

ONCEIL™ G2150I AT Command Set

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www.moxa.com/product

MOXA®

Moxa Technologies Co., Ltd.

Tel: +886-2-8919-1230

Fax: +886-2-8919-1231

Web: www.moxa.com

MOXA Technical Support

Worldwide: support@moxa.com

The Americas: support@usa.moxa.com

OnCell G2150I AT Command Set

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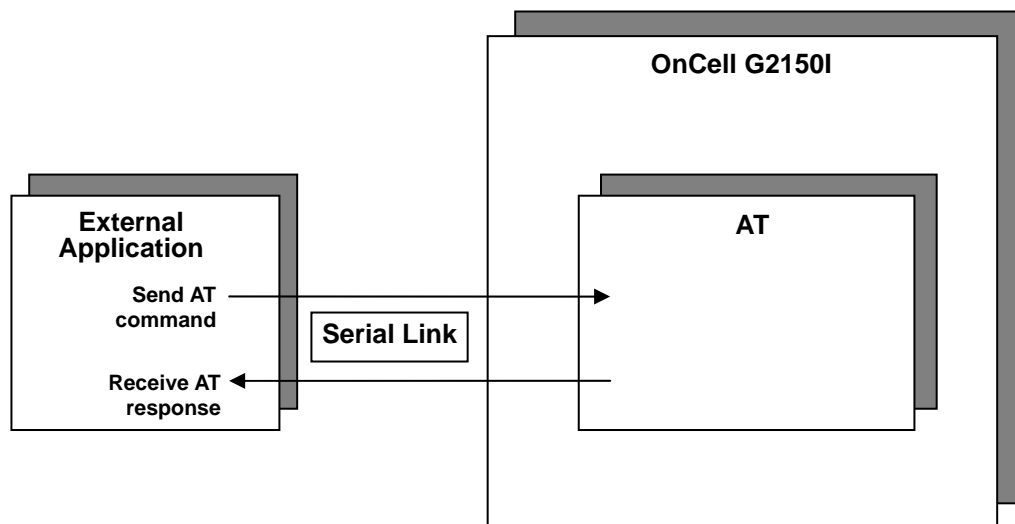
Introduction

This chapter is an introduction to the OnCell G2150I AT Command Set. The following topics are covered:

- Scope of the Document**
- Related Documents**
- ETSI Secretariat**
- Abbreviations**
- Definitions**
- Presentation Rules**

Scope of the Document

This document describes the AT-command based messages exchanged between an application and the OnCell G2150I for managing GSM related events or services.



Related Documents

The interface specifications described here are based on the following recommendations:

- [1] ETSI GSM 07.05: Digital cellular telecommunications system (Phase 2); Use of DTE-DCE interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)
- [2] ETSI GSM 07.07: Digital cellular telecommunications system (Phase 2); AT command set for GSM Mobile Equipment (ME)
- [3] ITU-T Recommendation V.25ter: Serial asynchronous automatic dialing and control
- [4] ETSI GSM 03.40: Digital cellular telecommunications system (Phase 2); Technical implementation of the Short Message Service (SMS) Point-to-Point (PP)
- [5] ETSI GSM 03.38: Digital cellular telecommunications system (Phase 2); Alphabets and language-specific information
- [6] ETSI GSM 04.80: Digital cellular telecommunications system (Phase 2); Mobile radio interface layer 3, Supplementary service specification, Formats and coding
- [7] 3GPP 05.02: 3rd Generation Partnership Project; Technical Specification Group GSM/EDGE-Radio Access Network; Multiplexing and multiple access on the radio path – 3GPP TS 05.02 V6.9.2 (2001-04)

ETSI Secretariat

The following addresses may be of use in obtaining the latest GSM/GPRS recommendations:

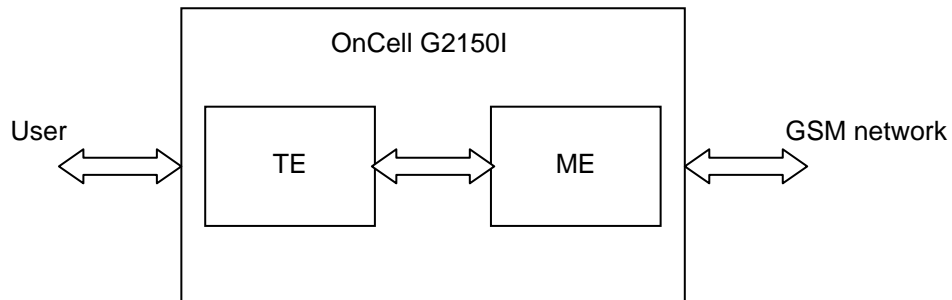
Postal address: F-06921 Sophia Antipolis CEDEX – France
Office address: 650 Route des Lucioles – Sophia Antipolis – Valbonne – France
Web address: <http://www.etsi.org/>
Tel: +33 4 92 94 42 00
Fax: +33 4 93 65 47 16

Abbreviations

ADN	Abbreviated Dialing Number (Phonebook)
AMR	Adaptive Multi-Rate
AMR-FR	AMR Full Rate (full rate speech Version3)
AMR-HR	AMR Half Rate (half rate speech version 3)
AOC	Advice Of Charge
ASCII	Standard characters table (1 byte coding)
AT	Modem Hayes commands prefix (for "ATtention")
BCCH	Broadcast Channel
BER	Bit Error Rate
CLI	Client Line Identification
CSD	(GSM data call)
CTS	Clear To Send signal
CUG	Closed User Group
DTMF	Dual Tone Multi-Frequency
DTR	Data Terminal Ready
EEPROM	Electrically Erasable Programming Only Memory
EFR	Enhanced Full Rate (full rate speech version 2)
E-ONS	Enhanced Operator Name Service
FDN	Fixed Dialing Number (Phonebook)
FR	Full Rate (full rate speech version 1)
GPRS	General Packet Radio Service
GSM	Global System for Mobile communication
HR	Half Rate (half rate speech version 1)
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
MCC	Mobile Country Code
ME	Mobile Equipment
MNC	Mobile Network Code
MOC	Mobile Originated Call (outgoing call)
MS	Mobile Station
MTC	Mobile Terminated Call (incoming call)
NITZ	Network Information and Time Zone
OPL	Operator PLMN List
PC	Personal Computer
PIN	Personal Identification Number
PLMN	Public Land Mobile Networks
PNN	PLMN Network Name
PPP	Point-to-Point Protocol
PSTN	Public Switched Telephone Network
PUK	PIN Unlock Key
RIL	Radio Interface Layer
RSSI	Received Signal Strength Indication
RTS	Ready To Send signal
SIM	Subscriber Information Module
SMS	Short Message Service
SPN	Service Provider Name
TE	Terminal Equipment
UCS2	Characters table (2 bytes coding)
UIH	Unnumbered Information with Header check

Definitions

The words “Mobile Station” (MS) or “Mobile Equipment” (ME) are used for mobile terminals that support GSM services. Terminal Equipment (TE) is the Human Machine Interface (HMI) of a GSM device (modem or handset). TE can be a handset HMI or the AT command line interface.



A call from a GSM mobile station to the PSTN is called a “mobile originated call” (MOC) or “outgoing call,” and a call from a fixed network to a GSM mobile station is called a “mobile terminated call” (MTC) or “incoming call.”

Presentation Rules

In the remainder of this document, AT commands are presented in three parts. A “Description” paragraph provides general information about the AT command (or response) behavior. A “Syntax” paragraph describes how to use the command, and gives possible responses in a readable format. A “Defined values” paragraph provides parameter values, and the AT command for the corresponding responses. Schemas are provided where necessary.

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AT Command Features

This chapter includes information about the AT Command Features of the OnCell G2150I. The following topics are covered in this chapter:

- Serial Line Settings**
- Command Line**
- Information Response and Result Codes**

Serial Line Settings

A serial link handler is configured with the following default values (factory settings):

- 115200 bps
- 8 data bits
- 1 stop bit
- no parity
- RTS/CTS flow control

Use the +IPR, +IFC, and +ICF commands to change these settings.

Command Line

Commands always start with AT (which means ATtention) and finish with a <CR> character.

Information Response and Result Codes

Responses start and end with <CR><LF> (except for the ATV0 DCE response format) and the ATQ1 (result code suppression) commands.

- If the command syntax is incorrect, the “ERROR” string is returned.
- If the command syntax is correct, but the command is transmitted with the wrong parameters, the +CME ERROR: <Err> or +CMS ERROR: <SmsErr> strings are returned with adequate error codes if CMEE was previously set to 1. By default, CMEE is set to 0, and the error message is only “ERROR.”
- If the command line has been executed successfully, an “OK” string is returned.

In some cases, such as “AT+CPIN?” or (unsolicited) incoming events, the product does not return the “OK” string as a response.

In the following examples <CR> and <CR><LF> are omitted intentionally.

General Commands

This chapter includes information about the General Commands of the OnCell G2150I. The following topics are covered in this chapter:

- Manufacturer Identification: +CGMI**
- Request Model Identification: +CGMM**
- Request Revision Identification: +CGMR**
- Product Serial Number: +CGSN**
- Select TE Character Set: +CSCS**
- Phonebook Character Set: +WPCS**
- Request IMSI: +CIMI**
- Card Identification: +CCID**
- Capabilities List: +GCAP**
- Repeat Last Command: A/Power Off: +CPOF**
- Set Phone Functionality: +CFUN**
- Phone Activity Status: +CPAS**
- Report Mobile Equipment Errors: +CMEE**
- Keypad Control: +CKPD**
- Clock Management: +CCLK**
- Alarm Management: +CALA**
- Generic SIM Access: +CSIM**
- Restricted SIM Access: +CRSM**
- Mobile Equipment Control Mode: +CMEC**
- Indicator Control: +CIND**
- Multiplexing Mode: +CMUX**

Manufacturer Identification: +CGMI

Description: This command gives the manufacturer identification.

Command syntax: AT+CGMI

Command	Possible Responses
AT+CGMI <i>Note: Get manufacturer identification</i>	WAVECOM MODEM OK <i>Note: Command valid, Wavecom modem</i>

Defined values: No parameters

Request Model Identification: +CGMM

Description: This command is used to get the supported frequency bands. With multi-band products the response may be a combination of different bands.

Command syntax: AT+CGMM

Command	Possible Responses
AT+CGMM <i>Note: Get hardware version</i>	MULTIBAND 900E 1800 OK <i>Note: Multi-band: GSM 900 MHz extended band and DCS 1800 (default configuration).</i>
AT+CGMM <i>Note: Get hardware version</i>	900E OK <i>Note: 900 extended</i>
AT+CGMM <i>Note: Get hardware version</i>	1800 OK <i>Note: DCS</i>
AT+CGMM <i>Note: Get hardware version</i>	1900 OK <i>Note: PCS</i>
AT+CGMM <i>Note: Get hardware version</i>	G850 OK <i>Note: GSM 850</i>
AT+CGMM <i>Note: Get hardware version</i>	MULTIBAND G850 1900 OK <i>Note: Multi-band: GSM 850 and PCS</i>

Defined values: No parameters

Request Revision Identification: +CGMR

Description: This command is used to get the revised software version. This function only applies to default IP addresses.

Command syntax: AT+CGMR

Command	Possible responses
AT+CGMR <i>Note: Get software version</i>	657_09gg.02406B 2015268 100506 17:01 OK <i>Note: Software release 6.57, generated on the 5th of October 2006</i>

Defined values: No parameters

Product Serial Number: +CGSN

Description: This command allows the user application to get the product's IMEI (International Mobile Equipment Identity, a 15 digit number).

Command syntax: AT+CGSN

Command	Possible responses
AT+CGSN <i>Note: Get the IMEI</i>	012345678901234 OK <i>Note: IMEI read from EEPROM</i>
AT+CGSN <i>Note: Get the IMEI</i>	+CME ERROR: 22 <i>Note: IMEI not found in EEPROM</i>

Defined values: No parameter

Select TE Character Set: +CSCS

Description: This command informs the ME which character set is used by the TE. The ME can convert each character of entered or displayed strings. This is used to send, read or write short messages. See also +WPCS for the phonebooks' character sets.

Command syntax: AT+CSCS =<Character Set>

Command	Possible responses
AT+CSCS="GSM" <i>Note: GSM default alphabet</i>	OK <i>Note: Command valid</i>
AT+CSCS="PCCP437" <i>Note: PC character set code page 437</i>	OK <i>Note: Command valid</i>
AT+CSCS=? <i>Note: Get possible values</i>	+CSCS: ("GSM","PCCP437","CUSTOM","HEX") OK <i>Note: Possible values</i>

Defined values: <Character Set>
 "GSM" GSM default alphabet.
 "PCCP437" PC character set code page 437.
 "CUSTOM" User defined character set (cf. +WCCS command).
 "HEX" Hexadecimal mode. No character set used; the user can read or write hexadecimal values.

Phonebook Character Set: +WPCS

Description: This specific command informs the ME which character set is used by the TE for the phonebooks. The ME can convert each character of entered or displayed strings. This is used to read or write phonebook entries (parameters <text>, <address>, and <mail>). You may also refer to the definition of +CSCS above.

Command syntax: AT+WPCS=<Character Set>

Command	Possible responses
AT+WPCS="TRANSPARENT" <i>Note: Transparent mode</i>	OK <i>Note: Command valid</i>
AT+ WPCS ="CUSTOM" <i>Note: Custom character set</i>	OK <i>Note: Command valid</i>
AT+WPCS=? <i>Note: Get possible values</i>	+WPCS:(“TRANSPARENT”,“HEX”,“CUSTOM”) OK <i>Note: Possible values</i>

Defined values: <Character Set>

- “TRANSPARENT” Transparent mode. The strings are displayed and entered as they are stored in SIM or in ME.
- “CUSTOM” User defined character set (cf. +WCCS command).
- “HEX” Hexadecimal mode. No character set used; the user can read or write hexadecimal values.

Request IMSI: +CIMI

Description: This command is used to read and identify the IMSI (International Mobile Subscriber Identity) of the SIM card. The PIN may need to be entered before reading the IMSI.

Command syntax: AT+CIMI

Command	Possible responses
AT+CIMI <i>Note: Read the IMSI</i>	208200120320598 OK <i>Note: IMSI value (15 digits), starting with MCC (3digits) /MNC (2digits, 3 for PCS 1900)</i>

See appendix 19 Codes and values for MCC / MNC description.

Defined values: No parameters

Card Identification: +CCID

Description: This command orders the product to read the EF-CCID file on the SIM card.

Command syntax: AT+CCID

Command	Possible responses
AT+CCID <i>Note: Get card ID</i>	+CCID:"123456789AB111213141" OK <i>Note: EF-CCID is present, hexadecimal format</i>
AT+CCID? <i>Note: Get current value</i>	+CCID:"123456789AB111213141" OK <i>Note: Same result as +CCID</i>

AT+CCID=? <i>Note: Get possible value</i>	OK <i>Note: No parameter but this command is valid</i>
--	---

Note: if there is no EF-CCID file present on the SIM, the +CCID answer will not be sent, but the OK message will be returned.

Defined values: No parameter

Capabilities List: +GCAP

Description: This command gets the complete list of capabilities.

Command syntax: AT+GCAP

Command	Possible responses
AT+GCAP <i>Note: Get capabilities list</i>	+GCAP: +CGSM, +FCLASS OK <i>Note: Supports GSM and FAX commands</i>

Defined values: No parameter

Repeat Last Command: A/

Description: This command repeats the previous command. Only the A/ command itself cannot be repeated.

Command syntax: A/

Command	Possible responses
A/ <i>Note: Repeat last command</i>	

Defined values: No parameter

Power Off: +CPOF

Description: This specific command stops the GSM software stack as well as the hardware layer, or the G2150I activity. The AT+CFUN=0 command is equivalent to +CPOF.

Command syntax: Command syntax: AT+CPOF[=1]

Command	Possible responses
AT+CPOF <i>Note: Stop GSM stack</i>	OK <i>Note: Command valid</i>
AT+CPOF=1 <i>Note: Stop the Wireless CPU</i>	OK <i>Note: Command valid</i>

Note: After AT+CPOF=1, the G2150I will not respond to AT commands. To reset it, use the hard reset.

Note: In autobaud mode, after an AT+CPOF, unsolicited information waking up the G2150I is sent at 9600 bps until an AT command is sent. When an AT command is sent, the G2150I will synchronize with the sender's speed. (see CAUTION in § 14.1.1)

Defined values: No parameter

Set Phone Functionality: +CFUN

Description: This command selects the mobile station's level of functionality. When the application wants to stop the product with a power off, or if the application wants to force the product to execute an IMSI DETACH procedure, then it must send: AT+CFUN=0 (equivalent to

AT+CPOF). This command executes an IMSI DETACH and makes a backup copy of some internal parameters in SIM and in EEPROM. The SIM card cannot then be accessed. If the mobile equipment is not powered off by the application after this command has been sent, a re-start command (AT+CFUN=1) will have to issued to restart the whole GSM registration process. If the mobile equipment is turned off after this command, then a power on will automatically restart the whole GSM process. The AT+CFUN=1 command restarts the entire GSM stack and GSM functionality: a complete software reset is performed. All parameters are reset to their previous values if AT&W was not used. If you write entries in the phonebook (+CPBW) and then reset the product directly (AT+CFUN=1, with no previous AT+CFUN=0 command), some entries may not be written (the SIM task does not have enough time to write entries in the SIM card). In addition, the OK response will be sent at the last saved (AT&W) baud rate defined by the +IPR command. With the autobauding mode the response can be at a different baud rate. It is therefore preferable to save the defined baud rate with AT&W before directly sending the AT+CFUN=1 command.

Command syntax: AT+CFUN=<functionality level>

Command	Possible responses
AT+CFUN? <i>Note: Ask for current functionality level</i>	+CFUN: 1 OK <i>Note: Full functionality</i>
AT+CFUN=0 <i>Note: Set minimum functionality, IMSI detach procedure</i>	OK <i>Note: Command valid</i>
AT+CFUN=1 <i>Note: Set the full functionality mode with a complete software reset</i>	OK <i>Note: Command valid</i>

Defined values: <functionality level>

0: Set minimum functionality, IMSI detach procedure

1: Set the full functionality mode with a complete software reset

Phone Activity Status: +CPAS

Description: This command returns the activity status of the mobile equipment.

Command syntax: AT+CPAS

Command	Possible responses
AT+CPAS <i>Note: Current activity status</i>	+CPAS: <pas> OK

Defined values: <pas>

0 ready (allow commands from TA/TE)

1 unavailable (does not allow commands)

2 unknown

3 ringing (ringer is active)

4 call in progress 5 asleep (low functionality)

Report Mobile Equipment Errors: +CMEE

Description: This command disables or enables the use of the “+CME ERROR: <xxx>” or “+CMS ERROR:<xxx>” result code instead of simply “ERROR”.

Command syntax: Command syntax: AT+CMEE=<error reporting flag>

Command	Possible responses
AT+CMEE=?	+CMEE: (0,1) OK
AT+CMEE=0 <i>Note: Disable ME error reports, use only “ERROR”</i>	OK
AT+CMEE=1 <i>Note: Enable “+CME ERROR: <xxx>” or “+CMS ERROR: <xxx>”</i>	OK
AT+CMEE?	+CMEE: 1 OK

Defined values: <error reporting flag>

0: Disable ME error reports, use only « ERROR »

1: Enable «+CME ERROR: <xxx>» or «+CMS ERROR: <xxx>»

Keypad Control: +CKPD

Description: This command emulates the ME keypad by sending each keystroke as a character in a <keys> string. The supported GSM sequences are listed in the appendix. If emulation fails, a +CME ERROR: <err> is returned. If emulation succeeds, the result depends on the GSM sequence activated: Note: In the case where the FDN phonebook is activated, the sequences concerning “call forwarding” are allowed only if the entire sequence is written in the FDN.

Command syntax: AT+CKPD=<keys>

Command	Possible responses
AT+CKPD=“*#21#” <i>Note: Check every call forwarding status</i>	+CCFC: 0,7
AT+CKPD=“1234” <i>Note: Sequence not allowed</i>	+CME ERROR 3

Defined values: <keys> Keyboard sequence: string of the following characters (0-9,*,#).

Clock Management: +CCLK

Description: This command is used to set or get the current date and time of the ME real-time clock.

Command syntax: AT+CCLK=<date and time string>

Command	Possible responses
AT+CCLK=“00/06/09, 17:33:00” <i>Note: set date to June 9th, 2000, and time to 5:33 pm</i>	OK <i>Note: Date/Time stored</i>
AT+CCLK=“00/13/13, 12:00:00” <i>Note: Incorrect month entered</i>	+CME ERROR 3

AT+CCLK? <i>Note: Get current date and time</i>	+CCLK: "00/06/09, 17:34:23" OK <i>Note: current date is June 9th, 2000 current time is 5:34:23 pm</i>
--	--

Defined values: <date and time string>

String format for date/time is: "yy/MM/dd,hh:mm:ss".

Valid years are 00 (for 2000) to 99 (for 2099). The seconds field is not mandatory. Default date/time is "00/01/01,00:00:00" (January 1st, 2000 / midnight).

Alarm Management: +CALA

Description: This command is used to set alarms date/time in the ME. The maximum number of alarms is 16. Note: The date/time should be already set with AT+CCLK command before using AT+CALA.

Command syntax: AT+CALA=<date and time string> (set alarm)

AT+CALA="",<index> (delete alarm)

Command	Possible responses
AT+CALA="00/06/09, 07:30" <i>Note: set an alarm for June 9th, 2000 at 7:30 am</i>	OK <i>Note: Alarm stored</i>
AT+ CALA="99/03/05, 13:00:00" <i>Note: set an alarm for March 5th, 1999 at 1:00 pm</i>	+CME ERROR 3 <i>Note: Invalid alarm (date/time expired)</i>
AT+ CALA? <i>Note: list all alarms</i>	+CALA: "00/06/08, 15:25:00", 1 +CALA: "00/06/09, 07:30:00", 2 +CALA: "00/06/10, 23:59:00", 3 <i>Note: three alarms are set (index 1, 2, 3)</i>
	+CALA: "00/06/08, 15:25:00", 1 <i>Note: an alarm occurs (index 1)</i>
AT+CALA="",3 <i>Note: delete alarm index 3</i>	OK <i>Note: Alarm index 3 deleted</i>
AT+CALA? <i>Note: list all alarms</i>	+CALA: "00/06/09, 07:30:00", 2 <i>Note: Only one alarm (index 2)</i>

Defined values: <date and time string>

String format for alarms: "yy/MM/dd,hh:mm:ss" (see +CCLK).

Note: Seconds are taken into account.

<index> offset in the alarm list, range 1 to 16.

Generic SIM Access: +CSIM

Description: This command allows direct control of the SIM by a distant application on the TE. The <command> is sent without any modification to the SIM. In the same manner the SIM <response> is sent back by the ME as it is. **The user shall then take care of processing SIM information within the frame specified by GSM as specified in GSM 11.11(or 3GPP TS 51.011).** If operation mode is not allowed by the ME, +CME ERROR: <error> is returned. Between two successive +CSIM commands, there is no locking of the interface between the SIM and the GSM application. Since in this situation some command types and parameters can modify the wrong SIM files, some operations, described below, are not allowed for CSIM command. However, it is possible to process them with the CRSM command.

Command syntax: AT+CSIM=<length>,<command>

Command	Possible responses
AT+CSIM= <length>,<command>	+CSIM: <length>,<response> +CME ERROR: <err>
AT+CSIM?	OK
AT+CSIM=?	OK

Defined values: <length>: integer type

Length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response). For command sent to TE, This value must be in the range [10 – 522], or a CME_ERROR=3 is returned.

<command>: hexadecimal type

Command passed on by the MT to the SIM in the format as described in GSM 11.11 (or 3GPP TS 51.011) (hexadecimal character format; refer +CSCS)

Second Byte Value not supported:

Due to the absence of locking, a CME_ERROR=3 is returned for the following instructions (See CRSM commands):

- D6: UPDATE BINARY
- DC: UPDATE RECORD
- 32: INCREASE
- 44: REHABILITATE
- 04: INVALIDATE
- 88: RUN GSM ALGORITHM
- 20: VERIFY CHV
- 24: CHANGE CHV
- 26: DISABLE CHV
- 28: ENABLE CHV
- 2C: UNBLOCK CHV
- FA: SLEEP
- C0: GET RESPONSE

Second Byte Value warning:

Due to the absence of locking, the right response may not be returned for the following instructions (See CRSM commands).

- C2: ENVELOPE
- A2: SEEK
- A4: SELECT

Fifth Byte Value Restriction:

For the following instructions (Second Byte):

- A4: SELECT
- 10: TERMINAL PROFILE
- C2: ENVELOPE
- 14: TERMINAL RESPONSE
- A2: SEEK

the user must make sure that the value of the fifth Byte of the instruction corresponds to the length of bytes (data starting from 6th byte) which follow it.

The value of the Fifth Byte must be equal of the value: <length>/2 – 5, or the command is not sent to the SIM and CME_ERROR=3 is returned.

<error>: integer type

- 3: Wrong format or parameters of the command
- 13: SIM no response

<response>: hexadecimal type

Response to the command passed on by the SIM to the MT in the format as described in GSM 11.11 (or 3GPP TS 51.011) (hexadecimal character format; refer +CSCS)

Notes: The “READ RECORD” and “SEEK” actions on a transparent file return the status word

“9408”.

By using the AT+CSIM command, the “READ RECORD” and “SEEK” actions return 4, “9408” instead of CME ERROR:13.

Restricted SIM Access: +CRSM

Description: By using this command instead of Generic SIM Access the +CSIM TE application gives easier but more limited access to the SIM database. This command transmits to the MT the SIM <command> and its required parameters. As a response to the command, MT sends the actual SIM information parameters and response data. MT error result code +CME ERROR may be returned when the command cannot be passed to the SIM, but failure in the execution of the command in the SIM is reported in <sw1> and <sw2> parameters. As for the CSIM command, there is no locking between two successive commands. The user should be aware of the precedence of the GSM application commands to the TE commands.

