SEZ	633	1	SEYCEL	633-01
SEZ	633	10	SEZ AIRTEL	AIRTEL
SUD	634	1	MobiTel SDN	MobiTel
RWA	635	10	R-CELL	RCELL
ETH	636	1	ETH-MTN	ET-MTN
SOM	637	1	SOMTELESOM	TELESOM
SO	637	4	SOMAFONE	SOMAFONE
SOM	637	82	Telsom Mobile	telsom
DJI	638	1	DJ EVATIS	EVATIS
KEN	639	2	Safaricom	SAF-COM
KEN	639	3	YES!	YES!
TZA	640	2	MOBITEL - TZ	MOBITEL
TZA	640	3	ZANTEL-TZ	ZANTEL
TZA	640	4	VodaCom	VodaCom
TZA	640	5	celtel	celtel
UGA	641	1	UG CelTel	CELTEL
UGA	641	10	MTN-UGANDA	MTN-UG
UGA	641	11	UTL - Mango	UTL Mango
BDI	642	1	Spacetel BI	SPACETEL
BDI	642	2	BUSAFA	SAFARIS
MOZ	643	1	MOZ - mCel	mCel
MOZ	643	4	VodaCom-MZ	VodaCom
ZMB	645	1	ZM CELTEL	CELTEL
ZMB	645	2	TELECEL ZM	TELECEL
MDG	646	1	MG Madacom	Madacom

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
MDG	646	2	MG ANTARIS	ANTARIS
REU	647	0	Orange re	Orange
REU	647	2	F-OMT	OMT
FRA	647	10	SFR REUNION	SFR RU
ZWE	648	1	ZW NET*ONE	NETONE
ZWE	648	3	TELECEL ZW	TELECEL
ZWE	648	4	ZW ECONET	ECONET
NAM	649	1	MTC NAMIBIA	MTCNAM
MWI	650	1	MW CP 900	CP 900
MWI	650	10	CELTEL MW	CELTEL
LSO	651	1	VCL COMMS	VCLCOM
LSO	651	2	LS-ECONET-EZI-CEL	EZI-CEL
BWA	652	1	BW MASCOM	MASCOM
BWA	652	2	Orange	Orange
SWZ	653	10	Swazi-MTN	SwaziMTN
COM	654	1	HURI	HURI
ZAF	655	1	VodaCom-SA	VODA
ZAF	655	7	Cell C	Cell C
ZAF	655	10	MTN-SA	MTN
BLZ	702	67	BTL	BTL
BLZ	702	68	INTELCO	INTELCO
GTM	704	2	Comcel_GSM	COMCEL
GTM	704	3	MoviStar	MoviStar
SLV	706	1	ESV PERSONAL	PERSONAL
SLV	706	2	Digicel	DIGICEL
SLV	706	3	TELEMOVIL	TM
SLV	706	4	MoviStar	MoviStar
ESV	706	10	ESV PERSONAL	PERSONAL
HND	708	1	MEGATEL	HNDMGT
HND	708	2	CELTElhND	CELTEL
NIC	710	21	ENITEL	ENITEL
NIC	710	73	SERCOM	SERCOM
CRI	712	1	I.C.E.	I.C.E.
PAN	714	1	PANCW	PANCW
PE	716	10	TIM PERU	TIM
ARG	722	7	UNIFON	UNIFON
ARG	722	34	PERSONAL	AR TP
ARG	722	35	PORT-HABLE	P-HABLE
ARG	722	310	ARG CTI Movil	CTIMovil
BRA	724	2	TIM BRASIL	TIM
BRA	724	3	TIM BRASIL	TIM
BRA	724	4	TIM BRASIL	TIM

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Country Initials	MCC	MNC	Preferred Presentation of Country Initials and Mobile Network Name	Abbreviated Mobile Network Name
BRA	724	5	Claro	Claro
BRA	724	15	BRA SCTL	SCTL
BRA	724	16	BRA BrTCelular	BrTCel
BRA	724	31	Oi	Oi
BRA	724	32	CTBC CEL	CTBC
BRA	724	33	CTBC CEL	CTBC
BRA	724	34	CTBC CEL	CTBC
CHL	730	1	CL ENTEL PCS	ENTEL
CHL	730	2	TELEFONICA	TMOVIL
CHL	730	10	CL ENTEL PCS	ENTEL
COL	732	101	COLOMBIA - COMCEL S.A	COMCEL
COL	732	111	COL MOVIL	COL MOVIL
COL	732	103	OLA	OLA
VEN	734	1	VZ INFO	INFONT
VEN	734	2	DIGITEL TIM	DIGITEL
BOL	736	1	NUEVATEL	VIVA
BOL	736	2	EMOVIL	BOMOV
GUY	738	1	GUY TW	TWTGUY
GUY	738	2	GUY CLNK PLS	CLNK PLS
ECU	740	1	PORTA GSM	PORTAGSM
PRY	744	1	HOLA PARAGUAY S.A.	HPGYSA
PRY	744	2	PRY Porthable	Porth
PRY	744	4	Telecel GSM	Telecel
PRY	744	5	PY Personal	Personal
SUR	746	2	SR.TELESUR.GSM	TeleG
URY	748	10	URyamWU	AMWU
TKM	795	2	Altyn Asyr	TM Cell
	901	5	Thuraya	Thuraya
NOR	901	12	MCP Maritime Com	MCP

1.13 CPHS Information field

CPHS Information		
Data field	Bit Field	Meaning
0	None	All information
1	0	CSP service activated and allocated
2	1	SST service activated and allocated
3	2	Mailbox Number service activated and allocated
4	3	Operator Name Shortform service activated and allocated
5	4	Information Numbers service activated and allocated
6	5	RFU
7	6	RFU
8	7	RFU
9	8	Voice Message Waiting indicator for Line 1
10	9	Voice Message Waiting indicator for Line 2
11	10	Data Message Waiting indicator
12	11	Fax Message Waiting indicator
13	12	Call Forward Activated indicator for Line 1
14	13	Call Forward Activated indicator for Line 2
15	14	Call Forward Activated indicator for Data
16	15	Call Forward Activated indicator for Fax
17	16	Reserved
18	17	Reserved
19	18	Reserved
20	19	Reserved
21	20	Line 1 Mailbox Number available
22	21	Line 2 Mailbox Number available
23	22	Data Mailbox Number available
24	23	Fax Mailbox Number available
25	24	EF Mn Updateable

1.14 CSP constants

1.14.1 Service Group: Call Offering

Service	External value
Call Forwarding Unconditional	1
Call Forwarding On User Busy	2
Call Forwarding on No Reply	3
Call Forwarding On User Not Reachable	4
Call Transfer	5

1.14.2 Service Group: Call Restriction

Service	External value
Barring of All Outgoing Calls	9
Barring of Outgoing International Calls	10
Barring of Outgoing International Calls except those directed to the Home PLMN country	11
Barring of All Incoming Calls when Roaming Outside the Home PLMN country	12
BIC roam	13

1.14.3 Service Group: Other Supplementary Services

Service	External value
Multi-Party Service	17
Closed User Group	18
Advice Of Charge	19
Preferential CUG	20
CUG Outgoing Access	21

1.14.4 Service Group: Group Completion

Service	External value
Call Hold	25
Call Waiting	26
Completion of Call to Busy Subscriber	27
Restriction of the menus allowing use of user to user signaling	28

1.14.5 Service Group: Teleservices

Service	External value
Short Message - Mobile Terminated	33
Short Message - Mobile Originated	34
Short Message - Cell Broadcast	35
Restricts menu options for the ability to set reply path active on outgoing Short Messages	36
SMS Delivery Confirmation	37
Restriction of menus for SMS Protocol ID options	38
Validity Period, restriction of menus for SMS Validity period options	39

1.14.6 Service Group: CPHS Teleservices

Service	External value
Alternate Line Service	41

1.14.7 Service Group: CPHS Features

Service	External value
Reserved: SST in phase 1 CPHS	49

1.14.8 Service Group: Number Identification

Service	External value
Calling Line Identification Presentation	57
Connected Line Identification Restriction	59
Connected Line Identification Presentation	60
Malicious Call Indicator	61
CLI per call mode - default block CLI - menu to send CLI	63
CLI per call mode - default send CLI - menu to block CLI	64

1.14.9 Service Group: Phase 2+ Services

Service	External value
Menus concerned with GPRS functionality	65
Menus concerned with High Speed Circuit Switched Data functionality	66
ASCI Voice Group call menus	67
ASCI Voice Broadcast service menus	68
Multi Subscriber profile menus	69
Multiple band: Restriction of menus allowing user to select a particular GSM 900/ 1800 or 1900 band	70

1.14.10 Service Group: Value Added Services

Service	External value
Restriction of menu options for manual PLMN selection	73
Restriction of menu options for Voice Mail or other similar menus	74
Restriction of menu options for the ability to send Short messages with type Paging	75
Restriction of menu options for the ability to send Short messages with type Email	76
Restriction of menu options for Fax calls	77
Restriction of menu options for Data calls	78
Restriction of menus allowing the user to change language	80

1.14.11 Service Group: Information Numbers

Service	External value
The ME shall only present Information numbers to the user if this field is set to FF	81

Note: External values not used in these tables are reserved for further use.

2 Examples

This chapter gives illustrative examples of the general AT commands used for a communication. The presentation of commands and responses is as close as possible to what a user can see on its test monitor. Blank lines have been intentionally removed. The characters on the left margin are DTE generated. Middle column characters are modem generated.

