The INTERNET of THINGS made **Plug&Play**

Telit ® wireless solutions

SUPPORT SERVICES

WLAN
LPWAN

SHORT TO
LONG RANGE RF

FULL PROJECT
ASSISTANCE

SE 868 V2
JN3

GNSS

PRODUCTS

POSITIONING

ONE STOP.
ONE SHOP.

TELIT SOFTWARE
MANAGEMENT

HE910
GL865-DUAL
GE865-QUAD
LE920

WWAN

m2m**air**

MOBILE

CELLULAR

Java

python

SERVICES

m2m**air**

CLOUD

APPZONE DEVELOPMENT
ENVIRONMENT

LE910 V2 SERIES AT
COMMANDS REFERENCE GUIDE

APPLICABILITY TABLE

PRODUCTS	SW RELEASE
■■ LE910-SV V2	20.00.004
■■ LE910-SV1	20.00.014
■■ LE910-SVL	20.00.034
■■ LE910-NA V2	20.00.504
■■ LE910-NA1	20.00.524
■■ LE910-EU V2	20.00.402
■■ LE910-AU V2	20.00.102
■■ LE910-EU1	20.00.412
■■ LE910B1-EU	20.00.422
■■ LE910-JN1	20.00.203
■■ LE910B4-NA	20.00.534
■■ LE910B1-NA	20.00.544
■■ LE910B1-SA	20.00.514

NOTE: The features described by the present document are provided by the products equipped with the software versions equal or greater than the version shown in the table.

DISCLAIMER

LEGAL NOTICE

These Specifications are general guidelines pertaining to product selection and application and may not be appropriate for your particular project. Telit (which hereinafter shall include, its agents, licensors and affiliated companies) makes no representation as to the particular products identified in this document and makes no endorsement of any product. Telit disclaims any warranties, expressed or implied, relating to these specifications, including without limitation, warranties or merchantability, fitness for a particular purpose or satisfactory quality. Without limitation, Telit reserves the right to make changes to any products described herein and to remove any product, without notice.

It is possible that this document may contain references to, or information about Telit products, services and programs, that are not available in your region. Such references or information must not be construed to mean that Telit intends to make available such products, services and programs in your area.

USE AND INTELLECTUAL PROPERTY RIGHTS

These Specifications (and the products and services contained herein) are proprietary to Telit and its licensors and constitute the intellectual property of Telit (and its licensors). All title and intellectual property rights in and to the Specifications (and the products and services contained herein) is owned exclusively by Telit and its licensors. Other than as expressly set forth herein, no license or other rights in or to the Specifications and intellectual property rights related thereto are granted to you.   Nothing in these Specifications shall, or shall be deemed to, convey license or any other right under Telit's patents, copyright, mask work or other intellectual property rights or the rights of others.

You may not, without the express written permission of Telit: (i) copy, reproduce, create derivative works of, reverse engineer, disassemble, decompile, distribute, merge or modify in any manner these Specifications or the products and components described herein; (ii) separate any component part of the products described herein, or separately use any component part thereof on any equipment, machinery, hardware or system; (iii) remove or destroy any proprietary marking or legends placed upon or contained within the products or their components or these Specifications; (iv) develop methods to enable unauthorized parties to use the products or their components; and (v) attempt to reconstruct or discover any source code, underlying ideas, algorithms, file formats or programming or interoperability interfaces of the products or their components by any means whatsoever. No part of these Specifications or any products or components described herein may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language or computer language, in any form or by any means, without the prior express written permission of Telit.

HIGH RISK MATERIALS

Components, units, or third-party products contained or used with the products described herein are NOT fault-tolerant and are NOT designed, manufactured, or intended for use as on-line control equipment in the following hazardous environments requiring fail-safe controls: the operation of Nuclear Facilities, Aircraft Navigation or Aircraft Communication Systems, Air Traffic Control, Life Support, or Weapons Systems ("High Risk Activities"). Telit, its licensors and its supplier(s) specifically disclaim any expressed or implied warranty of fitness for such High Risk Activities.

TRADEMARKS

You may not and may not allow others to use Telit or its third party licensors' trademarks. To the extent that any portion of the products, components and any accompanying documents contain proprietary and confidential notices or legends, you will not remove such notices or legends.

THIRD PARTY RIGHTS

The software may include Third Party Right software. In this case you agree to comply with all terms and conditions imposed on you in respect of such separate software. In addition to Third Party Terms, the disclaimer of warranty and limitation of liability provisions in this License shall apply to the Third Party Right software.

TELIT HEREBY DISCLAIMS ANY AND ALL WARRANTIES EXPRESS OR IMPLIED FROM ANY THIRD PARTIES REGARDING ANY SEPARATE FILES, ANY THIRD PARTY MATERIALS INCLUDED IN THE SOFTWARE, ANY THIRD PARTY MATERIALS FROM WHICH THE SOFTWARE IS DERIVED (COLLECTIVELY "OTHER CODE"), AND THE USE OF ANY OR ALL THE OTHER CODE IN CONNECTION WITH THE SOFTWARE, INCLUDING (WITHOUT LIMITATION) ANY WARRANTIES OF SATISFACTORY QUALITY OR FITNESS FOR A PARTICULAR PURPOSE.

NO THIRD PARTY LICENSORS OF OTHER CODE SHALL HAVE ANY LIABILITY FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING WITHOUT LIMITATION LOST PROFITS), HOWEVER CAUSED AND WHETHER MADE UNDER CONTRACT, TORT OR OTHER LEGAL THEORY, ARISING IN ANY WAY OUT OF THE USE OR DISTRIBUTION OF THE OTHER CODE OR THE EXERCISE OF ANY RIGHTS GRANTED UNDER EITHER OR BOTH THIS LICENSE AND THE LEGAL TERMS APPLICABLE TO ANY SEPARATE FILES, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

CONTENTS

1 INTRODUCTION

1.1 Scope

Purpose of this document is providing a detailed specification and a comprehensive listing as a reference for the whole set of AT command for the LE910 V2 series (LTE/3G/2Gmodules)

1.2 Audience

Readers of this document should be familiar with Telit modules and their ease of controlling by means of AT Commands.

1.3 Contact Information, Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

TS-EMEA@telit.com

TS-AMERICAS@telit.com

TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/support

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4   List of acronyms

Acronym	Description
ARFCN	Absolute Radio Frequency Channel Number
AT	Attention command
BA	BCCH Allocation
BCCH	Broadcast Control Channel
CA	Cell Allocation
CBM	Cell Broadcast Message
CBS	Cell Broadcast Service
CCM	Current Call Meter
CLIR	Calling Line Identification Restriction
CTS	Clear To Send
CUG	Closed User Group
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DGPS	Differential GPS, the use of GPS measurements, which are differentially corrected
DNS	Domain Name System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
GGA	GPS Fix data
GLL	Geographic Position – Latitude/Longitude
GLONASS	Global positioning system maintained by the Russian Space Forces
GMT	Greenwich Mean Time
GNSS	Any single or combined satellite navigation system (GPS, GLONASS and combined GPS/GLONASS)
GPRS	Global Packet Radio Service
GPS	Global Positioning System

Acronym	Description
GSA	GPS DOP and Active satellites
GSM	Global System Mobile
GSV	GPS satellites in view
HDLC	High Level Data Link Control
HDOP	Horizontal Dilution of Precision
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IP	Internet Protocol
IRA	International Reference Alphabet
IWF	Interworking Function
ME	Mobile Equipment
MO	Mobile Originated
MT	*either* Mobile Terminated *or* Mobile Terminal
NMEA	National Marine Electronics Association
NVM	Non Volatile Memory
PCS	Personal Communication Service
PDP	Packet Data Protocol
PDU	Packet Data Unit
PIN	Personal Identification Number
PPP	Point to Point Protocol
PUK	Pin Unblocking Code
RLP	Radio Link Protocol
RMC	Recommended minimum Specific data
RTS	Request To Send
SAP	SIM Access Profile
SCA	Service Center Address
SMS	Short Message Service

Acronym	Description
SMSC	Short Message Service Centre
SMTP	Simple Mail Transport Protocol
TA	Terminal Adapter
TCP	Transmission Control Protocol
TE	Terminal Equipment
UDP	User Datagram Protocol
USSD	Unstructured Supplementary Service Data
UTC	Coordinated Universal Time
VDOP	Vertical dilution of precision
VTG	Course over ground and ground speed
WAAS	Wide Area Augmentation System
LTE	Long Term Evolution

1.5 Text Conventions

STOP	Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

⚠️	Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

ℹ️	Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

- 3GPP TS 27.007 specification and rules
  http://www.3gpp.org/ftp/Specs/archive/27_series/27.007/

- 3GPP TS 27.005 specification and rules
  http://www.3gpp.org/ftp/Specs/archive/27_series/27.005/

- Hayes standard AT command set

2   OVERVIEW

This document is to describe all AT commands implemented on the Telit wireless modules listed on the Applicability Table.

NOTICE:

(EN) The integration of the LTE **LE910 V2** cellular module within user application shall be done according to the design rules described in this manual.

(IT) L'integrazione del modulo cellulare LTE **LE910 V2** all'interno dell'applicazione dell'utente dovrà rispettare le indicazioni progettuali descritte in questo manuale.

(DE) Die Integration des **LE910 V2** LTE Mobilfunk-Moduls in ein Gerät muß gemäß der in diesem Dokument beschriebenen Kunstruktionsregeln erfolgen.

(SL) Integracija LTE **LE910 V2** modula v uporabniški aplikaciji bo morala upoštevati projektna navodila, opisana v tem priročniku.

(SP) La utilización del modulo LTE **LE910 V2** debe ser conforme a los usos para los cuales ha sido deseñado descritos en este manual del usuario.

(FR) L'intégration du module cellulaire LTE **LE910 V2** dans l'application de l'utilisateur sera faite selon les règles de conception décrites dans ce manuel.

(HE) האינטגרטור מתבקש ליישם את ההנחיות המפורטות במסמך זה בתהליך האינטגרציה של המודם הסלולרי **LE910 V2** עם המוצר.

The information presented in this document is believed to be accurate and reliable. However, no responsibility is assumed by Telit Communications S.p.A. for its use, nor any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent rights of Telit Communications S.p.A. other than for circuitry embodied in Telit products. This document is subject to change without notice.

3   AT COMMANDS

The Telit wireless module family can be controlled via the serial interface using the standard AT commands The Telit wireless module family is compliant with:

- Hayes standard AT command set, in order to maintain the compatibility with existing SW programs.
- 3GPP TS 27.007 specific AT command and LTE specific commands.
- 3GPP TS 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)

Moreover Telit wireless module family supports also Telit proprietary AT commands for special purposes.

The following is a description of how to use the AT commands with the Telit wireless module family.

The AT is an ATTENTION command and is used as a prefix to other parameters in a string. The AT command combined with other parameters can be set up in the communications package or typed in manually as a command line instruction. Combined with other parameters can be set up in the communications package or typed in manually as a command line instruction.

3.1   Definitions

The following syntactical definitions apply:

<CR>   Carriage return character, is the command line and result code terminator character, which value, in decimal ASCII between 0 and 255,is specified within parameter S3. The default value is 13.

<LF>   Linefeed character, is the character recognised as line feed character. Its value, in decimal ASCII between 0 and 255, is specified within parameter S4. The default value is 10.
The line feed character is output after carriage return character if verbose result codes are used (V1 option used) otherwise, if numeric format result codes are used (V0 option used) it will not appear in the result codes.

<...>   Name enclosed in angle brackets is a syntactical element. They do not appear in the command line.

[...]   Optional sub parameter of a command or an optional part of TA information response is enclosed in square brackets. Brackets themselves do not appear in the command line. When sub parameter is not given in AT commands which have a Read command, new value equals to its previous value. In AT commands which do not store the values of any of their sub parameters, and so have not a Read command, which are called *action type* commands, action should be done on the basis of the recommended default setting of the sub parameter.

3.2   AT Command Syntax

The syntax rules followed by Telit implementation of either Hayes AT commands, Modem commands are very similar to those of standard basic and extended AT commands

There are two types of extended command:

Parameter type commands. This type of commands may be "set" (to store a value or values for later use), "read" (to determine the current value or values stored), or "tested" (to determine ranges of values supported). Each of them has a test command (trailing **=?**) to give information about the type of its sub parameters; they also have a Read command (trailing **?**) to check the current values of sub parameters.

Action type commands. This type of command may be "executed" or "tested".

"executed" to invoke a particular function of the equipment, which generally involves more than the simple storage of a value for later use

"tested" to determine:

if sub parameters are associated with the action, the ranges of sub parameters values that are supported; if the command has no sub parameters, issuing the correspondent Test command (trailing **=?**) raises the result code "**ERROR**".

Note: issuing the Read command (trailing **?**) causes the command to be executed.

whether or not the equipment implements the Action Command (in this case issuing the correspondent Test command - trailing **=?** - returns the **OK** result code), and, if sub parameters are associated with the action, the ranges of sub parameters values that are supported.

Action commands don't store the values of any of their possible sub parameters.

Moreover:

The response to the Test Command (trailing **=?**) may be changed in the future by Telit to allow the description of new values/functionalities.

If all the sub parameters of a parameter type command **+CMD** are optional, issuing **AT+CMD=<CR>** causes the **OK** result code to be returned and the previous values of the omitted sub parameters to be retained.

3.2.1   String Type Parameters

A string, either enclosed between quotes or not, is considered to be a valid string type parameter input. According to V25.ter space characters are ignored on the command line and may be used freely for formatting purposes, unless they are embedded in numeric or quoted string constants; therefore a string containing a space character has to be enclosed between quotes to be considered a valid string type parameter (e.g. typing **AT+COPS=1,0,"A1"** is the same as typing **AT+COPS=1,0,A1**; typing **AT+COPS=1,0,"A BB"** is different from typing **AT+COPS=1,0,A BB**).

A string is always case sensitive.

A small set of commands requires always to write the input string parameters within quotes: this is explicitly reported in the specific descriptions.

3.2.2   Command Lines

A command line is made up of three elements: the **prefix**, the **body** and the **termination character**.

The **command line prefix** consists of the characters "**AT**" or "**at**", or, to repeat the execution of the previous command line, the characters "**A/**" or "**a/**" or **AT#/** or **at#/**.

The **termination character** may be selected by a user option (parameter S3), the default being **<CR>**. The basic structures of the command line are:

- **ATCMD1<CR>** where **AT** is the command line prefix, **CMD1** is the body of a **basic command** (nb: the name of the command never begins with the character "**+**") and **<CR>** is the command line terminator character **ATCMD2=10<CR>** where 10 is a sub parameter
- **+CMD1?<CR>** This is a Read command for checking current sub parameter values
- **+CMD1=?<CR>** This is a test command for checking possible sub parameter values

---

> The set of proprietary AT commands differentiates from the standard one because the name of each of them begins with either "@", "#", "$" or "*". Proprietary AT commands follow the same syntax rules as extended commands.

In case of errors depending on ME operation, **ERROR** (or **4**) response may be replaced by **+CME ERROR: <err> or +CMS ERROR: <err>**.

3.2.2.1　ME Error Result Code - +CME ERROR: <err>

This is NOT a command, it is the error response to **+Cxxx 3GPP TS 27.007** commands.

Syntax: +CME ERROR: <err>

Parameter: **<err>** - error code can be either numeric or verbose (see **+CMEE**).The possible values of **<err>** are reported in the table:

General Errors

Numeric Format	Verbose Format
0	phone failure
1	No connection to phone
2	phone-adaptor link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string

Numeric Format	Verbose Format
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network time-out
32	network not allowed - emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	nephonebooktwork subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
48	hidden key required
49	EAP method not supported
50	Incorrect parameters
100	Unknown

GPRS related errors to a failure to perform an Attach

Numeric Format	Verbose Format
103	Illegal MS (#3)*
106	Illegal ME (#6)*
107	GPRS service not allowed (#7)*
111	PLMN not allowed (#11)*
112	Location area not allowed (#12)*
113	Roaming not allowed in this location area (#13)*

GPRS related errors to a failure to Activate a Context and others

Numeric Format	Verbose Format
132	service option not supported (#32)*
133	requested service option not subscribed (#33)*
134	service option temporarily out of order (#34)*
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class

NOTE:
*(values in parentheses are GSM 04.08 cause codes).