Command syntax: AT+CRSM=<command>[,<field>[,<P1>,<P2>,<P3>[,<data>]]]

Command	Possible responses
+CRSM=<command>[,<field>[,<P1>,<P2>,<P3>[,<data>]]]	+CRSM: <sw1>,<sw2>[,<response>] +CME ERROR: <err>
AT+CRSM?	OK
AT+CRSM=?	OK

Defined values:

<command>: integer type

Command passed on by the MT to the SIM; refer to GSM 11.11 (or 3GPP51.011):

176 READ BINARY

178 READ RECO

192 GET RESPONSE

242 STATUS

all other values are reserved and the command will return +CME ERROR=3

NOTE 1: The MT internally executes all commands necessary for selecting the desired file, before performing the actual command.

<field>: integer type

This is the identifier of an elementary data file on the SIM. It is mandatory for every command except STATUS.

<field>: integer type

NOTE 2: The range of valid file identifiers depends on the actual SIM and is defined in GSM 11.11 (or 3GPP TS 51.011). Optional files may not be present at all. This value must be in the range [0 – 65535] else a CME_ERROR=3 is returned.

<P1>, <P2>, <P3>: integer type

Parameters passed on by the MT to the SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 11.11 (or 3GPP TS 51.011).

<data>: hex type

Information that will be written to the SIM (hexadecimal character format; refer +CSCS).

<sw1>, <sw2>: integer type

Information from the SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command.

<response>: hexadecimal type

Response of a successful completion of the command previously issued (hexadecimal character format; refer to +CSCS). STATUS and GET RESPONSE return data, which gives information about the current elementary data field. This information includes the type of file and its size (refer

to GSM 11.11 or 3GPP TS 51.011). After the READ BINARY or READ RECORD command, the requested data will be returned.

<error>: integer type

3: Wrong format or parameters of the command

13: SIM no response

Mobile Equipment Control Mode: +CMEC

Description: This command selects the equipment that operates the ME keypad, writes to MEi display and sets ME indicators. If operation mode is not allowed by the ME, +CME ERROR: <err> is returned

Command syntax: AT+CMEC=[<keyp>[,<disp>[,<ind>]]]

Response syntax: +CMEC: <keyp>,<disp>,<ind>

Command	Possible responses
AT+CMEC=[<keyp>[,<disp>[,<ind>]]]	+CME ERROR: <err>
AT+CMEC=[<keyp>[,<disp>[,<ind>]]]	OK
AT+CMEC?	+CMEC: 2,0,0 OK
AT+CMEC=?	+CMEC: (2),(0),(0) OK <i>Note: no change allowed</i>

Defined values:

<keyp>:

Defined values:

0: ME can be operated only through its keypad (execute command of +CKPD cannot be used)

1: ME can be operated only from TE (with command +CKPD)

2: ME can be operated from both ME keypad and TE

<disp>: 0: only ME can write to its display (command +CDIS can only be used to read the display)

1: only TE can write to ME display (with command +CDIS)

2: ME display can be written by both ME and TE

<ind>: 0: only ME can set the status of its indicators (command +CIND can only be used to read the indicators)

1: only TE can set the status of ME indicators (with command +CIND)

2: ME indicators can be set by both ME and TE

Indicator Control: +CIND

Description: This command is used to read or set the values of ME indicators. If ME does not allow setting of indicators or ME is not currently reachable, an error code is returned.

Command syntax:

Command Syntax: AT+CIND=[<ind>[,<ind>[,...]]]

Response syntax: +CIND: <ind>[,<ind>[,...]] or

+CIND: (<descr>,(list of supported <ind>s)) [,<descr>,(list of supported <ind>s)) [...]]

Command	Possible responses
AT+CIND=[<ind>[,<ind>[,...]]]	+CME ERROR: <err> <i>Note: ME not reachable</i>

AT+CIND? <i>Note: read ME indicators current values</i>	+CIND: <ind>[,<ind>[,...]] OK
AT+CIND?	+CIND: 2,2,1,0,0,0
AT+ CIND=? <i>Note: read ME indicators possible values</i>	+CIND: (<descr>,(list of supported<ind>s))[,<descr>,(list of supported <ind>s)][,...]] OK
AT+CIND?	+CIND: 1,2,1,1,0,0,0 <i>Note: battchg:1 – max=5, signal:2 – max=5, service:1 – we are registered on the network, message:1 – a SMS has been received, call:0 – no call in progress, roam:0 – not roaming, smsfull:0 – SIM card is not full of SMS</i>
AT+CIND=? <i>Note: read possible value for ME indicators</i>	+CIND: (“battchg”,(0-5)),(“signal”,(0-5)), (“service”,(0-1)), (“message”,(0-1)), (“call”,(0-1)), (“roam”,(0-1)), (“smsfull”,(0-2)) OK

Defined values:

<ind> integer type value, which shall be in range of corresponding <descr>:

- 0: indicator is OFF or in state which can be identified as “OFF” state
- 1: indicator is ON or in a state that is more substantial than “OFF” state
- 2: this value is more substantial than 1, and so on.

Note: If the indicator is a simple ON/OFF style element, it has values 0 and 1.

<descr>:

- “battchg”: battery charge level (0 - 5)
- “signal”: signal quality (0 - 5)
- “service”: service availability (0 - 1)
- “message”: message received (0 - 1)
- “call”: call in progress (0 - 1)
- “roam”: roaming indicator (0 - 1)
- “smsfull”: SMS memory storage status in the MT (0 - 2)
 - 0: memory locations are available
 - 1: memory full
 - 2: one SMS has been received in Service Center (SC) but the sms storage where this SMS tried to be stored is full.

Multiplexing Mode: +CMUX

Description: This command is used to manage (enable or disable) the 3GPP TS 27.010 multiplexing protocol control channel.

This command allows the multiplexing of 4 logical channels on a single UART. Two UARTs are available on the G2150I, but multiplexing can only apply to one. The client application may handle, by this means, up to 5 channels (4 logical multiplexed channels on a UART and 1 physical channel on the other UART).

Notes on speed and autobauding:

- The speed of the response is the same that the one of the received AT+CMUX command (prior to entering <mode>).
- It is recommended that, whenever the multiplexer control channel is released, the modem should assume an interface rate for autobauding purposes, irrespective of any previous higher speed selected.
- If a +CMUX command is issued while in any multiplexer mode, then that +CMUX

command is ignored and the modem will return a +CME ERROR: <err> response.

Restrictions

- Only basic option and UIH framing is supported.
- Only convergence layers type 1 and 3 are supported.
- Autobauding is not compliant with multiplexing mode. It is neither possible to start multiplexing when autobauding is active (AT+IPR=0), nor to set autobauding during multiplexing mode, since the multiplexer uses only a fixed baudrate. In the same way, the bit rate cannot be changed through the AT+IPR command while multiplexing mode is active. Therefore, the AT+IPR=<rate> command should not be used and will have no effect.
- Before starting multiplexing mode, port speed must be configured by the AT+IPR=<rate> command, to be compliant with values defined in 4.24.3 Defined valuesfor <port_speed> parameter.

Specific behaviors

- In multiplexing mode, AT configuration commands (AT+CMEE for example), will be applied to all logical channels.
- In multiplexing mode, unsolicited result code will be sent to all logical channels.
- Since AT commands are grouped by classes, launching an AT command from a port causes the lock of all commands belonging to the same class. If an AT command of the locked class is launched from another port, a +CME ERROR: 536 will occur as long as the class is not released (at first command completion time).
- In internal mode, if GPS is used on UART2, it is not possible to start multiplexing mode on UART2. In the same way, if multiplexing mode is started on UART2, it is not possible to use GPS in internal mode.
- If Bluetooth is started, it is not possible to start multiplexing mode on UART2. In the same way, if multiplexing mode is started on UART2, it is not possible to start Bluetooth.
- If TMT (Terminal Emulator) is launched on a specific UART, it is not possible to start multiplexing mode on this UART. TMT must be closed before starting multiplexing mode. On the other hand, as soon as multiplexing mode is started, HAPC can be started on a DLCi.
- After an AT+CFUN=1 command during a multiplexing mode session, multiplexing mode is automatically restarted by the modem with previous parameters and all previous opened DLCs are reopened with the speed of AT+IPR? Command.
- DCD, RI, and DTR signals are managed virtually; when V24 sets DCD, RI or DTR signals, an MSC frame is sent to the remote part to indicate a virtual state change. All is logical, no physical signal is involved.
- +++ Escape Sequence is always available to get offline.
- Flow control can be managed either physically, or virtually by MSC. By default, the G2150I manages hardware flow control on a UART, which becomes virtual on logical channels when some DLCs are opened.
- At multiplexing mode session stop, it is not necessary to reset the G2150I; it automatically goes back into AT mode.
- 2 timeouts are implemented for multiplexing mode connection:
 - Multiplexing mode starts the connection: 30 seconds. After this timeout, multiplexing mode is stopped and a previous physical port is reopened.
 - DLC inactivity timeout: 5 minutes This timeout is armed only if no DLC is opened, to avoid to be blocked into only DLC0 opening channel state. After this timeout, multiplexing mode stopped and previous physical port is reopened.

Command syntax:

AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>]]]]]]]

Response syntax:

+CMUX:<mode>,<subset>,<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3>

Command	Possible responses
AT+CMUX=? <i>Note: Get possible values</i>	MUX: (0),(0),(1-5),(1-255),(1-128),(0-255),(1-128),(1-128) OK
AT+CMUX? <i>Note: Get current values</i>	+CMUX:<mode>,<subset>,<port_speed>,<N1>,<T1>,<N2>,<T2>,<T3> OK <i>or</i> +CME ERROR: <err>
AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>]]]]]]] <i>Note: enter multiplex mode</i>	OK <i>or</i> +CME ERROR: <err>

Defined values:

<mode> multiplexer Transparency Mechanism

0: Basic option

<subset> This parameter defines the multiplexer control channel setup. A virtual channel may subsequently be set up differently but if there is no settings negotiation, the virtual channel will be set up according to the control channel <subset> setting.

0: UIH frames used only

<port_speed> transmission rate

1: 9600 bit/s

2: 19200 bit/s

3: 38400 bit/s

4: 57600 bit/s

5: 115200 bit/s

Note:

- If port speed is not configured by the at+CMUX command, the current <port_speed> is the same as that displayed by at+ipr? command.
- If port speed is configured by the AT+CMUX command, the AT+CMUX port speed setting is erasing the AT+IPR port speed
- At the end of the CMUX, the <port_speed> displayed is the same as that displayed by the at+ipr? command.

<N1> Maximum Frame Size

1-255

Default Value: 31

<T1> acknowledgement timer in units of 20 ms.

1-128 (1 unit <->20 ms).

Default Value: 5 (100 ms)

<N2> Maximum number of retransmission

0-255

Default Value: 3

<T2> response timer for the multiplexer control channel in units of 20 ms.

1-128 (1 unit <->20 ms).

Default Value: 15 (300 ms)

NOTE: <T2> must be longer than <T1>

<T3> wake up response timer in units of 2 seconds

1-128 (1 unit <->2 s).

Default Value: 5 (10 s)

Call Control Commands

This chapter includes information about the Call Control Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Dial Command: D**
- Hang-Up Command: H**
- Answer a Call: A**
- Remote Disconnection**
- Extended Error Report: +CEER**
- DTMF Signals: +VTD, +VTS**
- Redial Last Telephone Number: ATDL**
- Automatic Dialing with DTR: AT%Dn**
- Automatic Answer: ATSO**
- Incoming Call Bearer: +CICB**
- Single Numbering Scheme: +CSNS**
- Gain Control: +VGR, +VGT**

Dial Command: D

Description: The ATD command is used to set a voice, data or fax call. As per GSM 02.30, the dial command also controls supplementary services.

For a data or a fax call, the application sends the following ASCII string to the product (the bearer must be previously selected with the +CBST command):

ATD<nb>

Note: If a GPRS PPP session is already running, the setting of a CSD (GSM data call) is not supported.

For a voice call, the application sends the following ASCII string to the product: (the bearer may be selected previously; if not, a default bearer is used).

ATD<nb>; where <nb> is the destination phone number.

Emergency calls

The following Emergency Numbers are available without a SIM card:

000, 08, 110, 112, 118, 119, 911 and 999.

The following Emergency Numbers are available with a SIM card:

when EF_ECC file is missing from SIM: 112 and 911

when SIM includes an EF_ECC file: 112, 911 and any Emergency Numbers available in the EF_ECC file.

Please note that for an international number, the local international prefix does not need to be set (usually 00) but does need to be replaced by the '+' character.

Example: to set up a voice call to MOXA offices from another country, the AT command is: "ATD+886289191230;"

Note that some countries may have specific numbering rules for their GSM handset numbering.

The response to the ATD command is one of the following:

Verbose result code	Numeric code (with ATVO set)	Description
OK	0	If the call succeeds, for voice call only
CONNECT <speed>	10, 11, 12, 13, 14, 15	If the call succeeds, for data calls only, <speed> takes the value negotiated by the product
BUSY	7	If the called party is already in communication
NO ANSWER	8	If no hang up is detected after a fixed network time-out
NO ANSWER	3	Call setup failed or remote user release. Use the AT+CEER command to know the failure cause

Direct dialing from a phonebook (stored in the SIM card) can be performed with the following command:

ATD> <index>; to call <index> from the selected phonebook (by the +CPBS command)

ATD> "BILL"; to call "BILL" from the selected phonebook

ATD> mem <index> (mem is "SM", "LD", "MC", "ON", "ME", "RC", "MT" or "SN",

See +CPBS command) allows direct dialing from a phonebook number..

Command syntax: ATD<nb>[<I>][;]

ATD>[<mem>]<index>[<I>][;]

ATD>[<mem>]<name>[<I>][;]

Command	Possible responses
AT+CPBS? <i>Note: Which phonebook is selected?</i>	+CPBS:"SM",8,10 <i>Note: ADN phonebook is selected, 8 locations are used and 10 locations are available</i>
ATD>SM6; <i>Note: Call index 6 from ADN phonebook</i>	OK <i>Note: Call succeeds</i>

When the FDN phonebook has been locked, only numbers beginning with the digits of FDN phonebook entries can be called. For example, if "014629" is entered in the FDN phonebook all the phone numbers beginning with these 6 digits can be called. The CLIR supplementary service subscription can be overridden for this call only.

"I" means "invocation" (restrict CLI presentation).

"i" means "suppression" (allow CLI presentation).

Control of CUG supplementary service information by "G" or "g" is allowed for this call only. The index and info values set with the +CCUG command are used. An outgoing call attempt could be refused if the AOC service is active and credit has expired (NO CARRIER). When trying to set up an outgoing call while there is an active call, the active call is first put on hold, then the call set up is carried out. As per GSM 02.30, GSM sequences may be controlled using dial commands. These sequences can contain "*", "#", but ";" is forbidden. If the sequence is not supported or fails, +CME ERROR: <err> is returned. In the case where the FDN phonebook is activated, the sequence concerning call forwarding are allowed only if there are written in the FDN. See paragraph 19 Codes and values to have the list of supported sequences.

Command	Possible responses
ATD*#21# <i>Note: Check any call forwarding status</i>	+CCFC: 0,7 <i>Note: No call forwarding</i>
ATD**61*+33146290800**25# <i>Note: Register call forwarding on no reply, with no reply timer fixed at 25 s.</i>	OK <i>Note: done</i>
ATD*2# <i>Note: Bad sequence</i>	+CME ERROR 3

Defined values:

<nb> destination phone number

<I> (optional parameter) "I" means "invocation" (restrict CLI presentation). "i" means "suppression" (allow CLI presentation).

<mem> phonebook (one of "SM", "LD", "MC", "ON", "ME", "RC", "MT" or "SN"). A default value can be selected by +CPBS command.

<index> call number at indicated offset from the phonebook selected by the +CPBS command

<name> call number corresponding to given name from the phonebook selected by the +CPBS command

Hang-Up Command: H

Description: The ATH (or ATH0) command is used by the application to disconnect the remote user. In the case of multiple calls, all calls are released (active, on-hold and waiting calls). The specific G2150I ATH1 command has been appended to disconnect the current outgoing call, only in dialing or alerting state (i.e. ATH1 can be used only after the ATD command, and before its terminal response (OK, NO CARRIER, ...)). It can be useful in the case of multiple calls.

Command syntax: ATH<n>

Command	Possible responses
ATH <i>Note: Ask for disconnection</i>	OK <i>Note: Every call, if any, are released</i>
ATH1 <i>Note: Ask for outgoing call disconnection</i>	OK <i>Note: Outgoing call, if any, is released</i>

Defined values: <n>

0: Ask for disconnection (default value)

1: Ask for outgoing call disconnection

Answer a Call: A

Description: When the product receives a call, it sets the RingInd signal and sends the ASCII “RING” or “+CRING: <type>” string to the application (+CRING if the cellular result code +CRC is enabled). Then it waits for the application to accept the call with the ATA command.

Command syntax: ATA

Command	Possible responses
	RING <i>Note: Incoming call</i>
ATA <i>Note: Answer to this incoming call</i>	OK <i>Note: Call accepted</i>
ATH <i>Note: Disconnect call</i>	OK <i>Note: Call disconnected</i>

Defined values: No parameter

Remote Disconnection

This message is used by the product to inform the application that an active call has been released by the remote user. The product sends “NO CARRIER” to the application and sets the DCD signal. In addition, for AOC, the product can release the call if credit has expired (release cause 68 with +CEER command).

Extended Error Report: +CEER

Description: This command gives the cause of call release when the last call set up (originating or answering) failed.

Command syntax: AT+CEER

Command	Possible responses
ATD123456789; <i>Note: Outgoing voice call</i>	NO CARRIER <i>Note: Call setup failure</i>
AT+CEER <i>Note: Ask for reason of release</i>	+CEER: Error <xxx> OK <i>Note: <xxx> is the cause information element values from GSM recommendation 04.08 or specific Call accepted</i>

“NO CARRIER” indicates that the AT+CEER information is available for failure diagnosis.

Defined values: No parameter

DTMF Signals: +VTD, +VTS

+VTD description: The product enables the user application to send DTMF tones over the GSM network. This command is used to define tone duration (the default value is 70 ms \pm 5 ms, according to 3GPP 23.014).

Command syntax: AT+VTD=<n>

Command	Possible responses
AT+VTD=6 <i>Note: To define 600 ms tone duration</i>	OK <i>Note: Command valid</i>
AT+VTD=0 <i>Note: To set the default value (70\pm5 ms)</i>	OK
AT+VTD? <i>Note: interrogate current tone duration</i>	+VTD: <n> OK
AT+VTD=?	+VTD: (0-255) OK

Defined values: <n>: tone duration

This refers to an integer <n> that defines the length of tones emitted as a result of the +VTS command. This does not affect the D command. A value different than zero causes a tone of duration <n>*100 milliseconds. A value of zero (default value) causes a tone duration of 70 \pm 5 ms. *Note:* The value is used modulo 256.

+VTS description: The product enables the user application to send DTMF tones over the GSM network. This command enables tones to be transmitted, only when there is an active call.

Command syntax: AT+VTS=<Tone>

Command	Possible responses
AT+VTS="A"	OK <i>Note: Command valid</i>
AT+VTS="11"	+CME ERROR: 3 <i>Note: If the <Tone> is wrong</i>
AT+VTS="4"	+CME ERROR: 3 <i>Note: If there is no communication</i>
AT+VTS="1";+VTS="3";+VTS="#" OK <i>Note: send tone sequence 13#</i>	

Defined values: <Tone>: DTMF tone to transmit
<Tone> is in {0-9,*,#,A,B,C,D}

Redial Last Telephone Number: ATDL

Description: This command is used by the application to redial the last number used in the ATD command. The last number dialed is displayed followed by ";" for voice calls only

Command syntax: ATDL

Command	Possible responses
ATDL <i>Note: Redial last number</i>	0146290800; OK <i>Note: Last call was a voice call. Command valid</i>

Defined values: No parameter

Automatic Dialing with DTR: AT%Dn

Description: This command enables and disables:

- automatic dialing of the phone number stored in the first location of the ADN phonebook (or FDN phonebook, if it is activated using +CLCK command).
 - automatic sending of the short message (SMS) stored in the first location of the SIM.
- The number is dialed when DTR OFF switches to ON. The short message is sent when DTR OFF switches to ON

Command syntax: AT%D<n>[;]

Command	Possible responses
AT%D1; <i>Note: Activates DTR voice number dialing</i>	OK <i>Note: Command has been executed</i>
DTR is OFF DTR switches ON <i>Note: The number in the first location of the ADN is dialed automatically DTR switches OFF Note: The product goes on-hook</i>	OK
AT%D2 <i>Note: Activates DTR short message sending</i>	OK <i>Note: Command has been executed</i>
DTR is OFF DTR switches ON <i>Note: The first short message is sending</i>	+CMSS: x
AT%D1;	OK
DTR is OFF DTR switches ON <i>Note: no phone number in the first location in the ADN phonebook (or FDN phonebook if it's activated using +CLCK command)</i>	+CME ERROR: 21

Command	Possible responses
AT%D2	OK
<i>DTR is OFF DTR switches ON Note: no short message in the first location of the SIM.</i>	+CMS ERROR: 321

Defined values:

- <n> (0-2) To enable or disable automatic message transmission or number dialing. Informs the product that the number is a voice number, rather than a fax or data number.
- AT%D0 Disables automatic DTR number dialing / message transmission.
- AT%D1; Enables automatic DTR dialing if DTR switches from OFF to ON; Dials the phone number in the first location of the ADN phonebook (or FDN phonebook, if it is

- activated using +CLCK command). Voice call (with semi-colon).
- AT%D1 Activates automatic DTR dialing if DTR switches from OFF to ON; Dials the phone number in the first location of the ADN phonebook (or FDN phonebook, if it is activated using +CLCK command). Data or Fax call (without semi-colon).
- AT%D2 Activates automatic DTR short message transmission if DTR switches from OFF to ON. Sends the short message in the first location of the SIM.

If the first location is empty:

- AT%D1 and AT%D2 commands will receive an OK response
- The DTR ON event will trigger a CME ERROR: 21 or a CMS ERROR: 321.

Automatic Answer: ATSO

Description: This S0 parameter determines and controls the product automatic answering mode.

Command syntax: ATSO=<value>

Command	Possible responses
ATSO=2 <i>Note: Automatic answer after 2 rings</i>	OK
ATSO? <i>Note: Current value</i>	002 OK <i>Note: always 3 characters padded with zeros</i>
ATSO=0 <i>Note: No automatic answer</i>	OK <i>Note: Command valid</i>

All others S-parameters (S6,S7,S8 ...) are not implemented.

Defined values: <value>

number of rings before automatic answer (3 characters padded with zeros). Range of values is 0 to 255

Incoming Call Bearer: +CICB

Description: This specific command is used to set the type of incoming calls when no incoming bearer is given (see +CSNS).

Note: setting the +CICB command affects the current value of +CSNS.

Command syntax: AT+CICB=<mode>

Command	Possible responses
AT+CICB=1 <i>Note: If no incoming bearer, force a fax call</i>	OK <i>Note: Command accepted</i>
AT+CICB=2 <i>Note: If no incoming bearer, force a voice call</i>	OK <i>Note: Command accepted</i>
AT+CICB? <i>Note: Interrogate value</i>	+CICB: 2 OK <i>Note: Default incoming bearer: voice call</i>
AT+CICB=? <i>Note: Test command</i>	+CICB: (0-2) OK <i>Note: Speech, data or fax default incoming bearer</i>

Defined values: <mode>

- 0: Data
- 1: Fax
- 2: Speech

Single Numbering Scheme: +CSNS

Description: This command selects the bearer to be used when an MT single numbering scheme call is set up (see +CICB).

Note: Setting the +CSNS command affects the current value of +CICB.

Command syntax: AT+CSNS

Command	Possible responses
AT+CSNS=2 <i>Note: force a fax call</i>	OK <i>Note: Command accepted</i>
AT+CSNS=0 <i>Note: force a voice call</i>	OK <i>Note: Command accepted</i>
AT+CSNS? <i>Note: Interrogate value</i>	+CSNS: 0 OK <i>Note: Default incoming bearer: voice call</i>
AT+CSNS=? <i>Note: Test command</i>	+CSNS: (0,2,4) OK <i>Note: Voice, data or fax default incoming bearer</i>

Defined values: <mode>

- 0: Data
- 1: Fax
- 2: Speech

Gain Control: +VGR, +VGT

Description: This command is used by the application to tune the receive gain of the speaker and the transmit gain of the microphone.

Command syntax: AT+VGR=<Rgain>
AT+VGT=<Tgain>

Command	Possible responses
AT+VGR=25	OK <i>Note: Command valid</i>
AT+VGT=45	OK <i>Note: Command valid</i>
AT+VGR? <i>Note: Interrogate value</i>	+VGR: 128 OK <i>Note: Default receive gain</i>
AT+VGR=? <i>Note: Test command</i>	+VGR: (0-255) OK <i>Note: Possible values</i>
AT+VGT? <i>Note: Interrogate value</i>	+VGT: 32 OK <i>Note: Default transmit gain</i>
AT+VGT=? <i>Note: Test command</i>	+VGT: (0-255) OK <i>Note: Possible values</i>

Note: For the AT+VGT ? command with controller 1 set, the value is the lower value of range, where as with controller 2, value correspond to the entered value with AT+VGT=xx.