2.1 Examples with the PIN required

2.1.1 when the ME has to be powered ON.

```
AT+CMEE=1           Enable the report mobile equipment errors
    OK
AT+CREG=1           Report registration
    OK
AT+CPAS             Query ME Status
    +CPAS: 5        (ME is asleep)
    OK
AT+CFUN=1           Set ME to full functionality
    OK
AT+COPS=0           Ask for automatic operator selection and registration.
    +CME ERROR: 11 SIM PIN required.
AT+CPIN=1234        User entered a wrong PIN
    +CME ERROR: 16 Incorrect password.
AT+CPIN=0000
    OK              PIN Ok
AT+COPS=0           Ask for automatic operator selection and registration.
    OK
    +CREG:1         Registered on the network
AT+COPS=3,0         Select the long name alphanumeric format.
    OK
AT+COPS?            Get the operator name
    +COPS: 0,0,"I OMNITEL"
    OK
```

6th July 2005**2.1.2 When the ME has already been powered on.**

AT+CMEE=1 *Enable the report mobile equipment errors*
OK
AT+CPAS *Get the ME Status*
+CPAS: 0 *ME is ready to receive commands*
OK
AT+CPIN? *Is ME requiring a password?*
+CPIN: SIM PIN *Yes, SIM PIN required*
AT+CPIN=0000
OK *PIN Ok*

2.2 Examples where a voice call is originated.**2.2.1 When the ME is powered on and the SIM PIN has been entered.**

AT+CMEE=1 *Enable the reporting of mobile equipment errors*
OK
AT+WIND=63 *Ask to display the general indications.*
OK
AT+CPIN? *Is ME requiring a password?*
+CPIN: READY *product is ready*
ATD0607103543; *Make a voice call*
+WIND: 5,1 *Indication of call*
+WIND: 2 *Remote party is ringing.*
OK *Call setup was successful*
Conversation...
ATH *Release the call*
OK

2.2.2 When a voice call is attempted from a phonebook:

ATD>"John Pamborn";
+CME ERROR: 22 *The "John Pamborn" entry is not found.*
ATD>"Joel Guerry";
+WIND: 5,1 *Indication of outgoing call.*
+WIND: 2 *Remote party is ringing.*
OK *Call setup was successful*
Conversation...
ATH *Release the call*
OK

2.3 Example with incoming calls

2.3.1 When the ME is powered on and the SIM PIN has been entered.

AT+CMEE=1 *Enable the report mobile equipment errors*
OK

AT+WIND=63 *Ask to display the general indications.*
OK

AT+CLIP=1 *Enable the calling line identification presentation.*
OK

AT+CRC=1 *Enable extended format of incoming indication.*
OK

AT+CNUM *Query own number (voice number) or MSISDN.*
+CNUM: "Speech", "+33608971019", 145
OK

Call this number from another equipment.

+WIND: 5, 1 *Indication of call (Ring)*
+CRING: VOICE *Type of call is VOICE.*
+CLIP: "+33607103543", 145,, "John Panborn" *Identification of the remote party.*
+CRING: VOICE

ATA *Answer the call.*
OK

...Conversation...

NO CARRIER *The call has been released by the remote party.*
+WIND: 6,1 *Indication of call release.*

2.4 Example of a call forwarding

2.4.1 When the ME is powered on and the SIM PIN has been entered.

AT+CMEE=1 *Enable the report mobile equipment errors*
OK

AT+CCFC=1,3,"0607492638" *Register to a call forwarding when ME is busy.*
OK

AT+CCFC=2,3,"0149293031",129 *Register to a call forwarding when it does answer.*
+CME ERROR: 30 *No network service*

AT+CCFC=1,2 *Interrogate*
+CCFC: 1,1,"+33607492638",145 *Call forwarding active for a voice call.*

AT+CCFC=1,4 *Delete call forwarding ME busy*
OK

2.5 Example of a multiparty call

When the ME is powered on and the SIM PIN has been entered.

AT+CMEE=1 *Enable the report mobile equipment errors*
OK
AT+WIND=63 *Ask to display the general indications.*
OK
AT+CCWA=1,1 *Enable call waiting.*
OK
ATD>"John Panborn";
+WIND: 5,1 *Indication of call.*
+WIND: 2 *Remote party is ringing.*
OK *Call setup was successful*
...Conversation (call1)...
+WIND: 5,2 *Indication of another call.*
+CCWA: "+33595984834",145,"Dolores Claiborne" *Another call is waiting.*
AT+CHLD=2 *Put first call on hold and answer the second one.*
OK
...Conversation (call2)...
AT+CHLD=3 *Every call is part of a multiparty conversation.*
OK
AT+CHLD=11 *Release the first call (with John Panborn) and recover the second call (with Dolores Claiborne)*
...Conversation (call2)...
ATH *Release the second call.*

2.6 Examples about phonebooks

For each example illustrated in this section: at the beginning the ME is powered on and the SIM PIN has been entered.

2.6.1 Example 1: The whole phonebook of the ME is read

Command	Response
AT+CPBS=? <i>Note: Query supported phonebook memories</i>	+CPBS: ("SM","FD","ON") <i>Note: ADN, FDN, and MSISDN phonebooks supported.</i>
AT+CPBS="SM" <i>Note: Select ADN phonebook.</i>	OK
AT+CPBR=? <i>Note: Read the index range and the length of the elements.</i>	+CPBR: (1-80),20,14 OK <i>Note: 80 locations (from 1 to 80), max length of 20 for the phone number, 14 characters max for the text.</i>
AT+CPBR=1,80 <i>Note: Read all entries (only the set ones are returned).</i>	+CPBR: 1,"0346572834",129,"Dolores Claiborne" +CPBR: 2,"1284374523",129,"Thad Beaumont" +CPBR: 3, "1243657845",129,"John Panborn" OK

2.6.2 Example 2: Erase or Write a phonebook entry

Command	Response
AT+CPBW=? <i>Note: Get the phonebook type.</i>	+CPBW: (1-80),20,(129,145),14 <i>Note: 80 locations, max length of 20 for the phone number, TON/NPI of 129 or 145 and 14 characters max for the text.</i>
AT+CPBW=3 <i>Note: Erase location 3</i>	OK
AT+CPBW=3,"4356729012",129,"Carry" <i>Note: Write at location 3.</i>	OK
AT+CPBR=1,80 <i>Note: Read all entries (only the ones set are returned).</i>	+CPBR:1,"0346572834",129,"Dolores Claiborne" +CPBR:2,"1284374523",129,"Thad Beaumont" +CPBR: 3,"4356729012",129,"Carry" OK

2.6.3 Example 3: Find phonebook entries

Command	Response
AT+CPBF=? <i>Note: Get the phonebook type.</i>	+CPBF: 20,14 <i>Note: Max length of 20 for the phone number, 10 characters for the text.</i>
AT+CPBF="D" <i>Note: Read entries starting with "D".</i>	+CPBF: 1,"0346572834",129,"Dolores Clairborne" OK
AT+CPBF="W" <i>Note: Read entries with "W".</i>	+CME ERROR: 22 <i>Note: Entry not found.</i>

2.6.4 Example 4: Phonebook and custom character set

The Custom To Extended GSM conversion table and the Extended GSM To Custom conversion table can be used to display the extended GSM characters:

| ^ € { } [] ~ \

To manage one of these extended characters, the character 0x1B must be set in the right place (in the position corresponding to the value of the ASCII code) in the Custom to GSM conversion table (instead of 0x20 (space ASCII code)).

For example, the ASCII code of \ (backslash) is 0x5C, the character 0x1B must be set at the position 0x5C of the Custom to GSM conversion table. The range of character 0x5C in this table is 92. So to update the table the command AT+WCCS=1,0,92 will be used.

In the other way, write the space ASCII code 0x20 in the right place in the Custom to GSM conversion table if an extended character is not needed.

Command	Response
AT+CPBS? <i>Note: Query the current phonebook</i>	+CPBS: 3,80 OK <i>Note: ADN selected, 3 entries stored</i>
AT+WPCS? <i>Note: Query the current phonebook char set</i>	+WPCS: "TRANSPARENT" OK <i>Note: Transparent mode selected</i>
AT+CPBR=1	+CPBR: 1,"0146290800",129,"S bastien" OK <i>Note: GSM character "é" is not displayed</i>

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Command	Response
AT+WCCS=1,0,0,255 >2020202020202020200A20200D2020202020 20205F2020202020202020202020202021222302252 62728292A2B2C2D2E2F30313233343536373839 3A3B3C3D3E3F004142434445464748494A4B4C 4D4E4F505152535455565758595A20202020112 06162636465666768696A6B6C6D6E6F70717273 7475767778797A202020202020202020202020 0202020202020202027272020202020202020 2020202020204020012403205F20202020202D2 020202020202720202020202020202020604141 41415B0E1C09451F454549494949445D4F4F4F4 F5C200B5555555E59201E7F6161617B0F1D6304 05656507696969207D086F6F6F7C200C0675757 E792079	OK
AT+WCCS=1,1,0,127 >40A324A5E8E9F9ECF2C70AD8F80DC5E5205F2 020202020202020202020C6E6DFC920212223A425 262728292A2B2C2D2E2F3031323334353637383 93A3B3C3D3E3FA14142434445464748494A4B4 C4D4E4F505152535455565758595AC4D6D1DCA 7BF6162636465666768696A6B6C6D6E6F707172 737475767778797AE4F6F1FCE0 <i>Note: Set the custom character set tables to enable a GSM to default font conversion</i>	OK
AT+WPCS="CUSTOM" <i>Note: Use the custom character set</i>	OK
AT+CPBR=1	+CPBR: 1,"0146290800",129,"Sébastien" OK <i>Note: GSM character "é" is correctly displayed</i>