IP Easy related Errors

Numeric Format	Verbose Format
550	generic undocumented error
551	wrong state
552	wrong mode
553	context already activated
554	stack already active
555	activation failed
556	context not opened
557	cannot setup socket
558	cannot resolve DN
559	timeout in opening socket
560	cannot open socket
561	remote disconnected or time-out
562	connection failed

Numeric Format	Verbose Format
563	TX error
564	already listening
566	can not resume socket
567	wrong APN
568	wrong PDP
569	service not supported
570	QOS not accepted
571	NSAPI already used
572	LLC or SNDCP failure
573	network reject

Custom SIM Lock related errors

Numeric Format	Verbose Format
586	MCL personalization PIN required

FTP related Errors

Numeric Format	Verbose Format
600	generic undocumented error
601	wrong state
602	Can not activate
603	Can not resolve name
604	Can not allocate control socket
605	Can not connect control socket
606	Bad or no response from server
607	Not connected
608	Already connected
609	Context down
610	No photo available
611	Can not send photo
612	Resource used by other instance

Phonebook related errors

Numeric Format	Verbose Format
700	ADN memory exceeded
701	ANR memory exceeded
702	SNE memory exceeded
703	EMAIL memory exceeded
704	Extension memory exceeded

3.2.2.2. Message Service Failure Result Code - +CMS ERROR: <err>

This is NOT a command, it is the error response to +Cxxx 3GPP TS 27.005 commands.

Syntax: +CMS ERROR: <err>

Parameter: **<err>** - numeric error code.

The **<err>** values are reported in the table:

Numeric Format	Meaning
0...127	GSM 04.11 Annex E-2 values
128...255	3GPP TS 23.040 sub clause 9.2.3.22 values

Numeric Format	Meaning
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network time-out
340	no +CNMA acknowledgement expected
500	unknown error
512	FDN not allowed number

3.2.3 Information Responses And Result Codes

The TA response, in case of verbose response format enabled, for the previous examples command line could be as shown below:

- information response to **+CMD1?**

<CR><LF>+CMD1:2,1,10<CR><LF>

- information response to +CMD1=?

<CR><LF>+CMD1(0-2),(0,1),(0-15)<CR><LF>

- final result code   **<CR><LF>OK<CR><LF>**

Moreover there are other two types of result codes:

- result codes that inform about progress of TA operation (e.g. connection establishment CONNECT)

- result codes that indicate occurrence of an event not directly associated with issuance of a command from TE (e.g. ring indication **RING**).

Here the basic result codes according to ITU-T V25Ter recommendation:

Numeric Format	Verbose Form
0	OK
1	CONNECT or CONNECT <text>
2	RING
3	NO CARRIER
4	ERROR
6	NO DIALTONE
7	BUSY
8	NO ANSWER
10	CONNECT 2400
11	CONNECT 4800
12	CONNECT 9600
15	CONNECT 14400
23	CONNECT 1200/75

NOTE:
<text> can be"300", "1200", "2400", "4800", "9600", "14400" or "1200/75"

3.2.4   Command Response Time-Out

Every command issued to the Telit modules returns a result response, if response codes are enabled (default). The time needed to process the given command and return the response varies, depending on the command type. Commands that do not interact with the SIM or the network, and only involve internal setups or readings, have an immediate response.Commands that interact with the SIM or the network could take many seconds to send a response, depending on SIM configuration (e.g., number of contacts stored in the phonebook, number of stored SMS), or on the network the command may interact with.

3.2.5   Command Issuing Timing

The chain Command -> Response shall always be respected and a new command must not be issued before the module has terminated all the sending of its response result code (whatever it may be).

This applies especially to applications that "sense" the **OK** text and therefore may send the next command before the complete code **<CR><LF>OK<CR><LF>** is sent by the module.

It is advisable anyway to wait for at least 20ms between the end of the reception of the response and the issue of the next AT command.

If the response codes are disabled and therefore the module does not report any response to the command, then at least the 20ms pause time shall be respected.

3.3   Storage

3.3.1   Factory Profile And User Profiles

The Telit wireless modules stores the values set by several commands in the internal non volatile memory (NVM), allowing to remember this setting even after power off. In the NVM these values are set either as factory profile or as user profiles: there are two customizable user profiles and one factory profile in the NVM of the device: by default the device will start with user profile 0 equal to factory profile. For backward compatibility, each profile is divided into two sections, one base section which was historically the one that was saved and restored in early releases of code, and the extended section which includes all the remaining values.

The &W command is used to save the actual values of both sections of profiles into the NVM user profile. Commands &Y and &P are both used to set the profile to be loaded at startup. &Y instructs the device to load at startup only the base section. &P instructs the device to load at startup the full profile: base + extended sections.

The &F command resets to factory profile values only the command of the base section of profile, while the &F1 resets to factory profile values the full set of base + extended section commands.

The values set by other commands are stored in NVM outside the profile: some of them are stored always, without issuing any &W, some other are stored issuing specific commands (+CSAS, #SLEDSAV, #ESAV); all of these values are read at power-up.

The values set by following commands are stored in the profile base section; they depend on the specific AT instance:

Item	Command
DTE SPEED	+IPR
COMMAND ECHO	E
RESULT MESSAGES	Q
VERBOSE MESSAGES	V
EXTENDED MESSAGES	X
POWER SAVING	+CFUN (it does not depend on the specific AT instance; value is always taken from Instance 0)
DEFAULT PROFILE	&Y
S REGISTERS	S0;S2;S3;S4;S5;S7;S10;S12;S25

The values set by following commands are stored in the profile extended section and they depend on the specific AT instance (see +CMUX):

+FCLASS	+CSCS	+CR	+CAPD	+CSDF
+CREG	+CLIP	+CRLP	+CTZR	+CCWE
+CRC	+CLIR	+CSVM	#SIMPR	#NWEN
+CCWA	+CUSD	+CAOC	#NCIH	+COLP
+CSSN	+CIND	+CMER	+CCWE	#CEERNETEXT
+CPBS	+CMEE	+CGREG	#NWEN	
+CGEREP	+CMGF	+CSDH	+COLP	
+CNMI	#QSS	#ECAM	+CSIL	
#SMOV	#MWI	#NITZ	#PSNT	
#SKIPESC	#CFF	#STIA	#CESTHLCK	
+CSTF	+CSDF	+CTZU	+CSTA	

The values set by following commands are stored in the profile extended section and they do not depend on the specific AT instance (see +CMUX):

+CALM	+CRSL	+CMUT	#HFMICG	#HSMICG
+CLVL	+VTD	+CSCB	#SPKMUT	#NITZ
#CAP	#SRS	#SRP	#HFRECG	#HSRECG
#STM	#E2SLRI	#E2SMSRI	#SHSAGC	#SHFAGC
#DVI	#CODEC	#SHFEC	#SHFNR	#SHSSD
#SIMDET	#DVIEXT	#SHFSD	#SHSSD	

The values set by following commands are automatically stored in NVM, without issuing any storing command and independently from the profile (unique values), and are automatically restored at startup:

#SELINT	+COPS	+CGCLASS	#DNS	#ICMP
+CGDCONT	+CGQMIN	+CGQREQ	+CGSMS	+CGEQMIN
#ENS	#SCFG	#AUTOATT	#SMSMODE	+CGEQREQ
+CGEQOS				

The values set by following commands are stored in NVM on demand, issuing specific commands and independently from the profile:

+CSCA	+CSMP	+CSCB

stored by +CSAS command and restored by +CRES command:

#SLED

stored by #SLEDSAV command

#ESMTP	#EADDR	#EUSER
#EPASSW		

#BIQUADIN	#BIQUADINEX	#BIQUADOUT
#BIQUADOUTEX		

stored by #PSAV command and automatically restored at startup;

#ESMTP	#EADDR	#EUSER
#EPASSW		

stored by #ESAV command and automatically restored at startup;

NOTE:
+COPS is partially stored in NVM; see command description

Both commands +CSAS and +CRES deal with non-volatile memory, intending for it either the NVM and the SIM storage.

4 AT COMMANDS AVAILABITY TABLE

The following table highlights the availability of commands which are not shared between all the versions of the product (• = Supported):

Command	LE910-SV V2 LE910-SV1 LE910-SVL	LE910-NA V2 LE910-NA1 LE910B4-NA LE910B1-NA LE910-B1-SA	LE910-EU V2 LE910-EU1 LE910B1-EU	LE910-AU V2	LE910-JN1
#CIPHIND		•	•		
#CODEC		•	•		
#CODECINFO		•	•		
#CQI		•	•		
#ENCALG		•	•		
#FDOR		•	•		
+CRLP		•	•		
#DTMF		•	•		
#PRST		•	•		
#PSAV		•	•		
#PSEL		•	•		
#SHFEC		•	•		
#SHFNR		•	•		
#SHFSD		•	•		
#SHSAGC		•	•		
#SHSEC		•	•		
#SHSNR		•	•		
#SHSSD		•	•		
#SPKMUT		•	•		
#SRP		•	•		

Command				
+CALM		•	•	
+CLVL		•	•	
+CMUT		•	•	
+CRSL		•	•	
+CSIL		•	•	
+VTD		•	•	
+VTS		•	•	
#TONEEXT		•	•	
#TTY		•	•	
#UDTRST		•	•	
#UDTSAV		•	•	
#UDTSET		•	•	
#CSFB		•	•	
#ENAOMADM	•	•		
#OMACFG		•		
#OMASENDPIN		•		
#PDPAUTH	•		•	•
+CEVDP		•		
+CGCLASS*		•	•	
#UNIQUEDEVID		•		
#OSTODIS		•		
#MSCLASS			•	
#RXTOGGLE		•	•	•
#CEERNETEXT	•		•	
#TXCALEDGE			•	
AT+CEVDP	•			

*Note: **+CGCLASS** Not supported by LTE only modules

5   AT COMMANDS REFERENCES

1.1.   Command Line General Format

5.1.1   Command Line Prefixes

5.1.1.1   *Starting A Command Line - AT*

AT - Starting A Command Line		SELINT 2
AT	The prefix **AT**, or **at**, is a two-character abbreviation (**ATtention**), always used to start a command line to be sent from TE to TA, with the only exception of AT#/ prefix	
Reference	3GPP TS 27.007	

5.1.1.2   *Last Command Automatic Repetition - A/*

A/ - Last Command Automatic Repetition		SELINT 2
A/	If the prefix **A/** or **a/** is issued, the MODULE immediately execute once again the body of the preceding command line. No editing is possible and no termination character is necessary. A command line may be repeated multiple times through this mechanism, if desired. If **A/** is issued before any command line has been executed, the preceding command line is assumed to have been empty (that results in an **OK** result code). Note: this command works only at fixed IPR. Note: the custom prefix AT**#/** has been defined: it causes the last command to be executed again too; but it doesn't need a fixed IPR.	
Reference	V25ter	

5.1.1.3   *Repeat Last Command - AT#/*

AT#/ - Repeat Last Command		SELINT 2
AT#/	The prefix is used to execute again the last received command.	

5.1.2 General Configuration Commands

5.1.2.1 Select Interface Style - #SELINT

#SELINT - Select Interface Style		SELINT 2
AT#SELINT=[<v>]	Set command sets the AT command interface style depending on parameter **<v>**. Parameter: **<v>** - AT command interface style 2 - switches the AT command interface style of the product, to the new product	
AT#SELINT?	Read command reports the current interface style.	
AT#SELINT=?	Test command reports the available range of values for parameter **<v>**.	
Note	Issuing **AT#SELINT=<v>** when the 3GPP TS 27.010 multiplexing protocol control channel has been enabled (see **+CMUX**) causes an **ERROR** result code to be returned.	

5.1.3   Hayes Compliant AT Commands

5.1.3.1   Generic Modem Control

5.1.3.1.1   Set To Factory-Defined Configuration - &F

&F - Set To Factory-Defined Configuration		SELINT 2
AT&F[<value>]	Execution command sets the configuration parameters to default values specified by manufacturer; it takes in consideration hardware configuration switches and other manufacturer-defined criteria. Parameter: **<value>**: 0 - just the factory profile base section parameters are considered. 1 - either the factory profile base section and the extended section are considered (full factory profile). Note: if parameter **<value>** is omitted, the command has the same behavior as **AT&F0**	
Reference	V25ter.	

5.1.3.1.2   Soft Reset - Z

Z - Soft Reset		SELINT 2
ATZ[<n>]	Execution command loads the base section of the specified user profile and the extended section of the default factory profile. Parameter: **<n>** 0..1 - user profile number Note: any call in progress will be terminated. Note: if parameter **<n>** is omitted, the command has the same behaviour as **ATZ0**.	
Reference	V25ter.	

5.1.3.1.3   Select Active Service Class - +FCLASS

+FCLASS - Select Active Service Class		SELINT 2
AT+FCLASS=<n>	Set command sets the wireless module in specified connection mode (data, voice), hence all the calls done afterwards will be data or voice. Parameter: <n> 0 - data 8 - voice	
AT+FCLASS?	Read command returns the current configuration value of the parameter <n>.	
AT+FCLASS=?	Test command returns all supported values of the parameters <n>.	
Reference	V25ter.	

5.1.3.1.4   Default Reset Basic Profile Designation - &Y

&Y - Default Reset Basic Profile Designation		SELINT 2
AT&Y[<n>]	Execution command defines the basic profiles which will be loaded on start-up. Parameter: **<n>**	

&Y - Default Reset Basic Profile Designation	SELINT 2
	0..1 - profile (default is 0): the wireless module is able to store 2 complete configurations (see **&W**). Note: differently from command **Z<n>**, which loads just once the desired profile, the one chosen through command **&Y** will be loaded on every startup. Note: if parameter is omitted, the command has the same behavior as **AT&Y0**

5.1.3.1.5   Default Reset Full Profile Designation - &P

&P - Default Reset Full Profile Designation	SELINT 2
AT&P[<n>]	Execution command defines which full profile will be loaded on start-up. Parameter: **<n>** 0..1 – profile number: the wireless module is able to store 2 full configurations (see command **&W**). Note: differently from command **Z<n>**, which loads just once the desired profile, the one chosen through command **&P** will be loaded on every start-up. Note: if parameter is omitted, the command has the same behaviour as **AT&P0**
Reference	Telit Specifications

5.1.3.1.6   Store Current Configuration - &W

&W - Store Current Configuration	SELINT 2
AT&W[<n>]	Execution command stores on profile **<n>** the complete configuration of the device. Parameter: **<n>** 0..1 - profile Note: if parameter is omitted, the command has the same behaviour of **AT&W0**.

5.1.3.1.7   Store Telephone Number - &Z

&Z - Store Telephone Number In The Wireless Module Internal	SELINT 2
AT&Z<n>=<nr>	Execution command stores in the record **<n>** the telephone number **<nr>**. The records cannot be overwritten, they must be cleared before rewriting. Parameters: **<n>** - phonebook record **<nr>** - telephone number (string type) Note: the wireless module has a built in non volatile memory in which 10 telephone numbers of a maximum 24 digits can be stored Note: to delete the record **<n>** the command **AT&Z<n>=<CR>** must be issued.

&Z - Store Telephone Number In The Wireless Module Internal		SELINT 2
	Note: the records in the module memory can be viewed with the command **&N**, while the telephone number stored in the record **n** can be dialled by giving the command **ATDS=<n>**.	

5.1.3.1.8 Display Stored Numbers - &N

&N - Display Internal Phonebook Stored Numbers		SELINT 2
AT&N[<n>]	Execution command returns the telephone number stored at the **<n>** position in the internal memory. Parameter: **<n>** - phonebook record number Note: if parameter **<n>** is omitted then all the internal records are shown.	

5.1.3.1.9 Manufacturer Identification - +GMI

+GMI - Manufacturer Identification		SELINT 2
AT+GMI	Execution command returns the manufacturer identification.	
Reference	V.25ter	

5.1.3.1.10 Model Identification - +GMM

+GMM - Model Identification		SELINT 2
AT+GMM	Execution command returns the model identification.	
Reference	V.25ter	

5.1.3.1.11 Revision Identification - +GMR

+GMR - Revision Identification		SELINT 2
AT+GMR	Execution command returns the software revision identification.	
Reference	V.25ter	

5.1.3.1.12 Capabilities List - +GCAP

+GCAP - Capabilities List		SELINT 2
AT+GCAP	Execution command returns the equipment supported command set list. Where: **+CGSM**: GSM ETSI command set **+FCLASS**: Fax command set **+MS**: Mobile Specific command set **+ES**: WCDMA data Service common modem command set	
Reference	V.25ter	

5.1.3.1.13 Serial Number - +GSN

+GSN - Serial Number		SELINT 2
AT+GSN	Execution command returns the device board serial number. Note: The number returned is not the IMSI, it is only the board number	
Reference	V.25ter	

5.1.3.1.14   Display Configuration And Profile - &V

&V - Display Current Base Configuration And Profile		SELINT 2
AT&V	Execution command returns some of the base configuration parameters settings. Note: the row of information about **CTS (C106) OPTIONS** is in the output of **&V** only for compatibility reasons and represents only a dummy value.	