Defined values:

<Rgain>: reception gain

<Tgain>: transmission gain

AT+VGR=<val>	for receive gain	AT+VGT=<val> Controller 1	for transmit gain Controller 1	AT+VGT=<val> Controller 2	for transmit gain Controller 2
0 to 15	+6 db	0 to 31	+30 db	0	+0 db
16 to 31	+4 db	32 to 63	+33 db	1	+0,5 db
32 to 47	+2 db	64 to 95	+36 db	2	+1 db
48 to 63	+0 db	96 to 127	+39 db	3	+1,5 db
64 to 79	-2 db	128 to 159	+42 db
80 to 95	-4 db	160 to 191	+45 db	19	+9,5 db
96 to 111	-6 db	192 to 223	+48 db	20	+10 db
112 to 127	-8 db	224 to 255	+51 db	21	+10,5 db
128 to 143	-10 db			22	+11 db
144 to 159	-12 db			23	+11,5 db
160 to 175	-14 db			...	
176 to 191	-16 db			58	+29 db
192 to 207	-18 db			59	+29,5 db
208 to 223	-20 db			60	+30 db
224 to 255	-22 db			61	+30,5 db
				62	+31 db
			
				101	+50,5 db
		102	+51 db		
		103 to 127	reserved		
		128 to 242	reserved		
		243	-6,5 db		
		244	-6 db		
		245	-5,5 db		
		246	-5 db		
			
		255	-0,5 db		

Network Service Commands

This chapter includes information about the Network Service Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Signal Quality: +CSQ**
- Operator Selection: +COPS**
- Network Registration: +CREG**
- Operator List Management: +WOLM**
- Read Operator Name: +WOPN**
- Selection of Preferred PLMN List: +CPLS**
- Preferred Operator List: +CPOL**
- Read Operator Name: +COPN**

Signal Quality: +CSQ

Description: This command is used to ascertain the received signal strength indication (<rss>) and the channel bit error rate (<ber>) with or without a SIM card inserted.

Command syntax: AT+CSQ

Command	Possible responses
AT+CSQ	+CSQ: <rss>,<ber> OK <i>Note: <rss> and <ber> as defined below</i>

Defined values:

<rss>:

- 0 13 dBm or less
- 1 11 dBm
- 2 to 30 -109 to -53 dBm
- 31 -51dBm or greater
- 99 not known or not detectable

<ber>:

- 0...7 as RXQUAL values in the table GSM 05.08
- 99 not known or not detectable

Operator Selection: +COPS

Description: There are three possible ways of selecting an operator (PLMN):

- The product is in manual mode. It then tries to find the operator specified by the application and if found, tries to register.
- The product is in automatic mode. It then tries to find the home operator and if found, tries to register. If not found, the product automatically searches for another network.
- The product enters into manual/automatic mode, and then tries to find an operator as specified by the application (as in manual mode). If this attempt fails, it enters automatic mode. If this is successful, the operator specified by the application is selected. The mobile equipment then enters into automatic mode.

Note: The read command returns the current mode and the currently selected operator. In manual mode, this PLMN may not be the one set by the application (as it is in the search phase).

These commands are not allowed during communication.

Command syntax: To force an attempt to select and register on a network, the application must send the following command:

Command syntax: AT+COPS=<mode>, [<format> [, <oper>]]

Possible responses for AT+COPS=<mode>:

ERROR Responses	Meaning
OK	Network is selected with full service
+CME ERROR: 30	No network service
+CME ERROR: 32	Network not allowed – emergency calls only
+CME ERROR: 3	Not allowed during Communication
+CME ERROR: 4	Incorrect parameters
+CME ERROR: 527	Please wait, and retry your selection later
+CME ERROR: 528	Location update failure – emergency calls only
+CME ERROR: 529	Selection failure – emergency calls only
+CME ERROR: 546	Emergency call is not allowed without SIM

+CME ERROR: 547	Emergency call is allowed without SIM
-----------------	---------------------------------------

Careful: Error code + CME ERROR: 546 or +CME ERROR: 547 are only returned if SIM is not present.

The fact that network supports emergency calls (+CME ERROR: 547) does not imply that emergency calls will work without a SIM. The only way to know it is to try atd112.

Response syntax for AT+COPS?:

+COPS: <mode> [, <format>, <oper>]

Response syntax for AT+COPS=?:

+COPS: [list of supported (<stat>, long alphanumeric <oper>, short alphanumeric <oper>s, numeric <oper>) s]

Notes:

- If an incoming call occurs during a PLMN list request, the operation is aborted (+CME ERROR: 520) and the unsolicited RING appears.
- If SPN (Service Provider Name) is present in the SIM, it will be returned in both long and short alphanumeric <oper> fields. The string in the “short” field will be the SPN truncated to the appropriate character number (10).

The following operations are allowed without a SIM inserted, or PIN activated:

AT+COPS? : get current PLMN
 AT+COPS=? : List allowed PLMN
 AT+COPS=1,2,<plmn> : Set manually current PLMN.

Command	Possible responses
AT+COPS? <i>Note: Ask for current PLMN</i>	+COPS: 0,2,20801 OK <i>Note: Home PLMN is France Telecom Orange</i>
AT+COPS=? <i>Note: Ask for PLMN list</i>	+COPS: (2,"F SFR","SFR","20810"), (3,"F-BOUYGUES TELECOM","BYTEL","20820"),(3,"Orange F","Orange","20801") OK <i>Note: Home PLMN is SFR, BYTEL and Orange networks have been detected</i>
AT+COPS=1,2,20810 <i>Note: Ask for registration on SFR network</i>	+CME ERROR: 32 <i>Note: Network not allowed – emergency calls only</i>
AT+COPS=1,2 ,23433 <i>Note: Ask for registration on UK Orange network</i>	+CME ERROR: 529 <i>Note: Selection failed – emergency calls only</i>
AT+COPS=0 <i>Note: Ask for registration in automatic mode</i>	OK <i>Note: Succeeded</i>
AT+COPS=3,0 <i>Note: Set <format> to long alphanumeric</i>	OK
AT+COPS? <i>Note: Ask for current PLMN</i>	+COPS: 0,0,"Orange F" OK <i>Note: Home PLMN is France Telecom Orange</i>

AT+COPS=2 <i>Note: Ask for deregistration from network</i>	OK <i>Note: Succeeded</i>
AT+COPS? <i>Note: Ask for current PLMN</i>	+COPS: 2 <i>Note: ME is unregistered until <mode>=0 or 1 is selected</i>

Defined values:

<mode>

0: automatic (default value)

1: manual

2: deregistration; ME will be unregistered until <mode>=0 or 1 is selected.

3: set only <format> (for read command AT+COPS?)

4: manual / automatic (<oper> shall be present), if manual selection fails, automatic mode is entered.

<format>: format of <oper> field

0: long alphanumeric format <oper>

1: short alphanumeric format <oper>

2: numeric <oper> (default value)

<stat>: status of <oper>

0: unknown

1: available

2: current

3: forbidden

<oper>: operator identifier (MCC/MNC in numeric format only for operator selection) The long alphanumeric format can be up to 16 characters long (see appendix 19 Codes and values for operator names description, field is "Name"). The short alphanumeric format can be up to 10 characters long.

Network Registration: +CREG

Description: This command is used by the application to ascertain the registration status of the product.

Command syntax: AT+CREG= <mode>
+CREG: <mode>, <stat> [,<lac>,<ci>] for AT+CREG? command only

Command	Possible responses
AT+CREG?	+CREG: <mode>,<stat> OK <i>Note: As defined here-above</i>
AT+CREG=0 <i>Note: Disable network registration unsolicited result code</i>	OK <i>Note: Command valid</i>
AT+CREG=1 <i>Note: Enable network registration unsolicited result code</i>	OK <i>Note: Command valid</i>
AT+CREG=2 <i>Note: Enable network registration and location information unsolicited result code</i>	OK <i>Note: Command valid</i>
AT+CREG=?	+CREG: (0-2) <i>Note: 0,1,2 <mode> values are supported</i>

Defined values:

<mode>

- 0: Disable network registration unsolicited result code (default)
 1: Enable network registration code result code +CREG: <stat>
 2: Enable network registration and location information unsolicited result code +CREG: <stat>,<lac>,<ci> if there is a change of network cell.
- <stat>
 0: not registered, ME is not currently searching for a new operator.
 1: registered, home network.
 2: not registered, ME currently searching for a new operator to register to.
 3: registration denied.
 4: unknown.
 5: registered, roaming.
- <lac>: string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).
 <ci>: string type; two byte cell ID in hexadecimal format.

Operator List Management: +WOLM

Description: This specific command allows a new or modified operator to be added to the PLMN list. At most 10 PLMNs can be created and stored in the flash memory. Please note that if two entries with the same network (MCC+MNC), but have different names, are entered, the first one will be taken into account to have the name.

Command syntax: AT+WOLM=<mode>,<loc>[,<NumOper>,<short name>,<long name>]

Response syntax for AT+WOLM=?:

OK

Response syntax for AT+WOLM?: (lists all the PLMN in this list)

+WOLM: <loc>,<NumOper>,<short name>,<long name>

+WOLM:

Command	Possible responses
AT+WOLM=1,1,20812,"WM","WM PLMN" <i>Note: Add a new PLMN at location 1</i>	OK
AT+WOLM=2,1 <i>Note: Read the PLMN at location 1</i>	+WOLM: 1,20812,"WM","WM PLMN" OK
AT+WOLM=2,11 <i>Note: Read the PLMN at location 11</i>	+CME ERROR: 21 <i>Note: Invalid index</i>
AT+WOLM=1,1,20812,"WM1","WM1 PLMN" <i>Note: Modify an existing PLMN</i>	OK <i>Note: Done</i>
AT+WOLM=? <i>Note: Test command</i>	OK
AT+WOLM? <i>Note: Interrogate current list</i>	+WOLM: 1,20812,"WM1","WM1 PLMN" OK <i>Note: List of the created PLMN in flash</i>
AT+WOLM=1,,20813,"PLMN2","PLMN2 LONG" <i>Note: Add a new PLMN at available location</i>	OK or +CME ERROR: 20 <i>Note: Error returns if no more PLMN can be created</i>
AT+WOLM=0,1 <i>Note: Delete an entry at location 1</i>	OK

AT+WOLM=0,11 <i>Note: Delete an entry at location 11</i>	+CME ERROR: 21 <i>Note: Invalid index</i>
---	--

Defined values:

<mode> :

0 delete

1 write

2 read

<loc> : location. If this parameter is not filled with <mode>=1, the location will be the first empty one.

<NumOper>: Operator in numeric format: MCC and MNC

<short name>: The short name of the PLMN

<long name>: The long name of the PLMN

Read Operator Name: +WOPN

Description: This specific command returns the operator name in alphanumeric format, the numeric format being given. With E-ONS (Enhanced Operator Name Service) feature, <lac> is an optional parameter to read names from OPL/PNN SIM files. If it is not entered, name will be given with current <lac>. Note that in limited service, current <lac> is set to 0. You can also erase NITZ PLMN names stored in Flash memory with “AT+WOPN=3,0”. When the G2150I receives an NITZ (Network Information and Time Zone) message with Long Name or Short Name information, an entry with registered PLMN and names in message is created in flash memory. These names will then be used with +COPS,+COPN,+WOPN, +CPOL commands with the priority order defined in 3GPP TS 22.101. The G2150I supports only network names with GSM default alphabet coding scheme. The user can choose which of the following methods will be used for getting PLMN names with command “AT+WOPN=4,<PlmnOns>”.

The priority order is:

- 1 - E-ONS First entry if on Home PLMN, or matching entry if existing in OPL/PNN SIM files
- 2 – CPHS if on Home PLMN, use SIM file CPHS ONS (0x6F14) for Long Name if present and SIM file CPHS SONS (0x6F18) for short name if present (if not, reuse SIM file CPHS ONS)
- 3 – SPN If on Home PLMN, use SIM file SPN (0x6F46) if present
- 4 – NITZ if there is a matching entry in the list of names received so far, use it. Note that in France for example, all the operators use NITZ message for Date and Time feature, but not for PLMN names, so the list is always empty. In France, an NITZ message is sent on a GPRS attachment.

FLASH If there is a matching entry in the flash PLMN list (created by +WOLM), use it.

- 5 - ROM PLMN names in ROM defined according to MoU SE.13 and NAPRD Operator Names documents

Once a long name is found following this priority order, it is given as a response to the AT command.

Refer to 3GPP TS 24.008, 3GPP TS 23.040, 3GPP TS 22.042 and COMMON PCN HANDSET SPECIFICATION CPHS Phase 2 v4.2 for more information.

Command syntax: AT+WOPN=<mode>,<NumOper>[,<lac>]

Response syntax: +WOPN: <mode>,<AlphaOper>

Command	Possible responses
AT+WOPN=? <i>Note: Test command</i>	OK
AT+WOPN=0,20801 <i>Note: Give an operator in numeric format</i>	+WOPN: 0,"Orange F" OK <i>Note: Alphanumeric answer</i>

AT+WOPN=0,99999 <i>Note: Give a wrong operator</i>	+CME ERROR: 22 <i>Note: Not found</i>
AT+WOPN=0,20801,36 <i>Note: Give an operator in numeric format for lac 36</i>	+WOPN: 0,"Orange F" OK <i>Note: Alphanumeric answer</i>
AT+WOPN=3,0 <i>Note: Erase NITZ PLMN names stored in flash memory</i>	OK
AT+WOPN=4 <i>Note: Read from EEPROM which method will be used for PLMN names.</i>	+WOPN: 31 OK
AT+WOPN=4,<PlmnOns> <i>Note: Write to EEPROM which method will be used for PLMN names.</i>	OK

Defined values:

- <mode> 0 Use long alphanumeric format
- 1 Use short alphanumeric format
- 2 Reserved for later use
- 3 Erase NITZ PLMN list if <NumOper> = 0
- 4 Access to EEPROM to read or write the method used for getting PLMN names.
Read access if <NumOper> omitted, write access if <NumOper>(<PlmnOns>) provided.

<NumOper> is the operator in numeric format.

<AlphaOper> is the operator in long or short alphanumeric format (see appendix 19 Codes and values for operator names description)

<lac> is the two bytes Location on Area Code to be used to get the PLMN name. If it is not entered, Current lac will be used (0 if limited service). It is provided as an integer value.

<PlmnOns> is a bit-field with following coding:

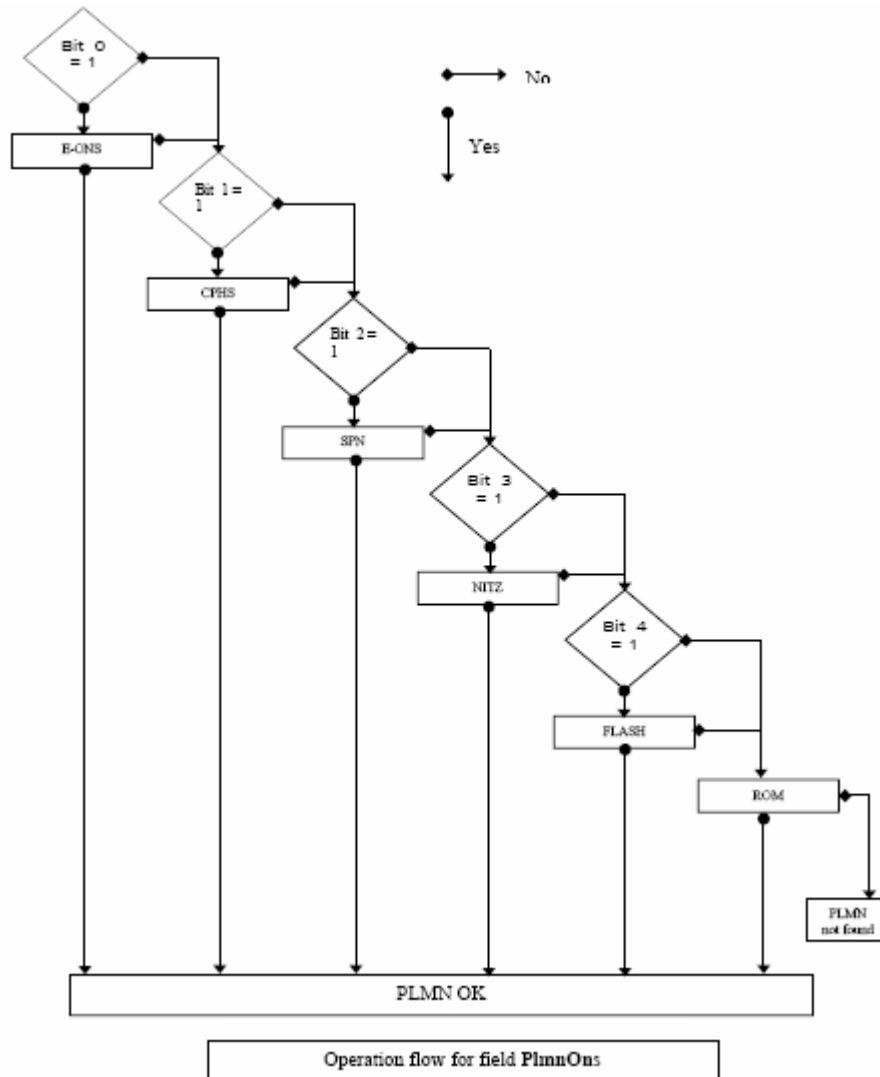
- bit 0 E-ONS
- bit 1 CPHS
- bit 2 SPN
- bit 3 NITZ
- bit 4 FLASH

Bit 4 (FLASH) Bit 3 (NITZ) Bit 2 (SPN) Bit 1 (CPHS) Bit 0 (E-ONS)

Bit value is 1 for Activate and 0 for Deactivate the method. <PlmnOns> value should be provided as a decimal value.

1 1 1 1 1

Note: For example, <PlmnOns>=31 means that the four methods will be used for PLMN names (bit-field value is 1111 or 0x1F).



Selection of Preferred PLMN List: +CPLS

Description: This command is used to select one PLMN selector with access technology list in the SIM card that is used by AT+CPL command.

Command syntax: AT+CPLS= <List>

Command	Possible responses
AT+CPLS?	+CPLS: 1 OK <i>Note: Ask for selection of the SIM file</i> <i>Note: EF_OPLMNwAct is selected</i>
AT+CPLS=0 <i>Note: selection of EF_PLMNwAct</i>	<i>Note: if EF_PLMNwAct is not present, EF_PLMNsel will be selected</i>
AT+CPLS=1 <i>Note: selection of EF_OPLMNwAct</i>	+CME ERROR: 3 <i>Note: EF_OPLMNwAct is not present</i>

AT+CPLS=? <i>Note: Get possible values</i>	+CPLS: (0,1,2) OK <i>Note: The 3 files with Acces technology are present and can be selected</i>
AT+CPLS=? <i>Note: Get possible values</i>	+CPLS: (0) OK <i>Note: Only EF_PLMNwAct or EF_PLMNsel can be selected</i>

Defined values: <List>:

- 0: User controlled PLMN selector with access technology EF_PLMNwAct. Note: if this file is not found EF_PLMNsel will be selected
- 1: Operator controlled PLMN selector with access technology EF_OPLMNwAct
- 2: Home PLMN selector with access technology EF_HPLMNwAct

Preferred Operator List: +CPOL

Description: This command is used to edit (or update) the SIM preferred list of networks. This list is read in the SIM file selected by the command AT+CPLS.

Command syntax: AT+CPOL= [<index>]
[,<format>,<oper>,<GSM_AcT>,<GSMcomp_Act>,<Utran_Act>]]

The different possibilities are:

- AT+CPOL= <index> to delete an entry.
- AT+CPOL= , <format> to set the format used by the read command (AT+CPOL?).
- AT+CPOL= , <format> , <oper> to put <oper> in the next free location.
- AT+CPOL= <index> , <format> , <oper> to write <oper> in the <format> at the <index>.
- AT+CPOL= <index>,<format>,<oper>,<GSM_AcT>,<GSMcp_Act>,<Utran_Act>

to write <oper> in the <format> at the <index> giving the access technology (in the case of EF_PLMNwact, EF_HPLMNwact or EF_OPLMNwact is present). Note: per default if Acces technology parameters are not given, the GSM access technology will be chosen.

The supported format are those of the +COPS command.

The length of this list is limited to 85 entries for EF_PLMNsel, and 51 for EF_PLMNwAct, EF_OPLMNwAct, EF_HPLMNwAct

Command	Possible responses
AT+CPOL? <i>Note: Ask for preferred list of networks with only EF_PLMNsel present</i>	+CPOL: 1,2,26201 +CPOL: 6,2,20810 OK <i>Note: Preferred list of networks in numeric format (read in EF_PLMNsel)</i>
AT+CPOL? <i>Note: Ask for preferred list of networks with EF_PLMNwAct selected and present</i>	+CPOL: 1,2,26201,1,0,0 +CPOL: 6,2,20810,1,0,0 OK <i>Note: Preferred list of networks in numeric format (read in EF_PLMNwAct) GSM access technology selected GSM compact access technology not selected Utran access technology not selected</i>

AT+CPOL=,0 <i>Note: Select long alphanumeric format</i>	OK
AT+CPOL? <i>Note: Ask for preferred list of networks with only EF_PLMNsel present</i>	+CPOL: 1,0,"D1-TELEKOM" +CPOL: 6,0,"F SFR" OK <i>Note: Preferred list of networks in long alphanumeric format</i>
AT+CPOL=7,2,20801 <i>Note: Add a network to the list</i>	OK
AT+CPOL? <i>Note: Ask for preferred list of networks with only EF_PLMNsel present</i>	+CPOL: 1,0,"D1-TELEKOM" +CPOL: 6,0,"F SFR" +CPOL: 7,0,"Orange F" OK <i>Note: Preferred list of networks in long alphanumeric format</i>
AT+CPOL=7 <i>Note: Delete 7th location</i>	OK

Command	Possible responses
AT+CPOL? <i>Note: Ask for preferred list of networks with only EF_PLMNsel present</i>	+CPOL: 1,0,"D1-TELEKOM" +CPOL: 6,0,"F SFR" OK <i>Note: Preferred list of networks in long alphanumeric format</i>
AT+CPOL=8,2,77777 <i>Note: Add a new network to the list ith only EF_PLMNsel present</i>	OK
AT+CPOL=8,2,77777,0,0,1 <i>Note: Add a new network to the list with EF_PLMNwact present</i>	OK <i>Note: Acces technology UTRAN is selected</i>
AT+CPOL=8,2,77777 <i>Note: Add a new network to the list with EF_PLMNwact present</i>	OK <i>Note: Per default Acces technology GSM is selected</i>
AT+CPOL? <i>Note: Ask for preferred list of networks with only EF_PLMNsel present</i>	+CPOL: 1,0,"D1-TELEKOM" +CPOL: 6,0,"F SFR" +CPOL: 8,2,77777" OK <i>Note: Preferred list of networks in long alphanumeric format but 8th entry is unknown so the product edits it in the numeric format</i>
AT+CPOL=9,0,"Orange F" <i>Note: Add a new network to the list (text format)</i>	
AT+CPOL? <i>Note: Ask for preferred list of networks with only EF_PLMNsel present</i>	+CPOL: 1,0,"D1-TELEKOM" +CPOL: 6,0,"F SFR" +CPOL: 8,2,77777" +CPOL: 9,0,"Orange F" OK <i>Note: Preferred list of networks in long alphanumeric format</i>

Defined values:

<index>: position of the operator record in the SIM preferred operator list. Use AT+CPOL=?

to get the maximum index of the selected EF.
 <format>:
 0 long alphanumeric format for <oper>
 1 short alphanumeric format for <oper>
 2 numeric format for <oper>
 <oper>: character string or integer (see <format>) indicating operator identifier.
 <GSM_Act>: GSM access technology
 <GSMcomp_Act>: GSM compact access technology
 <Utran_Act>: UTRA access technology
 0 access technology not selected
 1 access technology selected

Read Operator Name: +COPN

Description: This command returns the list of all operator names (in numeric and alphanumeric format) stored in the G2150I.

Command syntax: AT+COPN

Command response: +COPN: <NumOper>,<AlphaOper>

Command	Possible responses
AT+COPN <i>Note: Ask for preferred list of networks</i>	+COPN: 23201,"A1" +COPN: 23203,"A max." +COPN: 23207,"A tele.ring" +COPN: 23205,"one" ... OK +CME ERROR: <err>
AT+COPN=?	OK

Defined values:

<NumOper> is the operator in numeric format.

<AlphaOper> is the operator in long alphanumeric format (see appendix 19 Codes and values for operator names description)

6

Security Commands

This chapter includes information about the Security Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Enter PIN: +CPIN**
- Enter PIN2: +CPIN2**
- PIN Remaining Attempt Number: +CPINC**
- Facility Lock: +CLCK**
- Change Password: +CPWD**

Enter PIN: +CPIN

Description: This command is used to enter the ME passwords (CHV1 / CHV2 / PUK1 / PUK2, etc.), that are required before any ME functionality can be used. CHV1/CHV2 is between 4 and 8 digits long, PUK1/PUK2 is only 8 digits long.

If the user application tries to make an outgoing call before the SIM PIN code (CHV1) has been confirmed, then the product will refuse the “ATD” command with a “+CME ERROR: 11” (SIM PIN required).

The application is responsible for checking the PIN after each reset or power on if the PIN was enabled.

Command syntax: AT+CPIN=<pin>

Command	Possible responses
AT+CPIN=1234 <i>Note: Enter PIN</i>	OK <i>Note: PIN code is correct</i>
AT+CPIN=5678 <i>Note: Enter PIN</i>	+CME ERROR: 3 <i>Note: Operation not allowed, PIN previously entered</i>

After 3 unsuccessful attempts to enter the PIN (Personal Identification Number), the PUK (Personal Unblocking Key) will be required. PUK validation forces the user to enter a new PIN code as a second parameter and this will be the new PIN code if PUK validation succeeds. CHV1 is then enabled if PUK1 is correct. The application therefore uses this command:

AT+CPIN=<Puk>,<NewPin>

Command	Possible responses
AT+CPIN=00000000,1234 <i>Note: Enter PUK and new PIN</i>	+CME ERROR: 16 <i>Note: Incorrect PUK</i>
AT+CPIN=12345678,1234 <i>Note: Enter PUK and new PIN, 2nd attempt</i>	OK <i>Note: PUK correct, new PIN stored</i>

To ascertain which code must be entered (or not), the following query command can be used:

AT+CPIN?