2.6.5 Example 5: Use the extended phonebook

Command	Response
AT+WCOS?	+WCOS: 0 OK <i>Note: Phonebook not extended</i>
AT+CPBS?	+CPBS: "SM",10,20 OK <i>Note: Selected phonebook: ADN</i>
AT+CPBW=1,"0123456",,"test"	OK <i>Note: Write an entry in SIM</i>
AT+CPBR=1	+CPBR: 1,"0123456",129,"test" OK <i>Note: Read an entry in SIM</i>
AT+CPBW=1,"0123456",,"test",1	+CME ERROR: 3 <i>Note: +WCOS=0; you can't write a phonebook group</i>
AT+WCOS=1	OK <i>Note: Phonebook extended in SIM</i>
AT+CPBW=1,"0123456",,"test",1	OK <i>Note: Write an entry in SIM</i>
AT+CPBR=1	+CPBR: 1, "0123456", 129, "test", 1 OK <i>Note: Read an entry in SIM (extended)</i>
AT+WCOS=0	OK
AT+WCOS?	+WCOS: 0 OK <i>Note: Phonebook not extended</i>
AT+CPBR=1	+CPBR: 1,"0123456",129,"test" OK <i>Note: Read an entry in SIM (not extended)</i>
AT+CPBS="ME"	OK <i>Note: Selected phonebook: ME (Flash)</i>
AT+WCOS=1	OK <i>Note: Phonebook extended</i>
AT+CPBW=1, "+331290909", 145, "Fred", "0141284549", 129, "0600003210", 129, "0141280000", 129, "019876543210", 129, "fred@mywebaddress.com", "Becker Street London",1	OK <i>Note: Write an entry in Flash</i>

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Command	Response
AT+CPBR=1	+CPBR: 1, "+331290909", 145, "Fred", "0141284549", 129, "0600003210", 129, "0141280000", 129, "019876543210", 129, "fred@mywebaddress.com", "Becker Street London", 1 OK
AT+WCOS=0	OK
AT+CPBR=1	+CPBR: 13, "+331290909", 145, "Fred" OK <i>Note: Read an entry in Flash (not extended)</i>

To use the extended ME phonebook, you must do:

AT+CPBS="ME"

AT+WCOS=1

To use the extended ADN phonebook, you must do:

AT+CPBS="SM"

AT+WCOS=1

To use the not extended phonebook, you must do:

AT+WCOS=0

2.6.6 Example 6: Phonebook and custom character set

Command	Response
AT+CPBS? <i>Note: Query the current phonebook</i>	+CPBS: 3,80 OK <i>Note: ADN selected, 3 entries stored</i>
AT+WPCS? <i>Note: Query for the current phonebook character set</i>	+WPCS: "TRANSPARENT" OK <i>Note: Transparent mode selected</i>
AT+CPBW=1,"0146290800",129,"test of { }"	
AT+CPBR=1	+CPBR: 1,"0146290800",129," test of " OK <i>Note: GSM characters "{" and "}" are not displayed</i>

Command	Response
AT+WCCS=1,0,0,255<CR> >2020202020202020200A20200D2020202020 20205F2020202020202020202020202021222302252 62728292A2B2C2D2E2F30313233343536373839 3A3B3C3D3E3F004142434445464748494A4B4C 4D4E4F505152535455565758595A1B1B1B1B11 206162636465666768696A6B6C6D6E6F7071727 37475767778797A1B1B1B1B201B2020202020 0202020202020202020202727202020202020 2020202020204020012403205F20202020202 D202020202027202020202020202020206041 4141415B0E1C09451F4545494949445D4F4F4 F4F5C200B5555555E59201E7F6161617B0F1D63 0405656507696969207D086F6F6F7C200C06757 57E792079 <CTRL-Z>	OK
AT+WCCS=1,1,0,127<CR> >40A324A5E8E9F9ECF2C70AD8F80DC5E5205F2 020202020202020202020C6E6DFC920212223A425 262728292A2B2C2D2E2F3031323334353637383 93A3B3C3D3E3FA14142434445464748494A4B4 C4D4E4F505152535455565758595AC4D6D1DCA 7BF6162636465666768696A6B6C6D6E6F707172 737475767778797AE4F6F1FCE0 <CTRL-Z> Note: Set the custom character set tables to enable a GSM to default font conversion	OK
AT+WPCS="CUSTOM" Note: Use the custom character set	OK
AT+CPBR=1	+CPBR: 1,"0146290800",129," test of { }" OK Note: GSM characters "{" and}" are correctly displayed

2.6.7 Example 7: MT Phonebook (read only)

Command	Response
AT+CPBS="MT"	OK <i>Note: Select MT phonebook</i>
AT+WCOS=1 <i>Note: Select extended entries</i>	OK
AT+CPBF="" <i>Note: Read all entries</i>	+CPBF: 1,"0987654321",129," Carry",0 +CPBF: 2;"9876543210",129,"John",0 +CPBF: 31,"0346572834",129,"Dolores Claiborne","9876543210",129,"","","6547891230",129 ,"dolores@mywebaddress.com"," Becker Street London",0 +CPBF: 32, "6547892012", 129, "Pierre", "", ,"","9874521021",129,"","","Pierre@mywebaddress.com ", "",0 OK
AT+WCOS=0 <i>Note: Select extended entries: not extended</i>	OK
AT+CPBF="" <i>Note: Read all entries</i>	+CPBF: 1,"0987654321",129," Carry" +CPBF: 2;"9876543210",129,"John" +CPBF: 31,"0346572834",129,"Dolores Claiborne" +CPBF: 32,"6547892012",129,"Pierre" OK

Index: 1 and 2 → SM phonebook entries

Index: 31 and 32 → ME phonebook entries

2.7 Examples about short messages

2.7.1 Send a short message

AT+CNMI=0,1,1,1,0 *SMS-DELIVERs are directly stored, SMS-STATUS-REPORTs are displayed*

OK

AT+CSMP=17,169,0,0 *SMS-SUBMIT message with a validity period (one day)*

OK

AT+CMGF=1 *Text mode to send a Short Message*

OK

AT+CSCA="+33608080706" *Set Service Center Address to +33608080706*

OK

AT+CMGS=0601290800 *Send a SMS-SUBMIT to mobile phone*

Product sends a 4 characters sequence: 0x0D 0x0A 0x3E 0x20

This is the first text line *Edit first line and press carriage return (<CR>, 0x0D)*

This is the last text line *Edit last line and send message by pressing <ctrl-Z> (0x1A)*

+CMGS: 5 *Success: message reference 5 is returned from the SMS Service Center*

+CDS: 2,5,"0601290800",129,"99/05/01 14:15:10+04" *Success: report of successful message delivery received*

2.7.2 Read short messages

AT+CMGF=1 *Text mode to read Short Messages*

AT+CMGL="ALL" *List all stored messages*

+CMGL: 1,"REC READ","+336290918",,"99/05/01 14:15:10+04" *This is the first message*

I will be late

+CMGL: 2,"REC UNREAD","+336290918",,"99/05/01 14:19:44+04" *This is the second message*

Traffic jam on Broadway

OK

AT+CMGR=1 " " *Read the first message*

+CMGR: "REC READ","+336290918",,"99/05/01 14:19:44+04" *This is the first message*

OK

2.8 Examples about Fax class 2

2.8.1 Send a fax class 2

```
AT+FCLASS=2          Select fax class 2
    OK
AT+FLID="LocalFax"
    OK
ATD0601234567        Call establishment
    +FCON             Connection OK
    [+FCSI: "RemoteFax"]
    +FDIS:0,3,0,2,0,0,0
    OK
AT+FDT              Beginning of the data transfer
    +FDCS:0,3,0,2,0,0,0
    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 acknowledged
    +FHNG:0         Normal end of connection
    OK
```


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```
AT+FCR=1
    OK
AT+FLID="LocalFax"
    OK
    RING                               Incoming call
ATA                                     Answer
+FCON                                  Connection OK
    [+FTSI: "RemoteFax"]
    +FDCS:0,3,0,2,0,0,0,0
    OK
AT+FDR
    +FCFR
    +FDCS:0,3,0,2,0,0,0,0
    CONNECT
    <0x12h>                             Receive page carrier
    First page data terminated by
    <0x10h><0x03h>
    OK                                   Page received
+FPST:1                               First page acknowledged
+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
+FPST:1                               Second page acknowledged
+FET:2                                 No more page to receive
    OK
AT+FDR
    +FHNG:0                             Normal end of connection
    OK
```

2.9 +CSIM and +CRSM Examples

NOTE: if SIM answer is not specified in the following examples, it will mean that the answer will depend on the SIM content.

2.9.1 DF GSM selection and then status

```
AT+CSIM=14,"A0A40000027F20"  
+CSIM=4,"9F16"  
AT+CSIM=10,"A0F2000016"  
+CSIM=48,"..."
```

2.9.2 DF Telecom selection and then status

```
AT+CSIM=14,"A0A40000027F10"  
+CSIM=4,"9F16"  
AT+CSIM=10,"A0F2000016"  
+CSIM=48,"..."
```

2.9.3 EF ADN selection and then status

DF Telecom selection is mandatory just before the following AT commands.