5.1.3.1.15   Display Configuration And Profile - &V0

&V0 - Display Current Configuration And Profile		SELINT 2
AT&V0	Execution command returns all the configuration parameters settings. Note: this command is the same as **&V**, it is included only for backwards compatibility. Note: the row of information about **CTS (C106) OPTIONS** is in the output of **&V0** only for compatibility reasons and represents only a dummy value.	

5.1.3.1.16   S Registers Display - &V1

&V1 - S Registers Display		SELINT 2
AT&V1	Execution command returns the value of the **S** registers in decimal and hexadecimal value in the format: **REG DEC HEX** **<reg0>** **<dec>** **<hex>** **<reg1>** **<dec>** **<hex>** ... where **<reg*n*>** - **S** register number 000..005 007 012 025 038 **<dec>** - current value in decimal notation **<hex>** - current value in hexadecimal notation	

5.1.3.1.17   Extended S Registers Display - &V3

&V3 - Extended S Registers Display		SELINT 2
AT&V3	Execution command returns the value of the **S** registers in decimal and hexadecimal value in the format: **REG DEC HEX** **<reg0>** **<dec>** **<hex>** **<reg1>** **<dec>** **<hex>** ... where **<reg*n*>** - **S** register number 000..005 007 012 025 030 038 **<dec>** - current value in decimal notation **<hex>** - current value in hexadecimal notation	

5.1.3.1.18 Display Last Connection Statistics - &V2

&V2 - Display Last Connection Statistics		SELINT 2
AT&V2	Execution command returns the last connection statistics & connection failure reason.	

5.1.3.1.19 Single Line Connect Message - \V

\V - Single Line Connect Message		SELINT 2
AT\V<n>	Execution command set single line connect message. Parameter: **<n>** 0 - off 1 - on	

5.1.3.1.20 Country Of Installation - +GCI

+GCI - Country Of Installation		SELINT 2
AT+GCI=<code>	Set command selects the installation country code according to ITU-T.35 Annex A. Parameter: **<code>** 59 - it currently supports only the Italy country code	
AT+GCI?	Read command reports the currently selected country code.	
AT+GCI=?	Test command reports the supported country codes.	
Reference	V25ter.	

5.1.3.2 DTE - Modem Interface Control

5.1.3.2.1 Command Echo - E

E - Command Echo		SELINT 2
ATE[<n>]	Set command enables/disables the command echo. Parameter: **<n>** 0 - disables command echo 1 - enables command echo (factory default) , hence command sent to the device are echoed back to the **DTE** before the response is given. Note: if parameter is omitted, the command has the same behaviour of **ATE0**	
Reference	V25ter	

5.1.3.2.2 Quiet Result Codes - Q

Q - Quiet Result Codes		SELINT 2
ATQ[<n>]	Set command enables or disables the result codes. Parameter: **<n>** 0 - enables result codes (factory default) 1 - disables result codes 2 - disables result codes (only for backward compatibility) Note: After issuing either **ATQ1** or **ATQ2** every information text transmitted in response to commands is not affected Note: if parameter is omitted, the command has the same behaviour of **ATQ0**	
Reference	V25ter	

5.1.3.2.3 Data Carrier Detect (DCD) Control - &C

&C - Data Carrier Detect (DCD) Control		SELINT 2
AT&C[<n>]	Set command controls the RS232 **DCD** output behaviour. Parameter: **<n>** 0 - **DCD** remains **high** always. 1 - **DCD** follows the Carrier detect status: if carrier is detected **DCD** is high, otherwise **DCD** is **low**. (factory default) 2 - **DCD off** while disconnecting Note: if parameter is omitted, the command has the same behaviour of **AT&C0** Note: if parameter is omitted, the command has the same behaviour of **AT&D0** Note: if AT&D2 has been issued the call is drop on falling DTR edge and NO CARRIER exits on rising DTR edge.	
Reference	V25ter	

5.1.3.2.4 Data Terminal Ready (DTR) Control - &D

&D - Data Terminal Ready (DTR) Control	SELINT 2
AT&D[<n>]	Set command controls the Module behaviour to the RS232 **DTR** transitions.

&D - Data Terminal Ready (DTR) Control	SELINT 2

	Parameter:
	\<n\>
	  0 - device ignores **DTR** transitions (factory default); if **+CVHU** current setting is **different from 2** then every setting **AT&D0** is equivalent to **AT&D5**
	  1 - when the MODULE is connected, the **High** to **Low** transition of **DTR** pin sets the device in command mode, the current connection is NOT closed; if **+CVHU** current setting is **different from 2** then issuing **AT&D1** is equivalent to **AT&D5**
	  2 - when the MODULE is connected , the **High** to **Low** transition of **DTR** pin sets the device in command mode and the current connection is closed; if **+CVHU** current setting is **different from 2** then issuing **AT&D2** is equivalent to **AT&D5**
	  3 - device ignores **DTR** transitions; if **+CVHU** current setting is **different from 2** then issuing **AT&D3** is equivalent to **AT&D5**
	  4 - **C108/1** operation is disabled; if **+CVHU** current setting is **different from 2** then issuing **AT&D4** is equivalent to **AT&D5**
	  5 - **C108/1** operation is enabled; same behaviour as for **\<n\>=2**
	
	Note: If a connection has been set up issuing **AT#SD** then **AT&D1** and **AT&D2** have different effect, as described above.
	
	Note: if **AT&D2** has been issued and the **DTR** has been tied **Low**, autoanswering is inhibited and it is possible to answer only issuing command **ATA**.
	
	Note: if parameter is omitted, the command has the same behaviour of **AT&D0**
	
	Note: if AT&D2 has been issued the call is drop on falling DTR edge and NO CARRIER exits on rising DTR edge.

Reference	V25ter

5.1.3.2.5   Flow Control - &K

&K - Flow Control	SELINT 2

AT&K[\<n\>]	Set command controls the RS232 flow control behaviour.
	
	Parameter:
	\<n\>
	  0 - no flow control
	  3 - hardware bi-directional flow control (both **RTS/CTS** active) (factory default)
	
	Note: if parameter is omitted, the command has the same behaviour as **AT&K0**
	
	Note: **&K** has no Read Command. To verify the current setting of **&K**, simply check the settings of the active profile issuing **AT&V**.
	
	Note: Hardware flow control (**AT&K3**) is not active in command mode.

5.1.3.2.6   Data Set Ready (DSR) Control - &S

&S - Data Set Ready (DSR) Control	SELINT 2
AT&S[\<n\>]	Set command controls the RS232 **DSR** pin behaviour.

&S - Data Set Ready (DSR) Control	SELINT 2

	Parameter:
	<n>
	  0 - always **High**
	  1 - follows the GSM traffic channel indication.
	  2 - **High** when connected
	  3 - **High** when device is ready to receive commands (factory default).
	
	Note: if option 1 is selected then **DSR** is tied **High** when the device receives from the network the GSM traffic channel indication.
	
	Note: in power saving mode the **DSR** pin is always tied **Low**.
	
	Note: if parameter is omitted, the command has the same behaviour of **AT&S0**

5.1.3.2.7   Response Format - V

V - Response Format		SELINT 2
ATV[<n>]	Set command determines the contents of the header and trailer transmitted with result codes and information responses. It also determines if result codes are transmitted in a numeric form or an alphanumeric form (see [§3.2.3 Information Responses And Result Codes] for the table of result codes).	
	Parameter: **<n>** 0 - limited headers and trailers and numeric format of result codes	
	<table><tr><td>information responses</td><td>**<text><CR><LF>**</td></tr><tr><td>result codes</td><td>**<numeric code><CR>**</td></tr></table>	
	1 - full headers and trailers and verbose format of result codes (factory default)	
	<table><tr><td>information responses</td><td>**<CR><LF>** **<text><CR><LF>**</td></tr><tr><td>result codes</td><td>**<CR><LF>** **<verbose code><CR><LF>**</td></tr></table>	
	Note: the **<text>** portion of information responses is not affected by this setting. Note: if parameter is omitted, the command has the same behaviour of ATV0	
Reference	V25ter	

5.1.3.2.8   Extended Result Codes - X

X - Extended Result Codes		SELINT 2

ATX[<n>]	Set command selects the result code messages subset used by the modem to inform the **DTE** of the result of the commands.
	
	Parameter:
	<n> - (factory default is 1)
	  0 - on entering dial-mode **CONNECT** result code is given; **OK**, **CONNECT**, **RING**, **NO CARRIER**, **ERROR**, **NO ANSWER** result codes are enabled . Dial tone and busy detection (**NO DIALTONE** and **BUSY** result codes) are disabled.
	  1..4 - on entering dial-mode **CONNECT <text>** result code is given; all the other result codes are enabled.
	
	Note: If parameter is omitted, the command has the same behaviour of **ATX0**	

Reference	V25ter	

5.1.3.2.9   Identification Information - I

I - Identification Information		SELINT 2

ATI[<n>]	Execution command returns one or more lines of information text followed by a result code.
	
	Parameter:
	<n>
	  0 - numerical identifier
	  1 - module checksum
	  2 - checksum check result
	  3 - manufacturer
	  4 - product name
	  5 - DOB version
	
	Note: if parameter is omitted, the command has the same behaviour of **ATI0**	

Reference	V25ter	

5.1.3.2.10   Fixed DTE Interface Rate - +IPR

+IPR - Fixed DTE Interface Rate		SELINT 2

AT+IPR=<rate>	Set command specifies the **DTE** speed at which the device accepts commands during command mode operations; it may be used to fix the **DTE-DCE** interface speed.
	
	Parameter:
	<rate>
	  300
	  1200
	  2400
	  4800
	  9600
	  19200
	  38400
	  57600
	  115200 (default value)
	  230400
	  460800
	  921600
	  3000000	

AT+IPR?	Read command returns the current value of **+IPR** parameter.	

+IPR - Fixed DTE Interface Rate		SELINT 2
AT+IPR=?	Test command returns the list of fixed-only **<rate>** values in the format: **+IPR**: (list of fixed-only **<rate>** values)	
Reference	V25ter	

5.1.3.2.11 DTE-Modem Local Flow Control - +IFC

+IFC - DTE-Modem Local Flow Control		SELINT 2

AT+IFC=<by_te>, <by_ta>	Set command selects the flow control behaviour of the serial port in both directions: from **DTE** to **modem** (**<by_ta>** option) and from **modem** to **DTE** (**<by_te>**)
	
	Parameters:
	<by_te> - flow control option for the data received by **DTE**
	  0 - flow control None
	  2 - **C105** (**RTS**) (factory default)
	<by_ta> - flow control option for the data sent by **modem**
	  0 - flow control None
	  2 - **C106** (**CTS**) (factory default)
	
	Note: only possible commands are AT+IFC=0,0 and AT+IFC=2,2.	

AT+IFC?	Read command returns active flow control settings.	
AT+IFC=?	Test command returns all supported values of the parameters **<by_te>** and **<by_ta>**.	
Reference	V25ter	

5.1.3.2.12 DTE-Modem Character Framing - +ICF

+ICF - DTE-Modem Character Framing		SELINT 2

AT+ICF=<format> [,<parity>]	Set command defines the asynchronous character framing to be used when autobauding is disabled.
	
	Parameters:
	<format> - determines the number of bits in the data bits, the presence of a parity bit, and the number of stop bits in the start-stop frame.
	  1 - 8 Data, 2 Stop
	  2 - 8 Data, 1 Parity, 1 Stop
	  3 - 8 Data, 1 Stop
	  5 - 7 Data, 1 Parity, 1 Stop
	<parity> - determines how the parity bit is generated and checked, if present; setting this subparameter is mandatory and has a meaning only if **<format>** subparameter is either 2 or 5 otherwise is not allowed.
	  0 - Odd
	  1 - Even	

AT+ICF?	Read command returns current settings for subparameters **<format>** and **<parity>**. If current setting of subparameter **<format>** is neither 2 nor 5, the current setting of subparameter **<parity>** will always be represented as 0.	
AT+ICF=?	Test command returns the ranges of values for the parameters **<format>** and **<parity>**	
Reference	V25ter	
Example	*8N2* AT+ICF = 1 OK *8O1* AT+ICF = 2,0 OK *8E1* AT+ICF = 2,1	

+ICF - DTE-Modem Character Framing	SELINT 2

OK

8N1
AT+ICF = 3
OK

7O1
AT+ICF = 5,0
OK

7E1
AT+ICF = 5,1
OK

5.1.3.3   *Call Control*

5.1.3.3.1   **Dial D**

D – Dial	SELINT 2
ATD<number>[;]	Execution command starts a call to the phone number given as parameter. If "**;**" is present, a **voice** call to the given number is performed, regardless of the current value of the connection mode set by **+FCLASS** command. Parameter: **<number>** - phone number to be dialed Note: type of call (**data** or **voice**) depends on last **+FCLASS** setting. Note: the numbers accepted are 0-9 and *,#,"A", "B", "C", "D","+". Note: for backwards compatibility with landline modems modifiers "T", "P", "R", ",", "W", "!", "@" are accepted but have no effect.
ATD><str>[;]	Issues a call to phone number which corresponding alphanumeric field is **<str>**; all available memories will be searched for the correct entry. If "**;**" is present a **voice** call is performed. Parameter: **<str>** - alphanumeric field corresponding to phone number; it must be enclosed in quotation marks. Note: parameter **<str>** is case sensitive. Note: used character set should be the one selected with **+CSCS**.

ATD><mem><n>[;]	Issues a call to phone number in phonebook memory storage **<mem>**, entry location **<n>** (available memories may be queried with **AT+CPBS=?**). If "**;**" is present a **voice** call is performed.
	
	Parameters:
	<mem> - phonebook memory storage; it must not be enclosed in quotation marks.
	  SM - SIM phonebook
	  FD - SIM fixed dialing-phonebook
	  LD - SIM last-dialing-phonebook
	  MC - device missed (unanswered received) calls list
	  RC - ME received calls list
	  MB - mailbox numbers stored on SIM, if this service is provided by the SIM (see **#MBN**).
	<n> - entry location; it should be in the range of locations available in the memory used.