The possible responses are:

+CPIN: READY	ME is not pending for any password
+CPIN: SIM PIN	CHV1 is required
+CPIN: SIM PUK	PUK1 is required
+CPIN: SIM PIN2	CHV2 is required
+CPIN: SIM PUK2	PUK2 is required
+CPIN: PH-SIM PIN	SIM lock (phone-to-SIM) is required
+CPIN: PH-NET PIN	Network personalization is required
+CME ERROR: <err>	SIM failure (13) absent (10) etc

Please note that in this case the mobile equipment does not end its response with the OK string. The response +CME ERROR: 13 (SIM failure) is returned after 10 unsuccessful PUK attempts. The SIM card is then out of order and must be replaced by a new one.

Example: 3 failed PIN validations + 1 successful PUK validation

AT+CPIN?	Read the PIN status
+CPIN: SIM PIN	The product requires SIM PIN
AT+CPIN=1235	First attempt to enter a SIM PIN
+CME ERROR: 16	Wrong PIN
AT+CPIN=1236	Second attempt
+CME ERROR: 16	Wrong PIN
AT+CPIN=1237	Third attempt
+CME ERROR: 16	Wrong PIN
AT+CPIN?	Read PIN state
+CPIN: SIM PUK	The product requires PUK
AT+CPIN=99999999,5678	The PUK is entered, the new PIN shall be 5678 PUK
OK	validation is OK. New Pin is 5678
AT+CPIN?	Read PIN state
+CPIN: READY	The product is ready

If the user tries to do something that requires PIN2 (CHV2), the product will refuse the action with a "+ CME ERROR: 17" (SIM PIN2 required). The product then waits for SIM PIN2 to be given. Of course, if SIM PIN2 is blocked, SIM PUK2 is required instead of SIM PIN2.

For example, the product needs PIN2 to write in the fixed dialing phonebook (FDN), so if SIM PIN2 authentication has not been performed during the current session, SIM PIN2 is required.

Command	Possible responses
AT+CPBS="FD" <i>Note: Choose FDN</i>	OK
AT+CPBW=5,"01290917",129,"Jacky" <i>Note: Write in FDN at location 5</i>	+CME ERROR: 17 <i>Note: SIM PIN2 is required</i>
AT+CPIN?	+CPIN: SIM PIN2 <i>Note: SIM PIN2 is required</i>
AT+CPIN=5678 <i>Note: Enter SIM PIN2</i>	OK
AT+CPBW=2,"01290917",129,"Jacky" <i>Note: Write in FDN at location 5</i>	OK <i>Note: Now writing in FDN is allowed</i>

Please note that the product only requests PIN2 or PUK2 once. Therefore, if they are not entered properly, the next + CPIN? command will return "+CPIN: READY".

Defined values:

<pin> Personal Identification Number. 4-digit number.

<puk> Personal Unblocking Key needed to change the PIN. 8-digit number.

Enter PIN2: +CPIN2

Description: This specific command is used to validate the PIN2 code (CHV2), or to validate the PUK2 code (UNBLOCK CHV2) and to define a new PIN Code. Of course, the +CPIN command allows PIN2 or PUK2 codes to be validated, but only when the last command executed resulted in PIN2 authentication failure.

PIN2 length is between 4 and 8 digits, PUK2 length is 8 digits only.

Command syntax: AT+CPIN2=<pin2>

Command	Possible responses
AT+CPIN2=1234 <i>Note: Enter PIN2</i>	OK <i>Note: PIN2 code is correct</i>

AT+CPIN2=5678 <i>Note: Enter PIN2</i>	+CME ERROR: 3 <i>Note: Operation not allowed, PIN2 previously entered</i>
--	--

After 3 unsuccessful attempts, PUK2 will then be required. PUK2 validation forces the user to enter a new PIN2 code as a second parameter and this will be the new PIN2 code if PUK1 validation succeeds. The application therefore uses this command:

AT+CPIN2=<puk2>,<NewPin2>

Command	Possible responses
AT+CPIN2=00000000,1234 <i>Note: Enter PUK2 and new PIN2</i>	+CME ERROR: 16 <i>Note: Incorrect Password (PUK2)</i>
AT+CPIN2=12345678,1234 <i>Note: Enter PUK2 and new PIN2, 2nd attempt</i>	OK <i>Note: PUK2 correct, new PIN2 stored</i>

To ascertain which code must be entered (or not), the following query command can be used:

AT+CPIN2?

The possible responses are:

+CPIN2: READY +CPIN2: SIM PIN2 +CPIN2: SIM PUK2 +CME ERROR: <err>	<i>No PIN2 is needed</i> <i>PIN2 is required</i> <i>PUK2 is required</i> <i>Absent (10) etc</i>
--	--

Defined values:

<pin2> Personal Identification Number 2.

<puk2> Personal Unblocking Key 2 needed to change the PIN2.

<Newpin2>

Note: PIN2 length is between 4 and 8 digits; PUK2 length is 8 digits only.

PIN Remaining Attempt Number: +CPINC

Description: This specific command is used to get the number of valid attempts for PIN1 (CHV1), PIN2 (CHV2), PUK1 (UNBLOCK CHV1), and PUK2 (UNBLOCK CHV2) identifiers.

Command syntax: AT+CPINC

Response syntax: +CPINC: <n1>,<n2>,<k1>,<k2>

Command	Possible responses
AT+CPINC <i>Note: Get the number of attempts left</i>	+CPINC: 2,3,10,10 OK <i>Note: First CHV1 attempt was a failure</i>
AT+CPINC? <i>Note: Get current values</i>	+CPINC: 2,3,10,10 OK <i>Note: First attempt was a failure</i>
AT+CPINC=? <i>Note: Get possible values</i>	OK

Defined values:

<n1>, <n2> are the attempts left for PIN1, PIN2 (0 = blocked, 3 max)

<k1>, <k2> are the attempts left for PUK1, PUK2 (0 = blocked, 10 max)

If the card is not present at the time of initialization, +CME ERROR: 10 will be sent.

Facility Lock: +CLCK

Description: This command is used by the application to lock, unlock, or interrogate an ME or network facility <fac>.

Note: Test SIM cards (with MCC=001 & MNC=01) do not check “PS”, “PN”, “PU”, “PP” and “PC” locks.

Command syntax: AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]

Response syntax: +CLCK: <status> [,<class1>]<CR><LF>

+CLCK: <status>,<class2> [...]]

Command	Possible responses
AT+CLCK="SC",1,1234 <i>Note: Enable PIN</i>	OK <i>Note: PIN was correct</i>
AT+CLCK? <i>Note: Read PIN status</i>	+CLCK:(("PS",0),("SC",0),("FD",0),("PN",0),("PU",0),("PP",0),("PC",0)) OK <i>Note: PIN is enabled, no SIM lock, no network lock, no information on Call barring (no longer supported in GSM 07.07)</i>
AT+CLCK="SC",0,5555 <i>Note: Disable PIN</i>	+CME ERROR: 16 <i>Note: PIN was wrong</i>
AT+CPIN=1234 <i>Note: Enter PIN</i>	OK <i>Note: PIN was good</i>
AT+CLCK=? <i>Note: Request supported facilities</i>	+CLCK: ("PS","SC","AO","OI","OX","AI","IR","AB","AC","FD","PN","PU","PP","PC") OK <i>Note: Supported facilities</i>
AT+CLCK="PN",1,12345678 <i>Note: Activate network lock</i>	OK Network lock activated
AR+CLCK="AO",1,1234,2 <i>Note: Activate all outgoing calls barring data calls</i>	OK <i>Note: Call barring is activated</i>
AT+CLCK="AO",2 <i>Note: Query BAOC status</i>	+CLCK: 1,2 OK <i>Note: BAOC activate for data calls only</i>
AT+CLCK="SC",0,0000 <i>Note: Disable PIN</i>	+CME ERROR: 521 <i>Note: PIN deactivation is forbidden with this SIM card</i>

Defined values:

<fac>: supported facilities

- “PS”: SIM lock facility with an 8-digit password.
- “SC”: PIN enabled (<mode> = 1) / disabled (<mode> = 0)
- “AO”: BAOC (Barr All Outgoing Calls)
- “OI” : BOIC (Barr Outgoing International Calls)
- “OX”: BOIC-exHC (Barr Outgoing International Calls except to Home Country)
- “AI” : BAIC (Barr All Incoming Calls)
- “IR” : BIC-Roam (Barr Inc. When Roaming outside Home Country)
- “AB”: All Barring services
- “AG”: All outGoing barring services

- “AC”: All inComing barring services
- “PN”: Network lock with an 8-digit password (NCK).
- “PU”: Network Subset lock with an 8-digit password (NSCK).
- “PP”: Service Provider lock with an 8-digit password (SPCK).
- “PC”: Corporate lock with an 8-digit password (CCK).
- “FD”: SIM Fixed Dialing Numbers (FDN) memory feature (PIN2 is required as <password>)

<mode>

- 0: unlock the facility
- 1: lock the facility
- 2: query status

<class>

- 1: Voice (telephony)
- 2: Data (apply to all bearer services)
- 4: Fax (facsimile services)
- 8: Short Message service
- 7: Voice, Data, and Fax (Default value)

Any attempt to combine different classes will result in activation / deactivation / interrogation of Voice, Data and Fax.

If <class> is omitted, the default value of 7 will be used.

Password maximum length is given with the AT+CPWD=? Command.

Note: It is not possible to lock the FDN phonebook if this one is not loaded.

Change Password: +CPWD

Description: This command is used by the application to change a password (PIN, call barring, NCK, etc.). The facility values (<fac>) are the same as for the +CLCK command with a "P2" facility to manage SIM PIN2. For the network lock ("PN"), unlocking is forbidden after 10 failed attempts to disable (unlock) the network lock with an incorrect password.

Command syntax: AT+CPWD= <fac>, <oldpwd>, <newpwd>

Command	Possible responses
AT+CPWD=? <i>Note: Possible values</i>	+CPWD: ("PS",8), ("SC",8), ("AO",4), ("OI",4), ("OX",4), ("AI",4), ("IR",4), ("AB",4), ("AG",4), ("AC",4), ("P2",8), ("FD",8), ("PN",8), ("PU",8), ("PP",8), ("PC",8) OK <i>Note: CHV1/CHV2 must be on 8 digits maximum (4 mini). For call barring, on 4 digits maximum</i>
AT+CPWD="SC",1234,5555 <i>Note: Change PIN</i>	OK <i>Note: PIN was correct</i>
AT+CPWD="SC",1234,5555 <i>Note: Change PIN</i>	+CME ERROR: 16 <i>Note: PIN was wrong</i>
AT+CPIN=5555 <i>Note: Enter PIN</i>	OK <i>Note: PIN was correct</i>
AT+CPWD="PN",12345678,00000000 <i>Note: Change NCK</i>	OK <i>Note: NCK changed for net lock</i>

Defined values:

<fac>: facility

- "PS"
- "SC"
- "AO"
- "OI"
- "OX"
- "AI"
- "IR"
- "AB"
- "AG"
- "AC"
- "P2"
- "FD"
- "N"
- "U"
- "P"
- "C"

<oldpwd>, <newpwd> On 4 or up to 8 or 16 digits according to the facility.

Short Message Commands

This chapter includes information about the Short Message Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Parameter Definitions**
- Select Message Service: +CSMS**
- New Message Acknowledgement: +CNMA**
- Preferred Message Storage: +CPMS**
- Preferred Message Format: +CMGF**
- Save Settings: +CSAS**
- Restore Settings: +CRES**
- Show Text Mode Parameters: +CSDH**
- New Message Indication: +CNMI**
- Read Message: +CMGR**
- List Message: +CMGL**
- Send Message: +CMGS**
- Write Message to Memory: +CMGW**
- Send Message From Storage: +CMSS**
- Set Text Mode Parameters: +CSMP**
- Delete Message: +CMGD**
- Service Center Address: +CSCA**
- Select Cell Broadcast Message Types: +CSCB**
- Cell Broadcast Message Identifiers: +WCBM**
- Message Status Modification: +WMSC**
- Message Overwriting: +WMGO**
- Un-change SMS Status: +WUSS**
- Copy Messages: +WMCP**
- More Messages to Send: +CMMS**

Parameter Definitions

<da>	Destination Address, coded like GSM 03.40 TP-DA
<dcs>	Data Coding Scheme, coded like in document [5].
<dt>	Discharge Time in string format: “yy/MM/dd,hh:mm:ss zz”(Year [00-99], Month [01-12], Day [01-31], Hour, Minute, Second and Time Zone [quarters of an hour]). Years range is [2000-2099]
<fo>	First Byte, coded like SMS-SUBMIT first byte in document [4], default value is 17 for SMS-SUBMIT
<index>	Place of storage in memory.
<length>	Text mode (+CMGF=1): number of characters PDU mode (+CMGF=0): length of the TP data unit in bytes
<mem1>	Memory used to list, read and delete messages (+CMGL, +CMGR and +CMGD).
<mem2>	Memory used to write and send messages (+CMGW, +CMSS).
<mem3>	Preferred memory to which received SMS are to be stored
<mid>	CBM Message Identifier.
<mr>	Message Reference.
<oa>	Originator Address.
<pid>	Protocol Identifier.
<pdu>	For SMS : GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format, coded as specified in doc [4] For CBS : GSM 03.41 TPDU in hexadecimal format
<ra>	Recipient Address.
<sca>	Service Center Address
<scst>	Service Center Time Stamp in string format: “yy/MM/dd,hh:mm:ss zz” (Year/Month/Day,Hour:Min:Seconds TimeZone)
<sn>	CBM Serial Number
<st>	Status of a SMS-STATUS-REPORT
<stat>	Status of message in memory.
<tooa>	Type-of-Address of <oa>.
<tora>	Type-of-Address of <ra>.
<tosca>	Type-of-Address of <sca>.
<total1>	Number of message locations in <mem1>.
<total2>	Number of messages locations in <mem2>.
<total3>	Number of messages locations in <mem3>.
<used1>	Total number of messages locations in <mem1>.
<used2>	Total number of messages locations in <mem2>.
<used3>	Total number of message locations in <mem3>.
<vp>	Validity Period of the short message, default value is 167

Select Message Service: +CSMS

Description: The supported services are originated (SMS-MO) and terminated short message (SMS-MT) + Cell Broadcast Message (SMS-CB) services.

Command syntax: AT+CSMS=<service>

Command	Possible responses
AT+CSMS=0 <i>Note: SMS AT command Phase 2 version 4.7.0</i>	+CSMS: 1,1,1 OK <i>Note: SMS-MO, SMS-MT and SMS-CB supported</i>
AT+CSMS=1 <i>Note: SMS AT command Phase 2 +</i>	+CSMS: 1,1,1 <i>Note: SMS-MO, SMS-MT and SMS-CB supported</i>
AT+CSMS? <i>Note: Current values ?</i>	+CSMS: 0,1,1,1 OK <i>Note: GSM 03.40 and 03.41 (SMS AT command Phase 2 version 4.7.0)</i>
AT+CSMS=? <i>Note: Possible services</i>	+CSMS: (0,1) OK

Defined values: <service>

0: SMS AT commands are compatible with GSM 07.05 Phase 2 version 4.7.0.

1: SMS AT commands are compatible with GSM 07.05 Phase 2 + version.

New Message Acknowledgement: +CNMA

Description: This command allows reception of a new message routed directly to the TE to be acknowledged.

- In TEXT mode, only positive acknowledgement to the network (RP-ACK) is possible.
- In PDU mode, either positive (RP-ACK) or negative (RP-ERROR) acknowledgement to the network is possible.

Acknowledge with +CNMA is possible only if the +CSMS parameter is set to 1 (+CSMS=1) when a +CMT or +CDS indication is shown (see +CNMI command). If no acknowledgement is given within the network timeout, an RP-ERROR is sent to the network, the <mt> and <ds> parameters of the +CNMI command are then reset to zero (do not show new message indication).

Command syntax in text mode: AT+CNMA

Command syntax in PDU mode: AT+CNMA [= <n> [, <length> [<CR>
PDU is entered <ctrl-Z / ESC>]]]

Note: PDU is entered using <ackpdu> format instead of <pdu> format (e.g.. SMSC address field is not present).

Example of acknowledgement of a new message in TEXT mode

Command	Possible responses
AT+CSMS=1 <i>Note: SMS AT commands compatible with GSM 07.05 Phase 2 + version</i>	OK
AT+CMGF=1 <i>Note: Set TEXT mode</i>	OK <i>Note: TEXT mode valid</i>

AT+CNMI=2,2,0,0,0 <i>Note: <mt>=2</i>	OK
	+CMT: "123456", "98/10/01,12:30 00+00", 129, 4, 32, 240, "15379", 129, 5<CR><LF> Received message <i>Note: message received</i>

Example of acknowledgement of a new message in PDU mode:

Command	Possible responses
AT+CSMS=1 <i>Note: SMS AT commands compatible with GSM 07.05 Phase 2 + version</i>	OK
AT+CMGF=0 <i>Note: Set PDU mode</i>	OK <i>Note: PDU mode valid</i>
AT+CNMI=2,2,0,0,0 <i>Note: <mt>=2</i>	OK
	+CMT: ,29 07913366003000F1240B913366920547 F30000003003419404800B506215D42E CFE7E17319 <i>Note: message received</i>
AT+CNMA=2,2<CR> >00D3 <Ctrl-Z> <i>Note: Negative ACK to the SMS. Reason is: memory capacity exceeded</i>	OK
AT+CNMA=2,2<CR> >00D0 <Ctrl-Z> <i>Note: Negative ACK to the SMS. Reason is: SIM memory storage is full</i>	OK
AT+CNMA=2,2<CR> >00D2 <Ctrl-Z> <i>Note: Negative ACK to the SMS. Reason is: Error in MS</i>	OK
AT+CNMA=2,2<CR> >00FF <Ctrl-Z> <i>Note: Negative ACK to the SMS. Unspecified error</i>	OK

Defined values:

- <n>: Type of acknowledgement in PDU mode
 - 0: send RP-ACK without PDU (same as TEXT mode)
 - 1: send RP-ACK with optional PDU message
 - 2: send RP-ERROR with optional PDU message
- <length>: Length of the PDU message Please refer to GSM 03.40 Recommendation for other PDU negative acknowledgement codes.

Preferred Message Storage: +CPMS

Description: This command allows the message storage area to be selected (for reading, writing, etc).

Command syntax: AT+CPMS=<mem1>,[<mem2>,[<mem3>]]

Command	Possible responses
AT+CPMS=? <i>Note: Possible message storages</i>	+CPMS: (("SM","ME","BM","SR"), ("SM","ME"), ("SM","ME")) OK <i>Note: Read, list, delete: SMS or SMS Status Report</i> Write, send: SMS
AT+CPMS? <i>Note: Read</i>	+CPMS: "SM",3,10,"SM",3,10,"SM",3,10 OK <i>Note: Read, write...SMS from/to SIM. 3 SMS are stored in SIM. 10 is the total memory available in SIM</i>
AT+CPMS="SM","ME","SM" <i>Note: Select SM for reading, ME for writing and SM for storing</i>	+CPMS: 3,10,3,99,3,10 OK
AT+CPMS? <i>Note: Read</i>	+CPMS: "SM",3,10,"ME",3,99,"SM",3,10 OK <i>Note: Read, store...SMS from/to flash, write SMS to flash. 3 SMS are stored in flash. 99 is the total memory available in flash</i>
	+CMTI: "SM",4 <i>Note: Receive a SMS stored in SIM at location 4</i>
AT+CPMS="ME","ME","ME" <i>Note: Select ME for reading, ME for writing and ME for storing</i>	+CPMS: 3,99,3,99,3,99 OK
AT+CPMS? <i>Note: Read</i>	+CPMS: "ME",3,99,"ME",3,99,"ME",3,99 OK <i>Note: Read, write, store SMS from/to flash. 3 SMS are stored in flash. 99 is the total memory available in flash</i>
	+CMTI: "ME",4 <i>Note: Receive an SMS stored in flash at location 4</i>
AT+CPMS="AM" <i>Note: Select wrong message storage</i>	+CMS ERROR: 302
AT+CPMS="SM" <i>Note: Select SM for reading, writing and storing memory are not changed</i>	+CPMS: 4,10,4,99,4,99 OK

AT+CPMS?	+CPMS: "SM",4,10,"ME",4,99,"ME",4,99 OK
<i>Note: Read</i>	<i>Note: Read SMS from SIM; write, store SMS from/to flash</i>

Defined values:

<mem1> Memory used to list, read, and delete messages. It can be:

- SM: SMS message storage in SIM (default)
- ME: SMS message storage in Flash.
- SR: Status Report message storage (in SIM if the EF-SMR file exists, otherwise in the ME non volatile memory)
- BM: CBM message storage (in volatile memory).

Note: "SR" ME non volatile memory is cleared when another SIM card is inserted. It is kept, even after a reset, while the same SIM card is used.

<mem2> Memory used to write and send messages

- SM: SMS message storage in SIM (default).
- ME: SMS message storage in Flash.

<mem3> Memory to which received SMS are preferred to be stored

- SM: SMS message storage in SIM (default).
- ME: SMS message storage in Flash.

If the command is correct, the following message indication is sent:

+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3>

When <mem1> is selected, all following +CMGL, +CMGR and +CMGD commands are related to the type of SMS stored in this memory.

The maximum number of SMS in flash is 99.

When the G2150I is switched on, <mem1>, <mem2>, and <mem3> are initialized to SM.

Preferred Message Format: +CMGF

Description: The message formats supported are text mode and PDU mode. In PDU mode, a complete SMS Message including all header information is given as a binary string (in hexadecimal format). Therefore, only the following set of characters is allowed: {0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F}. Each pair or character is converted to a byte (e.g.: '41' is converted to the ASCII character 'A', whose ASCII code is 0x41 or 65). In Text mode, all commands and responses are in ASCII characters. The selected format is stored in EEPROM by the +CSAS command.

Command syntax: AT+CMGF=<mode>

Command	Possible responses
AT+CMGF?	+CMGF:1 OK
<i>Note: Current message format</i>	<i>Note: Text mode</i>
AT+CMGF=?	+CMGF: (0,1) OK
<i>Note: Possible message format</i>	<i>Note: Text or PDU modes are available</i>

Example, sending an SMS Message in PDU mode

Command	Possible responses
AT+CMGF=0	OK
<i>Note: Set PDU mode</i>	<i>Note: PDU mode valid</i>
AT+CMGS=14<CR> 0001030691214365000004C9E9340B	+CMGS: 4 OK
<i>Note: Send complete MSG in PDU mode, no SC address</i>	<i>Note: MSG correctly sent, <mr> is returned</i>

Defined values:

<mode> PDU or text mode

0	PDU mode
1	Text mode

The <pdu> message is composed of the SC address (00 means no SC address given, use default SC address read with +CSCA command) and the TPDU message.

In this example, the length in bytes of the TPDU buffer is 14, coded as GSM 03.40

In this case the TPDU is: 0x01 0x03 0x06 0x91 0x21 0x43 0x65 0x00 0x00 0x04 0xC9 0xE9 0x34 0x0B, which means regarding GSM 03.40:

<fo> 0x01 (SMS-SUBMIT, no validity period)
 <mr> (TP-MR) 0x03 (Message Reference)
 <da> (TP-DA) 0x06 0x91 0x21 0x43 0x65 (destination address +123456)
 <pid> (TP-PID) 0x00 (Protocol Identifier)
 <dc> (TP-DCS) 0x00 (Data Coding Scheme: 7 bits alphabet)
 <length> (TP-UDL) 0x04 (User Data Length, 4 characters of text)
 TP-UD 0xC9 0xE9 0x34 0x0B (User Data: ISSY)

TPDU in hexadecimal format must be converted into two ASCII characters. For example, the byte 0x2A is presented to the ME as two characters '2' (ASCII 50) and 'A' (ASCII 65).

Save Settings: +CSAS

Description: All settings specified by the +CSCA and +CSMP commands are stored in EEPROM if the SIM card is a Phase 1 card or in the SIM card if it is a Phase 2 SIM card.

Command syntax: AT+CSAS

Command	Possible responses
AT+CSAS <i>Note: Store +CSCA and +CSMP parameters</i>	OK <i>Note: Parameters saved</i>

Defined values: No parameter

Restore Settings: +CRES

Description: All settings specified in the +CSCA and +CSMP commands are restored from EEPROM if the SIM card is Phase 1 or from the SIM card if it is a Phase 2 one.

Command syntax: AT+CRES

Command	Possible responses
AT+CRES <i>Note: Restore +CSCA and +CSMP parameters</i>	OK <i>Note: Parameters restored</i>

Defined values: No parameter

Show Text Mode Parameters: +CSDH

Description: This command gives additional information on text mode result codes. This information can be found in the description of the +CMT, +CMGR, +CMGL commands and responses.

Command syntax: AT+CSDH=<n>

Command	Possible responses
AT+CSDH=0 <i>Note: Set value to "do not show"</i>	OK
AT+CSDH? <i>Note: Current value</i>	+CSDH: 0 OK <i>Note: Do not show header values</i>

Defined values: <n>: show indicator

- 0: do not show header values
- 1: show the values in result codes

New Message Indication: +CNMI

Description: This command selects the procedure for message reception from the network.

Command syntax: AT+CNMI=<mode>,<mt>,<bm>,<ds>,<bfr>

Command	Possible responses
AT+CNMI=2,1,0,0,0 <i>Note: <mt>=1</i>	OK
	AT+CMTI: "SM",1 <i>Note: message received</i>
AT+CNMI=2,2,0,0,0 <i>Note: <mt>=2</i>	OK
	+CMT: "123456","98/10/01,12:30 00+00",129,4,32,240,"15379",129,5<CR><LF> <i>Note: message received</i>
AT+CNMI=2,0,0,1,0 <i>Note: <ds>=1</i>	OK
AT+CMGS="+33146290800"<CR> Happy Birthday !<ctrl-Z> <i>Note: Send a message in text mode</i>	+CMGS: 7 OK <i>Note: Successful transmission</i>
	+CDS: 2, 116, "+33146290800", 145, "98/10/01,12:30:07+04", "98/10/01 12:30:08+04", 0 <i>Note: message was correctly delivered</i>

Defined values:

- <mode>: controls the processing of unsolicited result codes
- 0: Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications
 - 1: Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE
 - 2: Buffer unsolicited result codes in the TA when TA-TE link is reserved and flush them to the TE after reservation. Otherwise forward them directly to the TE
 - 3: Forward unsolicited result codes directly to the TE. TA-TE link specific in-band used to embed result codes and data when TA is in on-line data mode

Important note: only <mode>=2 is supported.