```
AT+CSIM=14,"A0A40000026F3A"  
+CSIM=4,"9F0F"  
AT+CSIM=10,"A0C000000F"  
+CSIM=34,"..."
```

2.9.4 Status commands

Status - No File Id - without P1, P2, P3

```
AT+CRSM=242
```

Status - 6F3A (EF ADN) - without P1, P2, P3

```
AT+CRSM=242,28474
```

Status - 6F07 (EF IMSI) - without P1, P2, P3

```
AT+CRSM=242,28423
```

Status - 3F00 (MF) - without P1, P2, P3

```
AT+CRSM=242,16128
```

Status - 7F10 (DF Telecom) - without P1, P2, P3

```
AT+CRSM=242,32528
```

Status - 7F20 (DF GSM) - without P1, P2, P3

```
AT+CRSM=242,32544
```

2.9.5 Get Response commands

Get Response - (EF ADN) - without P1, P2, P3

AT+CRSM=192,28474

Get Response - (EF IMSI) - without P1, P2, P3

AT+CRSM=192, 28423

Get Response - (MF) - without P1, P2, P3

AT+CRSM=192,16128

Get Response - (DF Telecom) - without P1, P2, P3

AT+CRSM=192,32528

Get Response - (DF GSM) - without P1, P2, P3

AT+CRSM=192,32544

Get Response - 6F07 (EF IMSI)

AT+CRSM=192, 28423,0,0,15

2.9.6 Read Record commands

Read Record - EF ADN (Pin Code validated)

AT+CRSM=178,28474,1,4,28

3 Technical appendixes

3.1 Data / Commands multiplexing protocol

3.1.1 Introduction

The Wavecom multiplexing protocol operates between a DCE (Data Communication Equipment: the product) and a DTE (Data Terminal Equipment). It allows a double session over a serial link interface: one for AT commands and one for DATA communications.

AT+WMUX=1 activates the Multiplexing Mode. With this mode, AT commands and DATA are encapsulated into packets. The header of these packets allows to recognize whether it is a DATA packet or an AT command packet. AT+WMUX=0 deactivates the Multiplexing Mode and gets the product back to the default mode.

This appendix presents how the multiplexing mode handles the DATA and the AT commands flow. It also describes the format of DATA packets and AT command packets.

3.1.2 AT command packets

An AT command is encapsulated into a packet with a header which allows to separate it from DATA packets. This packet is formed by a header (3 bytes), the AT command itself and a checksum (1 byte):

B7	B6	B5	B4	B3	B2	B1	B0
Start pattern → 0xAA							
AT command length LSB							
AT command pattern → 0x1D					AT command length MSB		
AT command							
Checksum							

The 3 bytes of the header are:

- ➔ the first byte (0xAA) is used to identify the packet,
- ➔ the second byte represents the 8 LSB (Low Significant Bits) bits of the length of the AT command,
- ➔ the third byte is made of 2 parts:
 - the 3 LSB bits are the 3 MSB (Most Significant Bits) bits of the length of the AT command,
 - the 5 MSB bits (0x1D which equals to 0xE8 with the 3 bits offset) are used to identify an AT command.

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The maximum length of an AT command could be 2047 bytes which is greater than all the existing AT commands.

The checksum is the addition (modulo 256) of all the transmitted bytes (header bytes and AT command bytes).

3.1.3 Data packets

Like for AT commands, DATA are encapsulated into packets. These packets are composed of a header (3 bytes), the data bytes and the checksum (1 byte):

B7	B6	B5	B4	B3	B2	B1	B0
Start pattern → 0xDD							
Data packet length LSB							
Data packet type					Data packet length MSB		
Data Bytes							
Checksum							

The 3 bytes of the header are:

- the first byte (0xDD) used to identify the packet,
- the second byte represents the 8 LSB bits of the length of the data field,
- the last byte is made of 2 parts:
 - the 3 LSB bits represent the 3 MSB bits of the length of the data field,
 - the 5 MSB bits represent the packet type.

Data packets can have different values according to the type of packet:

- 0 – DATA packet: the packet contains the data to transmit on the radio link or received from the radio link,
- 1 – STATUS packet: the packet contains the status of SA, SB, X bits⁽¹⁾ and the break condition coding as follow:

SA	SB	X	BRK	RI	Spare	Spare	Spare
----	----	---	-----	----	-------	-------	-------

- the length of data for the status packet is always equal to 1,
- whenever a status changes (except break), all the status bits are included,
- these bits are off by default (and therefore the bits DTR and RTS), so it is necessary to send a status packet to the target at the beginning of the multiplexing to start the transmission,
- 2 – READY packet: the packet indicates that the target is ready to receive data:

¹ These status bits contain the V24 control information:

- SA contains DTR (signal CT108 – from terminal to IWF) and DSR (signal CT107 – from terminal to IWF),
- SB contains RTS (signal CT105 – from terminal to IWF) and DCD (signal CT109 – from IWF to terminal),
- X contains CTS (signal CT106).

For more information, refer to GSM 07.02

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- no data are transmitted in this packet (so the length is null),
- 3 – BUSY packet: the packet indicates that the target is busy and can not receive data:
 - like the ready packet, no data are transmitted,
- other values: currently, these values are not used (reserved for future enhancement).

The checksum is calculated like the AT command packet checksum (addition of all the transmitted bytes including the header bytes).

3.1.4 Example: AT command and its answer

When there is no encapsulation the AT command transmitted on the serial link is like this (in ASCII and hexadecimal):

AT\r\n ⇔ 0x41 0x54 0x0D 0x0A

and the answer is like this:

\r\nOK\r\n ⇔ 0x0D 0x0A 0x4F 0x4B 0x0D 0x0A

With the encapsulation in the serial link, the packet transmitted is (in hexadecimal):

0xAA 0x04 0xE8 0x41 0x54 0x0D 0x0A 0x42

and the answer is like this:

0xAA 0x06 0xE8 0x0D 0x0A 0x4F 0x4B 0x0D 0x0A 0x60

3.1.5 Example: Initialization and Data packet