D – Dial	SELINT 2
ATD><n>[;]	Issues a call to phone number in entry location **<n>** of the active phonebook memory storage (see **+CPBS**). If "**;**" is present a **voice** call is performed. Parameter: **<n>** - active phonebook memory storage entry location; it should be in the range of locations available in the active phonebook memory storage.
ATDL	Issues a call to the last number dialed.
ATDS=<nr>[;]	Issues a call to the number stored in the MODULE internal phonebook position number **<nr>**. **If ";" is present,** a voice call is performed. Parameter: **<nr>** - internal phonebook position to be called (See commands **&N** and **&Z**)
ATD<number>I[;] **ATD<number>i[;]**	Issues a call overwriting the CLIR supplementary service subscription default value for this call If "**;**" is present a **voice** call is performed. I - invocation, restrict CLI presentation i - suppression, allow CLI presentation
ATD<number>G[;] **ATD<number>g[;]**	Issues a call checking the CUG supplementary service information for the current call. Refer to **+CCUG** command. If "**;**" is present a **voice** call is performed.
ATD*<gprs_sc> **[*<addr>][*[<L2P]** **[*[<cid>]]]]#**	This command is specific of GPRS functionality and causes the **MT** to perform whatever actions are necessary to establish communication between the **TE** and the external PDN. Parameters: **<gprs_sc>** - GPRS Service Code, a digit string (value 99) which identifies a request to use the GPRS **<addr>** - string that identifies the called party in the address space applicable to the PDP. **<L2P>** - a string which indicates the layer 2 protocol to be used. For communications software that does not support arbitrary characters in the dial string, the following numeric equivalents shall be used: 1 - PPP **<cid>** - a digit which specifies a particular **PDP** context definition (see **+CGDCONT** command).
Note	Data only products do not start the call and command answer is ERROR if a voice call is requested.
Note	The escape sequence causes a closure of the link.
Example	*To dial a number in SIM phonebook entry 6:* *ATD>SM6* *OK* *To have a voice call to the 6-th entry of active phonebook:* *ATD>6;* *OK* *To call the entry with alphanumeric field "Name":* *ATD>"Name";* *OK*
Reference	*V25ter.*

5.1.3.3.2 Tone Dial - T

T - Tone Dial		SELINT 2
ATT	Set command has no effect is included only for backward compatibility with landline modems.	
Reference	V25ter	

5.1.3.3.3 Pulse Dial - P

P - Pulse Dial		SELINT 2
ATP	Set command has no effect is included only for backward compatibility with landline modems.	
Reference	V25ter	

5.1.3.3.4 Answer - A

A - Answer		SELINT 2
ATA	Execution command is used to answer to an incoming call if automatic answer is disabled. Note: This command MUST be the last in the command line and must be followed immediately by a **<CR>** character.	
Note	Data only products do not start the call and command answer is ERROR if a voice call is requested.	
Reference	V25ter	

5.1.3.3.5 Disconnect - H

H - Disconnect		SELINT 2
ATH	Execution command is used to close the current conversation (voice or data). Note: this command can be issued only in command mode; when a data conversation is active the device is in on-line mode (commands are not sensed and characters are sent to the other party), hence escape sequence is required before issuing this command, otherwise if **&D1** option is active, **DTR** pin has to be tied **Low** to return in command mode.	
Reference	V25ter	

5.1.3.3.6 Return To On Line Mode - O

O - Return To On Line Mode		SELINT 2
ATO	Execution command is used to return to on-line mode from command mode. If there's no active connection it returns **NO CARRIER**. Note: After issuing this command, if the device is in conversation, to send other commands to the device you must return to command mode by issuing the escape sequence (see **register S2**).	
Note	The escape sequence causes a closure of the link.	
Reference	V25ter	

5.1.3.4 Modulation Control

5.1.3.4.1 Line Quality And Auto Retrain - %E

%E - Line Quality Monitor And Auto Retrain Or Fallback/Fallforward		SELINT 2
AT%E<n>	Execution command has no effect and is included only for backward compatibility with landline modems.	

5.1.3.5   S Parameters

Basic commands that begin with the letter "**S**" are known as "**S-Parameters**". The number following the "**S**" indicates the "parameter number" being referenced. If the number is not recognized as a valid parameter number, an **ERROR** result code is issued.

If no value is given for the sub parameter of an **S-Parameter**, an **ERROR** result code will be issued and the stored value left unchanged.

Reference: V25ter

NOTE:
What follows is a special way to set and read an S-parameter:

AT=<value><CR> sets the contents of the last **S-parameter** accessed with ATSn=<value> command (default: S0)

Example:
AT=40<CR>   sets the content of S0 to 40

AT?   returns the current value of the last S-parameter accessed with ATSn=<value> command (default: S0)

5.1.3.5.1   Number Of Rings To Auto Answer - S0

S0 - Number Of Rings To Auto Answer		SELINT 2

ATS0=[<n>]	Set command sets the number of rings required before device automatically answers an incoming call.
	
	Parameter:
	<n> - number of rings
	  0 - auto answer disabled (factory default)
	  1..255 - number of rings required before automatic answer.	

ATS0?	Read command returns the current value of **S0 parameter**.	
Note	Data only products ignore command setting and have auto answer disabled if incoming call is a voice call.	
Reference	V25ter	

5.1.3.5.2   Ring Counter - S1

S1 - Ring Counter		SELINT 2
ATS1	**S1** is incremented each time the device detects the ring signal of an incoming call. **S1** is cleared as soon as no ring occur. Note: the form **ATS1** has no effect.	
ATS1?	Read command returns the value of this parameter.	

5.1.3.5.3   Escape Character - S2

S2 - Escape Character		SELINT 2
ATS2=[<char>]	Set command sets the ASCII character to be used as escape character. Parameter: **<char>** - escape character decimal ASCII	

S2 - Escape Character		SELINT 2
	0..255 - factory default value is 43 (+).	
	Note: the escape sequence consists of three escape characters preceded and followed by **n** ms of idle (see **S12** to set **n**).	
ATS2?	Read command returns the current value of **S2** parameter.	
	Note: the format of the numbers in output is always 3 digits, left-filled with 0s	

5.1.3.5.4 Command Line Termination Character - S3

S3 - Command Line Termination Character		SELINT 2
ATS3=[<char>]	Set command sets the value of the character either recognized by the device as command line terminator and generated by the device as part of the header, trailer, and terminator for result codes and information text, along with **S4 parameter**. Parameter: **<char>** - command line termination character (decimal ASCII) 0..127 - factory default value is 13 (ASCII **<CR>**) Note: the "previous" value of **S3** is used to determine the command line termination character for entering the command line containing the **S3** setting command. However the result code issued shall use the "new" value of **S3** (as set during the processing of the command line)	
ATS3?	Read command returns the current value of **S3 parameter**. Note: the format of the numbers in output is always 3 digits, left-filled with 0s	
Reference	V25ter	

5.1.3.5.5 Response Formatting Character - S4

S4 - Response Formatting Character		SELINT 2
ATS4=[<char>]	Set command sets the value of the character generated by the device as part of the header, trailer, and terminator for result codes and information text, along with the **S3 parameter**. Parameter: **<char>** - response formatting character (decimal ASCII) 0..127 - factory default value is 10 (ASCII **LF**) Note: if the value of **S4** is changed in a command line the result code issued in response of that command line will use the new value of **S4**.	
ATS4?	Read command returns the current value of S4 parameter. Note: the format of the numbers in output is always 3 digits, left-filled with 0s	
Reference	V25ter	

5.1.3.5.6 Command Line Editing Character - S5

S5 - Command Line Editing Character		SELINT 2
ATS5=[<char>]	Set command sets the value of the character recognized by the device as a request to delete from the command line the immediately preceding character. Parameter: **<char>** - command line editing character (decimal ASCII) 0..127 - factory default value is 8 (ASCII **BS**)	
ATS5?	Read command returns the current value of **S5 parameter**.	

S5 - Command Line Editing Character		SELINT 2
	Note: the format of the numbers in output is always 3 digits, left-filled with 0s	
Reference	V25ter	

5.1.3.5.7 Connection Completion Time-Out - S7

S7 - Connection Completion Time-Out		SELINT 2
ATS4=[<tout>]	Set command sets the amount of time, in seconds, that the device shall allow between either answering a call (automatically or by **A** command) or completion of signalling of call addressing information to network (dialing), and establishment of a connection with the remote device. Parameter: **<tout>** - number of seconds 1..255 - factory default value is 60	
ATS7?	Read command returns the current value of **S7 parameter**.	
Reference	V25ter	

5.1.3.5.8 – Carrier Off With Firm Time - S10

S10 –Carrier Off With Firm Time		SELINT 2
ATS10	Execution command has no effect and is included only for backward compatibility with landline modems	

5.1.3.5.9 – Escaper Prompt Delay - S12

S12 - Escape Prompt Delay		SELINT 2
ATS12=[<time>]	Set command sets: 1) the minimum period, before receipt of the first character of the three escape character sequence, during which no other character has to be detected in order to accept it as valid first character; 2) the maximum period allowed between receipt of first or second character of the three escape character sequence and receipt of the next; 3) the minimum period, after receipt of the last character of the three escape character sequence, during which no other character has to be detected in order to accept the escape sequence as a valid one. Parameter: **<time>** - expressed in fiftieth of a second 2..255 - factory default value is 50. Note: the minimum period **S12** has to pass after **CONNECT** result code too, before a received character is accepted as valid first character of the three escape character sequence.	
ATS12?	Read command returns the current value of **S12 parameter**. Note: the format of the numbers in output is always 3 digits, left-filled with 0s	

5.1.3.5.10 Delay To DTR Off - S25

S25 -Delay To DTR Off		SELINT 2
ATS25=[<time>]	Set command defines the amount of time, in hundredths of second, that the device will ignore the **DTR** for taking the action specified by command **&D**. Parameter: **<time>** - expressed in hundredths of a second 0..255 - factory default value is 5.	

S25 -Delay To DTR Off		SELINT 2
	Note: the delay is effective only if its value is greater than 5. To be recognized as valid the DTR transition must be greater than S25, the lower values could require a transition increased of a factor 1.5 to be handled correctly. (e.g. to be sure that S25=5 works, use a DTR toggle of 75ms to be detected).	
	Note: in power saving (e.g. CFUN 5 with DTR low) DTR has to be off at least 3 seconds for taking the action specified by command &D, independently of S25 parameter.	
ATS25?	Read command returns the current value of **S25 parameter**.	
	Note: the format of the numbers in output is always 3 digits, left-filled with 0s	

5.1.4 3GPP TS 27.007 AT Commands

5.1.4.1 General

5.1.4.1.1 Request Manufacturer Identification - +CGMI

+CGMI - Request Manufacturer Identification		SELINT 2
AT+CGMI	Execution command returns the device manufacturer identification code without command echo.	
AT+CGMI=?	Test command returns **OK** result code.	
Reference	3GPP TS 27.007	

5.1.4.1.2 Request Model Identification - +CGMM

+CGMM - Request Model Identification		SELINT 2
AT+CGMM	Execution command returns the device model identification code without command echo.	
AT+CGMM=?	Test command returns **OK** result code.	
Reference	3GPP TS 27.007	

5.1.4.1.3 Request Revision Identification - +CGMR

+CGMR - Request Revision Identification		SELINT 2
AT+CGMR	Execution command returns device software revision number without command echo.	
AT+CGMR=?	Test command returns **OK** result code.	
Reference	3GPP TS 27.007	

5.1.4.1.4 Request Product Serial Number Identification - +CGSN

+CGSN - Request Product Serial Number Identification		SELINT 2
AT+CGSN	Execution command returns the product serial number, identified as the IMEI of the mobile, without command echo.	
AT+CGSN=?	Test command returns **OK** result code.	
Reference	3GPP TS 27.007	

5.1.4.1.5 Select TE Character Set - +CSCS

+CSCS - Select TE Character Set		SELINT 2

AT+CSCS= [<chset>]	Set command sets the current character set used by the device.
	
	Parameter:
	<chset> - character set
	  "GSM" - GSM default alphabet (3GPP TS 23.038)
	  "IRA" - international reference alphabet (ITU-T T.50)
	  "8859-1" - ISO 8859 Latin 1 character set
	  "PCCP437" - PC character set Code Page 437
	  "UCS2" - 16-bit universal multiple-octet coded character set (ISO/IEC10646)
	"HEX" - Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done. If MT is using GSM 7 bit default alphabet, its characters shall be padded with 8th bit (zero) before converting them to hexadecimal numbers (i.e. no SMS-style packing of 7-bit alphabet).	

AT+CSCS?	Read command returns the current value of the active character set.	
AT+CSCS=?	Test command returns the supported values for parameter **<chset>**.	
Reference	3GPP TS 27.007	

5.1.4.1.6 International Mobile Subscriber Identity (IMSI) - +CIMI

+CIMI - Request International Mobile Subscriber Identify (IMSI)		SELINT 2
AT+CIMI	Execution command returns the value of the Internal Mobile Subscriber Identity stored in the SIM without command echo. Note: a SIM card must be present in the SIM card housing, otherwise the command returns **ERROR**.	
AT+CIMI=?	Test command returns **OK** result code.	
Reference	3GPP TS 27.007	

5.1.4.1.7 Multiplexing Mode - +CMUX

+CMUX - Multiplexing Mode		SELINT 2

AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]]	Set command is used to enable/disable the 3GPP TS 27.010 multiplexing protocol control channel.
	
	Parameters:
	<mode> multiplexer transparency mechanism
	  0 - basic option; it is currently the only supported value.
	<subset>
	  0 - UIH frames used only; it is currently the only supported value.
	<port_speed> transmission rate
	  5 - 115 200 bit/s (default)
	<N1> maximum frame size
	  1-1509, the default is 121
	<T1> acknowledgement timer in units of ten milliseconds
	  1-255: where 10 is default (100 ms)
	<N2> maximum number of re-transmissions
	  0-100: currently only the range 0-5 is supported, the default is 3
	<T2> response timer for the multiplexer control channel in units of ten milliseconds
	  2-255: where 30 is default (300 ms). Note: T2 must be longer than T1.
	<T3> wake up response timer in seconds
	  1-255: currently not supported, in case of read command 0 is returned
	<k> window size, for Advanced operation with Error Recovery options
	  1-7: currently not supported, in case of read command 0 is returned
	
	Note: all the CMUX protocol parameters are fixed as defined in GSM07.10 and cannot be changed.	

AT+CMUX?	Read command returns the current value of **<mode>, <subset>, <port_speed>, <N1>, <T1>, <N2>, <T2>, <T3>** and **<k>** parameters, in the format: **+CMUX: <mode>,<subset>, <port_speed>, <N1>, <T1>, <N2>, <T2>, <T3>,<k>**	
AT+CMUX=?	Test command returns the range of supported values for parameters **<mode>, <subset>, <port_speed>, <N1>, <T1>, <N2>, <T2>, <T3>** and **<k>**.	
Reference	3GPP TS 27.007, 3GPP TS 27.010	

5.1.4.1.8 Read ICCID - +CCID

+CCID - Read ICCID		SELINT 2
AT+CCID	Execution command reads on SIM the ICCID (card identification number that provides a unique identification number for the SIM)	
AT+CCID=?	Test command returns the **OK** result code.	

5.1.4.2 Call Control

5.1.4.2.1 Select type of address - +CSTA

+CSTA – Select Type of Address	SELINT 2
AT+CSTA= [<type>]	Set command selects the type of number for further dialing commands (D) according to 3GPP specifications. Parameter: <type>: type of address octet in integer format (refer TS 24.008, subclause 10.5.4.7); default 145 when dialing string includes international access code character "+", otherwise 129
AT+CSTA?	Read command returns the current value of <type> in the format: +CSTA: <type>
AT+CSTA=?	Test command reports the range for the parameter <type>

5.1.4.2.2 Hang Up Call - +CHUP

+CHUP - Hang Up Call	SELINT 2
AT+CHUP	Execution command cancels all active and held calls, also if a multi-party session is running.
AT+CHUP=?	Test command returns the **OK** result code
Reference	3GPP TS 27.007

5.1.4.2.3 Cellular Result Codes - +CRC

+CRC - Cellular Result Codes	SELINT 2

AT+CRC=
[<mode>]
	Set command controls whether or not the extended format of incoming call indication is used.
	
	Parameter:
	
	<mode>
	  0 - disables extended format reporting (factory default)
	  1 - enables extended format reporting:
	
	When enabled, an incoming call is indicated to the **TE** with unsolicited result code
	
	+CRING: <type>
	
	instead of the normal **RING**.
	
	where
	<type> - call type:
	  ASYNC - asynchronous transparent data
	  SYNC - synchronous transparent data
	  REL ASYNC - asynchronous non-transparent data
	  REL SYNC - synchronous non-transparent data
	  VOICE - normal voice (TS 11)

AT+CRC?	Read command returns current value of the parameter <mode>.
AT+CRC=?	Test command returns supported values of the parameter <mode>.
Reference	3GPP TS 27.007

5.1.4.2.4   Radio Link Protocol - +CRLP

+CRLP - Radio Link Protocol		SELINT 2

AT+CRLP=[<iws>
[,<mws>[,<T1>
[,<N2>[,<ver>]]]]]
	Set command sets Radio Link Protocol (RLP) parameters used when non-transparent data calls are originated
	
	Parameters:
	<iws> - IWF window Dimension
	  1..61 - factory default value is 61
	
	<mws> - MS window Dimension
	  1..61 - default value is 61
	
	<T1> - acknowledge timer (10 ms units).
	  39..255 - default value is 48
	
	<N2> - retransmission attempts
	  1..255 - default value is 6
	
	<ver> - protocol version
	  0	

AT+CRLP?	Read command returns the current value of the RLP protocol parameters.	
AT+CRLP=?	Test command returns supported range of values of the RLP protocol parameters.	

5.1.4.2.5   Service Reporting Control - +CR

+CR - Service Reporting Control		SELINT 2

AT+CR=[<mode>]	Set command controls whether or not intermediate result code **+CR** is returned from **TA** to **TE**.
	
	Parameter:
	<mode>
	  0 - disables **+CR** reporting (factory default)
	  1 - enables **+CR** reporting: the intermediate result code is transmitted at the point during connect negotiation at which the **TA** has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before the intermediate result code **CONNECT** is transmitted. Its format is:
	
	+CR: <serv>
	
	where:
	<serv>
	  ASYNC - asynchronous transparent
	  SYNC - synchronous transparent
	  REL ASYNC - asynchronous non-transparent
	  REL SYNC - synchronous non-transparent.
	