Any other value for <mode> (0,1 or 3) is accepted (return code will be OK), but the processing of unsolicited result codes will be the same as with <mode>=2.

<mt>: sets the result code indication routing for SMS-DELIVER indications. Default is 1.

- 0: No SMS-DELIVER indications are routed.

- 1: SMS-DELIVERs are routed using unsolicited code: +CMTI: "SM",<index>
 - 2: SMS-DELIVERs (except class 2 messages) are routed using unsolicited code:
 - if PDU mode:
 - +CMT: [<alpha>], <length> <CR> <LF> <pdu>
 - if text mode:
 - +CMT: <oa>,<alpha>, <scts> [,<tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>] <CR><LF><data>
 - 3: Class 3 SMS-DELIVERs are routed directly using code in <mt>=2. Other classes messages result in indication <mt>=1
- <bm>: defines the rules for storing the received CBMs (Cell Broadcast Message) types. They depend also on the coding scheme (text or PDU) and the setting of Select CBM Types (see +CSCB command). Default is 0.
- 0: No CBM indications are routed to the TE. The CBMs are stored.
 - 1: The CBM is stored and an indication of the memory location is routed to the customer application using unsolicited result code: +CBMI: "BM", <index>
 - 2: New CBMs are routed directly to the TE using unsolicited result code. If PDU mode: If text mode: +CBM:<sn>,<mid>,<dcs>,<page>,<pages> <CR><LF> <data>
 - 3: Class 3 CBMs: as <bm>=2.
Other classes CBMs: as <bm>=1.
- <ds> for SMS-STATUS-REPORTs. Default is 0.
- 0: No SMS-STATUS-REPORTs are routed.
 - 1: SMS-STATUS-REPORTs are routed using unsolicited code:
 - f PDU mode:
 - +CDS: <length> <CR> <LF> <pdu> (PDU mode) or
 - If text mode:
 - +CDS: <fo>,<mr>, [<ra>] , [<tora>], <scts>,<dt>,<st> (Text mode)
 - 2: SMS-STATUS-REPORTs are stored and routed using the unsolicited result code: +CDSI: "SR",<index>
- <bfr> Default is 0.
- 0: TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> = 1 to 3 is entered (OK response shall be given before flushing the codes)
 - 1: TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.

Read Message: +CMGR

Description: This command allows the application to read stored messages. The messages are read from the memory selected by +CPMS command.

Command syntax: AT+CMGR=<index>

Response syntax for text mode:

- for SMS-DELIVER only +CMGR:<stat>,<oa>,<alpha>,<scts> [,<tooa>,<fo>, <pid>, <dcs>, <sca>, <tosca>, <length>] <CR><LF> <data>
- for SMS-SUBMIT only +CMGR: <stat>,<da>,<alpha>,<scts> [,<toda>, <fo>, <pid>, <dcs>, [<vp>], <sca>, <tosca>, <length>]<CR><LF> <data>
- for SMS-STATUS-REPORT only +CMGR: <stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st> ()

Response syntax for PDU mode:

- +CMGR: <stat>, [<alpha>], <length> <CR><LF> <pdu>

A message read with status "REC UNREAD" will be updated in memory with the status "REC READ".

Note: The <stat> parameter for SMS Status Reports is always "READ".

Command	Possible responses
	AT+CMTI: "SM",1 <i>Note: New message received</i>
AT+CMGR=1 <i>Note: Read the message</i>	+CMGR: "REC UNREAD", "0146290800", "98/10/01,18:22:11+00", <CR><LF> ABCdefGHI OK
AT+CMGR=1 <i>Note: Read the message again</i>	+CMGR: "REC READ", "0146290800", "98/10/01,18:22:11+00", <CR><LF> ABCdefGHI OK <i>Note: Message is read now</i>
AT+CMGR=2	OK <i>Note: location empty</i>
AT+CMGF=0 ;+CMGR=1 <i>Note: In PDU mode</i>	+CMGR: 2,,<length> <CR><LF><pdu> OK <i>Note: Message is stored but unsent, no <alpha>field</i>
AT+CMGF=1;+CPMS="SR";+CNMI=,,2 <i>Note: Reset to text mode, set read memory to "SR", and allow storage of further SMS Status Report into "SR" memory</i>	OK
AT+CMSS=3 <i>Note: Send an SMS previously stored</i>	+CMSS: 160 OK
	+CDSI: "SR",1 <i>Note: New SMS Status Report stored in "SR" memory at index 1</i>
AT+CMGR=1 <i>Note: Read the SMS Status Report</i>	+CMGR: "REC UNREAD",6,160, "+33612345678", 129, "01/05/31,15:15:09+00", "01/05/31,15:15:09+00", 0 OK

List Message: +CMGL

Description: This command allows the application to read stored messages, by indicating the type of the message to read. The messages are read from the memory selected by the +CPMS command.

Command syntax: AT+CMGL=<stat>

Response syntax for text mode:

- +CMGL: <index>,<stat>,<da/oa>,[<alpha>], [<scts>, <tooa/toda>, <length>]
<CR><LF><data> (for SMS-DELIVER and SMS-SUBMIT, may be followed by other
<CR><LF>+CMGL:<index>...) +CMGL:
<index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (for SMS-STATUS-REPORT
only, may be followed by other <CR><LF>+CMGL:<index>...)

Response syntax for PDU mode:

- +CMGL: <index>,<stat>, [<alpha>], <length> <CR><LF> <pdu> (for SMS-DELIVER,
SMS-SUBMIT and SMS-STATUS-REPORT, may be followed by other
<CR><LF>+CMGL:<index>...)

Command	Possible responses
AT+CMGL="REC UNREAD" <i>Note: List unread messages in text mode</i>	+CMGL: 1,"REC UNREAD","0146290800",, <CR><LF> I will be late +CMGL: 3,"REC UNREAD", "46290800",, <CR><LF>See you tonight ! OK <i>Note: 2 messages are unread, these messages will then have their status changed to "REC READ"</i>
AT+CMGL="REC READ" <i>Note: List read messages in text mode</i>	+CMGL: 2,"REC READ","0146290800",, <CR><LF> Keep cool OK
AT+CMGL="STO SENT" <i>Note: List stored and sent messages in text mode</i>	OK <i>Note: No message found</i>
AT+CMGL=1 <i>Note: List read messages in PDU mode</i>	+CMGL: 1,1,,26 <CR><LF> 07913366003000F3040B913366920547F40013 001190412530400741AA8E5A9C5201 OK

Defined values: <stat> possible values (status of messages in memory):

Text mode possible values	PDU mode possible values	Status of messages in memory
"REC UNREAD"	0	received unread messages
"REC READ"	1	received read messages
"STO UNSENT"	2	stored unsent messages
"STO SENT"	3	stored sent messages
"ALL"	4	all messages

Note: For SMS Status Reports, only "ALL" / 4 and "READ" / 1 values of the <stat> parameter will list messages; other values will only return OK.

Send Message: +CMGS

Description: The <address> field is the address of the terminal to which the message is sent. To send the message, simply type <ctrl-Z> character (ASCII 26). The text can contain all existing characters except <ctrl-Z> and <ESC> (ASCII 27). This command can be aborted using the <ESC> character when entering text. In PDU mode, only hexadecimal characters are used ('0'...'9','A'...'F').

Command syntax:

in text mode: AT+CMGS=<da> [,<toda>] <CR>
text is entered <ctrl-Z / ESC >
in PDU mode: AT+CMGS=<length> <CR>
PDU is entered <ctrl-Z / ESC >

Command	Possible responses
AT+CMGS="+33146290800"<CR>	
Please call me soon, Fred. <ctrl-Z> <i>Note: Send a message in text mode</i>	

	+CMGS: <mr>,, OK <i>Note: Successful transmission</i>
AT+CMGS=<length><CR> <i>Note: Send a message in PDU mode (1/3)</i>	
<pdu> <i>Note: Enter message in PDU mode (2/3)</i>	
<ctrl-Z> <i>Note: End the message (3/3)</i>	+CMGS: <mr> OK <i>Note: Successful transmission</i>

The message reference, <mr>, which is returned to the application, is allocated by the product. This number begins with 0 and is incremented by one for each outgoing message (successful and failure cases); it is cyclic on one byte (0 follows 255).

Note: This number is not a storage number – outgoing messages are not stored.

Write Message to Memory: +CMGW

Description: This command stores a message in memory (either SMS-SUBMIT or SMS-DELIVERS). The memory location <index> is returned (no choice possible as with phonebooks +CPBW).

Text or PDU is entered as described for the Send Message +CMGS command.

Command syntax:

in text mode:

- (<index> is returned in both cases) AT+CMGW=<oa/da> [,<toa/toda> [,<stat>]] <CR>
enter text <ctrl-Z / ESC>

in PDU mode:

- AT+CMGW=<length> [,<stat>] <CR>
give PDU <ctrl-Z / ESC>

Response syntax: +CMGW: <index> or +CMS ERROR: <err> if writing fails

Command	Possible responses
AT+CMGW="+33146290800"<CR>	
Hello how are you ?<ctrl-Z> <i>Note: Write a message in text mode</i>	
	+CMGW: 4 OK <i>Note: Message stored in index 4</i>
AT+ CMGW=<length><CR> <i>Note: Write a message in PDU mode (1/3)</i>	
<pdu> <i>Note: Enter message in PDU mode (2/3)</i>	
<ctrl-Z> <i>Note: End the message (3/3)</i>	+CMGW: <index> OK <i>Note: Message stored in <index></i>

Defined values:

- <oa/da> Originating or Destination Address Value in string format.
- <toa/toda> Type of Originating / Destination Address.
- <stat> Integer type in PDU mode (default 2 for +CMGW), or string type in text

mode (default “STO UNSENT” for +CMGW). Indicates the status of message in memory. If <stat> is omitted, the stored message is considered as a message to send.

- 0 “REC UNREAD”
- 1 “REC READ”
- 2 “STO UNSENT”
- 3 “STO SENT”

<length> Length of the actual data unit in bytes

Send Message From Storage: +CMSS

Description: This command sends a message stored at location value <index>.

Command syntax: AT+CMSS=<index>[,<da> [,<toda>]]

Response syntax: +CMSS: <mr> or +CMS ERROR: <err> if sending fails

If a new recipient address <da> is given, it will be used instead of the one stored with the message

Command	Possible responses
AT+CMGW=0660123456<CR> Today is my birthday	+CMGW: 5 OK <i>Note: Message stored with index 5</i>
AT+CMSS=5, 0680654321 <i>Note: Send the message 5 to a different destination number</i>	+CMSS:<mr> OK <i>Note: Successful transmission</i>

Set Text Mode Parameters: +CSMP

Description: This command is used to select a value for <vp>, <pid>, and <dc>.

Command syntax: AT+CSMP=<fo>, <vp>, <pid>,<dc>

Command	Possible responses
AT+CSMP? <i>Note: current values</i>	+CSMP: 0,0,0,0 OK <i>Note: No validity period</i> <dc>= PCCP437 alphabet (8 bits → 7 bits)
AT+CSMP=17,23,64,244 <i>Note: <vp> = 23 (2 hours, relative format)</i> <dc> = GSM 8 bits alphabet Remind to enter <fo> value in decimal notation.	OK <i>Note: Command correct</i>

Defined values:

The <fo> byte comprises 6 different fields:

b7	b6	B5	b4	b3	b2	b1	b0
RP	UDHI	SRR	VPF		RD	MTI	

Note: <fo> must be entered in DECIMAL format. Hexadecimal format would lead to irrelevant result.

RP: Reply Path, not used in text mode.

UDHI: User Data Header Information, b6=1 if the beginning of the User Data field contains a Header in addition to the short message. This option is not supported in +CSMP command,

but can be used in PDU mode (+CMGS).

SRR: Status Report Request, b5=1 if a status report is requested. This mode is supported.

VPF: Validity Period Format

b4=0 & b3=0 -> <vp> field is not present

b4=1 & b3=0 -> <vp> field is present in relative format

Other formats (absolute & enhanced) are not supported.

RD: Reject Duplicates, b2=1 to instruct the SC to reject an SMS-SUBMIT for an SM still held in the SC which has the same <mr> and the same <da> as the previously submitted SM from the same <oa>

MTI: Message Type Indicator

b1=0 & b0=0 -> SMS-DELIVER (in the direction SC to MS)

b1=0 & b0=1 -> SMS-SUBMIT (in the direction MS to SC)

In text mode <vp> is only coded in “relative” format. The default value is 167 (24 hours).

This means that one byte can describe different values:

VP value	Validity period value
0 to 143	(VP + 1) x 5 minutes (up to 12 hours)
144 to 167	12 hours + ((VP – 143) x 30 minutes)
168 to 196	(VP – 166) x 1 day
197 to 255	(VP – 192) x 1 week

<pid> is used to indicate the higher layer protocol being used or indicates inter-working with a certain type of telematic device. For example, 0x22 is for group 3 fax, 0x24 is for voice telephone, 0x25 is for ERMES (European Radio Messaging System).

<dcs> is used to determine the way the information is encoded. Compressed text is not supported. Only GSM default alphabet, 8 bit data and UCS2 alphabet are supported.

Delete Message: +CMGD

Description: This command is used to delete one or several messages from preferred message storage (“BM” SMS-CB ‘RAM storage’, “SM” SMSPP storage ‘SIM storage’ or “SR” SMS Status-Report storage). Refer also to Preferred Message Storage +CPMS command.

Command syntax: AT+CMGD=<Index> [,<DelFlag>]

Command	Possible responses
	+CMTI:”SM”,3 <i>Note: New message received</i>
AT+CMGR=3 <i>Note: Read it</i>	+CMGR: “REC UNREAD”,”0146290800”, “98/10/01,18:19:20+00” <CR><LF> Message received! Note: Unread message received from 0146290800 on the 01/10/1998 at 18H19m 20s
AT+CMGD=3 <i>Note: Delete it</i>	OK <i>Note: Message deleted</i>

AT+CMGD=1,0	OK <i>Note: The message from the preferred message storage at the location 1 is deleted</i>
AT+CMGD=1,1	OK <i>Note: All READ messages from the preferred message storage are deleted</i>
AT+CMGD=1,2	OK <i>Note: All READ messages and SENT mobile originated messages are deleted</i>
AT+CMGD=1,3	OK <i>Note: All READ, SENT, and UNSENT messages are deleted</i>
AT+CMGD=1,4	OK <i>Note: All messages are deleted</i>

Defined values:

<index> If <DelFlag> = 0

- (1-20) if the preferred message storage is “BM”
- SIM dependant integer values (in the range of SIM location number) if the preferred message storage is “SM” or “SR”.

If <DelFlag> is > 0, <index> is ignored.

<DelFlag>

0 Delete message at location <index> (default value).

1 Delete All READ messages

2 Delete All READ and SENT messages

3 Delete All READ, SENT and UNSENT messages

4 Delete All messages

If <DelFlag> is omitted, default value is used.

Note: When the preferred message storage is “SR”, as SMS status reports are assumed to have a “READ” status, if <DelFlag> is greater than 0, all SMS status reports will be deleted.

Service Center Address: +CSCA

Description: This command is used to indicate to which service center the message must be sent. The product has no default value for this address. If the application tries to send a message without having indicated the service center address, an error will be generated. Therefore, the application must indicate the SC address when initializing the SMS. This address is then permanently valid. The application may change it if necessary.

Command syntax: AT+CSCA=<sca>

Command	Possible responses
AT+CMGS=“+33146290800”<CR> Hello, how are you?<ctrl-Z> <i>Note: Send a message</i>	+CMS ERROR: 330 <i>Note: service center unknown</i>
AT+CSCA=“0696741234” <i>Note: Service center initialization</i>	OK
AT+CMGS=“+33146290800”<CR> Happy Birthday ! <ctrl-Z>	+CMGS: 1 OK <i>Note: Successful transmission</i>

Select Cell Broadcast Message Types: +CSCB

Description: This command selects which types of CBMs are to be received by the ME. It is allowed in both PDU and text modes.

Command syntax: AT+CSCB=<mode>, [<mids>, [<dcss>]]

Important note: Test read command (AT+CSCB ?) is not supported.

Command	Possible responses
AT+CSCB=0,"15-17,50,86","" <i>Note: Accept SMS-CB types, 15,16,17,50, and 86 in any language</i>	OK <i>Note: CBMs can be received</i>
	+CBM: 10<CR><LF> 00112233445566778899 <i>Note: CBM length of a received Cell Broadcast message (SMS-CB), CBM bytes in PDU mode)</i>
AT+CSCB=1 <i>Note: Deactivate the reception of CBMs</i>	OK <i>Note: CBM reception is completely stopped</i>

Defined values:

The <bm> parameter of +CNMI command controls the message indication.

The activation of CBM reception (<mode>=0) can select only specific Message Identifiers (list in <mids>) for specific Languages (list in <dcss>), but the deactivation stops any reception of CBMs (only AT+CSCB=1 is allowed).

Message Identifiers (<mids> parameter) indicates to which type of message identifiers the ME should listen.

<dcss>: Supported languages

- 0 German
- 1 English
- 2 Italian
- 3 French
- 4 Spanish
- 5 Dutch
- 6 Swedish
- 7 Danish
- 8 Portuguese
- 9 Finnish
- 10 Norwegian
- 11 Greek
- 12 Turkish
- 13 Hungarian
- 14 Polish 32 Czech.

Cell Broadcast Message Identifiers: +WCBM

Description: This specific command is used to read the EF-CBMI SIM file.

Remark: The EF-CBMI file is not used with the +CSCB command.

The application should read this file (using AT+WCBM?) and combine the Message Identifiers with those required by the application.

Command syntax: AT+WCBM=<mids>

Command	Possible responses
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AT+WCBM="10,100,1000,10000" <i>Note: Write 4 message identifiers in EF- CBMI</i>	OK <i>Note: CBMIs are stored in EF-CBMI</i>
AT+WCBM? <i>Note: Read the CBMIs in EF-CBMI</i>	+WCBM="10,100,1000,10000" OK <i>Note: 4 CBMIs are stored in EF-CBMI</i>

Message Status Modification: +WMSC

Description: These commands allow the manipulation of message status. The accepted status changes are from READ to NOT READ and vice versa, and from SENT to NOT SENT and vice versa.

Command syntax: AT+WMSC=<loc>,<status>

Command	Possible responses
AT+CMGR=2	+CMGR: "REC READ",,+336290918",,"99/05/01 14:19:44+04" <CR><LF> Hello All of you ! OK
AT+WMSC=2,"REC UNREAD"	
AT+CMGR=2	+CMGR: "REC UNREAD",,+336290918",,"99/05/01 14:19:44+04" <CR><LF> Hello All of you ! OK

Possible responses:

OK if the location is valid

+CMS ERROR: 321 if <loc> is invalid or free

+CMS ERROR: 302 if the new <status> and the previous one are incompatible (1)

Note: If all the parameters are correct, the product overwrites the whole SMS in SIM. Only the first byte (Status byte) is changed.

Defined values:

<loc> location number of the stored message (integer)

<status> new status to be stored, as for +CMGL command:

PDU Mode	Text Mode
0	"REC UNREAD"
1	"REC READ"
2	"STO UNSENT"

Message Overwriting: +WMGO

Description: The +WMGO command is used to specify a location in the SIM or Flash memory, for the next SMS storing with +CMGW command. The defined location is used only once: +WMGO has to be used again to perform another overwrite.

Important notes:

- If the external application specifies a free location, and an incoming message is received before the AT+CMGW command occurs, the product may store the incoming message at the specified available location. If the user then issues an AT+CMGW command without changing the location with another AT+WMGO, the received message will be overwritten.
- The location number is not kept over a software reset.

Command syntax: AT+WMGO=<loc>

Command	Possible responses
AT+CPMS? <i>Note: Check the storage area</i>	+CPMS: "SM",3,10,"SM",3,10,"SM",3,10 OK
AT+CMGW="+33146290800"<CR> Hello how are you ?<ctrl-Z> <i>Note: Write a message in text mode</i>	+CMGW: 4 OK <i>Note: Message stored in index 4 in the SIM</i>
AT+WMGO=?	+WMGO: (1-10) OK <i>Note: Possible values for the SIM</i>
AT+WMGO=4	OK
AT+CMGW="+33146290000"<CR> You are overwritten<ctrl-Z>	+CMGW: 4 OK <i>Note: New Message stored in index 4</i>
AT+WMGO?	+WMGO: 4 OK <i>Note: The value was used, so re-initialization</i>
AT+WMGO=4	OK
AT+CPMS="SM","ME","SM"	+CPMS: 3,10,0,99,3,10 OK <i>Note: Change the storage area from SIM to Flash</i>
AT+WMGO=?	+WMGO: (1-99) OK <i>Note: Possible values for the Flash</i>
AT+WMGO?	+WMGO: 0 OK <i>Note: We changed the storage area, so the value was reinitialized</i>
AT+WMGO=999	+CMS ERROR: 321

Note: if the storage area is changed with the AT+CPMS command, the value of WMGO will be reset to 0.

Defined values: <loc> location number of the SMS to write or overwrite. Number depends on the SIM or Flash memory capacity.

Un-change SMS Status: +WUSS

Description: The +WUSS command allows keeping the SMS Status to UNREAD after +CMGR or +CMGL.

Command syntax: AT+WUSS=<mode>

Command	Possible responses
AT+WUSS=?	+WUSS: (0-1) OK
AT+WUSS=1	OK
	+CMTI: "SM",10 <i>Note: SMS has been received in index 10</i>
AT+CMGR=10	+CMGR: "REC UNREAD","+33660669023",,"03/02/13,18:36:35+00"<CR><LF> Do you want to change state ? OK

AT+CMGR=10	+CMGR: "REC UNREAD", "+33660669023", "03/02/13,18:36:35+00" <CR><LF> Do you want to change state ? OK Note: The state hasn't be updated
AT+WUSS=0	OK
	+CMTI: "SM",11 Note: SMS has been received in index 11
AT+CMGR=11	+CMGR: "REC UNREAD", "+33660669023", "03/02/13,18:56:55+00" <CR><LF> It is me again. OK
AT+CMGR=11	+CMGR: "REC UNREAD", "+33660669023", "03/02/13,18:56:55+00" <CR><LF> It is me again. OK Note: The state has been updated
AT+WUSS?	+WUSS: 0 OK
AT+CMGR=10	+CMGR: "REC READ", "+33660669023", "03/02/13,18:56:55+00" <CR><LF> It is me again. OK Note: The state has been updated
AT+WUSS?	+WUSS: 0 OK

Defined values: <mode>

- 1 The SMS Status will not change.
- 0 The SMS Status will change.

Copy Messages: +WMCP

Description: This command copies the SMS from the SIM to the Flash or from the Flash to the SIM.

Command syntax: AT+WMCP=<mode>[,<loc>]

Command	Possible responses
AT+WMCP=?	+WMCP: 0,(1-12) +WMCP: 1,(1-99) OK Note: The location of the SMS that can be copied from the SIM to the flash is 1 to 12 (maximum available in the SIM). The location of the SMS that can be copied from the flash to the SIM is 1 to 99 (the maximum available in the flash).
AT+CPMS? Note: Read the SMS storage	+CPMS: "SM",3,10,"ME",0,99,"SM",3,10 OK Note: Read, write...SMS from/to SIM. 3 SMS are stored in SIM. 10 is the total memory available in SIM. No SMS in Flash

AT+CMGR=1 <i>Note: Read the first SMS from the SIM</i>	+CMGR: "REC UNREAD", "0146290800", "98/10/01,18:22:11+00", <CR><LF> My test message: SMS in the SIM at location 1 OK
AT+WMCP=0,1 <i>Note: Copy the SMS at location 1 in the SIM to the Flash</i>	OK
AT+CPMS? <i>Note: Read the SMS storage</i>	+CPMS: "SM",3,10,"ME",1,99,"SM",3,10 OK <i>Note: Read, write...SMS from/to SIM. 3 SMS are stored in SIM. 10 is the total memory available in SIM. 1 SMS in Flash</i>
AT+CPMS="ME","ME","ME" <i>Note: Select ME for reading, ME for writing and ME for storing</i>	+CPMS: 1,99,1,99,1,99 OK
AT+CMGR=1 <i>Note: Read the first SMS from the Flash</i>	+CMGR: "REC READ", "0146290800", "98/10/01,18:22:11+00", <CR><LF> My test message: SMS in the SIM at location 1 OK
AT+CMGW="+33146290800"<CR> Other test message: SMS in the Flash at location 2<ctrl-Z> <i>Note: Write a message in text mode</i>	+CMGW: 2 OK <i>Note: Message stored in index 2 in the flash</i>
AT+CPMS? <i>Note: Read the SMS storage</i>	+CPMS: "ME",2,99,"ME",2,99,"ME",2,99 OK <i>Note: Read, write...SMS from/to the flash. 2 SMS are stored in the flash.</i>
AT+WMCP=1,2 <i>Note: Copy the SMS at location 2 in the flash to the SIM</i>	OK
AT+CPMS="SM","ME","SM" <i>Note: Select SM for reading, ME for writing and SM for storing</i>	+CPMS: 4,10,2,99,4,10 OK
AT+CMGR=4 <i>Note: Read the first SMS from the SIM</i>	+CMGR: "REC UNREAD", "+33146290800", "98/10/01,18:22:11+00", <CR><LF> Other test message: SMS in the Flash at location 2 OK
AT+CPMS="ME" <i>Note: Select ME for reading</i>	+CPMS: 2,99,2,99,4,10 OK
AT+CMGD=0,4 <i>Note: Erase all the SMS stored in the Flash</i>	OK
AT+CPMS? <i>Note: Read the SMS storage</i>	+CPMS: "ME",0,99,"ME",0,99,"SM",4,10 OK <i>Note: No SMS is stored in the flash.</i>

AT+WMCP=0 <i>Note: Copy all the SMS from the SIM to the Flash</i>	OK
AT+CPMS? <i>Note: Read the SMS storage</i>	+CPMS: "ME",4,99,"ME",4,99,"SM",4,10 OK <i>Note: 4 SMS are stored in the flash.</i>

Defined values:

<mode> Copy mode

- 0: From the SIM to the Flash
- 1: From the Flash to the SIM

<loc> Location of the SMS to copy (mandatory for <mode>=1). If this location is not defined, all the SMS will be copied.