When the Multiplexing Mode is activated (+WMUX=1), the product sends 2 Data packets after the establishment of a DATA call (after the CONNECT xxxx message): 1 READY Packet and 1 STATUS Packet. To set the different signals to the right value, it is necessary to send a STATUS packet to the product.

Here are some examples of STATUS packets:

0xDD 0x01 0x08 0x40 0x26 ⇔ bit RTS is on

to start a data call, all the bits should be on:

0xDD 0x01 0x08 0xC0 0xA6 ⇔ bits DTR and RTS are on

3.1.6 Restriction

The autobauding mode is not available when the Multiplexing Mode is activated: the serial link speed must be set to a fixed rate.

3.2 Support of SIM ToolKit by the M.E.

This has been extracted from the GSM Technical specification 11.14.

TABLE 1 – Support of SIM Toolkit classes

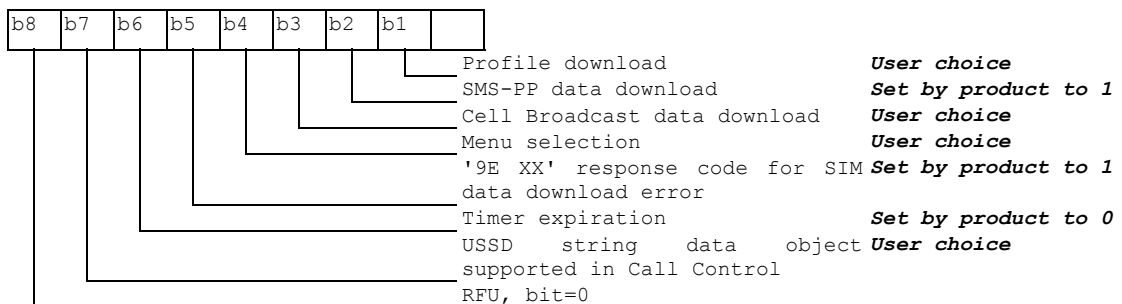
Command description	Classes		
	1	2	3
CALL CONTROL		X	X
CELL BROADCAST DOWNLOAD		X	X
DISPLAY TEXT		X	X
EVENT DOWNLOAD			
- MT call			X
- Call connected			X
- Call disconnected			X
- Location status			X
- User activity			X
- Idle screen available			X
GET INKEY		X	X
GET INPUT		X	X
GET READER STATUS \$(MultipleCard)\$			Lc
MENU SELECTION		X	X
MO SHORT MESSAGE CONTROL			X
MORE TIME		X	X
PERFORM CARD APDU \$(MultipleCard)\$			Lc
PLAY TONE		X	X
POLLING OFF		X	X
POLL INTERVAL		X	X
POWER ON CARD \$(MultipleCard)\$			Lc
POWER OFF CARD \$(MultipleCard)\$			Lc
PROVIDE LOCAL INFORMATION		X	X
REFRESH	X	X	X
RUN AT COMMAND \$(AT\$)			Lc
SELECT ITEM		X	X
SEND SHORT MESSAGE		X	X
SEND SS		X	X
SEND USSD			X
SET UP CALL		X	X
SET UP EVENT LIST			X
SET UP IDLE MODE TEXT \$(IdleModeText)\$			X
SET UP MENU		X	X
SMS-PP DOWNLOAD	X	X	X
TIMER MANAGEMENT \$(Timer)\$			Lc
TIMER EXPIRATION \$(Timer)\$			Lc

TABLE 2 - Compatibility between available Terminal Responses and Proactive Commands

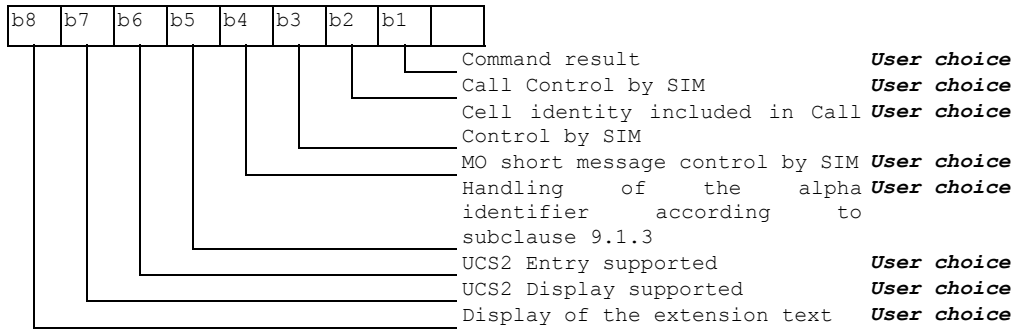
Terminal Responses	Proactive commands											
	Setup Menu (0)	Display Text(1)	Get Inkey (2)	Get Input (3)	Setup Call (4)	Play Tone (5)	Select Item (6)	Refresh (7)	Send SS (8)	Send SMS (9)	Send USSD (10)	Setup event list (11)
Backward Move (95)		•	•	•			•					
Command beyond ME capabilities (96)	•	•	•	•	•	•	•	•	•	•	•	•
ME currently unable to process command (97)	•	•	•	•	•	•	•	•	•	•	•	•
No response from the user (98)		•	•	•			•					
SIM session terminated by the user (99)		•	•	•	•	•	•					

3.3 Structure of TERMINAL PROFILE

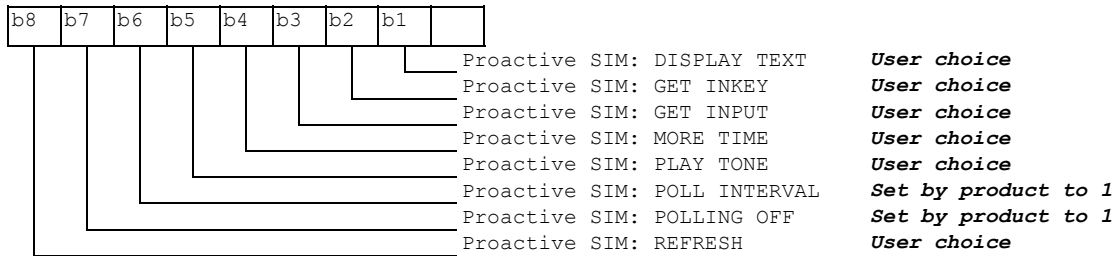
First byte (Download):



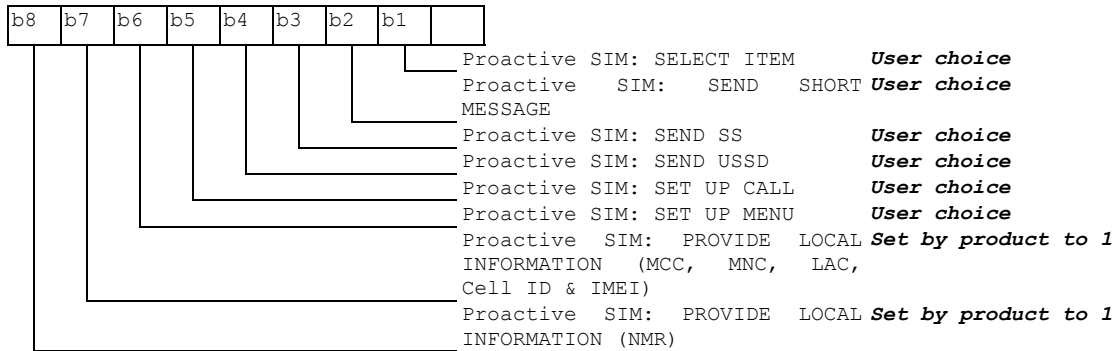
Second byte (Other):



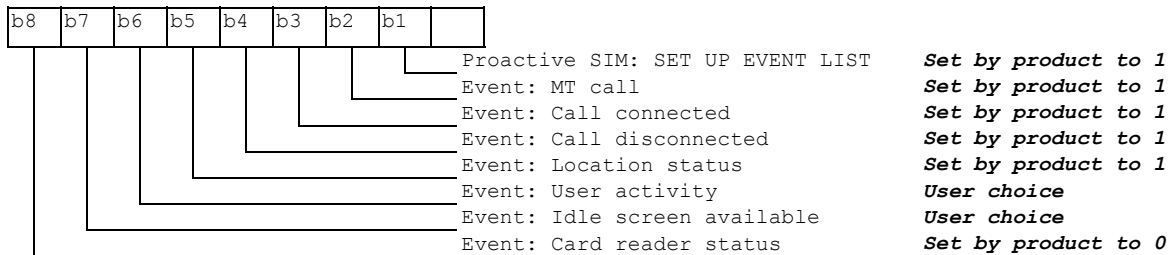
Third byte (Proactive SIM):



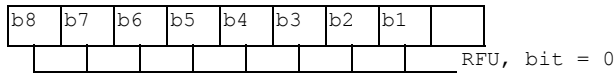
Fourth byte (Proactive SIM):



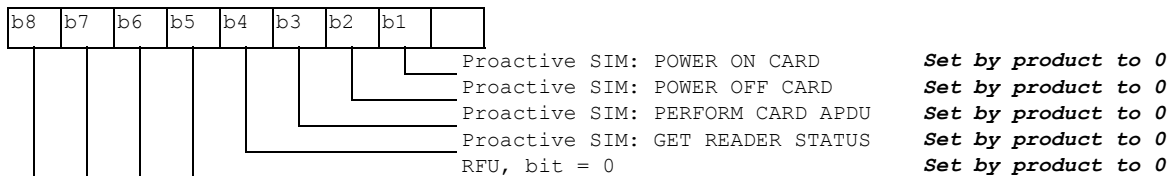
Fifth byte (Event driven information):



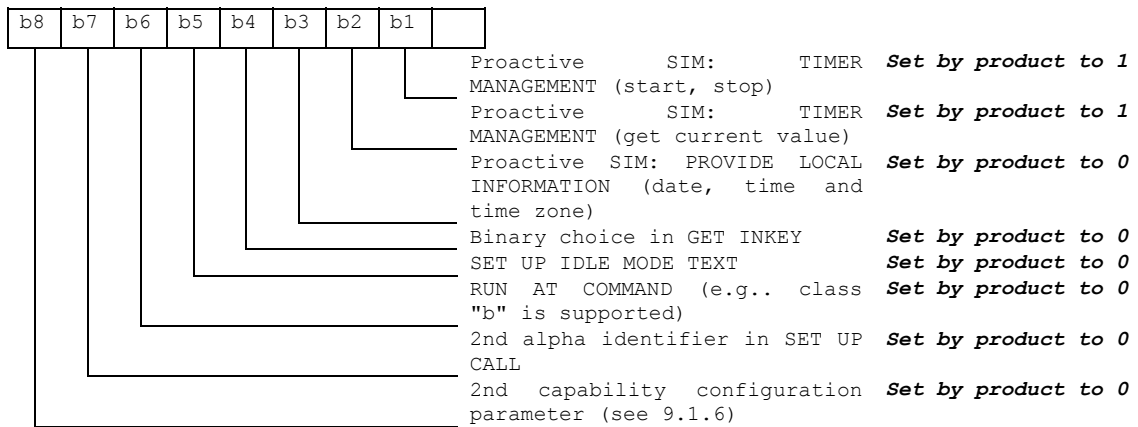
Sixth byte: (reserved for Event driven information extensions)



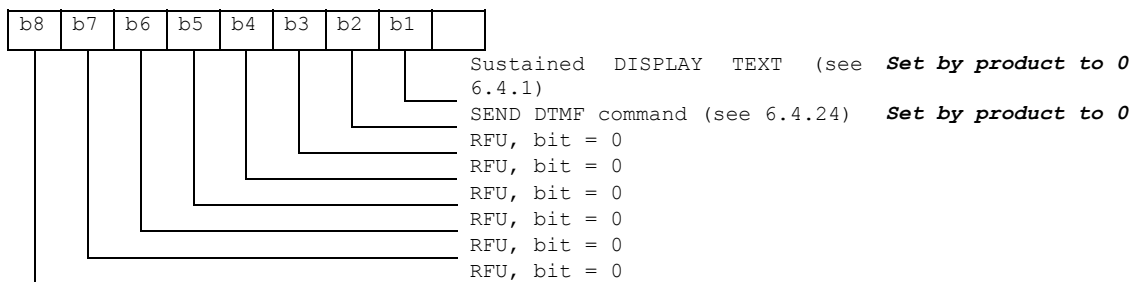
Seventh byte (Multiple card proactive commands) for class "a"



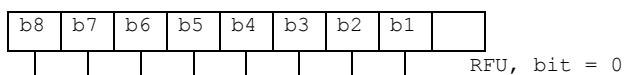
Eighth byte (Proactive SIM):



Ninth byte:



Subsequent bytes:



Information about BCCH channel list

(this is an extract of GSM Rec 11.14)

Byte(s)	Description	Length
1	BCCH channel list tag	1
2	Length (X) of bytes following	1
3 to X+2	BCCH channel list	X

- BCCH channel list

Contents: the list of absolute RF channels for BCCH carriers, as known by the ME from the SYSTEM INFORMATION messages. The BCCH channel list is composed of one to three BCCH channel sub lists, each sub list is derived from the set of frequencies defined by reference neighbor cells description information element or elements. In the latter case the set is the union of the different subsets defined by the neighbor cells description information elements (see TS 04.08 [8]). The length of the BCCH channel list field depends on the length of the received BCCH channel list derived from the different SYSTEM INFORMATION messages to be considered.

Coding: Each ARFCN (*Absolute Radio Frequency Channel Number*) is represented by 10 bits. Spare bit(s) are to be filled with 0.

	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
Byte 1	ARFCN#1 (high part)							
Byte 2	ARFCN#1 (low part)			ARFCN#2 (high part)				
Byte 3	ARFCN#2 (low part)				ARFCN#3 (high part)			
...	...							
Byte X-1	ARFCN#m-1 (low part)				ARFCN#m (high part)			
Byte X	ARFCN#m (low part)						Spare bit (0)	Spare bit(0)

SIM applications should take into account that early implementations of SIM application toolkit may have coded this field differently, because of an inconsistency between the content and the coding of this element in previous versions of 11.14. The SIM is able to identify MEs that are using the coding described above by evaluating the indication "BCCH Channel List coding" in the TERMINAL PROFILE command.

3.4 Command Type and Next Action Indicator.

This table has been extracted from the GSM Technical specification 11.14.

Value	Name	Used for Type of Command coding	used for Next Action Indicator coding
'00'		-	-
'01'	REFRESH	X	
'02'	MORE TIME	X	
'03'	POLL INTERVAL	X	
'04'	POLLING OFF	X	
'05'	SET UP EVENT LIST	X	
'10'	SET UP CALL	X	X
'11'	SEND SS	X	X
'12'	SEND USSD	X	X
'13'	SEND SHORT MESSAGE	X	X
'14'	SEND DTMF	X	
'20'	PLAY TONE	X	X
'21'	DISPLAY TEXT	X	X
'22'	GET INKEY	X	X
'23'	GET INPUT	X	X
'24'	SELECT ITEM	X	X
'25'	SET UP MENU	X	X
'26'	PROVIDE LOCAL INFORMATION	X	
'27'	TIMER MANAGEMENT	X	
'28'	SET UP IDLE MODEL TEXT	X	X
'30'	PERFORM CARD APDU	class "a" only	X
'31'	POWER ON CARD	class "a" only	X
'32'	POWER OFF CARD	class "a" only	X
'33'	GET READER STATUS	class "a" only	X
'34'	RUN AT COMMAND	class "b" only	
'81'	End of the proactive session	not applicable	X

3.5 Coding of Alpha fields in the SIM for UCS2

The coding can take one of the three following structures, or GSM default alphabet. If the ME supports UCS2 coding of alpha fields in the SIM, it will support all three coding schemes for character sets containing 128 characters or less. For character sets containing more than 128 characters, the ME will at least support the first coding scheme. Within a record, only one coding scheme, either GSM default alphabet, or one of the three described below, can be used.