	Note: this command replaces V.25ter [14] command Modulation Reporting Control (**+MR**), which is not appropriate for use with a GSM terminal.	

AT+CR?	Read command returns whether or not intermediate result code **+CR** is enabled, in the format: **+CR: <mode>**	
AT+CR=?	Test command reports the range of supported values for parameter **<mode>**	

5.1.4.2.6 Extended Error Report - +CEER

+CEER - Extended Error Report		SELINT 2
AT+CEER	Execution command returns one or more lines of information text **<report>** offering the TA user an extended error report, in the format: **+CEER: <report>** This report regards some error condition that may occur: • the failure in the last unsuccessful call setup (originating or answering) • the last call release Note: if none of the previous conditions has occurred since power up then **"Normal, unspecified"** condition is reported	
AT+CEER=?	Test command returns **OK** result code.	

5.1.4.2.7 Voice Hung Up Control - +CVHU

+CVHU - Voice Hang Up Control		SELINT 2

AT+CVHU=
[<mode>]
	Set command selects whether **ATH** or "**drop DTR**" shall cause a voice connection to be disconnected or not.
	
	Parameter:
	<mode>
	  0 - "**Drop DTR**" ignored but **OK** result code given. **ATH** disconnects.
	  1 - "**Drop DTR**" and **ATH** ignored but **OK** result code given.
	  2 - "**Drop DTR**" behavior according to **&D** setting. **ATH** disconnects (factory default).	

AT+CVHU?	Read command reports the current value of the **<mode>** parameter, in the format: **+CVHU: <mode>**	
AT+CVHU=?	Test command reports the range of supported values for parameter **<mode>**	

5.1.4.3 Network Service Handling

5.1.4.3.1 Subscriber Number - +CNUM

+CNUM - Subscriber Number		SELINT 2

AT+CNUM	Execution command returns the MSISDN (if the phone number of the device has been stored in the SIM card) in the format:
	
	+CNUM: <alpha>,<number>,<type>[<CR><LF>
	+CNUM: <alpha>,<number>,<type>[…]]
	
	where:
	<alpha> - alphanumeric string associated to **<number>**; used character set should be the one selected with **+CSCS**.
	<number> - string containing the phone number in the format **<type>**
	<type> - type of number:
	  129 - national numbering scheme
	  145 - international numbering scheme (contains the character "+").	

AT+CNUM=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007	

5.1.4.3.2 Read Operator Names - +COPN

+COPN - Read Operator Names	SELINT 2
AT+COPN	Execution command returns the list of operator names from the **ME** in the format: **+COPN: <numeric1>,<alpha1>[<CR><LF>** **+COPN: <numeric2>,<alpha2>[…]]** where: **<numericn>** - string type, operator in numeric format (see **+COPS**) **<alphan>** - string type, operator in long alphanumeric format (see **+COPS**) Note: each operator code **<numericn>** that has an alphanumeric equivalent **<alphan>** in the ME memory is returned
AT+COPN=?	Test command returns the **OK** result code
Reference	3GPP TS 27.007

+CREG - Network Registration Report		SELINT 2

AT+CREG=
[<mode>]
	Set command enables/disables network registration reports depending on the parameter **<mode>**.
	
	Parameter:
	<mode>
	
	 0 - disable network registration unsolicited result code (factory default)
	
	 1 - enable network registration unsolicited result code
	 2 - enable network registration unsolicited result code with network Cell identification data
	
	If **<mode>=1**, network registration result code reports:
	
	    +CREG: <stat>
	
	    where
	    <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
	
	If **<mode>=2**, network registration result code reports:
	
	    +CREG: <stat>[,<Lac>,<Ci>[,<AcT>]]
	
	    where:
	    <Lac> - Local Area Code (when <AcT> indicates value 0 to 6) or tracking area code (when <AcT> indicates value 7)
	    <Ci> - Cell Id for the currently registered on cell
	    <AcT>: access technology of the registered network:
	        0 GSM
	        2 UTRAN
	        3 GSM w/EGPRS
	        4 UTRAN w/HSDPA
	        5 UTRAN w/HSUPA
	        6 UTRAN w/HSDPA and HSUPA
	        7 E-UTRAN
	
	Note: <Lac>, <Ci> and **<AcT>** are reported only if **<mode>=2** and the mobile is registered on some network cell.		

AT+CREG?	Read command reports the **<mode>** and **<stat>** parameter values in the format: **+CREG: <mode>,<stat>[,<Lac>,<Ci>[,<AcT>]]** Note: **<Lac>, <Ci>** and **<AcT>** are reported only if **<mode>=2** and the mobile is registered on some network cell.		
AT+CREG=?	Test command returns the range of supported **<mode>**		
Example	AT OK at+creg? +CREG: 0,2		

+CREG - Network Registration Report		SELINT 2
	OK *(the MODULE is in network searching state)* at+creg? +CREG: 0,2 OK at+creg? +CREG: 0,2 OK at+creg? +CREG: 0,2 OK at+creg? +CREG: 0,1 OK *(the MODULE is registered)* at+creg? +CREG: 0,1 OK	
Reference	3GPP TS 27.007	

5.1.4.3.4 Operator Selection - +COPS

+COPS - Operator Selection		SELINT 2
AT+COPS= [<mode> [,<format> [,<oper>[,< AcT>]]]]	Set command forces an attempt to select and register the network operator. <mode> parameter defines whether the operator selection is done automatically or it is forced by this command to operator <oper>. The operator <oper> shall be given in format <format>. Parameters: **<mode>** 0 - automatic choice (the parameter **<oper>** will be ignored) (factory default) 1 - manual choice (**<oper>** field shall be present) 2 - deregister from network; the MODULE is kept unregistered until a **+COPS** with **<mode>=0, 1** or **4** is issued 3 - set only **<format>** parameter (the parameter **<oper>** will be ignored) 4 - manual/automatic (**<oper>** field shall be present); if manual selection fails, automatic mode (**<mode>=0**) is entered **<format>** 0 - alphanumeric long form (max length 16 digits) 2 - Numeric 5 or 6 digits [country code (3) + network code (2 or 3)] **<oper>**: network operator in format defined by **<format>** parameter. **<AcT>** access technology selected: 0 GSM 2 UTRAN 7 E-UTRAN Note: **<mode>** parameter setting is stored in NVM and available at next reboot, if it is not **3** (i.e.: set only **<format>** parameter). Note: if **<mode>=1 or 4**, the selected network is stored in NVM too and is available at next reboot (this will happen even with a new SIM inserted) Note: **<format>** parameter setting is never stored in NVM Note: 3G only products support **<AcT>** parameter value 2 only.	

+COPS - Operator Selection		SELINT 2
	Note: 4G only products support **<AcT>** parameter value 7 only.	

AT+COPS?	Read command returns current value of **<mode>**,**<format>**,**<oper>** and **<AcT>** in format **<format>**; if no operator is selected, **<format>**, **<oper>** and **<AcT>** are omitted
	
	+COPS: <mode>[, **<format>**, **<oper>**,**< AcT>**]
	
	Where
	<AcT> access technology selected:
	  0 GSM
	  2 UTRAN
	  3 GSM w/EGPRS
	  4 UTRAN w/HSDPA
	  5 UTRAN w/HSUPA
	  6 UTRAN w/HSDPA and HSUPA
	  7 E-UTRAN	

AT+COPS=?	Test command returns a list of quadruplets, each representing an operator present in the network.
	The quadruplets in the list are separated by commas:
	
	+COPS: [list of supported (<stat> ,<oper (in <format>=0)>,,
	<oper (in <format>=2)>,< AcT>)s][,,(list of supported <mode>s),
	(list of supported<format>s)]
	
	where
	<stat> - operator availability
	  0 - unknown
	  1 - available
	  2 - current
	  3 - forbidden
	
	<AcT> access technology selected:
	  0 GSM
	  2 UTRAN
	  7 E-UTRAN
	
	Note: since with this command a network scan is done, this command may require some seconds before the output is given.	

Reference	3GPP TS 27.007	

5.1.4.3.5　　　Select Wireless Network - +WS46

+WS46 - PCCA STD-101 Select Wireless Network		SELINT 2

AT+WS46=[<n>]	Set command selects the cellular network (Wireless Data Service, WDS) to operate with the **TA** (WDS-Side Stack Selection).
	
	Parameter:
	<n> - integer type, it is the WDS-Side Stack to be used by the **TA**.
	  12 - GSM Digital Cellular Systems (GERAN only)
	  22 UTRAN only
	  25 3GPP Systems (GERAN and UTRAN and E-UTRAN) (factory default)
	  28 E-UTRAN only
	  29 GERAN and UTRAN
	  30 GERAN and E-UTRAN
	  31 UTRAN and E-UTRAN	

	NOTE: <n> parameter setting is stored in NVM and available at next reboot.
	NOTE: 4G only products support **<n>** parameter value 28 only.
	NOTE: 4G/3G only products support **<n>** parameter values 22, 28 and 31 only. 31 is factory default
	NOTE: 4G/2G only products support **<n>** parameter values 12, 28 and 30 only. 30 is factory default
	NOTE: for NA (North America) products supporting at&t requirement 13340 about RAT Balancing and EF-RAT Mode, the value **<n>** stored with AT+WS46 command can be changed and overwritten in case of full SIM read (e.g.: power on, AT+CFUN=4/AT+CFUN=1 sequence, SIM ejection/SIM insertion sequence).
AT+WS46?	Read command reports the currently selected cellular network, in the format: **+ WS46: <n>**
AT+WS46=?	Test command reports the range for the parameter **<n>**.
Reference	3GPP TS 27.007

5.1.4.3.6   Facility Lock/Unlock - +CLCK

+CLCK - Facility Lock/Unlock	SELINT 2

**AT+CLCK=
<fac>,<mode>
[,<passwd>
[,<class>]]**
	Execution command is used to lock or unlock a **ME** on a network facility.
	
	Parameters:
	<fac> - facility
	  "PS" - PH-SIM (lock Phone to SIM card) MT asks password when other than current SIM card inserted; MT may remember certain amount of previously used cards thus not requiring password when they are inserted
	  "PF" - lock Phone to the very First inserted SIM card (MT asks password when other than the first SIM card is inserted)
	  "SC" - SIM (PIN request) (device asks SIM password at power-up and when this lock command issued)
	  "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 Incoming Calls when Roaming outside the home country)
	  "AB" - All Barring services (applicable only for **<mode>=0**)
	  "AG" - All outGoing barring services (applicable only for **<mode>=0**) (not yet supported)
	  "AC" - All inComing barring services (applicable only for **<mode>=0**)
	  "FD" - SIM fixed dialing memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as **<passwd>**)
	  "PN" - network Personalisation
	  "PU" - network subset Personalisation
	  "PP" - service Provider Personalization
	  "PC" - Corporate Personalization
	<mode> - defines the operation to be done on the facility
	  0 - unlock facility
	  1 - lock facility
	  2 - query status
	<passwd> - shall be the same as password specified for the facility from the **DTE** user interface or with command Change Password **+CPWD**
	<class> - sum of integers each representing a class of information (default is 7)
	  1 - voice (telephony)
	  2 - data (refers to all bearer services)
	  4 - fax (facsimile services)
	  8 - short message service

	16 - data circuit sync 32 - data circuit async 64 - dedicated packet access 128 - dedicated PAD access Note: when **<mode>=2** and command successful, it returns: **+CLCK: <status>[,<class1>[<CR><LF>+CLCK: <status>,<class2>** **[…]]** where **<status>** - the current status of the facility 0 - not active 1 - active **<class*n*>** - class of information of the facility
AT+CLCK=?	Test command reports all the facilities supported by the device.
Reference	3GPP TS 27.007
Example	Querying such a facility returns an output on three rows, the first for voice, the second for data, the third for fax: AT+CLCK ="AO",2 +CLCK: <status>,1 +CLCK: <status>,2 +CLCK: <status>,4
Note	It will return ERROR if executed using SMSATRUN digest mode or TCPATRUN server mode

5.1.4.3.7 Change Facility Password - +CPWD

+CPWD - Change Facility Password		SELINT 2

AT+CPWD=<fac>, <oldpwd>, <newpwd>	Execution command changes the password for the facility lock function defined by command Facility Lock **+CLCK**.
	
	Parameters:
	<fac> - facility
	  "SC" - SIM (PIN request)
	  "AB" - All barring services
	  "P2" - SIM PIN2
	  "PS"- SIM VO
	
	<oldpwd> - string type, it shall be the same as password specified for the facility from the ME user interface or with command **+CPWD**.
	<newpwd> - string type, it is the new password
	
	Note: parameter **<oldpwd>** is the old password while **<newpwd>** is the new one.	

AT+CPWD=?	Test command returns a list of pairs **(<fac>,<pwdlength>)** which presents the available facilities and the maximum length of their password (**<pwdlength>**)	
Example	at+cpwd=? +CPWD: ("SC",8), ("AB",4), ("P2",8),("PS",8) OK	
Reference	3GPP TS 27.007	

5.1.4.3.8 Calling Line Identification Presentation - +CLIP

+CLIP - Calling Line Identification Presentation		SELINT 2

AT+CLIP=[<n>]	Set command enables/disables the presentation of the CLI (Calling Line Identity) at the **TE**. This command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the CLI of the calling party when receiving a mobile terminated call.
	
	Parameters:
	<n>
	  0 - disables CLI indication (factory default)
	  1 - enables CLI indication
	
	If enabled the device reports after each RING the response:
	
	+CLIP: <number>,<type>,"",128,<alpha>,<CLI_validity>
	
	where:
	<number> - string type phone number of format specified by **<type>**
	<type> - type of address octet in integer format
	  128 - both the type of number and the numbering plan are unknown
	  129 - unknown type of number and ISDN/Telephony numbering plan
	  145 - international type of number and ISDN/Telephony numbering plan (contains the character "**+**")
	<alpha> - string type; alphanumeric representation of **<number>** corresponding to the entry found in phonebook; used character set should be the one selected with command Select **TE** character set **+CSCS**.
	<CLI_validity>
	  0 - CLI valid
	  1 - CLI has been withheld by the originator.
	  2 - CLI is not available due to interworking problems or limitation or originating network.	

+CLIP - Calling Line Identification Presentation		SELINT 2
	Note: in the **+CLIP:** response they are currently not reported either the **subaddress** information (it's always **""** after the 2nd comma) and the **subaddress type** information (it's always **128** after the 3rd comma)	
AT+CLIP?	Read command returns the presentation status of the CLI in the format: **+CLIP: <n>**,**<m>** where: **<n>** 0 - CLI presentation disabled 1 - CLI presentation enabled **<m>** - status of the CLIP service on the GSM network 0 - CLIP not provisioned 1 - CLIP provisioned 2 - unknown (e.g. no network is present) Note: This command issues a status request to the network, hence it may take a few seconds to give the answer due to the time needed to exchange data with it.	
AT+CLIP=?	Test command reports the supported values of parameter **<n>**.	
Reference	3GPP TS 27.007	
Note	The command changes only the report behaviour of the device, it does not change CLI supplementary service setting on the network.	

5.1.4.3.9   Calling Line Identification Restriction - +CLIR

+CLIR - Calling Line Identification Restriction		SELINT 2
AT+CLIR=[<n>]	Set command overrides the CLIR subscription when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command. This command refers to CLIR-service (GSM 02.81) that allows a calling subscriber to enable or disable the presentation of the CLI to the called party when originating a call. Parameter: **<n>** - facility status on the Mobile 0 - CLIR facility according to CLIR service network status 1 - CLIR facility active (CLI not sent) 2 - CLIR facility not active (CLI sent)	
AT+CLIR?	Read command gives the default adjustment for all outgoing calls (**<n>**) and also triggers an interrogation of the provision status of the CLIR service (**<m>**), where **<n>** - facility status on the Mobile 0 - CLIR facility according to CLIR service network status 1 - CLIR facility active (CLI not sent) 2 - CLIR facility not active (CLI sent) **<m>** - facility status on the Network 0 - CLIR service not provisioned 1 - CLIR service provisioned permanently 2 - unknown (e.g. no network present, etc.) 3 - CLI temporary mode presentation restricted 4 - CLI temporary mode presentation allowed	
AT+CLIR=?	Test command reports the supported values of parameter **<n>**.	
Reference	3GPP TS 27.007	
Note	This command sets the default behaviour of the device in outgoing calls.	