Note: The SMS copied will have the first free location.

More Messages to Send: +CMMS

Description: This short message service-oriented AT command allows to keep the link opened while sending several short messages within a short delay.

Command syntax: AT+CMMS = <mode>

Command	Possible responses
AT+ CMMS=0 <i>Note: Disable feature</i>	OK <i>Note: feature is disabled</i>
AT+ CMMS=1 <i>Note: Enable feature 1 time</i>	OK <i>Note: feature is enabled, link is open</i>
AT+ CMMS=2 <i>Note: Enable feature</i>	OK <i>Note: feature is enabled, link is open</i>
AT+ CMMS?	+CMMS: 2 OK
AT+ CMMS=?	+CMMS: (0-2) OK

Defined values: <mode>

0 Disable feature

1 Keep link opened while messages are sent. If the delay between two messages exceeds 5 seconds, the link is closed and the mode is reset to 0: the feature is disabled.

2 Keep link opened while messages are sent. If the delay between two messages exceeds 5 seconds, the link is closed

Notes:

- The delay of 5 seconds complies with Rec 3GPP 27.005 §3.5.6.
- Before sending the last SMS in the link, you must use AT+CMMS=0 command. This command will indicate that the NEXT SMS will be the last one.

This chapter includes information about the Data Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Using AT Commands During a Data Connection**
- Bearer Type Selection: +CBST**
- Select Mode: +FCLASS**
- Service Reporting Control: +CR**
- Cellular Result Codes: +CRC**
- DTE-DCE Local Rate Reporting: +ILRR**
- Radio Link Protocol Parameters: +CRLP**
- Select Data Compression: %C**
- V42 bis Data Compression: +DS**
- V42 bis Data Compression Report: +DR**
- Select Data Error Correcting Mode: \N**

Using AT Commands During a Data Connection

To use AT Commands during a data connection (e.g., while the product is in online mode), it is necessary either to switch to offline mode, or to use the specific +WMUX command to enable Commands / Data multiplexing.

Switch from online to offline mode:

To switch from online mode to offline mode, the “+++” sequence must be sent. Following this, the product gets back to offline mode with an “OK” response, and a AT command can be sent.

Note: The “+++” sequence will only work with the +ICF command using one of the following settings:

- 8 data bits, with no parity
- 7 data bits, with even parity

Switch from offline to online mode: See the ATO command description.

Bearer Type Selection: +CBST

Description: This command applies to both outgoing and incoming data calls, but in a different way. For an outgoing call, the two parameters (e.g. <speed> and <ce>) are meaningful, whereas for an incoming call, only the <ce> parameter is used.

Note 1) For incoming calls, if <ce> is set to ‘T’ only and the network offers only ‘NT’ or vice versa, then the call is released.

Note 2) Values 2 and 3 for <ce> parameter are equivalent to former values 100 and 101. Those values are managed for compatibility purposes, but they shouldn’t be used in new code (2 as former 100, and 3 as former 101).

Command syntax: AT+CBST= <speed>, <name>, <ce>

Command	Possible responses
AT+CBST=? <i>Note: Test command</i>	+CBST: (0-8,65,66,68,70,71),(0),(0-3) OK <i>Note: Data 14.4 kbps not supported</i>
AT+CBST=? <i>Note: Test command</i>	+CBST: (0-8,12,14,65,66,68,70,71,75),(0),(0-3) OK <i>Note: Data 14.4 kbps supported</i>
AT+CBST=7,0,1 <i>Note: Ask for a bearer</i>	OK <i>Note: Bearer supported</i>
AT+CBST? <i>Note: Current values</i>	+CBST:7,0,1 OK <i>Note: Command valid</i>
AT+CBST=81,0,0 <i>Note: Ask for a bearer</i>	+CME ERROR: 4 <i>Note: Bearer not supported</i>

Defined values:

- <speed>
- 0 (default) Autobauding (modem type: none)
 - 1 300 bps (modem type: V.21)
 - 2 1200 bps (modem type: V.22)
 - 3 1200/75 bps (modem type: V.23)
 - 4 2400 bps (modem type: V.22bis)
 - 5 2400 bps (modem type: V.26ter)

6 4800 bps (modem type: V.32)
 7 9600 bps (modem type: V.32)
 8 Specific
 12 9600 bps (modem type: V.34)
 14(*) 1400 bps (modem type: V.34) 65 300 bps (modem type: V.110)
 66 1200 bps (modem type: V.110)
 68 2400 bps (modem type: V.110)
 70 4800 bps (modem type: V.110)
 71 9600 bps (modem type: V.110)
 75(*): 14400 bps (modem type: V.110)
 (*)This speed configures data and fax 14.4 kbps bearers.
 <name> No data compression is provided and only asynchronous modem is supported:
 <name> = 0.
 <ce>: Connection element
 0 Transparent only
 1(default) Non transparent only
 2 Transparent preferred
 3 Non transparent preferred

Select Mode: +FCLASS

Description: This command sets the product into a particular operating mode (data or fax).

Command syntax: AT+FCLASS= <n>

Command	Possible responses
AT+FCLASS=? <i>Note: Test command</i>	+FCLASS: (0,1) OK <i>Note: Fax class 2 not supported</i>
AT+FCLASS=? <i>Note: Test command</i>	+FCLASS: (0,1,2) OK <i>Note: Fax class 2 supported</i>
AT+FCLASS=0 <i>Note: Data mode requested</i>	OK <i>Note: Command valid</i>
AT+FCLASS=1 <i>Note: Fax class 1 mode requested</i>	OK <i>Note: Command valid</i>
AT+FCLASS? <i>Note: Current value</i>	+FCLASS: 1 OK <i>Note: Command valid</i>

Defined values: <n>
 0: Data
 1: Fax class 1
 2: Fax class 2

Service Reporting Control: +CR

Description: This command enables a detailed type of service reporting in the case of incoming or outgoing data calls. Before sending the CONNECT response to the application, the product will specify the type of data connection that has been set up.

These report types are:

+CR: ASYNC	For asynchronous transparent
+CR: REL ASYNC	For asynchronous non-transparent

Command syntax: AT+CR=<mode>

Command	Possible responses
AT+CR=0 <i>Note: Extended reports disabled</i>	OK <i>Note: Command valid</i>
AT+CR=1 <i>Note: Extended reports enabled</i>	OK <i>Note: Command valid</i>
AT+CR?	+CR: 1 OK
AT+CR=?	+CR: (0,1) OK

Defined values: <mode>:

0: disable extended reports

1: enable extended reports

Cellular Result Codes: +CRC

Description: This command allows more detailed ring information for an incoming call (voice or data). Instead of the string “RING”, an extended string is used to indicate which type of call is ringing (e.g. +CRING: VOICE). These extended indications are:

+CRING ASYNC	for asynchronous transparent
+CRING: REL ASYNC	for asynchronous non-transparent
+CRING: VOICE	for normal speech.
+CRING: FAX	for fax calls

Command syntax: AT+CRC=<mode>

Command	Possible responses
AT+CRC=0 <i>Note: Extended reports disabled</i>	OK <i>Note: Command valid</i>
AT+CRC=1 <i>Note: Extended reports enabled</i>	OK <i>Note: Command valid</i>
AT+CRC?	+CRC: 1 OK
AT+CRC=?	+CRC: (0,1) OK

Defined values: <mode>:

0: disable extended reports

1: enable extended reports

DTE-DCE Local Rate Reporting: +ILRR

Description: This parameter controls whether the extended-format “+ILRR: <rate>” information text is transmitted from the DCE to the DTE or not. The <rate> value reported represents the current (negotiated or renegotiated) DTE-DCE speed rate. If enabled, the intermediate result code is transmitted in an incoming or outgoing data call, after any data compression report, and before any final result code (CONNECT)

Command syntax: AT+ILRR = <value>

Command	Possible responses
AT+ILRR=0 <i>Note: Local port rate report disabled</i>	OK <i>Note: Command valid</i>
AT+ILRR=1 <i>Note: Local port rate report enabled</i>	OK <i>Note: Command valid</i>
AT+ILRR?	+ILRR: 1 OK
AT+ILRR=?	+ILRR: (0,1) OK

Defined values:

<value>:

0: disable local port rate report

1: enable local port rate report

<rate> can take the following values: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (kbps).

Radio Link Protocol Parameters: +CRLP

Description: This command modifies the radio link protocol parameters used for non transparent data transmission.

Command syntax: AT+CRLP= <iws>, <mws>, <T1>, <N2>, <ver>

Command	Possible responses
AT+CRLP=? <i>Note: Test command</i>	+CRLP: (0-61),(0-61),(40-255),(1,255),(0) OK <i>Note: V42bis not supported</i>
AT+CRLP=? <i>Note: Test command</i>	+CRLP: (0-61),(0-61),(40-255),(1,255),(0,1) OK <i>Note: V42bis supported</i>
AT+CRLP=61,61,48,6,0 <i>Note: Set new parameters</i>	OK <i>Note: Command valid</i>
AT+CRLP? <i>Note: Current values</i>	+CRLP: 61,61,48,6,0 <i>Note: Command valid</i>

Defined values:

<IWS>: Down window size, (default is 61)

Range 0 to 61

<mws>: Up window size, (default is 61)

Range 0 to 61

<T1>: Acknowledgement timer in units of 10 ms, (default is 48)

Range 40 to 255

<N2>: Retransmission attempts, (default is 6),

Range 1 to 255

<ver>: Version number.

0: V42bis is not supported.

1: V42bis is supported

Select Data Compression: %C

Description: This command enables or disables data compression negotiation if this feature is supported by the product.

Command syntax: AT% C<n>

Command	Possible responses
AT% C0 <i>Note: Command</i>	OK <i>Note: Feature supported</i>
AT% C2 <i>Note: Command</i>	OK <i>Note: V42bis supported</i>
AT% C? <i>Note: Current value</i>	2 OK <i>Note: Command valid</i>

Defined values: <n>

0: no compression (default value)

2: V42bis compression if supported

V42 bis Data Compression: +DS

Description: This command enables or disables V.42bis data compression if this feature is supported by the product. Beware that the product only allows the MNP2 protocol.

Command syntax: AT+DS=[[<dir>],[<neg>],[<P1>],[<P2>]]]

Command	Possible responses
AT+DS=? <i>Note: Test command</i>	+DS: (0-3),(0,1),(512-2048),(6-250) OK
AT+DS=3,0,2048,250 <i>Note: Set new parameters</i>	OK <i>Note: Command valid</i>
AT+DS? <i>Note: Current values</i>	+DS: 3,0,2048,250 OK <i>Note: Command valid</i>

Defined values:

< dir >: specifies the desired direction(s) of operation of the data compression function; from the DTE point of view

- 0 Negotiated ... no compression
- 1 Transmit only
- 2 Receive only
- 3 Both directions, accept any direction (default value)

< neg >: specifies whether or not the DCE should continue to operate if the desired result is not obtained

- 0 Do not disconnect if V.42 bis is not negotiated by the remote DCE as specified in <dir> (default value)
- 1 Disconnect if V.42 bis is not negotiated by the remote DCE as specified in <dir>

< P1 >: specifies the maximum number of dictionary entries that should be negotiated (default is 2048)

Range 512 to 2048

< P2 >: specifies the maximum string length to be negotiated (default is 20).

Range 6 to 250

V42 bis Data Compression Report: +DR

Description: This command determines whether or not the use of V42bis is allowed for an incoming or outgoing data call, if the feature is provided by the product. The intermediate result code represents current DCE-DCE data compression type. The format of this result code is as follows:

+DR: NONE	Data compression is not in use
+DR: V42B	Rec. V.42 bis is in use in both directions
+DR: V42B RD	Rec. V.42 bis is in use in receive direction only
+DR: V42B TD	Rec. V.42 bis is in use in transmit direction only

The +DR intermediate result code, if enabled, is issued before the final result code, after the service report control +CR and before the +ILRR intermediate report.

Command syntax: AT+DR=<status>

Command	Possible responses
AT+DR=? <i>Note: Test command</i>	+DR: (0,1) OK
AT+DR=1 <i>Note: Reporting enabled</i>	OK <i>Note: Command valid</i>
AT+DR? <i>Note: Current value</i>	+DR: 1 OK <i>Note: Command valid</i>

Defined values: <status>: state of the V42bis enabling
0: disabled (default value)
1: enabled

Select Data Error Correcting Mode: \N

Description: This command controls the preferred error correcting mode for a data connection, if the feature is provided by the product. It can only be used for transparent data transmission. If the MNP2 feature is provided, the product authorizes MNP error correction mode.

Command syntax: AT\N<n>

Command	Possible responses
AT\N0 <i>Note: no error correction</i>	OK
AT\N? <i>Note: Current value</i>	0 OK <i>Note: Command valid</i>
AT\N4	+CME ERROR: 3

Defined values: <n>
0: Disables error correction mode (default value)
5: Selects MNP error correction mode
Note: +E prefixed commands of V.25 ter are not used.

V24-V25 Commands

This chapter includes information about the V24-V25 Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Fixed DTE Rate: +IPR**
- DTE-DCE Character Framing: +ICF**
- DTE-DCE Local Flow Control: +IFCR**
- Set DCD Signal: &C**
- Set DTR Signal: &D**
- Set DSR Signal: &S**
- Back to Online Mode: O**
- Result Code Suppression: Q**
- DCE Response Format: V**
- Default Configuration: Z**
- Save Configuration: &W**
- Auto-tests: &T**
- Echo: E**
- Restore Factory Settings: &F**
- Display Configuration: &V**
- Request Identification: I**
- Data / Commands Multiplexing: +WMUX**

Fixed DTE Rate: +IPR

Description: This command specifies the data rate at which the DCE will accept commands.

Notes:

- The serial autobauding feature is supported, and covers the following serial speeds (only): 2400, 4800, 9600, 19200, 38400, 57600 bps. Beyond those serial speeds, proper operation of the G2150I is not guaranteed.
- Any AT command issued by the DTE must start with both capital 'A' and 'T' (or '/') or both lower case 'a' and 't' (or '/'), otherwise the DCE may return some garbage characters and become desynchronized. Should this happen, the DTE simply issues 'AT\r' (at 2400 or 4800 bauds) once or twice or just 'AT' (at 9600 bauds) to resynchronize the modem.
- The DTE waits for 1 ms after receiving the last character of the AT response (which is always '\n' or 0x0A) to send a new AT command at either the same rate or a new rate. Should this delay be ignored, the DCE can become desynchronized. Once again, sending 'AT\r' once or twice or just 'AT' causes the DCE to recover.

Caution: when starting up, if autobauding is enabled and no AT command has yet been received, the product sends all unsolicited responses (like RING) at 9600 baud.

Command syntax: AT+IPR=<rate>

Command	Possible responses
AT+IPR?	+IPR: 9600 OK <i>Note: Current rate is 9600 bps</i>
AT+IPR=?	+IPR: (0, 2400, 4800, 9600, 19200, 38400, 57600), (300, 600, 1200, 115200) OK <i>Note: Possible values, according to V25ter</i> <i>Recommendation: the first set of values indicates the range of auto-detectable baud rates (including 0). The second set of values indicates the baud rates supported by the DCE but not auto-detectable.</i>
AT+IPR=38400	OK <i>Note: Disable autobauding and set rate to 38400 bps</i>
AT+IPR=0	OK <i>Note: Enable autobauding</i>

Defined values: <rate>: baud rates that can be used by the DCE

- 0 (enables autobauding)
- 300
- 600
- 1200
- 2400
- 4800
- 9600
- 19200
- 38400
- 57600
- 115200

DTE-DCE Character Framing: +ICF

Description: This command is used to determine the local serial port start-stop (asynchronous) character framing used by the DCE.

Command syntax: AT+ICF=<format>[, <parity>]

Command	Possible responses
AT+ICF?	+ICF: 3,4 OK <i>Note: Current values</i>
AT+ICF=?	+ICF: (1-6),(0-4) OK <i>Note: Possible values</i>
AT+ICF=2,0	OK <i>Note: New values</i>

Defined values:

<format>

- 0: Auto detect (not supported)
- 1: 8 Data 2 Stop (supported) <parity> parameter is ignored.
- 2: 8 Data 1 Parity 1 Stop (supported) if no <parity> provided
- 3: is used by default as <parity> value. 3: 8 Data 1 Stop (supported) <parity> parameter is ignored.
- 4: 7 Data 2 Stop (supported) <parity> parameter is ignored.
- 5: 7 Data 1 Parity 1 Stop (supported) if no <parity> provided, 3 is used by default as <parity> value.
- 6: 7 Data 1 Stop (supported) <parity> parameter is ignored.

<parity>

- 0: Odd (supported)
- 1: Even (supported)
- 2: Mark (supported)
- 3: Space (supported)
- 4: None (supported)

Notes:

- Setting a character framing different from 8N1 will disable autobauding if it was activated. Setting it back to 8N1 will not re-enable auto-baud.
- Setting the framing to 8N1 will let autobauding be enabled, if it was already enabled (implying framing was already 8N1).

DTE-DCE Local Flow Control: +IFCR

Description: This command is used to control the operation of local flow control between the DTE and DCE.

Command syntax: AT+IFC=<DCE_by_DTE>,<DTE_by_DCE>

Command	Possible responses
AT+IFC?	+IFC: 2,2 OK <i>Note: Current values</i>
AT+IFC=?	+IFC: (0,2),(0,2) OK <i>Note: Possible values</i>

AT+IFC=0,0	OK <i>Note: New values</i>
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Defined values:

< DCE_by_DTE >

- 0: none (supported)
- 1: XOn/Xoff local circuit 103 (not supported)
- 2: RTS (supported)
- 3: Xon/Xoff global on circuit 103 (not supported)

Important note: When this parameter is set to 2 (DTE invokes flow control through RTS) DCE behavior is as follows:

If the DCE has never detected RTS in the high (or ON) condition since startup, then it ignores RTS (assuming this signal is not connected).

As soon as the DCE detects RTS high the signal acts on it. Therefore subsequent RTS transition to OFF will prevent the DCE from sending any further data in both online and offline modes.

This behavior allows the user to use the default settings (hardware flow control) and leave RTS disconnected. In the case where RTS is connected and is high at least once, it acts on the DCE.

< DTE_by_DCE >

- 0: none (supported)
- 1: Xon/Xoff circuit 104 (not supported)
- 2: CTS (supported)

When this parameter is set to 0 (none) then CTS is kept high all the time.

Set DCD Signal: &C

Description: This command controls the Data Carrier Detect (DCD) signal.

G2150O products differ slightly from V25ter Recommendation. DCD signal (“Circuit Irred ON at the same time the CONNECT message is sent, whereas the specification states the DCD should be turned ON after the CONNECT message was received.

Command syntax: AT&C<n>

Command	Possible responses
AT&C0 <i>Note: DCD always on</i>	OK <i>Note: Command valid</i>
AT&C1 <i>Note: DCD matches state of the remote modem’s data carrier</i>	OK <i>Note: Command valid</i>

Defined values: <n>

- 0 DCD always on
- 1 DCD matches state of the remote modem’s data carrier

Set DTR Signal: &D

Description: This command controls the Data Terminal Ready (DTR) signal

Command syntax: AT&D<n>

Command	Possible responses
AT&D0 <i>Note: The DTR signal is ignored</i>	OK <i>Note: Command valid</i>

AT&D1 <i>Note: Modem switches from data to command mode when DTR switches from ON to OFF</i>	OK <i>Note: Command valid</i>
AT&D2 <i>Note: When DTR switches from ON to OFF, the call is released</i>	OK <i>Note: Command valid</i>

Defined values: <n>

0: The DTR signal is ignored

1: Modem switches from data to command mode when DTR switches from ON to OFF

2: Upon DTR switch from ON to OFF, the call is released

Set DSR Signal: &S

Description: This command controls the Data Set Ready (DSR) signal.**Command syntax:** AT&S<n>

Command	Possible responses
AT&S0 <i>Note: DSR always on</i>	OK <i>Note: Command valid</i>
AT&S1 <i>Note: DSR off in command mode, DSR on in data mode</i>	OK <i>Note: Command valid</i>

Defined values: <n>

0: DSR always on

1: DSR off in command mode, DSR on in data mode

Back to Online Mode: O

Description: If a connection has been established and the ME is in command mode, this command allows you to return to online data mode.**Command syntax:** ATO

Command	Possible responses
ATO <i>Note: Return from offline mode to online mode</i>	OK

Defined values: No parameter

Result Code Suppression: Q

Description: This command determines whether the mobile equipment sends result codes or not**Command syntax:** ATQ<n>

Command	Possible responses
ATQ0 <i>Note: DCE transmits result codes</i>	OK <i>Note: Command valid</i>
ATQ1 <i>Note: Result codes are suppressed and not transmitted</i>	<i>Note: No response</i>

Defined values: <n>

0: DCE transmission result code

1: Result codes are suppressed and not transmitted

DCE Response Format: V

Description: This command determines whether or not the DCE response format uses the header characters <CR><LF>, and the result codes are provided as numeric or verbose.

Command syntax: ATV<n>

Command	Possible responses
ATV0 <i>Note: DCE transmits limited headers and trailers and numeric result codes</i>	0 <i>Note: Command is valid (0 means OK)</i>
ATV1 <i>Note: DCE transmits full headers and trailers and verbose response text</i>	OK <i>Note: Command valid</i>

Defined values:

	<n>=0	<n>=1
Information responses	<text><CR><LF>	<CR><LF> <text><CR><LF>
Result codes	<numeric code><CR>	<CR><LF> <verbose code><CR><LF>

Default Configuration: Z

Description: This command restores the configuration profile. Any call is released.

Command syntax: ATZ

Command	Possible responses
ATZ	Ok <i>Note: Command valid</i>

Defined values: No parameter

Save Configuration: &W

Description: This commands writes the active configuration to a non-volatile memory (EEPROM).

Command syntax: AT&W

Command	Possible responses
AT&W <i>Note: Writes current configuration to EEPROM</i>	OK <i>Note: Command valid</i>

Defined values: No parameter

Auto-tests: &T

Description: This command allows the triggering of various auto-tests.

Command syntax: AT&T<n>

Command	Possible responses
AT&T0 <i>Note: Perform software auto-tests</i>	OK <i>Note: No software problem detected, all checksums are correct</i>
AT&T1 <i>Note: Do the audio loop test (close)</i>	OK <i>Note: Command valid</i>
AT&T2 <i>Note: Stop the audio loop test (open)</i>	OK <i>Note: Command valid</i>

Defined values: <n>

0: Perform software auto-tests

The response will be OK if no software problem is detected (EEPROM, RAM and ROM checksums), otherwise a simple ERROR response is sent.

1: Do the audio loop test (close)

This is used to validate the audio loop (microphone to speaker).

2: Stop the audio loop test (open)

This is used to validate the audio loop (microphone to speaker).

Echo: E

Description: This command is used to determine whether or not the modem echoes characters received by an external application (DTE).

Command syntax: ATE<n>

Command	Possible responses
ATE0 <i>Note: Characters are not echoed</i>	OK <i>Note: Done</i>
ATE1 <i>Note: Characters are echoed</i>	OK <i>Note: Done</i>

Defined values: <n>

0: Characters are not echoed

1: Characters are echoed

Restore Factory Settings: &F

Description: This command is used to restore the factory settings from EEPROM. It only restores the parameters that can be found in paragraph 19 Codes and values (Parameters Storage paragraph) with AT&F column checked. Those parameters are restored in RAM and in E2P, overwriting the profile set with AT&W.

Command syntax: AT&F[<n>]

Command	Possible responses
AT&F <i>Note: Ask to restore the factory settings</i>	OK <i>Note: Done</i>
AT&F0 <i>Note: idem</i>	OK <i>Note: Done</i>

Defined values: <n>
 0: restore factory setting
 No other value supported

Display Configuration: &V

Description: This command is used to display the modem configuration.

Command syntax: AT&V<n>

The parameters displayed are the following:

Q:val1, V:val2, S0:val3, S2:val4, S3:val5, S4:val6, S5:val7,
 +CR:val8, +CRC:val9, +CMEE:val10, +CBST:val11,
 +SPEAKER:val12, +ECHO:val13, &C:val14, &D:val15, %C:val16
 +IPR:val17, +ICF:val18, +IFC:val19

Command	Possible responses
AT&V <i>Note: Display active parameters in RAM</i>	Q:0 V:1 S0:000 S2:043 S3:013 S4:010 S5:008 +CR:0 +CRC:0 +CMEE:0 +CBST:0,0,1 +SPEAKER:0 +ECHO:0,0 &C:1 &D:2 %C:0 +IPR:9600 +ICF:3,4 +IFC:2,2 OK <i>Note: Done</i> <i>For Echo the first value corresponds to Echo cancellation 1.</i>

Defined values: <n>
 0 Display the modem configuration in RAM (default value if no parameter provided)
 1 Display the modem configuration in EEPROM
 2 Display the modem factory configuration.