- 1) If the **first byte in the alpha string is '0x80'**, then the other bytes are 16 bit UCS2 characters. The most significant byte (MSB) of the UCS2 character is coded in the lower numbered byte of the alpha field, and the less significant byte (LSB) of the UCS2 character is coded in the higher numbered alpha field byte. In other words, byte 2 of the alpha field contains the most significant byte (MSB) of the first UCS2 character, and byte 3 of the alpha field contains the less significant byte (LSB) of the first UCS2 character (as shown below). Unused bytes shall be set to 'FF': if the alpha field has an even length in bytes, the last (unusable) byte will be set to 'FF'.

Example 1

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'80'	Ch1 _{MSB}	Ch1 _{LSB}	Ch2 _{MSB}	Ch2 _{LSB}	Ch3 _{MSB}	Ch3 _{LSB}	'FF'	'FF'

- 2) If the **first byte of the alpha string is '0x81'**, then the 2nd byte contains a value indicating the number of characters in the string. The 3rd byte contains an 8 bit number which defines bits 15 to 8 of a 16 bit base pointer, where bit 16, and bits 7 to 1 would be set to zero. These sixteen bits represent a base pointer to a "half-page" in the UCS2 code space, to be used with some or all of the remaining bytes in the string. The 4th and subsequent bytes in the string contain coding as follows:
 - if bit 8 of the byte is set to zero, the remaining bits of the byte contain a GSM Default Alphabet character
 - if bit 8 of the byte is set to one, the remaining bits are an offset value to add to the 16 bit base pointer defined by byte 3, and the resulting 16 bit value is a UCS2 code point, and defines a UCS2 character.

Example 2

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte 9
'81'	'05'	'13'	'53'	'95'	'A6'	'28'	'FF'	'FF'

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In the example above

- Byte 2 indicates there are 5 characters in the string
 - Byte 3 indicates bits 15 to 8 of the base pointer, and indicates a bit pattern of 0hhh shah h000 0000 as the 16 bit base pointer number. Bengali characters for example start at code position 0980 (0000 1001 1000 0000), which is indicated by the coding '13' in byte 3 (shown by the italicized underlined digits).
 - Byte 4 indicates GSM Default Alphabet character '53', e.g.. "S".
 - Byte 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, e.g.. '0995', which is the Bengali letter KA.
 - Byte 8 contains the value 'FF': 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 to a sixteen bit value of 0000 1001 1111 1111 for the UCS2 character (that is '09FF').
 - Byte 9 contains the padding value 0xFF.
- 3) **If the first byte of the alpha string is set to '0x82'**, then the 2nd byte contains the length of the string (number of characters).
 The 3rd and 4th bytes 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 bytes in the string.
 The 5th and subsequent bytes in the string contain coding as follows:
- if bit 8 of the byte is set to zero, the remaining seven bits of the byte contain a GSM Default Alphabet character,
 - if bit 8 of the byte is set to one, the remaining seven bits are an offset value added to the base pointer defined in bytes 3 and 4, and the resulting 16 bit value is a UCS2 code point, and defines a UCS2 character.

Example 3

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

In the example above:

- Byte 2 indicates there are 5 characters in the string
- Bytes 3 and 4 contain a 16 bit base pointer number of '0530', pointing to the first character of the Armenian character set.
- Byte 5 contains a GSM Default Alphabet character of '2D', which is a dash "-".
- Byte 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.
- Byte 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.

3.6 Specification of Power Down Control via RS232

This appendix describes how to activate and deactivate the power down mode of the product via the RS232 serial link. Refer to +W32K to activate or deactivate the power down mode.

In this document, the term "DTE" refers to the customer device driving the product, which is referred to as the "DCE".

The terms referring to the RS232 signals and levels are used according to the V.24 and V.28 recommendations. Here are some points to remind:

- DTR is the circuit 108/2,
- TX is the circuit 103,
- RX is the circuit 102,
- CTS is the circuit 106.
- The logical level "HIGH or ON" corresponds to the electrical level of +12 V, and the level "LOW or OFF" corresponds to -12 V.
- The activation and deactivation are always initiated from the DTE and is carried out through the handshaking of DTR and CTS.

The power down mode can be triggered only when the DCE is idle, that means when there is no connection to the network in progress.

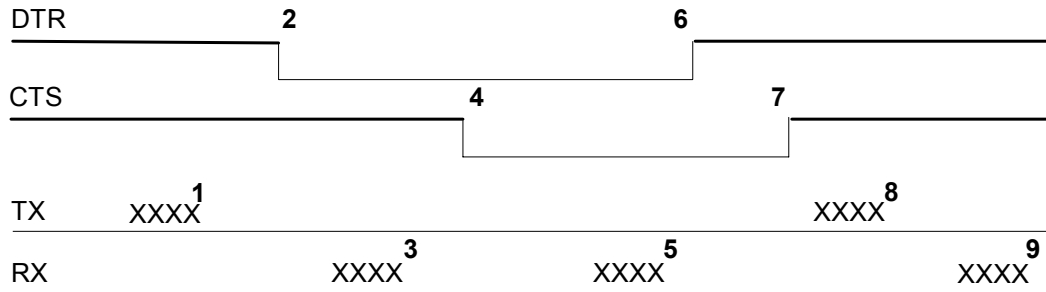
When the DTE requests the DCE to enter the power down mode, it (DTE) drops (ON-to-OFF transition) DTR. From this time on, it (DTE) **must not send** any more characters on the TX line: the TX FIFO must be empty.

The DCE acknowledges its entry in the power down mode by dropping CTS, within a time interval of 5s. after the DTR drop. During that period the DTE is prohibited from sending any more AT commands.

AT responses can be sent to the DTE even if the DCE is in power down mode: for this, it (DCE) suspends its power down mode, sends the requested AT response and recovers the power down mode. Therefore the DTE can trigger DCE power down mode without having to take care of any AT responses

The DTE exits the power down mode by raising the DTR. DCE is not ready to receive further AT commands until it raises in turn CTS, within a time interval of 2s. after the DTR raise.

Here below is a diagram depicting the handshaking:



Description of the steps:

1: the DTE sends an AT command

2: the DTE drops DTR to make the DCE enter the power down mode. Warning: this mode will not really enter until CTS is dropped (step 4). The DTE could also have dropped DTR after having received the AT response (step 3).

3: the DCE sends back the AT response (if any)

4: the DCE drops CTS: it enters the power down mode.

5: the DCE sends back an unsolicited response (for instance a RING or +SMTI (incoming SMS indication))

6: the DTE wants to reply to that unsolicited response so it raises the DTR, causing the DCE to exit the power down mode.

7: the DCE acknowledges the exit of the power down mode by raising CTS.

8) & 9) exchange of AT commands/responses.

Note 1): The DTE must not send any AT commands from steps 2 to 7.

Note 2): During the latency period (between steps 2 and 4) should the DTE want to abort the power down mode, it raises DTR and should wait for 150µs before assessing CTS. If CTS is still high than the DCE has aborted the power down mode and is ready to receive AT commands.

The 150µs wait should get around the race condition between DTR raise and CTS drop.

Warning: The diagram above is V.28 compliant (PC interface), meaning the HIGH level corresponds to +12V, and the LOW level to -12V.

3.7 Description of Multi-Flow behavior

Multi-flows allows the module to treat commands from various sources (or flows):

- UART ports
- USB port
- embedded Open-AT applications.

AT commands are organized in classes , and multi-flow allows the simultaneous execution of commands of different classes coming from the possible sources:

- commands belonging to the same class can not be treated as the same time. When a command of a class is treated, the module will respond "busy" to any command of the same class until the first command processing has completed.
- when a flow is waiting for the treatment of a command, it is busy until the command execution completion.

Example:

- 1) The module receives a command of class AT_CLASS_PHONEBOOK on UART1. The processing of the command starts, and a response from the phonebook entity is expected. No other command of the AT_CLASS_PHONEBOOK class can be processed, and the UART1 port is busy.
- 2) The module receives then a command from USB port, of another class. It is able to immediately process this second command.
- 3) When the phonebook entity answers, the first command's processing completes. UART1 port and AT_CLASS_PHONEBOOK class are released.

Notes:

- concatenation of commands remains possible,
- the Repeat command (A/) runs independently for each flow,
- an embedded Open-AT application may changes data redirection.

3.7.1 Commands classes

There are 27 commands classes, presented in the array below:

Class name	Related commands
AT_CLASS_A_SLASH	A/
AT_CLASS_AGENDA	+WAGR, +WAGD, +WAGW
AT_CLASS_COM	+CHLD, +VTD, +VTS, +WATH, A, D, DL, H, O
AT_CLASS_CPHS	+CPHS, +WALS, +WMBN
AT_CLASS_DATA	+CRLP, +DOPT
AT_CLASS_FAX	+FBOR, +FBUF, +FCQ, +FCR, +FDCC, +FDIS, +FPHCT, +FRH, +FRM, +FRS, +FTH, +FTM, +FTS, FLID
AT_CLASS_GPRS	+CGACT, +CGANS, +CGATT, +CGAUT, +CGCLA, +CGDATA, +CGDCONT, +CGERE, +CGPAD, +CGQMI, +CGQRE, +CGREG, +CGSMS, +GCAP, +WGPRS
AT_CLASS_LOCATION	+WLOC
AT_CLASS_MAIN	%D, &C, &D, &E, &F, &S, &T, &V, &W, +ADC, +CALA, +CBST, +CCLK, +CEER, +CGMI, +CGMM, +CGMR, +CGSN, +CICB, +CIND, +CLCC, +CMEC, +CMEE, +CMER, +CMUT, +CPAS, +CR, +CRC, +CREG, +CRMP, +CRSL, +CSCS, +CSNS, +CSVM, +ECHO, +FLCLASS, +ICF, +IFC, +ILRR, +IPR, +SIDET, +SPEAK, +VGR, +VGT, +VIP, +W32K, +WAC, +WBCM, +WBM, +WBR, +WBW, +WCCS, +WCDM, +WCDP, +WCFM, +WCTM, +WDOP, +WDR, +WDTMF, +WDWL, +WFM, +WHWV, +WIMEI, +WIND, +WIOM, +WIOR, +WIOW, +WLCK, +WMIR, +WMSN, +WMUX, +WOPEN, +WPCS, +WRIM, +WRST, +WSCAN, +WSST, +WSSW, +WSTR, +WSVG, +WSVN, +WTONE, +WVR, E, I, Q, S, V, Z, +WMFEM, +WOPEN, +WCOS
AT_CLASS_NETWORK	+CCED, +COPN, +COPS, +CPLS, +CPOL, +CSQ, +WMBS, +WOPN
AT_CLASS_PHONEBOOK	+CNUM, +CPBF, +CPBN, +CPBP, +CPBR, +CPBS, +CPBW, +WAIP, +WDPC
AT_CLASS_PHONEBOOK	WPGW, WPGR, WPGS
AT_CLASS_POFF	+CFUN, +CPOF, +WBHV
AT_CLASS_RIL	+CRSM, +CSIM
AT_CLASS_RS	+CPWL
AT_CLASS_SECURITY	+CLCK, +CPIN, +CPIN2, +CPINC, +CPWD
AT_CLASS_SIM	+CCID, +CIMI, +WLPR, +WLPW
AT_CLASS_SMS	+CMGD, +CMGF, +CMGL, +CMGR, +CMGS, +CMGW, +CMSS, +CNMA, +CNMI, +CPMS, +CRES, +CSAS, +CSCA, +CSCB, +CSDH, +CSMP, +CSMS, +WCBM, +WMGO, +WMSC, +WUSS, +WMCP

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Class name	Related commands
AT_CLASS_SS	+CACM, +CAMM, +CAOC, +CCFC, +CCUG, +CCWA, +CKPD, +CLIP, +CLIR, +COLP, +CPUC, +CSSN, +CUSD
AT_CLASS_STLK	+STGI, +STGR, +STIN, +STSF
AT_CLASS_V24B	%C, \N, +DR, +DS

3.7.2 Remark on error 536

When a class is locked and when another command belonging to the same class arrives, module answers +CME ERROR: 536.

4 Command execution and dependence to SIM

These arrays list all the AT command. For each, a column indicates the command execution condition (if +WIND:4 must have occurred OK, for example). SIM dependency column indicates if the command behavior will vary if another card is used (for example, it will be the case for phonebook reading commands). The Intermediate column indicates if intermediate responses can occur for the considered command.

4.1 General commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CGMI	+WIND: 3	N	N
AT+CGMM	+WIND: 3	N	N
AT+CGMR	+WIND: 3	N	N
AT+CGSN	+WIND: 3	N	N
AT+CSCS	+WIND: 4	N	N
AT+WPCS	+WIND: 4	N	N
AT+CIMI	+WIND: 4	Y	N
AT+CCID	+WIND: 1	Y	N
AT+GCAP	+WIND: 3	N	N
A/	Depends on previous command	Depends on previous command	N
AT+CPOF	+WIND: 3 without SIM, +WIND: 1 with SIM	N	N
AT+CFUN	+WIND: 3	N	N
AT+CPAS	+WIND: 3	N	N
AT+CMEE	+WIND: 3	N	N
AT+CKPD	Depends of the sequence used	Y/N	N
AT+CCLK	+WIND: 3	Y	N
AT+CALA	+WIND: 3	N	Y
AT+CRMP	+WIND: 3	N	N
AT+CRSL	+WIND: 3	N	N

4.2 Call Control commands

AT commands	Conditions	SIM dependence	Intermediate