5.1.4.3.10   Connected line identification presentation - +COLP

+COLP - Connected Line Identification Presentation		SELINT 2

AT+COLP=[<n>]	This command refers to the supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. The command enables or disables the presentation of the COL at the TE. It has no effect on the execution of the supplementary service COLR in the network.
	
	Parameters:
	<n>
	  0 - disables COL indication (factory default)
	  1 - enables COL indication
	
	When enabled (and called subscriber allows),
	
	 +COLP: <number>,<type>
	
	intermediate result code is returned from TA to TE before any **+CR** or ITU-T Recommendation V.250 responses, where
	
	<number> - string type phone number of format specified by **<type>**
	<type> - type of address octet in integer format
	  129 - unknown type of number and ISDN/Telephony numbering plan
	  145 - international type of number and ISDN/Telephony numbering plan (contains the character "**+**")
	
	Note: if COL information is needed, it is recommended to set DIALMODE to 1 (see AT#DIALMODE command), in order to have network information available for display before returning to command mode.	

AT+COLP?	Read command gives the status of **<n>**, and also triggers an interrogation of the provision status of the COLP service according 3GPP TS 22.081 (given in **<m>**) in the format:
	
	+COLP: <n>,<m>
	
	where:
	<n>
	  0 - COL presentation disabled
	  1 - COL presentation enabled
	
	<m> - status of the COLP service on the network
	  0 - COLP not provisioned
	  1 - COLP provisioned
	  2 - unknown (e.g. no network is present)
	
	Note: This command issues a status request to the network, hence it may take a few seconds to give the answer due to the time needed to exchange data with it.	

AT+COLP=?	Test command reports the range for the parameter **<n>**	

5.1.4.3.11 Connected line identification restriction status - +COLR

+COLR - Connected Line Identification Restriction status		SELINT 2

AT+COLR	This command refers to the supplementary service COLR (Connected Line Identification Restriction) that enables a called subscriber to restrict the possibility of presentation of connected line identity (COL) to the calling party after receiving a mobile terminated call. The command displays the status of the COL presentation in the network. It has no effect on the execution of the supplementary service COLR in the network. Execution command triggers an interrogation of the activation status of the COLR service according 3GPP TS 22.081 (given in <m>):
	
	+COLR: <m>
	
	where:
	
	    <m>: integer type (parameter shows the subscriber COLR service status in the network)
	
	        0 COLR not provisioned
	
	        1 COLR provisioned
	
	        2 unknown (e.g. no network, etc.)
	
	Activation, deactivation, registration and erasure of the supplementary service COLR are not applicable.	

AT+COLR=?	Test command tests for command existence	

5.1.4.3.12   Call Forwarding Number And Conditions - +CCFC

+CCFC - Call Forwarding Number And Condition		SELINT 2
AT+CCFC= <reason>, <cmd>[,<number>[,<type>[,<class> [,,,<time>]]]	Execution command controls the call forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported. Parameters: **<reason>** 0 - unconditional 1 - mobile busy 2 - no reply 3 - not reachable 4 - all calls (not with query command) 5 - all conditional calls (not with query command) **<cmd>** 0 - disable 1 - enable 2 - query status 3 - registration 4 - erasure **<number>** - string type phone number of forwarding address in format specified by **<type>** parameter **<type>** - type of address octet in integer format : 129 - national numbering scheme 145 - international numbering scheme (contains the character "**+**") **<class>** - sum of integers each representing a class of information which the command refers to; default 7 (voice + data + fax) 1 - voice (telephony) 2 - data 4 - fax (facsimile services) 8 - short message service 16 - data circuit sync 32 - data circuit async 64 - dedicated packet access 128 - dedicated PAD access **<time>** - time in *seconds* to wait before call is forwarded; it is valid only when **<reason>** "no reply" is enabled (**<cmd>**=1) or queried (**<cmd>**=2) 1..30 - automatically rounded to a multiple of 5 seconds (default is 20) Note: when **<cmd>=2** and command successful, it returns: **+CCFC: <status>,<class1>[,<number>,<type>[,,,<time>]][<CR><LF>** **+CCFC: <status>,<class2>[,<number>,<type>[,,,<time>]][…]]** where: **<status>** - current status of the network service 0 - not active 1 - active	
	<classn> - same as **<class>** **<time>** - it is returned only when **<reason>**=2 ("no reply") and **<cmd>**=2. The other parameters are as seen before.	
AT+CCFC=?	Test command reports supported values for the parameter **<reason>**.	
Reference	3GPP TS 27.007	

+CCFC - Call Forwarding Number And Condition		SELINT 2
Note	When querying the status of a network service **(<cmd>=2)** the response line for 'not active' case **(<status>=0)** should be returned only if service is not active for any **<class>**.	

5.1.4.3.13   Call Waiting - +CCWA

+CCWA - Call Waiting		SELINT 2

AT+CCWA=
[<n>[,<cmd>
[,<class>]]]
	Set command allows the control of the call waiting supplementary service. Activation, deactivation, and status query are supported.
	
	Parameters:
	<n> - enables/disables the presentation of an unsolicited result code:
	  0 - disable
	  1 - enable
	<cmd> - enables/disables or queries the service at network level:
	  0 - disable
	  1 - enable
	  2 - query status
	<class> - is a sum of integers each representing a class of information which the command refers to; default is 7 (**voice + data + fax**)
	  1 - voice (telephony)
	  2 - data
	  4 - fax (facsimile services)
	  8 - short message service
	  16 - data circuit sync
	  32 - data circuit async
	  64 - dedicated packet access
	  128 - dedicated PAD access
	
	Note: the response to the query command is in the format:
	
	+CCWA: <status>,<class1>[<CR><LF>
	+CCWA: <status>,<class2>[…]]
	
	where
	<status> represents the status of the service:
	  0 - inactive
	  1 - active
	<class*n*> - same as **<class>**
	
	Note: the unsolicited result code enabled by parameter **<n>** is in the format::
	
	+CCWA: <number>,<type>,<class>,[<alpha>][,<cli_validity>]
	where:
	<number> - string type phone number of calling address in format specified by **<type>**
	<type> - type of address in integer format
	<class> - see before
	<alpha> - string type; alphanumeric representation of **<number>** corresponding to the entry found in phonebook; used character set should be the one selected with **+CSCS**.
	<cli_validity>
	  0 - CLI valid
	  1 - CLI has been withheld by the originator
	  2 - CLI is not available due to interworking problems or limitations of originating network
	
	Note: if parameter **<cmd>** is omitted then network is not interrogated.
	
	Note: in the query command the class parameter must not be issued.	

+CCWA - Call Waiting		SELINT 2
	Note: the difference between call waiting report disabling (**AT+CCWA = 0,1,7**) and call waiting service disabling (**AT+CCWA = 0,0,7**) is that in the first case the call waiting indication is sent to the device by network but this last one does not report it to the **DTE**; instead in the second case the call waiting indication is not generated by the network. Hence the device results busy to the third party in the 2nd case while in the 1st case a ringing indication is sent to the third party. Note: The command **AT+CCWA=1,0** has no effect a non sense and must not be issued.	
AT+CCWA?	Read command reports the current value of the parameter **<n>**.	
AT+CCWA=?	Test command reports the supported values for the parameter **<n>**.	
Reference	3GPP TS 27.007	

5.1.4.3.14   Call Holding Services - +CHLD

+CHLD - Call Holding Services		SELINT 2

AT+CHLD=[<n>]	Execution command controls the network call hold service. With this service it is possible to disconnect temporarily a call and keep it suspended while it is retained by the network, contemporary it is possible to connect another party or make a multiparty connection.
	
	 Parameter:
	 <n>
	  0 - releases all held calls, or sets the UDUB (User Determined User Busy) indication for a waiting call. (only from version D)
	  1 - releases all active calls (if any exist), and accepts the other (held or waiting) call
	  1X - releases a specific active call X
	  2 - places all active calls (if any exist) on hold and accepts the other (held or waiting) call.
	  2X - places all active calls on hold except call X with which communication shall be supported (only from version D).
	  3 - adds an held call to the conversation
	  4 - connects the two calls and disconnects the subscriber from both calls (Explicit Call Transfer (ECT))
	
	 Note: "X" is the numbering (starting with 1) of the call given by the sequence of setting up or receiving the calls (active, held or waiting) as seen by the served subscriber. Calls hold their number until they are released. New calls take the lowest available number.
	
	 Note: where both a held and a waiting call exist, the above procedures apply to the waiting call (i.e. not to the held call) in conflicting situation.	

AT+CHLD=?	Test command returns the list of supported **<n>s**. **+CHLD: (0,1,1X,2,2X,3,4)**	
Reference	3GPP TS 27.007	
Note	ONLY for VOICE calls	

5.1.4.3.15   Call deflection - +CTFR

+CTFR – Call deflection		SELINT 2
AT+CTFR=<number>[, <type>]	Set command is used to request a service that causes an incoming alerting call to be forwarded to a specified number. This is based on the supplementary service CD (Call Deflection; refer 3GPP TS 22.072). Parameters:	

+CTFR – Call deflection	SELINT 2
	<number>: string type phone number of format specified by <type>

<type>: type of address octet in integer format; default 145 when dialing string includes international access code character "+", otherwise 129

Note: Call Deflection is only applicable to an incoming voice call |
| AT+CTFR=? | Test command tests for command existence |

5.1.4.3.16 Unstructured Supplementary Service Data - +CUSD

+CUSD - Unstructured Supplementary Service Data	SELINT 2
AT+CUSD= [<n>[,<str> [,<dcs>]]]	Set command allows control of the Unstructured Supplementary Service Data (USSD 3GPP TS 22.090).

Parameters:
<n> - is used to disable/enable the presentation of an unsolicited result code.
  0 - disable the result code presentation in the **DTA**
  1 - enable the result code presentation in the **DTA**
  2 - cancel an ongoing USSD session (not applicable to read command response)
<str> - USSD-string (when <str> parameter is not given, network is not interrogated)
  - If <dcs> indicates that GSM338 default alphabet is used **ME/TA** converts GSM alphabet into current TE character set (see **+CSCS**).
  - If <dcs> indicates that 8-bit data coding scheme is used: **ME/TA** converts each 8-bit octet into two IRA character long hexadecimal number; e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65).

<dcs> - 3GPP TS 23.038 Cell Broadcast Data Coding Scheme in integer format (default is 0).

Note: the unsolicited result code enabled by parameter <n> is in the format:

+CUSD: <m>[,<str>,<dcs>] to the TE

where:
<m>:
  0 - no further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation).
  1 - further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation)
  2 - USSD terminated by the network
  3 - other local client has responded
  4 - operation not supported
  5 - network time out |
AT+CUSD?	Read command reports the current value of the parameter <n>
AT+CUSD=?	Test command reports the supported values for the parameter <n>.
Reference	3GPP TS 27.007

5.1.4.3.17 Advice Of Charge - +CAOC

+CAOC - Advice Of Charge	SELINT 2
AT+CAOC= <mode>	Set command refers to the Advice of Charge supplementary services that enable subscriber to get information about the cost of calls; the command

+CAOC - Advice Of Charge		SELINT 2

	also includes the possibility to enable an unsolicited event reporting of the Current Call Meter (CCM) information.
	
	Parameter:
	\<mode\>
	  0 - query CCM value
	  1 - disables unsolicited CCM reporting
	  2 - enables unsolicited CCM reporting
	
	Note: the unsolicited result code enabled by parameter **\<mode\>** is in the format:
	
	+CCCM: \<ccm\>
	
	where:
	\<ccm\> - current call meter in home units, string type: three bytes of the CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30)
	
	Note: the unsolicited result code **+CCCM** is sent when the CCM value changes, but not more than every 10 seconds.	

AT+CAOC?	Read command reports the value of parameter **\<mode\>** in the format: **+CAOC: \<mode\>**	
AT+CAOC=?	Test command reports the supported values for **\<mode\>** parameter.	
Reference	3GPP TS 27.007	
Note	**+CAOC** command returns an estimate of the cost of the current call only, produced by the MS and based on the information provided by either AoCI or AOCC supplementary services; it is not stored in the SIM.	

5.1.4.3.18 List Current Calls - +CLCC

+CLCC - List Current Calls		SELINT 2

AT+CLCC	Execution command returns the list of current calls and their characteristics in the format:
	
	[+CLCC:\<id1\>,\<dir\>,\<stat\>,\<mode\>,\<mpty\>,\<number\>,\<type\> ,\<alpha\>[\<CR\>\<LF\>+CLCC:\<id2\>,\<dir\>,\<stat\>,\<mode\>, \<mpty\>,\<number\>,\<type\>,\<alpha\>[…]]]
	
	where:
	\<id_n\> - call identification number
	\<dir\> - call direction
	  0 - mobile originated call
	  1 - mobile terminated call
	\<stat\> - state of the call
	  0 - active
	  1 - held
	  2 - dialing (**MO** call)
	  3 - alerting (**MO** call)
	  4 - incoming (**MT** call)
	  5 - waiting (**MT** call)
	\<mode\> - call type
	  0 - voice
	  1 - data
	  9 - unknown
	\<mpty\> - multiparty call flag
	  0 - call is not one of multiparty (conference) call parties
	  1 - call is one of multiparty (conference) call parties	

+CLCC - List Current Calls		SELINT 2

	<number> - string type phone number in format specified by <type>
	<type> - type of phone number octet in integer format
	  129 - national numbering scheme
	  145 - international numbering scheme (contains the character "+")
	<alpha> - string type; alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with +CSCS.
	
	Note: If no call is active then only OK message is sent. This command is useful in conjunction with command +CHLD to know the various call status for call holding	

AT+CLCC=?	Test command returns the OK result code	
Reference	3GPP TS 27.007	

5.1.4.3.19   SS Notification - +CSSN

+CSSN - SS Notification		SELINT 2

AT+CSSN=[<n>[,<m>]]	It refers to supplementary service related network initiated notifications. Set command enables/disables the presentation of notification result codes from TA to TE.
	
	Parameters:
	<n> - sets the +CSSI result code presentation status
	  0 - disable
	  1 - enable
	<m> - sets the +CSSU result code presentation status
	  0 - disable
	  1 - enable
	
	When <n>=1 and a supplementary service notification is received after a mobile originated call setup, an unsolicited code:
	
	+CSSI: <code1>
	is sent to TE before any other MO call setup result codes, where:
	<code1>:
	0 - unconditional call forwarding is active
	  1 - some of the conditional call forwardings are active
	  2 - call has been forwarded
	  3 - call is waiting
	  5 - outgoing calls are barred
	  6 - incoming calls are barred
	
	When <m>=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, an unsolicited result code:
	
	+CSSU: <code2>
	is sent to TE, where:
	<code2>:
	  0 - this is a forwarded call (MT call setup)
	  2 - call has been put on hold (during a voice call)
	  3 - call has been retrieved (during a voice call).	

AT+CSSN?	Read command reports the current value of the parameters.	
AT+CSSN=?	Test command reports the supported range of values for parameters <n>, <m>.	
Reference	3GPP TS 27.007	

5.1.4.3.20 Closed User Group - +CCUG

+CCUG - Closed User Group Supplementary Service Control		SELINT 2

AT+CCUG= [<n>[,<index> [,<info>]]]	Set command allows control of the Closed User Group supplementary service [GSM 02.85].
	
	Parameters:
	<n>
	  0 - disable CUG temporary mode (factory default).
	  1 - enable CUG temporary mode: it enables to control the CUG information on the air interface as a default adjustment for all following outgoing calls.
	<index>
	  0..9 - CUG index
	  10 - no index (preferential CUG taken from subscriber data) (default)
	<info>
	  0 - no information (default)
	  1 - suppress Outgoing Access (OA)
	  2 - suppress preferential CUG
	  3 - suppress OA and preferential CUG	

AT+CCUG?	Read command reports the current value of the parameters	
AT+CCUG=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007	

5.1.4.3.21 Preferred Operator List - +CPOL

+CPOL - Preferred Operator List		SELINT 2

AT+CPOL= [<index>][,<format> [,<oper>[,<GSM_AcT>, <GSM_Compact_AcT>, <UTRAN_AcT,<EUTRAN_Ac T>]]]	Execution command writes an entry in the SIM list of preferred operators.
	