Request Identification: I

Description: This command causes the product to transmit one or more lines of specific information text

Command syntax: ATI<n>

Command	Possible responses
ATI0 <i>Note: Manufacturer and model identifications</i>	WAVECOM MODEM 900P OK <i>Note: GSM 900 MHz primary band</i>
ATI3 <i>Note: Revision identification</i>	657_09gg.Q2406B 2015268 100506 17:01 OK <i>Note: Software release 6.57, generated on the 5th of October 2006</i>
ATI6 <i>Note: Modem data features</i>	DATA RATES: AUTOBAUD,300,1200,1200/75,2400,4800,9600,14400 DATA MODES: T/NT,ASYNCHRONOUS FAX CLASS 1,2 OK <i>Note: Done</i>
ATI7 <i>Note: Modem voice features</i>	SPEECH CODINGS: FR,EFR,HR,AMR OK <i>Note: Done</i>

Defined values: <n>

- 0 Display manufacturer followed by model identification. (equivalent to +CGMI and +CGMM, refer to these commands for more precisions).
 - 3 Display revision identification (equivalent to +CGMR).
 - 4 Display modem configuration in RAM (equivalent to &V0).
 - 5 Display modem configuration in EEPROM (equivalent to &V1).
 - 6 Display modem data features. Lists the supported data rates, data modes, and fax classes.
 - 7 Display modem voice features.
- Other values: "OK" string is sent back.

Data / Commands Multiplexing: +WMUX

Description: This specific command allows managing the data / AT commands multiplexing

Command syntax: AT+WMUX=<mode>

Command	Possible responses
AT+WMUX=?	+WMUX: (0-1) OK
AT+WMUX?	+WMUX: 0 OK <i>Note: Data / Commands multiplexing disabled.</i>
AT+WMUX=1 <i>Note: Enable Data / Commands multiplexing.</i>	OK

Defined values:

<mode>

0: Multiplexing disabled. When the product is online (data communication in progress), no AT command can be used (default).

1: Multiplexing enabled. Data flows and AT commands are multiplexed while in online mode (data communication in progress).

Note: The Multiplexing mode is available to only one UART. If this mode is available on UART1 and the AT+WMUX=1 command is sent through UART2, the multiplexing mode will be available on UART2 and disabled on UART1.

10

GPRS Commands

This chapter includes information about the GPRS Commands of the OnCell G2150I.

The following topics are covered in this chapter:

- Define PDP Context: +CGDCONT**
- Quality of Service Profile (Requested): +CGQREQ**
- Quality of Service Profile (Minimum acceptable): +CGQMIN**
- GPRS Attach or Detach: +CGATT**
- PDP Context Activate or Deactivate: +CGACT**
- Enter Data State: +CGDATA**
- GPRS Mobile Station Class: +CGCLASS**
- Select Service for MO SMS Messages: +CGSMS**
- GPRS Event Reporting: +CGEREP**
- GPRS Network Registration Status: +CGREG**
- Request GPRS IP Service: 'D'**
- Network Requested PDP Context Activation**
- Automatic Response to a Network Request for PDP Context Activation: +CGAUTO**
- Manual Response to a Network Request for PDP Context Activation: +CGANS**
- Show PDP Address: +CGPADDR**
- Cellular Result Codes: +CRC**
- Service Reporting Control: +CR**
- Extended Error Report: +CEER**
- GPRS Parameter Customization: +WGPRS**
- Full AT GPRS Command Examples**

Define PDP Context: + CGDCONT

Description: This Command specifies PDP context parameter values for a PDP context identified by the local context identification parameter, <cid>. Four PDP contexts can be defined through MOXA software. A special form of the set command, +CGDCONT= <cid> causes the values for context number <cid> to become undefined. The test command returns values supported as a compound value. If the MT supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line. The read command returns the current settings for each defined context. The test command returns values supported as a compound value. If the MT supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line.

Command syntax:

Command	Possible responses
AT+CGDCONT=[<cid> [,<PDP_type> [,<APN> [,<PDP_addr> [,<d_comp> [,<h_comp>]]]]]]	OK ERROR
AT+CGDCONT?	+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <data_comp>, <head_comp> [<CR><LF>+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <data_comp>, <head_comp> [...]] OK
AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s) [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s) [...]] OK
AT+CGDCONT: 1, "IP", "internet"; +CGDCONT=2, "IP", "abc.com"	OK
AT+CGDCONT=?	+CGDCONT: (1-4),"IP",,,(0-1),(0-1) +CGDCONT: (1-4),"PPP",,0,0 OK
AT+CGDCONT?	+CGDCONT: 1, "IP", "internet",,0,0 +CGDCONT: 2, "IP", "abc.com",,0,0 OK

Defined values:

<cid>: (PDP Context Identifier) a numeric parameter that specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. Range of values is 1 to 4.

<PDP_type>: (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol

- IP: Internet Protocol
- PPP: Point to Point Protocol

<APN>: (Access Point Name) a string parameter, which is a logical name that is used to select the GGSN or the external packet data network.

<PDP_address>: a string parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure, or a dynamic address will be requested. The read form of the command will return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the +CGPADDR command.

<d_comp> a numeric parameter that controls PDP data compression

- 0: OFF (default if value is omitted)
- 1: ON
- Other values are reserved.

<h_comp> a numeric parameter that controls PDP header compression

- 0: OFF (default if value is omitted)
- 1: ON
- Other values are reserved.

Notes:

- The data compression algorithm provided in SNDCP is V.42bis.
- 4 CIDs are available to specify 4 PDP context but only 11 NSAPI are available for PDP activation. 4 PDP contexts can be specified with only one activated at the same time.

Quality of Service Profile (Requested): +CGQREQ

Description: This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network. The set command specifies a profile for the context identified by the local context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT command, the +CGQREQ command is effectively an extension to the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value. A special form of the set command, +CGQREQ= <cid> causes the requested profile for context number <cid> to become undefined. The read command returns the current settings for each defined context. The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

Command syntax:

Command	Possible responses
AT+CGQREQ=[<cid> [,<precedence > [,<delay> [,<reliability.> [,<peak> [,<mean>]]]]]]	OK ERROR
AT+CGQREQ?	+CGQREQ: <cid>, <precedence >, <delay>, <reliability>, <peak>, <mean> [<CR><LF>+CGQREQ: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean> [...]] OK

AT+CGQREQ=?	+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [<CR><LF>+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [...]] OK
AT +CGQREQ=1,1,4,5,2,14	OK
AT+CGQREQ=[<cid> [,<precedence > [,<delay> [,<reliability.> [,<peak> [,<mean>]]]]]]	OK ERROR
AT+CGQREQ?	+CGQREQ: <cid>, <precedence >, <delay>, <reliability>, <peak>, <mean> [<CR><LF>+CGQREQ: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean> [...]] OK

Defined values:

- <cid>: numeric parameter that specifies a particular PDP context definition.
Range of values is 1 to 3
- <precedence>: numeric parameter that specifies the precedence class
 - 0: Subscribed precedence (subscribed by the Network by default if value is omitted)
 - 1: High priority (service commitments shall be maintained ahead of precedence class 3.)
 - 3: Low priority (service commitments shall be maintained after precedence classes 1 and 2)
- <delay>: numeric parameter which specifies the delay class
 - 0: Subscribed
 - 1: Delay class 1
 - 2: Delay class 2
 - 3: Delay class 3
 - 4: Delay class 4

Delay Class	Delay (maximum values)			
	SDU size: 128 bytes		SDU size: 1024 bytes	
	Mean Transfer Delay (sec)	95 percentile Delay (sec)	Mean Transfer Delay (sec)	95 percentile Delay (sec)
0	Subscribed	Subscribed by the Nwk / default if value is omitted		
1. (Predictive)	< 0.5	< 1.5	< 2	< 7
2. (Predictive)	< 5	< 25	< 15	< 75
3. (Predictive)	< 50	< 250	< 75	< 375
4. (Best Effort)	Unspecified			

<reliability>: numeric parameter that specifies the reliability class

- 0: Subscribed
- 1: Up to 1 000 (8 kbits/s).
- 2: Up to 2 000 (16 kbits/s).
- 3: Up to 4 000 (32 kbits/s).
- 4: Up to 8 000 (64 kbits/s).
- 5: Up to 16 000 (128 kbits/s).
- 6: Up to 32 000 (256 kbits/s).
- 7: Up to 64 000 (512 kbits/s).
- 8: Up to 128 000 (1 024 kbits/s).
- 9: Up to 256 000 (2 048 kbits/s).

<peak>: numeric parameter that specifies the peak throughput class

- 0: Subscribed
- 1: Up to 1 000 (8 kbits/s).
- 2: Up to 2 000 (16 kbits/s).

Reliability Class	GTP Mode	LLC Frame Mode	LLC Data Protection	RLC Block Mode	Traffic Type
0	Subscribed	Subscribed by the Nwk / default if value is omitted			
1	Acknowledged	Acknowledged	Protected	Acknowledged	Non real-time traffic, error-sensitive application that cannot cope with data loss.
2	Unacknowledged	Acknowledged	Protected	Acknowledged	Non real-time traffic, error-sensitive application that can cope with infrequent data loss.
3	Unacknowledged	Unacknowledged	Protected	Acknowledged	Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS.
4	Unacknowledged	Unacknowledged	Protected	Unacknowledged	Real-time traffic, error-sensitive application that can cope with data loss.
5	Unacknowledged	Unacknowledged	Unprotected	Unacknowledged	Real-time traffic, error

					non-sensitive application that can cope with data loss.
NOTE: For real-time traffic, the QoS profile also requires appropriate settings for delay and throughput.					

3: Up to 4 000 (32 kbits/s).

4: Up to 8 000 (64 kbits/s).

5: Up to 16 000 (128 kbits/s).

6: Up to 32 000 (256 kbits/s).

7: Up to 64 000 (512 kbits/s).

8: Up to 128 000 (1 024 kbits/s).

9: Up to 256 000 (2 048 kbits/s).

<mean>: numeric parameter which specifies the mean throughput class

0: Subscribed by the Nwk / default if value is omitted

1: 100 (~0.22 bit/s).

2: 200 (~0.44 bit/s).

3: 500 (~1.11 bit/s).

4: 1 000 (~2.2 bit/s).

5: 2 000 (~4.4 bit/s).

6: 5 000 (~11.1 bit/s).

7: 10 000 (~22 bit/s).

8: 20 000 (~44 bit/s).

9: 50 000 (~111 bit/s).

10: 100 000 (~0.22 kbits/s).

11: 200 000 (~0.44 kbits/s).

12: 500 000 (~1.11 kbits/s).

13: 1 000 000 (~2.2 kbits/s).

14: 2 000 000 (~4.4 kbits/s).

15: 5 000 000 (~11.1 kbits/s).

16: 10 000 000 (~22 kbits/s).

17: 20 000 000 (~44 kbits/s).

18: 50 000 000 (~111 kbits/s).

31: Best effort.

If a value is omitted for a particular class, then it is considered to be unspecified.

Quality of Service Profile (Minimum acceptable): +CGQMIN

Description: This command allows the TE to specify a minimum acceptable profile that is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message. The set command specifies a profile for the context identified by the local context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT command, the +CGQMIN command is an extension to the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value. A special form of the set command, +CGQMIN= <cid> causes the minimum acceptable profile for context number <cid> to become undefined. In this case, no check is made against the negotiated profile. The read command returns the current settings for each defined context. The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

Command syntax:

Command	Possible responses
AT+CGQMIN=[<cid> > [,<delay> [,<precedence [,<peak> [,<reliability.> [,<mean>]]]]]]	OK ERROR
AT+CGQMIN?	+CGQMIN: <cid>, <precedence >, <delay>, <reliability>, <peak>, <mean> [<CR><LF>+CGQMIN: <cid>, <precedence >, <delay>, <reliability.>, <peak>, <mean>[...]] OK
AT+CGQMIN=?	+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [<CR><LF>+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak>s), (list of supported <mean>s) [...]] OK
AT +CGQMIN=1,1,4,5,2,31	OK
AT+CGQMIN=?	+CGQMIN:"IP",(1-3),(1-4),(1-5),(1-9),(1-31) +CGQMIN:"PPP",(1-3),(1-4),(1-5),(1-9),(1-31) OK
AT+CGQMIN?	+CGQMIN: 1,1,4,5,2,14 OK

Defined values:

- <cid>: a numeric parameter that specifies a particular PDP context .
 - <precedence>: a numeric parameter that specifies the precedence class.
 - <delay>: a numeric parameter that specifies the delay class.
 - <reliability>: a numeric parameter that specifies the reliability class.
 - <peak>: a numeric parameter that specifies the peak throughput class.
 - <mean>: a numeric parameter that specifies the mean throughput class.
- If a value is omitted for a particular class then this class is not checked.

GPRS Attach or Detach: +CGATT

Description: The execution command is used to attach the MT to, or detach the MT from the GPRS service. After the command has completed, the MT remains in V.25ter command state. If the MT is already in the requested state, the command is ignored and the OK is returned. If the requested state cannot be achieved because the GPRS is not supported by the MT, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. Any active PDP contexts will be automatically deactivated when the attachment state changes to detached. The read command returns the current GPRS service state. The test command is used for requesting information on the supported GPRS service states..

Command syntax:

Command	Possible responses
AT+CGATT= [<state>]	OK ERROR
AT+CGATT?	+CGATT: <state> OK
AT+CGATT=?	+CGATT: (list of supported <state>s) OK

AT +CGATT=1	OK
-------------	----

Defined values: <state>: indicates the state of GPRS attachment

- 0: detached
- 1: attached
- 2: combined detach (GPRS and GSM detach in the same network request)
- Other values are reserved and will result in an ERROR response to the execution command.

PDP Context Activate or Deactivate: +CGACT

Description: The execution command is used to activate or deactivate the specified PDP context(s). After the command has completed, the MT remains in V.25ter command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the requested state for any specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. If the MT is not GPRS attached when the activation form of the command is executed, the MT first performs a GPRS attach and then attempts to activate the specified contexts. If the attach fails then the MT responds with ERROR, or if extended error responses are enabled, with the appropriate failure-to-attach error message. If no <cid>s are specified the activation form of the command activates the first possible within the defined contexts. If no <cid>s is specified the deactivation form of the command deactivates all active contexts. One PDP contexts can be activated through MOXA software at the same time. The read command returns the current activation states for all the defined PDP contexts. The test command is used for requesting information on the supported PDP context activation states.

Command syntax:

Command	Possible responses
AT+CGACT=[<state> [,<cid>[,<cid>[,...]]]]	OK ERROR
AT+CGACT?	+CGACT: <cid>, <state> [<CR><LF>+CGACT: <cid>, <state> [...]] OK
AT+CGACT=?	+CGACT: (list of supported <state>s) OK
AT +CGACT=1,1	OK
AT+CGACT?	+CGACT: 1, 1 OK
AT+CGACT=?	+CGACT: (0-1) OK

Defined values:

- <state>: indicates the state of PDP context activation
 - 0: deactivated
 - 1: activated
 - Other values are reserved and will result in an ERROR response to the execution command.
 - <cid>: a numeric parameter that specifies a particular PDP context. Before the activation of the context, the MT has to attach itself to the GPRS network if necessary.
- Note: if a GPRS PPP session is already running, the setting of a CSD (GSM data call) is not supported.

Enter Data State: +CGDATA

Description: This command causes the MT to perform the necessary actions to set up communication between the TE and the network. This may include performing a GPRS attach and one PDP context activation. If the <cid> value is not defined to the MT, it will return an ERROR or +CME ERROR response. Otherwise, the MT issues the intermediate result code CONNECT and enters V.25ter online data state. GPRS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the +CGATT and +CGACT commands. If no <cid> is given, the MT attempts to activate the context with available information. The other context parameters are set to their default values (No APN, default QOS parameters, dynamic IP address requested). If the activation is successful, data transfer may proceed. After data transfer and layer 2 protocol termination procedure completion, the V.25ter command state is re-entered and the MT returns the final result code OK. In case of abnormal termination or start up, the V.25ter command state is re-entered and the MT returns the final result code NO CARRIER or, if enabled, +CME ERROR. Attach, activate, and other errors may be reported. This command may be used in both normal and modem compatibility modes.

Notes:

- This command has the same effects than ATD*99***.
- If a GPRS PPP session is already running, the setting of a CSD (GSM data call) is not supported.

Command syntax:

Command	Possible responses
AT+CGDATA=[<cid>]	CONNECT ERROR
AT+CGDATA=?	+CGDATA: OK
AT+CGDATA=?	+CGDATA: OK
AT +CGDATA=1	CONNECT

Defined values: <cid>: a numeric parameter that specifies a particular PDP context definition.

GPRS Mobile Station Class: +CGCLASS

Description: The set command is used to set the MT to operate according to the specified GPRS mobile class. If the requested class is not supported, an ERROR or +CME ERROR response is returned. The read command returns the current GPRS mobile class. The test command is used for requesting information on the supported GPRS mobile classes.

Command syntax:

Command	Possible responses
AT+CGCLASS= [<class>]	OK ERROR
AT+CGCLASS?	+CGCLASS: <class> OK
AT+CGCLASS=?	+CGCLASS: (list of supported <class>s) OK
AT +CGCLASS="CG" <i>Note: Enter GPRS class C mode</i>	OK
AT +CGCLASS="CC" <i>Note: Enter GSM mode</i>	OK
AT +CGCLASS="A" <i>Note: Chosen class not supported.</i>	+CME ERROR: 150

AT+CGCLASS=?	+CGCLASS: ("CG","CC") OK
AT+CGCLASS?	+CGCLASS: "CC" OK

Defined values:

<class>: a string parameter that indicates the GPRS mobile class (in descending order of functionality)

- A class A (highest)
- B class B
- CG class C in GPRS only mode
- CC class C in circuit switched only mode (lowest)

Other values are reserved and will result in an ERROR response to the set command. If the MT is GPRS attached when the set command is issued with a <class> = CC specified, a GPRS detach request is sent to the network. If the MT is GSM attached when the set command is issued with a <class> = CG specified, a GSM detach request is sent to the network.

Class A is not supported by G2150I GPRS software.

Remark: During switch-On in CG class, the MS always performs an automatic GPRS attach (the ATTACH-STATUS parameter of +WGPRS is ignored). But, if the MS is not already GPRS attached when switching from B/CC class to CG class then no automatic GPRS attach is performed.

Example about automatic attachment (see remark above):

```
AT+CGCLASS?
+CGCLASS: "B" OK
AT+CGATT?
+CGATT: 0
OK AT+CGCLASS="CG" OK
AT+CGATT?
+CGATT: 0
OK
AT+CGATT=1
OK
AT+CPOF
OK
AT+CFUN=1
OK
AT+CGCLASS?
+CGCLASS: "CG" OK
AT+CGATT?
+CGATT: 1
OK
```

Select Service for MO SMS Messages: +CGSMS

Description: The set command is used to specify the service or service preference that the MT will use to send MO SMS messages. The read command returns the currently selected service or service preference. The test command is used for requesting information on the currently available services and service preferences.

Command syntax:

Command	Possible responses
+CGSMS= [<service>]	OK ERROR
+CGSMS?	+CGSMS: <service> OK
+CGSMS=?	+CGSMS: (list of currently available <service>s) OK
AT +CGSMS=0	OK
AT+CGSMS=?	+CGSMS: (0-3) OK

Defined values: <service>: a numeric parameter which indicates the service or service preference to be used.

- 0: GPRS
- 1: Circuit switched
- 2: GPRS preferred (use circuit switched if GPRS is not available)
- 3: Circuit switched preferred (use GPRS if circuit switched not available)
- Other values are reserved and will result in an ERROR response to the set command.

GPRS Event Reporting: +CGEREP

Description: Set command enables or disables sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of certain events occurring in the GPRS MT or the network.

<mode> controls the processing of unsolicited result codes specified within this command.

Read command returns the current mode and buffer settings

Test command returns the modes and buffer settings supported by the MT as compound values.

Command syntax:

Command	Possible responses
+CGEREP=[<mode>]	OK ERROR
+CGEREP?	+CGEREP: <mode>,<bfr> OK
+CGEREP=?	+CGEREP: (list of supported <mode>s), (list of supported <bfr>s) OK

Defined values:

<mode>:

- 0: buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.
- 2: buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g., in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE

<bfr>:

- 0: MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 entered. Only this case is supported by G2150I
- 1: MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 2 is entered. This case is not supported by G2150I.

With G2150I, a combination of all modes is implemented. When serial link is available, indications are forwarded directly to the TE. If serial link is reserved (e.g., in on-line data

mode), if MT result code buffer is full, the oldest ones can be discarded.

Defined events:

The following unsolicited result codes and the corresponding events are defined:

- +GEV: REJECT <PDP_type>, <PDP_addr>
A network request for PDP context activation occurred when the MT was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected.
- +CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]
The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to the MT.
- +CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]
The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.
- +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]
The mobile equipment has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.
- +CGEV: NW DETACH
The network has forced a GPRS detach. This implies that all active contexts have been deactivated. These are not reported separately.
- +CGEV: ME DETACH
The mobile equipment has forced a GPRS detach. This implies that all active contexts have been deactivated. These are not reported separately.
- +CGEV: NW CLASS <class>
The network has forced a change of MS class. The highest available class is reported.
- +CGEV: ME CLASS <class>
The mobile equipment has forced a change of MS class. The highest available class is reported.

GPRS Network Registration Status: +CGREG

Description: The set command controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the MT's GPRS network registration status, or code +CGREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell.

The read command returns the status of result code presentation and an integer <stat> that shows whether the network has currently indicated the registration of the MT. Location information elements <lac> and <ci> are returned only when <n>=2 and MT is registered in the network.

Command syntax:

Command	Possible responses
AT+CGREG=[<n>]	OK +CGREG: stat>[,<lac>,<ci>]
AT+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>] OK +CME ERROR: <err>
AT+CGREG=?	+CGREG: (list of supported <n>s) OK

Defined values:

<n>:

0: disable network registration unsolicited result code

1: enable network registration unsolicited result code +CGREG: <stat>

2: enable network registration and location information unsolicited result code
 +CGREG: <stat>[,<lac>,<ci>]
 <stat>:
 0: not registered, ME is not currently searching a new operator to register to
 1: registered, home network
 2: not registered, but ME is currently searching a new operator to register to
 3: registration denied
 4: unknown
 5: registered, roaming
 <lac>: string type; two byte location area code in hexadecimal format.
 <ci>: string type; two byte cell ID in hexadecimal format

Request GPRS IP Service: 'D'

Description: This command causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN. The V.25ter 'D' (Dial) command causes the MT to enter the V.25ter online data state and, with the TE, to start the specified layer 2 protocol. The MT return CONNECT to confirm acceptance of the command prior to entering the V.25ter online data state. No further commands may follow on the AT command line.

The detailed behavior after the online data state has been entered is described briefly in clause 9, for IP, of GSM 07.60. GPRS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the +CGATT and +CGACT commands.

If <cid> is supported, its usage is the same as in the +CGDATA command. The +CGDCONT, +CGQREQ, etc., commands may then be used in the modem initialization AT command string to set values for PDP type, APN, QoS, etc.

If <cid> is not supported or is supported but omitted, the MT attempt to activate the context using the 'Empty PDP type' (GSM 04.08). (No PDP address or APN is sent in this case and only one PDP context subscription record is present in the HLR for this subscriber.)

Note: If a GPRS PPP session is already running, the setting of a CSD (GSM data call) is not supported.

Command syntax:

Command	Possible responses
D*<GPRS_SC_IP>[***<cid>]#	CONNECT ERROR

Defined values:

<GPRS_SC_IP>: (GPRS Service Code for IP) a digit string (value 99), which identifies a request to use the GPRS with IP (PDP types IP and PPP)

<cid>: a digit string that specifies a particular PDP context definition.

Example

```
ATD*99***1#
CONNECT
ATD*99***2#
ERROR
```


Network Requested PDP Context Activation

In this mode of operation, the MT behaves like an answering modem and accepts the normal V.25ter commands associated with answering a call. If GPRS-specific configuration commands are required, they may be sent to the MT as part of the modem initialization commands.

The +CGAUTO command is used to select modem compatibility mode.

Automatic response to a network request for PDP context activation 'S0'

The V.25ter 'S0=n' (Automatic answer) command may be used to turn off (n=0) and on (n>0) the automatic response to a network request for a PDP context activation

When the 'S0=n' (n>0) command is received, the MT attempt to perform a GPRS attach if it is not already attached. Failure will result in ERROR being returned to the TE. Subsequently, the MT will announce a network request for PDP context activation by issuing the unsolicited result code RING to the TE, followed by the intermediate result code CONNECT. The MT then enters V.25ter online data state and follows the same procedure as it would after having received a +CGANS=1 with no <L2P> or <cid> values specified.

Note: The 'S0=n' (n=0) command does not perform an automatic GPRS detach.

Manual acceptance of a network request for PDP context activation 'A'

The V.25ter 'A' (Answer) command may be used to accept a network request for a PDP context activation announced by the unsolicited result code RING. The MT responds with CONNECT, enters V.25ter online data state and follows the same procedure as it would after having received a +CGANS=1 with no <cid> value specified. It is an error to issue the 'A' command when there is no outstanding network request.

Manual rejection of a network request for PDP context activation 'H'

The V.25ter 'H' or 'H0' (On-hook) command may be used to reject a network request for PDP context activation announced by the unsolicited result code RING. The MT responds with OK. It is an error to issue the 'H' command when there is no outstanding network request.

Note: This is an extension to the usage of the 'H' command that is described in ITU-T V.25ter.

Automatic Response to a Network Request for PDP Context Activation: +CGAUTO

Description: The set command disables or enables an automatic positive response (auto-answer) to the receipt of a Request PDP Context Activation message from the network. It also provides control over the use of the V.25ter basic commands 'S0', 'A' and 'H' for handling network requests for PDP context activation. The setting does not affect the issuing of the unsolicited result code RING or +CRING.

The test command returns values of <n> supported by the MT as a compound value.

When the +CGAUTO=0 command is received, the MT will not perform a GPRS detach if it is attached. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING, the TE may manually accept or reject the request by issuing the +CGANS command or may simply ignore the network request.