ATD	Depends of sequence used	Y/N	Y
ATH	+WIND: 3	N	N
ATA	+WIND: 3	N	N
AT+CEER	+WIND: 4	Y	N
AT+VTD	+WIND: 3	N	N
AT+VTS	+WIND: 5	N	N
ATDL	+WIND: 3	N	Y
AT%D	+WIND: 3	N	N
ATSO	+WIND: 3	N	N
AT+CICB	+WIND: 3	N	N
AT+CSNS	+WIND: 3	N	N
AT+VGR	+WIND: 3	N	N
AT+VGT	+WIND: 3	N	N
AT+CMUT	+WIND: 5	N	N
AT+SPEAKER	+WIND: 3	N	N
AT+ECHO	+WIND: 3	N	N
AT+SIDET	+WIND: 3	N	N
AT+VIP	+WIND: 3	N	N

4.3 Network service commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CSQ	+WIND: 3	N	N
AT+COPS	+WIND: 4	Y	N
AT+CREG	+WIND: 3	N	Y
AT+WOPN	+WIND: 3	N	N
AT+CPLS	PIN	Y	N
AT+CPOL	After PIN entered	Y	Y
AT+COPN	After PIN entered	N	N

4.4 Security commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CPIN	+WIND: 1	Y	N
AT+CPIN2	after PIN entered	Y	N
AT+CPINC	+WIND: 1	Y	N
AT+CLCK	+WIND: 4	Y	N
AT+CPWD	+WIND: 4	Y	N

4.5 Phonebook commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CPBS	+WIND: 4	Y	N
AT+CPBR	+WIND: 4	Y	Y
AT+CPBF	+WIND: 4	Y	Y
AT+CPBW	+WIND: 4	Y	N
AT+CPBP	+WIND: 4	Y	Y
AT+CPBN	+WIND: 4	Y	Y
AT+CNUM	+WIND: 4	Y	N
AT+WAIP	+WIND: 3	N	N
AT+WDCP	+WIND: 4	Y	N
AT+CSVM	+WIND: 4	N	N
AT+WCOS	+WIND: 3	N	N
AT+WPGW	+WIND: 4	N	N
AT+WPGR	+WIND: 4	N	Y
AT+WPGS	+WIND: 4	N	Y

4.6 Short Messages commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CSMS	+WIND: 4	Y	N
AT+CNMA	+WIND: 4	Y	N
AT+CPMS	+WIND: 4	Y	N
AT+CMGF	+WIND: 3	N	N
AT+CSAS	+WIND: 3	Y	N
AT+CRES	+WIND: 3	Y	N
AT+CSDH	+WIND: 4	Y	N
AT+CNMI	+WIND: 4	Y	N
AT+CMGR	+WIND: 4	Y	Y
AT+CMGL	+WIND: 4	Y	Y
AT+CMGS	+WIND: 4	Y	N
AT+CMGW	+WIND: 4	Y	Y
AT+CMSS	+WIND: 4	Y	N
AT+CSMP	+WIND: 4	Y	N
AT+CMGD	+WIND: 4	Y	N
AT+CSCA	+WIND: 4	Y	N
AT+CSCB	+WIND: 4	Y	N
AT+WCBM	+WIND: 4	Y	N
AT+WMSC	+WIND: 4	Y	Y
AT+WMGO	+WIND: 4	Y	N
AT+WUSS	+WIND: 3	N	N
AT+WMCP	+WIND: 4	Y	N

AT commands	Conditions	SIM dependence	Intermediate
AT+CMMS	+WIND: 3	Yes	No

4.7 Supplementary Services commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CCFC	+WIND: 4	Y	N
AT+CLCK	+WIND: 4	Y	N
AT+CPWD	+WIND: 4	Y	N
AT+CCWA	+WIND: 4	Y	N
AT+CLIR	After PIN entered	Y	N
AT+CLIP	After PIN entered	Y	N
AT+COLP	After PIN entered	Y	N
AT+CAOC	After PIN entered	Y	Y
AT+CACM	After PIN entered	Y	N
AT+CAMM	After PIN entered	Y	N
AT+CPUC	After PIN entered	Y	N
AT+CHLD	+WIND: 5,2	Y	N
AT+CLCC	+WIND: 3	N	N
AT+CSSN	+WIND: 3	N	N
AT+CUUSD	+WIND: 3	N	N
AT+CCUG	+WIND: 4	Y	Y

4.8 Data commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CBST	+WIND: 3	N	N
AT+FCLASS	+WIND: 3	N	N
AT+CR	+WIND: 3	N	N
AT+CRC	+WIND: 3	N	N
AT+ILRR	After PIN entered	N	N
AT+CRLP	+WIND: 3	N	N
AT+DOPT	+WIND: 3	N	N
AT%C	+WIND: 3	N	N
AT+DS	+WIND: 3	N	N
AT+DR	+WIND: 3	N	N
\N	+WIND: 3	N	N

4.9 Fax commands

AT commands	Conditions	SIM dependence	Intermediate
AT+FTM	+WIND: 3	N	N
AT+FRM	+WIND: 3	N	N
AT+FTH	+WIND: 3	N	N
AT+FRH	+WIND: 3	N	N
AT+FTS	+WIND: 3	N	N
AT+FRS	+WIND: 3	N	N

4.10 Class 2 Commands

AT commands	Conditions	SIM dependence	Intermediate
AT+FDT	+CLCC:X,X,0,2,X (fax call)	N	N
AT+FDR	+CLCC:X,X,0,2,X (fax call)	N	N
AT+FET	+CLCC:X,X,0,2,X (fax call)	N	N
AT+FPTS	+CLCC:X,X,0,2,X (fax call)	N	N
AT+FK	+CLCC:X,X,0,2,X (fax call)	N	N
AT+FBOR	+WIND: 3	N	N
AT+FBUF	+WIND: 3	N	N
AT+FCQ	+WIND: 3	N	N
AT+FCR	+WIND: 3	N	N
AT+FDIS	+WIND: 3	N	N
AT+FDCC	+WIND: 3	N	N
AT+FLID	+WIND: 3	N	N
AT+FPHCTO	+WIND: 3	N	N

4.11 V24-V25 commands

AT commands	Conditions	SIM dependence	Intermediate
AT+IPR	+WIND: 3	N	N
AT+ICF	+WIND: 3	N	N
AT+IFC	+WIND: 3	N	N
AT&C	+WIND: 3	N	N
AT&D	+WIND: 3	N	N
AT&S	+WIND: 3	N	N
ATO	+CLCC:X,0,0,1,X (data call)	N	N
ATQ	+WIND: 3	N	N
ATV	+WIND: 3	N	N
ATZ	+WIND: 3	N	N
AT&W	+WIND: 3	N	N
AT&T	+WIND: 3	N	N
ATE	+WIND: 3	N	N
AT&F	+WIND: 3	N	N
AT&V	+WIND: 3	N	N
ATI	+WIND: 3	N	N
AT+WMUX	+WIND: 3	N	N

4.12 Specific AT commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CCED	+WIND: 3	N	N
AT+WIND	+WIND: 3	N	N
AT+ADC	+WIND: 3	N	N
AT+CMER	+WIND: 3	N	N
AT+CIND	+WIND: 3	N	N
AT+CMEC	+WIND: 3	N	N
AT+WLPR	+WIND: 1	N	N
AT+WLPW	+WIND: 1	N	N
AT+WIOR	+WIND: 3	N	N
AT+WIOW	+WIND: 3	N	N
AT+WIOM	+WIND: 3	N	N
AT+WAC	+WIND: 3	N	N
AT+Wtone	+WIND: 3	N	N
AT+WDTMF	+WIND: 3	N	N
AT+WDWL	+WIND: 3	N	N
AT+WVR	+WIND: 3	N	N
AT+WDR	+WIND: 3	N	N
AT+WHWV	+WIND: 3	N	N
AT+WDOP	+WIND: 3	N	N
AT+WSVG	+WIND: 3	N	N
AT+WSTR	+WIND: 3	N	N

AT commands	Conditions	SIM dependence	Intermediate
AT+WSCAN	+WIND: 3	N	N
AT+WRIM	+WIND: 3	N	N
AT+W32K	+WIND: 3	N	N
AT+WCDM	+WIND: 3	N	N
AT+WSSW	+WIND: 3	N	N
AT+WCCS	+WIND: 4	N	N
AT+WLCK	None (PIN for auto CNL)	N (Y for auto CNL)	N
AT+CPHS	+WIND: 4	Y	N
AT+WBCM	+WIND: 3	N	N
AT+WFM	+WIND: 3	N	N
AT+WCFM	+WIND: 3	N	N
AT+WMIR	+WIND: 3	N	N
AT+WCDP	+WIND: 3	N	N
AT+WMBN	PIN	Y	N
AT+WALS	+WIND: 4	Y	N
AT+WOPEN	+WIND: 3	N	N
AT+WRST	+WIND: 3	N	N
AT+WSST	+WIND: 3	N	N
AT+WLOC	PIN Code	Y	N
AT+WBR	+WIND: 3	N	N
AT+WBW	+WIND: 3	N	N
AT+WBM	+WIND: 3	N	N
AT+WATH	+WIND: 3	N	N
AT+WIMEI	+WIND: 3	N	N
AT+WSVN	+WIND: 3	N	N
AT+WMBS	+WIND: 3	N	N
AT+WMFM	+WIND: 3	No	No
AT+WBHV	+WIND: 3	N	N

4.13 Agenda Commands

AT commands	Conditions	SIM dependence	Intermediate
AT+WAGW	+WIND: 3	N	N
AT+WAGR	+WIND: 3	N	Y
AT+WAGD	+WIND: 3	N	N

4.14

AT commands	Conditions	SIM dependence	Intermediate

4.15 SIM Toolkit commands

AT commands	Conditions	SIM dependence	Intermediate
AT+STSF	+WIND: 3	N	N
AT+STIN	+WIND: 4	Y	N
AT+STGI	+WIND: 4	Y	N
AT+STGR	+WIND: 4	Y	N

4.16 GPRS commands

AT commands	Conditions	SIM dependence	Intermediate
AT+CGDCONT	+WIND: 4		
AT+CGQREQ	+WIND: 4		
AT+CGQMIN	+WIND: 4		
AT+CGATT	+WIND: 4		
AT+CGACT	+WIND: 4		
AT+CGDATA	+WIND: 4		
AT+CGCLASS	+WIND: 3	N	N
AT+CGCLASS	+WIND: 4		
AT+CGSMS	+WIND: 4		
AT+CGREP	+WIND: 4		
AT+CGREG	+WIND: 4		
AT+CGAUTO	+WIND: 4		
AT+CGANS	+WIND: 4		
AT+CGADDR	+WIND: 4		
AT+WGPRS	+WIND: 3	None	N

5 Interoperability

All the commands listed below are only used for interoperability with other applications. They have no action and always reply OK.

Command	Responses
ATB	OK
ATC	OK
ATG	OK
ATL	OK
ATM	OK
ATN	OK
ATP	OK
ATT	OK
ATW	OK
ATX	OK
ATY	OK
ATK	OK
AT&E	OK
AT&G	OK
AT&K	OK
AT&P	OK
AT&Q	OK
AT&R	OK
AT&Y	OK
AT+GOI	OK
AT+GCI	OK



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