	Parameters:
	<index> - integer type; the order number of operator in the SIM preferred operator list
	  1..*n*
	<format>
	  2 - numeric **<oper>**
	<oper> - string type
	<GSM_AcT> - GSM access technology
	  0 – access technology not selected
	  1 – access technology selected
	  <GSM_Compact_AcT> - GSM compact access technology
	  0 – access technology not selected
	  1 – access technology selected
	  <UTRAN_AcT> - UTRAN acess technology
	  0 – access technology not selected
	  1 – access technology selected
	
	  <E-UTRAN_AcTn> - E-UTRAN access technology:
	  0 access technology not selected
	  1 access technology selected
	
	Note: if **<index>** is given but **<oper>** is left out, entry is deleted. If **<oper>** is given but **<index>** is left out, **<oper>** is put in the next free location. If only **<format>** is given, the format of the **<oper>** in the read command is changed.	

AT+CPOL?	Read command returns all used entries from the SIM list of preferred operators.	
AT+CPOL=?	Test command returns the whole **<index>** range supported by the SIM and the range for the parameter **<format>**	
Reference	3GPP TS 27.007	

5.1.4.3.22 Selection of preferred PLMN list - +CPLS

+CPLS – Selection of preferred PLMN list		SELINT 2

AT+CPLS=<list>	The execution command is used to select a list of preferred PLMNs in the SIM/USIM.
	
	Parameters:
	<list>:
	    0 - User controlled PLMN selector with Access Technology EFPLMNwAcT, if not found in the SIM/UICC then PLMN preferred list EFPLMNsel (this file is only available in SIM card or GSM application selected in UICC)
	    1 - Operator controlled PLMN selector with Access Technology EFOPLMNwAcT
	    2 - HPLMN selector with Access Technology EFHPLMNwAcT
	
	Note: the value set by command is directly stored in NVM and doesn't depend on the specific CMUX instance.	

AT+CPLS?	Read command returns the selected PLMN selector **<list>** from the SIM/USIM.	
AT+CPLS=?	Test command returns the whole index range supported **<list>**s by the SIM/USIM.	

5.1.4.4 Mobile Equipment Control

5.1.4.4.1 Phone Activity Status - +CPAS

+CPAS - Phone Activity Status		SELINT 2

AT+CPAS	Execution command reports the device status in the form:
	
	+CPAS: <pas>
	
	Where:
	<pas> - phone activity status
	  0 - ready (device allows commands from **TA/TE**)
	  1 - unavailable (device does not allow commands from **TA/TE**)
	  2 - unknown (device is not guaranteed to respond to instructions)
	  3 - ringing (device is ready for commands from **TA/TE**, but the ringer is active)
	  4 - call in progress (device is ready for commands from **TA/TE**, but a call is in progress)	

AT+CPAS=?	Test command reports the supported range of values for **<pas>**. Note: although **+CPAS** is an execution command, ETSI 07.07 requires the Test command to be defined.	
Example	ATD03282131321; OK AT+CPAS +CPAS: 4 *the called phone has answered to your call* OK ATH OK	
Reference	3GPP TS 27.007	

5.1.4.4.2 Set Phone functionality - +CFUN

+CFUN - Set Phone Functionality		SELINT 2

AT+CFUN=
[<fun>[,<rst>]]
	Set command selects the level of functionality in the ME.
	
	Parameters:
	<fun> - is the power saving function mode
	  0 - minimum functionality, NON-CYCLIC SLEEP mode: in this mode, the AT interface is not accessible. Consequently, once you have set **<fun>** level 0, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code. The first wake-up event, or rising RTS line, stops power saving and takes the ME back to full functionality level **<fun>=1**.
	  1 - mobile full functionality with power saving disabled (factory default)
	  2 - disable TX and the ME stays attached to the network (it is not available on LE910-NA products). **<fun>** level 2 cannot be set (an ERROR is returned) if:
	    a) Access technology of the registered network is E-UTRAN (see **+COPS**,**+WS46**).
	    b) The current **<fun>** level is set to 4.
	    c) The SIM is not READY (see **+CPIN**).
	    d) The protocol stack is transmitting.
	  <fun> level 2 is not stored into profile (see **&P**, **&W**).
	  4 - disable both TX and RX
	  5 - mobile full functionality with power saving enabled
	  7 - CYCLIC SLEEP mode: in this mode, the serial interface is periodically enabled while CTS is active. If characters are recognized on the serial interface, the ME stays active for 2 seconds after the last character was sent or received. ME exits SLEEP mode only, if AT+CFUN=1 is entered
	  9 - just as 0 but with different wake-up events (see SW User Guide)
	  12 – Fast detach
	
	<rst> - reset flag
	  0 - do not reset the ME before setting it to **<fun>** functionality level
	  1 - reset the device. The device is fully functional after the reset. This value is available only for <fun> = 1
	
	Note: issuing **AT+CFUN=4[,0]** causes the module to perform a network deregistration but the SIM is still available.
	
	Note: if power saving enabled, it reduces the power consumption during the idle time, thus allowing a longer standby time with a given battery capacity.
	
	Note: to place the module in power saving mode, set the **<fun>** parameter at value = 5 and the line **DTR** (RS232) must be set to **OFF**. Once in power saving, the **CTS** line switch to the **OFF** status to signal that the module is really in power saving condition.
	During the power saving condition, before sending any **AT** command on the serial line, the **DTR** must be set to **ON** (0V) to exit from power saving and it must be waited for the **CTS** (RS232) line to go in **ON** status.
	Until the **DTR** line is **ON**, the module will not return back in the power saving condition
	Note: the power saving function does not affect the network behaviour of the module, even during the power save condition the module remains registered on the network and reachable for incoming calls or SMS. If a call incomes during the power save, then the module will wake up and proceed normally with the unsolicited incoming call code
	Note: when the module detects USB port is connected, then the power saving mode is not allowed
	Note: in CYCLIC SLEEP mode (**AT+CFUN=7**) CTS line toggles slowly, the toggle delay is about 2 seconds

+CFUN - Set Phone Functionality		SELINT 2

	Note: in CYCLIC SLEEP mode (**AT+CFUN=7**) during incoming voice call the CTS line continues to toggle
	Note: If the current **\<fun\>** level is 2 the next accepted **\<fun\>** shall be equal to the **\<fun\>** level set before 2, e.g.:
	    AT+CFUN=1->AT+CFUN=2->AT+CFUN=1 OK
	    AT+CFUN=1->AT+CFUN=2->AT+CFUN=5 ERROR
	
	Note: if **AT#ENS=1** then **AT+CFUN=0** has the same functionality of **AT+CFUN=4**	

AT+CFUN?	Read command reports the current setting of **\<fun\>**.	
AT+CFUN=?	Test command returns the list of supported values for **\<fun\>** and **\<rst\>**.	
Reference	3GPP TS 27.007	

5.1.4.4.3   Enter PIN - +CPIN

+CPIN - Enter PIN		SELINT 2
AT+CPIN=\<pin\> [,\<newpin\>]	Set command sends to the device a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN required is SIM PUK or SIM PUK2, the **\<newpin\>** is required. This second pin, **\<newpin\>** will replace the old pin in the SIM. The command may be used to change the SIM PIN by sending it with both parameters **\<pin\>** and **\<newpin\>** Parameters: **\<pin\>** - string type value **\<newpin\>** - string type value. To check the status of the PIN request use the command **AT+CPIN?** Note: if MBIM is enabled and SIM PIN is required, the SIM must be unlocked from the MBIM interface.	

AT+CPIN?	Read command reports the PIN/PUK/PUK2 request status of the device in the form:
	+CPIN: \<code\>
	where:
	\<code\> - PIN/PUK/PUK2 request status code
	  READY - ME is not pending for any password
	  SIM PIN - ME is waiting SIM PIN to be given
	  SIM PUK - ME is waiting SIM PUK to be given
	  PH-SIM PIN - ME is waiting phone-to-SIM card password to be given
	  PH-FSIM PIN - ME is waiting phone-to-very first SIM card password to be given
	  PH-FSIM PUK - ME is waiting phone-to-very first SIM card unblocking password to be given
	  SIM PIN2 - ME is waiting SIM PIN2 to be given; this **\<code\>** is returned only when the last executed command resulted in PIN2 authentication failure (i.e. **+CME ERROR: 17**)
	  SIM PUK2 - ME is waiting SIM PUK2 to be given; this **\<code\>** is returned only when the last executed command resulted in PUK2 authentication failure (i.e. **+CME ERROR: 18**)
	  PH-NET PIN - ME is waiting network personalization password to be given
	  PH-NET PUK - ME is waiting network personalization unblocking password to be given
	  PH-NETSUB PIN - ME is waiting network subset personalization password to be given
	  PH-NETSUB PUK - ME is waiting network subset personalization unblocking password to be given	

+CPIN - Enter PIN	SELINT 2
	PH-SP PIN - ME is waiting service provider personalization password to be given
	PH-SP PUK - ME is waiting service provider personalization unblocking password to be given
	PH-CORP PIN - ME is waiting corporate personalization password to be given
	PH-CORP PUK - ME is waiting corporate personalization unblocking password to be given
	Note: Pin pending status at startup depends on PIN facility setting, to change or query the default power up setting use the command **AT+CLCK=SC,<mode>,<pin>**
AT+CPIN=?	Test command returns **OK** result code.
Example	AT+CMEE=1 OK AT+CPIN? +CME ERROR: 10 *error: you have to insert the SIM* AT+CPIN? +CPIN: READY *you inserted the SIM and device is not waiting for PIN to be given* OK
Reference	3GPP TS 27.007

+CSQ - Signal Quality		SELINT 2

AT+CSQ	Execution command reports received signal quality indicators in the form:
	+CSQ: <rssi>,<ber>
	where
	<rssi> - received signal strength indication
	  0 - (-113) dBm or less
	  1 - (-111) dBm
	  2..30 - (-109)dBm..(-53)dBm / 2 dBm per step
	  31 - (-51)dBm or greater
	  99 - not known or not detectable
	<ber> - bit error rate (in percent)
	  0 - less than 0.2%
	  1 - 0.2% to 0.4%
	  2 - 0.4% to 0.8%
	  3 - 0.8% to 1.6%
	  4 - 1.6% to 3.2%
	  5 - 3.2% to 6.4%
	  6 - 6.4% to 12.8%
	  7 - more than 12.8%
	  99 - not known or not detectable
	
	Note: in GSM, the received signal strength indication is the average of the received signal level measurement samples in dBm, taken on a channel within the reporting period of length one SACCH multi frame, and is mapped as above.
	For UMTS, the current radio signal strength indicates CPICH RSCP in levels. According to the specification 3GPP TS25.133, the level range is from 0 to 91, with
	
	   0 less than (-115) dBm
	   1 (-115) dBm...(-114) dBm
	   .
	   .
	   .
	   91 (-25) dBm or greater
	   99 - not known or not detectable
	
	Values between -115dbm and -120dbm will all be represented by level 0
	To be compliant with 3GPP TS27.007 specification, the above 0...91 levels are mapped to range 0...31:
	
	3GPP TS25.133 Level Scaled (displayed) RSSI
	3 or less 0
	4...65 Level /2 - 1
	66...91 31
	99 99
	
	If module is registered in 4G the execution command reports received signal quality indicators in the form:
	+CSQ: <**RSSI**>,<**RSRQ**>
	
	Where:
	<**RSSI**> **-** Received Signal Strength Indication
	<**RSRQ**> **-** Reference Signal Received Quality
	
	For <**RSSI**> To be compliant with 3GPP TS27.007 specification, levels are mapped to range 0...31:
	:
	0 -113 dBm or less
	1 -111 dBm

+CSQ - Signal Quality	SELINT 2

	2...30 -109... -53 dBm 31 -51 dBm or greater 99 not known or not detectable For **<RSRQ>** levels are mapped to range 0..7: 4G (LTE)-RSRQ[in dBm] 0:(-4) to (-3) 1:(-6) to (-5) 2:(-8) to (-7) 3:(-10) to (-9) 4:(-13) to (-11) 5:(-15) to (-14) 6:(-17) to (-16) 7:(-19) to (-18) 99 - not known or not detectable
AT+CSQ=?	Test command returns the supported range of values of the parameters <rssi> and **<ber>**. Note: although +CSQ is an execution command without parameters, ETSI 07.07 requires the Test command to be defined.
Reference	3GPP TS 27.007

+CESQ – Extended Signal Quality	SELINT 2
AT+CESQ	Execution command reports received signal quality parameters in the form: **+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>** Where **< rxlev >** - received received signal strength level (see 3GPP TS 45.008 subclause 8.1.4). 0 - rssi < -110 dBm 1 - -110 dBm $\leq$ rssi < -109 dBm 2 - -109 dBm $\leq$ rssi < -108 dBm ... 61 - -50 dBm $\leq$ rssi < -49 dBm 62 - -49 dBm $\leq$ rssi < -48 dBm 63 - -48 dBm $\leq$ rssi 99 - not known or not detectable or if the current serving cell is not a GERAN cell **<ber>** - bit error rate (in percent) 0...7 - as RXQUAL values in the table in 3GPP TS 45.008 subclause 8.2.4 99 - not known or not detectable or if the current serving cell is not a GERAN cell. **<rscp>** - received signal code power (see 3GPP TS 25.133 subclause 9.1.1.3 and 3GPP TS 25.123 subclause 9.1.1.1.3). 0 - rscp < -120 dBm 1 - -120 dBm $\leq$ rscp < -119 dBm 2 - -119 dBm $\leq$ rscp < -118 dBm ... 94 - -27 dBm $\leq$ rscp < -26 dBm 95 - -26 dBm $\leq$ rscp < -25 dBm 96 - 25 dBm $\leq$ rscp 255 - not known or not detectable or if the current serving cell is not a UTRA cell **<ecno>** - ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 subclause). 0 - Ec/Io < -24 dB 1 - -24 dB $\leq$ Ec/Io < -23.5 dB 2 - -23.5 dB $\leq$ Ec/Io < -23 dB ... 47 - -1 dB $\leq$ Ec/Io < -0.5 dB 48 - -0.5 dB $\leq$ Ec/Io < 0 dB 49 – 0 dB $\leq$ Ec/Io 255 - not known or not detectable detectable or if the current serving cell is not a UTRA cell **<rsrq>** - reference signal received quality (see 3GPP TS 36.133 subclause 9.1.7). 0 - rsrq < -19.5 dB 1 - -19.5 dB $\leq$ rsrq < -19 dB 2-19 dB $\leq$ rsrq < -18.5 dB ... 32 - -4 dB $\leq$ rsrq < -3.5 dB 33 - -3.5 dB $\leq$ rsrq < -3 dB

+CESQ – Extended Signal Quality		SELINT 2
	34 - -3 dB ≤ rsrq 255 - not known or not detectable detectable or if the current serving cell is not a EUTRA cell **<rsrp>** - reference signal received power (see 3GPP TS 36.133 subclause 9.1.4). 0 - rsrp < -140 dBm 1 - -140 dBm ≤ rsrp < -139 dBm 2 - -139 dBm ≤ rsrp < -138 dBm ... 95 - -46 dBm ≤ rsrp < -45 dBm 96 - -45 dBm ≤ rsrp < -44 dBm 97 - -44 dBm ≤ rsrp 255 not known or not detectable detectable or if the current serving cell is not a EUTRA cell	
AT+CESQ=?	Test command returns the supported range of values of the parameters **<rxlev>, <ber>, <rscp>, <ecno>, <rsrq>, <rsrp>.**	
Reference	3GPP TS 27.007	

5.1.4.4.6 Indicator Control - +CIND

+CIND - Indicator Control		SELINT 2
AT+CIND= [<state> [,<state>[,…]]]	Set command is used to control the registration state of ME indicators, in order to automatically send the **+CIEV** URC, whenever the value of the associated indicator changes. The supported indicators (**<descr>**) and their order appear from test command **AT+CIND=?** Parameter: **<state>** - registration state 0 - the indicator is deregistered; there's no unsolicited result code (**+CIEV** URC) automatically sent by the ME to the application, whenever the value of the associated indicator changes; the value can be directly queried with **+CIND?** 1 - the indicator is registered: an unsolicited result code (**+CIEV** URC) is automatically sent by the ME to the application, whenever the value of the associated indicator changes; it is still possible to query the value through **+CIND?** (default) Note: When the ME is switched on all of the indicators are in registered mode.	
AT+CIND?	Read command returns the current value of ME indicators, in the format: **+CIND: <ind>[,<ind>[,…]]** Note: the order of the values **<ind>s** is the same as that in which the associated indicators appear from test command **AT+CIND=?**	