When the +CGAUTO=1 command is received, the MT will attempt to perform a GPRS attach if it is not already attached. Failure will result in ERROR or, if enabled, +CME ERROR being returned to the TE. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING to the TE, this is followed by the intermediate result code CONNECT. The MT then enters V.25ter online data state and follows the same procedure as it would after having received a +CGANS=1 with <cid> values specified.

Command syntax:

Command	Possible responses
+CGAUTO=[<n>]	OK ERROR
+CGAUTO?	+CGAUTO: <n> OK
+CGAUTO=?	+CGAUTO: (0-3) OK

Defined values: <n>:

- 0 turn off automatic response for GPRS only
- 1 turn on automatic response for GPRS only
- 2 modem compatibility mode, GPRS only
- 3 modem compatibility mode, GPRS and circuit switched calls (default)

For <n> = 0 GPRS network requests are manually accepted or rejected by the +CGANS command.

For <n> = 1 GPRS network requests are automatically accepted according to the description above.

For <n> = 2, automatic acceptance of GPRS network requests is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject GPRS requests (+CGANS may also be used). Incoming circuit switched calls can be neither manually nor automatically answered.

For <n> = 3, automatic acceptance of both GPRS network requests and incoming circuit switched calls is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject GPRS requests (+CGANS may also be used). Circuit switched calls are handled as described elsewhere in this specification. Note: In class CGPRS the modem can't receive simultaneously GPRS and GSM incoming calls.

Example

```
AT+CGAUTO=?
+CGAUTO: (0-2)
OK
```

```
AT+CGAUTO=?
+CGAUTO: (0-2)
OK
```

```
AT+CGAUTO=0
OK
```

Manual Response to a Network Request for PDP Context Activation: +CGANS

Description: The execution command requests the MT to respond to a network request for GPRS PDP context activation that has been signaled to the TE by the RING or +CRING: unsolicited result code. The <response> parameter allows the TE to accept or reject the request.

If <response> is 0, the request is rejected and the MT returns OK to the TE.

If <response> is 1, the following procedure is followed by the MT.

PDP context activation procedures take place prior to or during the PDP startup.

One <cid> may be specified in order to provide the values needed for the context activation request.

During the PDP startup procedure the MT has the PDP type and the PDP address provided by the network in the Request PDP Context Activation message. If a <cid> is given its information must match the PDP type and PDP address in the network request as follows:

The PDP type must match exactly.

The PDP addresses are considered to match if they are identical or if the address in the context definition is unspecified.

If any of this information is in conflict, the command will fail.

The context is activated using the values for PDP type and PDP address provided by the network, together with the other information found in the PDP context definition. An APN may or may not be required, depending on the application.

If no <cid> is given, the MT will attempt to activate the context using the values for PDP type and PDP address provided by the network, together with any other relevant information to the MT. The other context parameters will be set to their default values. If the activation is successful, data transfer may proceed.

After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the V.25ter command state is re-entered and the MT returns the final result code OK. In the event of an erroneous termination or a failure to startup, the V.25ter command state is re-entered and the MT returns the final result code NO CARRIER or, if enabled, +CME ERROR. Attach, activate, and other errors may be reported. It is also an error to issue the +CGANS command when there is no outstanding network request. This command may be used in both normal and modem compatibility modes.

Command syntax:

Command	Possible responses
+CGANS=[<response>, [<cid>]]	OK ERROR
+CGANS=?	+CGANS: (list of supported <response>s), (list of supported <L2P>s) OK

Defined values:

<response>: is a numeric parameter that specifies how the request should be responded to.

0 reject the request

1 accept and request that the PDP context be activated

If <response> is omitted it is assumed to be 0. Other values are reserved and will result in the ERROR response.

<cid>: a numeric parameter that specifies a particular PDP context definition.

Example

```
+CRING: GPRS "IP", "122.41.74.238"
```

```
AT+CTANS=1
CONNECT
AT+CGANS=?
+CGANS: (0-1)
OK
```

Show PDP Address: +CGPADDR

Description: The exclusion command returns a lot of PDP addresses for the specified context identifiers. The test command returns a list of defined <cid>s

Command syntax:

Command	Possible responses
+CGPADDR=[<cid> [,<cid> [...]]]	+CGPADDR: <cid>,<PDP_addr> [<CR><LF>+CGPADDR: <cid>,<PDP_addr> [...]] OK
+CGPADDR=?	+CGPADDR: (list of defined <cid>s) OK

Defined values:

<cid>: a numeric parameter that specifies a particular PDP context definition. If no <cid> is specified, the addresses for all defined contexts are returned.

<PDP_address>: a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available.

Example

In this example 3 CIDs are defined.

```
AT+CGPADDR=1
+CGPADDR=1,"107.210.5.4"
OK
AT+CGPADDR=?
+CGPADDR: (1,2,4)
OK
AT+CGPADDR
+CGPADDR: 1,
+CGPADDR: 2, "10.3.73.151"
+CGPADDR: 4,
```

Cellular Result Codes: +CRING

Description: This command enables a more detailed ring indication, in case of an incoming call (voice or data). Instead of the string "RING", an extended string is used to indicate which type of call is ringing (e.g. +CRING: VOICE).

These extended indications are:

+CRING: ASYNC	for asynchronous transparent
+CRING: REL ASYNC	for asynchronous non-transparent
+CRING: VOICE	for normal speech.
+CRING: FAX	for fax calls

+CRING: GPRS	GPRS network request for PDP context activation
--------------	---

If the MT is unable to announce to the TE the network's request (for example it is in V.25ter on line data state) the MT rejects the request. No corresponding unsolicited result code is issued when the MT returns to a command state.

Command syntax: See Chapter 7. Cellular result codes +CRC.

Defined values: No parameter.

Service Reporting Control: +CR

Description: This command enables a more detailed service reporting, in case of an incoming or outgoing data call. Before sending the CONNECT response to the application, the G2150I will precise the type of data connection that have been established.

These reports types are:

+CR: ASYNC	For asynchronous transparent
+CR: REL ASYNC	For asynchronous non-transparent
+CR: GPRS	For GPRS

Command syntax: AT+CR

Command	Possible responses
AT+CR=0 <i>Note: Extended reports disabled</i>	OK <i>Note: Command valid</i>
AT+CR=1 <i>Note: Extended reports enabled</i>	OK <i>Note: Command valid</i>

Defined values: No parameter.

Extended Error Report: +CEER

Description: This command gives the reason of the call release when the last call setup (originating or answering) failed. New indication for GPRS is the reason of the last unsuccessful PDP context activation and the last GPRS detach or PDP context activation.

Command syntax: AT+CEER

Command	Possible responses
ATD123456789 ; <i>Note: Outgoing voice call</i>	NO CARRIER <i>Note: Call setup failure</i>
AT+CEER <i>Note: Ask for reason of release</i>	+CEER: Error <xxx> OK <i>Note: <xxx>is the cause information element values form GSM recommendation 04.08 or specific. Call accepted</i>

Codes and values for specific GPRS failure causes (values 224 to 238). The "NO CARRIER" indicates that the AT+CEER information is available for a failure diagnostic.

Defined values: No parameters.

GPRS Parameter Customization: + WGPRS

Description: This command modifies some G2150I GPRS parameters:

- the ATTACH-STATUS (the ME does or not perform automatically a GPRS attachment after initialization),
- the PDP-INIT-STATUS (activates automatically or not some defined PDP contexts after initialization) and
- the user-defined multislot class. This parameter represents the GPRS class chosen by the user to perform power saving (by reducing TX (or uplink) time slots).

In addition, this command allows:

- set automatically “ACTIVABLE” some defined PDP contexts after initialization
- set some parameters for PALM® OS software: PPP Silent Mode (PPP waits for PPP Client to start the dialog) and Slow CONNECT (due to the delay of the processing of PALM® OK, the CONNECT is sent one second after the dialing command request)

IMPORTANT NOTE: The G2150I must be rebooted to activate the new setup except for <mode> 3, 5, 6 and 7 (please refer to Defined Values paragraph).

Command syntax: AT+WGPRS=<mode>,<parameter>,[<cid>],[<class>]

Command	Possible responses
AT+WGPRS=?	+WGPRS: <mode>, <parameter1>,[<cid>] [<CR><LF>+WGPRS: <mode>, <parameter>,[<cid>] [...]] OK
AT+WGPRS?	+WGPRS:<mode>(list of supported <parameter>),[(list of supported <cid>)] [<CR><LF>+WGPR S:<mode>(list of supported <parameter>),[(list of supported <cid>)] [...]] OK
AT+WGPRS=2,1,3 <i>Note: set ACTIVABLE to ON on PDP context 3</i>	OK
AT+WGPRS=7,1 <i>Note: set automatic re-attachment to the network and reactivation of PDP context in case of change of operator for MCC/MNC</i>	OK
AT+WGPRS=4,,8 <i>Note: choose GPRS multislot class 8</i>	OK
AT+WGPRS=? <i>Note: Request ranges of values</i>	+WGPRS: (0-7),(0-1),(0- 4),(2,8,10, 12) OK

Command	Possible responses
AT+WGPRS? Note: - Automatic re-attachment at init not activated	+WGPRS: 0,0
- Automatic reactivation of PDP context at init not activated	+WGPRS: 1,0
- 3 PDP contexts, and automatic reactivation only for Cid 1	+WGPRS: 2,1,1 +WGPRS: 2,0,2 +WGPRS: 2,0,3 +WGPRS: 2,0,4
- PPP silent mode activated	+WGPRS: 3,1
- GPRS class is 8	+WGPRS:4,8
- GPRS slow connect activated	+WGPRS:5,1
- PPP filtering activated	+WGPRS:6,1
- Automatic re-attachment and PDP reactivation at operator border areas	+WGPRS:7,1
	OK

Defined values:

<mode>: a numeric parameter that specifies a G2150I GPRS parameter.

- 0 ATTACH-STATUS (the ME don't make automatically a GPRS attachment after init)
- 1 PDP-INIT-STATUS (declare some PDP contexts liable to be activated automatically after initialization by <mode>=2)
- 2 Set ACTIVABLE automatically after init a define PDP context
- 3 PPP silent mode
- 4 Definition of the GPRS multislot class.
- 5 Slow CONNECT for PALM® OS
- 6 PPP Filtering
- 7 Automatic GPRS roaming inter-operator: if activated, ME automatically re- attaches itself to the network and reactivates its PDP context by changing operator when reaching border areas.

Notes:

If <mode>=0, 1, 3, 4, 5, 6 or 7 <cid> and <class> values will be ignored.

If <mode>=0, 1, 2, 3, 5 or 6, <class> value will be ignored.

If <mode>=4, <parameter> and <cid> values will be ignored. G2150I must be restarted to take the modification into account.

PPP Filtering is a test-purpose functionality. It avoids sending on the radio link

some OS-specific frames, for accurate transfer rate measurements.

<parameter>: a numeric parameter that controls the operation defined by <mode> if it is equal to 0, 1, 2, or 3.

0 operation OFF (disabled)

1 operation ON (enabled)

<cid>: (PDP Context Identifier) a numeric parameter that specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. Range of values is 0 to 4.

<class>: GPRS multislot class number. It may be lower than the maximum possible class. Possible values are 2, 8, 10, 12. Refer to doc ref [6] for more information about GPRS multislot classes.

Multislot class	Maximum number of slots			Minimum number of slots				Type of MS
	Rx	Tx	Sum	T _{ta}	T _{tb}	T _{ra}	T _{rb}	
2	2	1	3	3	2	3	1	1
8	4	1	5	3	1	2	1	1
10	4	2	5	3	1	2	1	1
12	4	4	5	2	1	2	1	1

NB: Type 1 MS are not required to transmit and receive at the same time

Remark: When the G2150I is set in "CG" class, the ME always make automatically a GPRS attachment after init, so AT+WGPRS? always give +WGPRS: 0,0 for the parameter 0.

Note: Default value for mode 7 is 0; in this case, no automatic GPRS reconnection to new operator is done when reaching border areas.

Full AT GPRS Command Examples

Activation of an IP PDP context :

Example 1:

```
AT+CGPDCONT=1,"IP","internet"; +CGDCONT=2,"IP","abc.com"
OK
ATD*99***1#
CONNECT
```


Example 2:

```
AT+CGCLASS="CG"  
OK  
+CGREG: 1  
AT +CGDCONT=1,"IP","internet"  
OK  
AT +CGQREQ=1,1,4,5,2,14  
OK  
AT +CGQMIN=1,1,4,5,2,14  
OK  
AT +CGATT=1  
OK  
AT +CGACT=1,1  
OK
```

Remark about +CGDATA:

The goal of this command is the same as

```
ATD*99***AT + CGDATA=1  
CONNECT
```

.....

Data transfer

.....

```
+CGEV: NW DETACH
```

Network request:

```
AT + CGAUTO=0  
OK  
+CRING: GPRS "IP","211.45.89.152"  
AT+CGANS=1  
CONNECT
```

.....

Data transfer

MOXA Proprietary Commands

This chapter includes information about the MOXA proprietary Commands of the OnCell G2150I. The following topics are covered in this chapter:

- ❑ **Firmware Upgrade: *UPG**
- ❑ **Restore Default Setting: *DEFAULT**
- ❑ **Automatic PIN Entry: *USEPIN**
- ❑ **Initial Strings: *BOOTSTR**
- ❑ **Serial Port Configuration: *SERIAL**
- ❑ **SMS Tunnel Mode: *SMS**

Firmware Upgrade: *UPG

Description: This command triggers a X-modem(checksum) downloading session for G2150I firmware image.

Notes:

- There will always be risks when performing the firmware upgrade. Ensure to have fixed physical connection on both the power and the signal lines, and to have the correct image file.
- System responses with “Clean-up OK All Done!!” message on the terminal if the upgrade is successful.
- X-modem receive timeout: 10 sec.

Example

```
AT + UPG
Moxa Firmware Upgrader, v1.0

*UPG: 73851 bytes transferred, in 45s
Upgrading, please keep power intact and wait...

CR

+WIND: 13

Restoring modem defaults, please wait...

OK

Clean-up OK

All Done!!

OK

+WIND: 13
```

NOTE	Upgrading the firmware will clear all the settings and reset the OnCell G2150I to its factory defaults.
------	--

Restore Default Setting: *DEFAULT

Description: This command resets the G2150I to its factory default.

Example

```
AT* DEFAULT
*DEFAULT: reset modem configurations

Restoring modem defaults, please wit...

OK

Clean-up, please wait...

Clean-up OK

All Done!!

OK

+WIND: 13
```

NOTE

Upgrading the firmware will clear all the settings and reset the OnCell G2150I to its factory defaults.

Automatic PIN Entry: *USEPIN

Description: This command enables/disables the automatic PIN code entry function when G2150I is booting up

Command syntax: AT*USEPIN=<n>, <PIN Code>

Command	Possible responses
AT*USEPIN=1, 1234 <i>Note: 1234 is an example of PIN code</i>	OK <i>Note: Done</i>
AT*USERPIN=0 <i>Note: Automatic PIN entry is disabled</i>	OK <i>Note: Done</i>
AT*USEPIN?	*USEPIN: (0, 1)

Defined values: <n>

0: Automatic PIN Entry is disabled

1: Automatic PIN Entry is enabled

Notes:

The PIN code will be used in the booting process. If PIN is not entered correctly, system will automatic disable the auto-entry function to avoid the SIM to be locked.

Example

```
AT*USEPIN=1,000
*USEPIN: 0
```

```
OK
AT*USEPIN=1,000
OK
AT
OK
AT*USEPIN=0
OK
```

Initial Strings: *BOOTSTR

Description: This command enables/disables the initial strings

Command syntax: AT*BOOTSTR=<m>
AT*BOOTSTR<n>=<initial strings>

Command	Possible responses
AT*BOOTSTR=1	OK <i>Note: Done</i>
AT*BOOTSTR=0	OK <i>Note: Done</i>
At*BOOTSTR=? <i>Note: list the usage</i>	*BOOTSTR=: (0, 1) OK <i>Note: max 39 charters for each <initial string></i>
AT*BOOTSTR? <i>Note: List all status</i>	*BOOTSTR: 1 *BOOTSTR1: E0 *BOOTSTR2: S0=1 OK
AT*BOOTSTR1=E0&W	OK <i>Note: Done</i>

Defined values:

<m> states of boot initial string function
 0: Disable boot initial strings entry
 1: Enable boot initial strings entry
 <n>: number of boot initial string
 1: 1st boot string
 2: 2nd boot string
 3: 3rd boot string
 4: 4th boot string
 5: 5th boot string
 6: 6th boot string

Example

```

AT

OK
AT*BOOTSTR=1

OK
AT*BOOTSTR1=E0&SO=1

OK
AT*BOOTSTR?

BOOTSTR: 1
*BOOTSTR1: EO&SO=1

OK
  
```

Serial Port Configuration: *SERIAL

Description: This command configures the serial port settings

Command syntax:

AT*SERIAL=<n>,<baudrate>,<data bits>,"<parity>"<stop bits>,"<flow control>"

Command	Possible responses
AT*SERIAL?	*SERIAL: (0, 1)
AT*SERIAL=?	*SERIAL=: (0, 1), (baudrate, data bits, parity, start bits, flow cntrl)
AT*SERIAL=1, 9600,7, "E", 1, "N"	OK <i>Note: Done</i>

Defined values:

<n>:

0: Disable automatic serial settings

1: Enable automatic serial settings

<baudrate>: <300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200>

<data bits>: <7, 8>

<parity>: <n, e, o, s, m>

n: None parity

e: Even parity

o: Odd parity

s: Space parity

m: mark parity

<stop bits>: <1, 2>

<flow control>:

None: None for flow control

HW: RTS/CTS flow control

Note:

If serial port manager function is enabled, all serial port related AT commands will be monitored, any changes will recorded automatically. These commands includes AT+IPR/AT+ICF/AT+IFC/ATE0/ATE1.

Example

AT

OK

AT*SERIAL=1,115200,8"N",1,"N"

OK

SMS Tunnel Mode: *SMS

Description: This command configures the SMS Tunnel mode settings

Command syntax:

```
AT*SMSIN=<encoding>,<receive phone 1>,<receive phone 2>
AT*SMSOUT=<encoding>,<target phone 1>,<target phone 2>
AT*SMSTUN=<n>
AT*SMSIO=<x>,<y>
```

Command	Possible responses
AT*SMSOUT?	*SMSOUT: (0, +886289191230, +8886289191231)
AT*SMSOUT=0, +88689191230, +88689191231	OK <i>Note: Done</i>
AT*SMSIN?	*SMSIN: (0, +886289191230, +8886289191231)
AT*SMSIN=0, +88689191230, +88689191231	OK <i>Note: Done</i>
AT*SMSTUN?	*SMSTUN: (0, 1)
AT*SMSTUN=1	OK <i>Note: Done</i>
AT*SMSIO?	*SMSIO: (0,1), (0,1)
AT*SMSIO=0, 1	OK <i>Note: Done</i>

Defined values:

<encoding>: format of the send/receive short message format

- 0: 7 bits text format
- 1: 8 bits binary
- 2: 16 bits Unicode (UCS2) format

<receive phone 1>: <phone numbers in internal format starts with "+">

<receive phone 2>: <phone numbers in internal format starts with "+">

<target phone 1>: <phone numbers in internal format starts with "+">

<target phone 2>: <phone numbers in internal format starts with "+">

<n>:

- 0: Disable SMS Tunnel mode
- 1: Enable SMS Tunnel mode

<x>: State of SMS-IN

- 0: Disable SMS-IN
- 1: Enable SMS-IN

<y>: State of SMS-OUT

- 0: Disable SMS-OUT
- 1: Enable SMS-OUT

Example

AT

OK

AT*SMSOUT=0,+886289191230,+886289191231

*SMSOUT: Configured
Encode: 7-Bits GSM Text
Receiver1: +886289191230
Receiver2: +886289191231

AT*SMSIN=0,+886289191230,+886289191231

*SMSIN: Configured
Encode: 7-Bits GSM Text
Sender1: +886289191230
Sender2: +886289191231

OK
AT*SMSTUN=1

OK
AT
SMSOUT:

Enter SMS Tunnel Mode...
Encode: 7-Bits GSM Text
Receiver1: +886289191230
Receiver2: +886289191231

SMSIn:
Encode: 7-Bits GSM Text
Sender1: +886289191230
Sender2: +886289191231

OK

A

Result Codes, Failure Causes, and Other Tables

This chapter includes information about the Result Codes, Failure Causes, and Other Tables of the OnCell G2150I.

The following topics are covered in this chapter:

- ME Error Result Code: +CME ERROR: <error>**
- Message Service Failure Result Code: +CMS ERROR: <er>**
- Specific Error Result Codes**
- Failure Cause from GSM 04.08 Recommendation: +CEER**
- Specific Failure Cause for +CEER**
- GSM 04.11 Annex E-2: Mobile Originating SM-Transfer**
- Unsolicited Result Codes**
- Final Result Codes**
- Intermediate Result Codes**

ME Error Result Code: +CME ERROR: <error>

<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
22	Not found	+CPBF, +CPBP, +CPBN, +CGSN, +WOPN, ATD>[mem]’name”
24	Text string too long	+CPBW, +CPIN, +CPIN2, +CLCK, +CPWD
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 personal PIN required (Network lock)	All GSM 07.07 commands (+CME ERROR: 40)
103	Illegal MS (#3)	+CGATT
106	Illegal ME (#6)	+CGATT
107	GPRS services not allowed (#7)	+CGATT
111	PLMN not allowed (#11)	+CGATT
112	Location area not allowed (#12)	+CGATT
113	Roaming not allowed in this area (#13)	+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

Message Service Failure Result Code: +CMS ERROR: <er>

<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 memory full	+CMGW
330	SC address unknown	+CSCA?, +CMSS, +CMGS
340	no +CNMA acknowledgement expected	+CNMA

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"
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 algo.	+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

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
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	Interworking, unspecified
224	MS requested detach
225	PDP unsuccessful activation cause MMI ignore
226	NWK requested Detach
227	Unsuccessful attach cause NO SERVICE
228	Unsuccessful attach cause NO ACCESS
229	Unsuccessful attach cause GPRS SERVICE REFUSED
230	PDP deactivation requested by Nwk

231	PDP deactivation cause LLC link activation failed
232	PDP deactivation cause NWK reactivation with same TI
233	PDP deactivation cause GMM abort
234	PDP deactivation cause LLC or SNDSCP failure
235	PDP unsuccessful activation cause GMM error
236	PDP unsuccessful activation cause NWK reject
237	PDP unsuccessful activation cause NO NSAPI available
238	PDP unsuccessful activation cause SM refuse

All other values in the range 0 to 31 shall be treated as cause 3.

All other values in the range 32 to 47 shall be treated as cause 47.

All other values in the range 48 to 63 shall be treated as cause 63.

All other values in the range 64 to 79 shall be treated as cause 79.

All other values in the range 80 to 95 shall be treated as cause 95.

All other values in the range 96 to 111 shall be treated as cause 111.

All other values in the range 112 to 127 shall be treated as cause 127.

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

GSM 04.11 Annex E-2: Mobile Originating SM-Transfer

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

Cause No. 1: “Unassigned (unallocated) number”

This cause indicates that 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).

Cause No. 8: “Operator determined barring”

This cause indicates that the MS has tried to send a mobile originating short message when the MS's network operator or service provider has forbidden such transactions.

Cause No. 10: “Call barred”

This cause indicates that the outgoing call barred service applies to the short message service for the called destination.

Cause No. 21: “Short message transfer rejected”

This cause indicates that 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.

Cause No. 27: “Destination out of service”

This cause indicates that 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.

Cause No. 28: “Unidentified subscriber”

This cause indicates that the subscriber is not registered in the PLMN (e.g.. IMSI not known)

Cause No. 29: “Facility rejected”

This cause indicates that the facility requested by the Mobile Station is not supported by the PLMN.

Cause No. 30: “Unknown subscriber”

This cause indicates that the subscriber is not registered in the HLR (e.g.. IMSI or directory number is not allocated to a subscriber).

Cause No. 38: “Network out of order”

This cause indicates that the network is not functioning correctly and that 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.

Cause No. 41: “Temporary failure”

This cause indicates that the network is not functioning correctly and that 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.

Cause No. 42: “Congestion”

This cause indicates that the short message service cannot be serviced because of high traffic.

Cause No. 47: “Resources unavailable, unspecified”

This cause is used to report a resource unavailable event only when no other cause applies.

Cause No. 69: “Requested facility not implemented”

This cause indicates that the network is unable to provide the requested short message service.

Cause No. 81: “Invalid short message transfer reference value”

This cause indicates that 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.

Cause No. 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.

Cause No. 96: “Invalid mandatory information”

This cause indicates that the equipment sending this cause has received a message where a

mandatory information element is missing and/or has a content error (the two cases are undistinguishable).

Cause No. 97: “Message type non-existent or not implemented”

This cause indicates that 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.

Cause No. 98: “Message not compatible with short message protocol state”

This cause indicates that 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.

Cause No. 99: “Information element non-existent or not implemented”

This cause indicates that 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. However, the information element is not required to be present in the message so that the equipment sends the cause to process the message.

Cause No. 111: “Protocol error, unspecified”

This cause is used to report a protocol error event only when no other cause applies.

Cause No. 127: “Interworking, unspecified”

This cause indicates that there has been interworking 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 determined. All values other than specified should be treated as error Cause No 41.

Unsolicited Result Codes

Verbose Result Code	Numeric (V0 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: <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: <LineId>,<Status>	As verbose (specific)	Voice Mail Indicator notification (cf. +CPHS command)
+WDCI: <LineId>,<Status>	As Verbose (specific)	Diverted call indicator
RING	2	Incoming call signal from network
+CIEV	As Verbose (specific)	Indicator event reporting

Final Result Codes

Verbose Result Code	Numeric (V0 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

Intermediate Result Codes

Verbose Result Code	Numeric (V0 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