AT+CIND=?	Test command returns pairs, where string value **<descr>** is a description (max. 16 chars) of the indicator and compound value is the supported values for the indicator, in the format:
	+CIND: ((<descr>, (list of supported <ind>s))[,(<descr>, (list of supported <ind>s))[,…]])
	where:
	<descr> - indicator names as follows (along with their **<ind>** ranges)
	"battchg" - battery charge level
	  <ind> - battery charge level indicator range
	    0..5
	    99 - not measurable
	"signal" - signal quality
	  <ind> - signal quality indicator range
	    0..7
	    99 - not measurable	

+CIND - Indicator Control	SELINT 2

	"service" - service availability
	  <ind> - service availability indicator range
	   0 - not registered to any network
	   1 - registered
	"sounder" - sounder activity
	  <ind> - sounder activity indicator range
	   0 - there's no any sound activity
	   1 - there's some sound activity
	"message" - message received
	  <ind> - message received indicator range
	   0 - there is no unread short message at memory location "SM"
	   1 - unread short message at memory location "SM"
	"call" - call in progress
	  <ind> - call in progress indicator range
	   0 - there's no calls in progress
	   1 - at least a call has been established
	"roam" - roaming
	  <ind> - roaming indicator range
	   0 - registered to home network or not registered
	   1 - registered to other network
	"smsfull" - a short message memory storage in the MT has become full
	    (1), or memory locations are available (0)
	  <ind> - short message memory storage indicator range
	   0 - memory locations are available
	   1 - a short message memory storage in the MT has become full.
	"rssi" - received signal (field) strength
	  <ind> - received signal strength level indicator range
	   0 - signal strength ≤ (-112) dBm
	   1..4 - signal strength in (-97) dBm..(-66) dBm (15 dBm steps)
	   5 - signal strength ≥ (-51) dBm
	   99 - not measurable

Example	*Next command causes all the indicators to be registered* AT+CIND=1,1,1,1,1,1,1,1,1 *Next command causes all the indicators to be de-registered* AT+CIND=0,0,0,0,0,0,0,0,0 *Next command to query the current value of all indicators* AT+CIND? CIND: 4,0,1,0,0,0,0,0,2 OK
Note	See command **+CMER**
Reference	3GPP TS 27.007

5.1.4.4.7　　Mobile Equipment Event Reporting - +CMER

+CMER - Mobile Equipment Event Reporting		SELINT 2
AT+CMER= [<mode> [,<keyp> [,<disp> [,<ind> [,<bfr>]]]]]	Set command enables/disables sending of unsolicited result codes from TA to TE in the case of indicator state changes (n.b.: sending of URCs in the case of key pressings or display changes are currently not implemented). Parameters: **<mode>** - controls the processing of unsolicited result codes 0 - buffer **+CIEV** Unsolicited Result Codes. 1 - discard **+CIEV** Unsolicited Result Codes when TA-TE link is reserved (e.g. on-line data mode); otherwise forward them directly to the TE. 2 - buffer **+CIEV** Unsolicited Result Codes in the TA when TA-TE link is reserved (e.g. on-line data mode) and flush them to the TE after reservation; otherwise forward them directly to the TE. 3 - forward **+CIEV** Unsolicited Result Codes directly to the TE; when TA is in on-line data mode each **+CIEV** URC is stored in a buffer; once the ME goes into command mode (after **+++** was entered), all URCs stored in the buffer will be output. **<keyp>** - keypad event reporting 　0 - no keypad event reporting **<disp>** - display event reporting 　0 - no display event reporting **<ind>** - indicator event reporting 　0 - no indicator event reporting 　2 - indicator event reporting **<bfr>** - TA buffer clearing 　0 - TA buffer of unsolicited result codes is cleared when <mode> 1..3 is entered 　1 -　TA buffer of unsolicited result codes is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes) Note: After AT+CMER has been switched on with e.g. AT+CMER=2,0,0,2 command (i.e. <bfr> is 0), URCs for all registered indicators will be issued only first time, if previous <mode> was 0, for backward compatibility. Values shown by the indicators will be current indicators values, not buffered ones. Subsequent AT+CMER commands with <mode> different from 0 and <bfr> equal to 0 will not flush the codes, even if <mode> was set again to 0 before. To flush the codes, <bfr> must be set to 1. Although it is possible to issue the command when SIM PIN is pending, it will answer ERROR if "message" or "smsfull" indicators are enabled in AT+CIND, because with pending PIN it is not possible to give a correct indication about SMS status. To issue the command when SIM PIN is pending you have to disable "message" and "smsfull" indicators in AT+CIND first.
AT+CMER?	Read command returns the current setting of parameters, in the format: +CMER: <mode>,<keyp>,<disp>,<ind>,<bfr>
AT+CMER=?	Test command returns the range of supported values for parameters **<mode>, <keyp>, <disp>, <ind>, <bfr>**, in the format: +CMER: (list of supported <mode>s),(list of supported <keyp>s), (list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s)
Reference	3GPP TS 27.007

5.1.4.4.8 Select Phonebook Memory Storage - +CPBS

+CPBS - Select Phonebook Memory Storage		SELINT 2

AT+CPBS=
<storage>[,<password>]
	Set command selects phonebook memory storage **<storage>**, which will be used by other phonebook commands.
	
	Parameter:
	<storage>
	  "SM" - SIM phonebook
	  "FD" - SIM fixed dialing-phonebook (FDN)(only phase 2/2+ SIM)
	  "LD" - SIM last-dialing-phonebook **(+CPBF** is not applicable for this storage)
	  "MC" - device missed (unanswered received) calls list **(+CPBF** is not applicable for this storage)
	  "RC" - ME received calls list **(+CPBF** is not applicable for this storage).
	  "MB" - mailbox numbers stored on SIM; it is possible to select this storage only if the **mailbox** service is provided by the SIM (see **#MBN**).
	  "DC" - ME last-dialing-phonebook **(+CPBF** is not applicable for this storage).
	  "ME" - ME phonebook
	  "EN" – SIM emergency numbers phonebook **(+CPBW** and **+CPBF** not applicable for this storage).
	  "ON" - SIM own numbers (MSISDNs) phonebook **(+CPBF** is not applicable for this storage).
	  "SD" - SIM Service Dialling Numbers (SDN) phonebook **(+CPBW** is not applicable for this storage).
	
	<password>: string type value representing the PIN2-code required when selecting PIN2-code locked <storage> above "FD
	
	Note: If **"SM"** is the currently selected phonebook, selecting**"FD"** phonebook with "**AT+CPBS="FD"**" command simply selects the FDN as the phonebook upon which all subsequent **+CPBW, +CPBF** and **+CPBR** commands act; the command does not deactivate "SM" phonebook, and does not activate FDN
	
	Note: if **<password>** parameter is given, PIN2 will be verified, even if it is not required, i.e. it has already been inserted and verified during current session	

AT+CPBS?	Read command returns the actual values of the parameter **<storage>**, the number of occupied records **<used>** and the maximum index number **<total>**, in the format: **+CPBS: <storage>,<used>,<total>** Note: For **<storage>="MC"**: if there are more than one missed calls from the same number the read command will return only the last call	
AT+CPBS=?	Test command returns the supported range of values for the parameters **<storage>**.	

5.1.4.4.9 Read Phonebook Entries - +CPBR

+CPBR - Read Phonebook Entries		SELINT 2
AT+CPBR= <index1> [,<index2>]	Execution command returns phonebook entries in location number range **<index1>..<index2>** from the current phonebook memory storage selected with **+CPBS**. If **<index2>** is omitted, only location **<index1>** is returned. Parameters:	

+CPBR - Read Phonebook Entries		SELINT 2

	<index1> - integer type, value in the range of location numbers of the currently selected phonebook memory storage (see **+CPBS**).
	 <index2> - integer type, value in the range of location numbers of the currently selected phonebook memory storage (see **+CPBS**).
	
	 The response format is:
	 [+CPBR:
	 <index1>,**<number>**,**<type>**,**<text>**[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>]] **[<CR><LF>**
	 +CPBR:
	 <index2>,**<number>**,**<type>**,**<text>**[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>]] **[…]]]**
	
	 where:
	 <index*n***>** - the location number of the phonebook entry
	 <number> - string type phone number of format **<type>**
	 <type> - type of phone number octet in integer format
	   129 - national numbering scheme
	   145 - international numbering scheme (contains the character "**+**")
	 <text> - the alphanumeric text associated to the number; used character set should be the one selected with command **+CSCS.**
	 <group>: string type field of maximum length <glength> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
	 <adnumber>: additional number ; string type phone number of format <adtype>
	 <adtype>: type of address octet in integer format
	 <secondtext>: string type field of maximum length <slength> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
	 <email>: string type field of maximum length <elength> indicating an email address; character set as specified by command Select TE Character Set +CSCS
	 <hidden>: indicates if the entry is hidden or not
	 <u>0</u>: phonebook entry not hidden
	 1: phonebook entry hidden
	
	 Note: if "MC" is the currently selected phonebook memory storage, a sequence of missed calls coming from the same number will be saved as one missed call and **+CPBR** will show just one line of information.
	
	 Note: If all queried locations are empty (but available), no information text lines will be returned, while if listing fails in an **ME** error, **+CME ERROR: <err>** is returned.	

AT+CPBR=?	Test command returns the supported range of values for parameters **<index***n***>** and the maximum lengths of **<number>** , **<text>,** <group>, <secondtext> and <email> fields fields, in the format: **+CPBR: (<minIndex> -** **<maxIndex>)**,**<nlength>**,**<tlength>**,<glength>,<slength>,<elength> where: **<minIndex>** - the minimum **<index>** number, integer type **<maxIndex>**- the maximum **<index>** number, integer type **<nlength>** - maximum **<number>** field length, integer type **<tlength>** - maximum **<name>** field length, integer type <glength>: integer type value indicating the maximum length of field <group> <slength>: integer type value indicating the maximum length of field <secondtext>	

+CPBR - Read Phonebook Entries		SELINT 2

	<elength>: integer type value indicating the maximum length of field <email>
	
	 Note: the value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
	
	     1. if "SM" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension1** service
	
	     2. if "FD" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension2** service
	
	 if "MB" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension6** service	

Note	Remember to select the PB storage with **+CPBS** command before issuing PB commands.	
Reference	3GPP TS 27.007	

5.1.4.4.10   Find Phonebook Entries - +CPBF

+CPBF - Find Phonebook Entries		SELINT 2

AT+CPBF= <findtext>	Execution command returns phonebook entries (from the current phonebook memory storage selected with **+CPBS**) which alphanumeric field start with string **<findtext>**.
	
	 Parameter:
	 <findtext> - string type; used character set should be the one selected with command **+CSCS.**
	
	 The command returns a report in the form:
	
	 [+CPBF:
	 <index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>**]<CR><LF>**
	 +CPBF:
	 <index2>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>]**[…]]]**
	
	 where:
	 <index*n***>** - the location number of the phonebook entry
	 <number> - string type phone number of format **<type>**
	 <type> - type of phone number octet in integer format
	   129 - national numbering scheme
	   145 - international numbering scheme (contains the character "**+**")
	 <text> - the alphanumeric text associated to the number; used character set should be the one selected with command **+CSCS.**
	 <group>: string type field of maximum length <glength> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
	 <adnumber>: additional number ; string type phone number of format <adtype>
	 <adtype>: type of address octet in integer format
	 <secondtext>: string type field of maximum length <slength> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
	 <email>: string type field of maximum length <elength> indicating an email address; character set as specified by command Select TE Character Set +CSCS
	 <hidden>: indicates if the entry is hidden or not
	 <u>0</u>: phonebook entry not hidden
	 1: phonebook entry hidden
	
	 Note: **+CPBF** is not applicable if the current selected storage (see **+CPBS**) is either "MC", either "RC" or "LD".	

+CPBF - Find Phonebook Entries		SELINT 2
	Note: if **\<findtext\>=""** the command returns all the phonebook records. Note: if no PB records satisfy the search criteria then an **ERROR** message is reported..	

AT+CPBF=?	Test command reports the maximum lengths of **\<number\>** and **\<text\>** fields, in the format:
	
	+CPBF: \<nlength\>,\<tlength\>,\<glength\>,\<slength\>,\<elength\>
	
	where:
	\<nlength\> - maximum length of field **\<number\>**, integer type
	\<tlength\> - maximum length of field **\<text\>**, integer type
	\<glength\>: integer type value indicating the maximum length of field \<group\>
	\<slength\>: integer type value indicating the maximum length of field \<secondtext\>
	\<elength\>: integer type value indicating the maximum length of field \<email\>
	
	Note: the value of **\<nlength\>** could vary, depending on the availability of Extension service, in the following situations:
	    1. if "SM" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension1** service
	    2. if "FD" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension2** service
	if "MB" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension6** service	

Note	Remember to select the PB storage with **+CPBF** command before issuing PB commands.	
Reference	3GPP TS 27.007	

5.1.4.4.11   Write Phonebook Entry - +CPBW

+CPBW - Write Phonebook Entry		SELINT 2

AT+CPBW=
[\<index\>]
[,\<number\> [,\<type\>
[,\<text\>[,\<group\>[,\<adnumber\>[,\<adtype\>[
,\<secondtext\>[,\<email\>[,\<hidden\>]]]]]]]]]
	Execution command writes phonebook entry in location number **\<index\>** in the current phonebook memory storage selected with **+CPBS**.
	
	Parameters:
	\<index\> - integer type, value in the range of location numbers of the currently selected phonebook memory storage (see **+CPBS**).
	\<number\> - string type, phone number in the format **\<type\>**
	\<type\> - the type of number
	  129 - national numbering scheme
	  145 - international numbering scheme (contains the character "**+**")
	\<text\> - the text associated to the number, string type; used character set should be the one selected with command **+CSCS**.
	\<group\>: string type field of maximum length \<glength\> indicating a group the entry may belong to; character set as specified by command Select TE Character Set +CSCS
	\<adnumber\>: additional number ; string type phone number of format \<adtype\>
	\<adtype\>: type of address octet in integer format
	\<secondtext\>: string type field of maximum length \<slength\> indicating a second text field associated with the number; character set as specified by command Select TE Character Set +CSCS
	\<email\>: string type field of maximum length \<elength\> indicating an email address; character set as specified by command Select TE Character Set +CSCS
	\<hidden\>: indicates if the entry is hidden or not	

	<u>0</u>: phonebook entry not hidden 1: phonebook entry hidden Note: If record number **<index>** already exists, it will be overwritten. Note: if either **<number>**, **<type>** and **<text>** are omitted, the phonebook entry in location **<index>** is deleted. Note: if **<index>** is omitted or **<index>**=0, the number **<number>** is stored in the first free phonebook location. (example at+cpbw=0,"+390404192701",129,"Text" and at+cpbw=,"+390404192701",129,"Text") Note: if either "LD", "MC" or "RC" memory storage has been selected (see **+CPBS**) it is possible just to delete the phonebook entry in location **<index>**, therefore parameters **<number>**, **<type>** and **<text>** must be omitted. Note: before defining <group> string, it is recommended to check, with **#CPBGR** command, the predefined group names, that could be already stored in USIM in Grouping information Alpha String (GAS) file. If all records in such file are already occupied, **+CPBW** command will return **ERROR** when trying to use a new group name that is not in the predefined GAS names. To define a new custom group string, it is necessary to overwrite with it one of the old predefined strings, using **#CPBGW** command.

AT+CPBW=?	Test command returns location range supported by the current storage as a compound value, the maximum length of **<number>** field, supported number format of the storage and maximum length of **<text>** field. The format is:
	
	+CPBW: (list of supported <index>s),<nlength>,
	(list of supported <type>s),<tlength>>,<glength>,<slength>,<elength>
	
	where:
	<nlength> - integer type value indicating the maximum length of field **<number>**.
	<tlength> - integer type value indicating the maximum length of field **<text>**
	<glength>: integer type value indicating the maximum length of field <group>
	<slength>: integer type value indicating the maximum length of field <secondtext>
	<elength>: integer type value indicating the maximum length of field <email>
	
	Note: the value of **<nlength>** could vary, depending on the availability of Extension service, in the following situations:
	   1. if "SM" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension1** service
	   2. if "FD" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension2** service
	if "MB" memory storage has been selected (see **+CPBS**) and the **SIM** supports the **Extension6** service

Note	Remember to select the PB storage with **+CPBW** command before issuing PB commands.
Reference	3GPP TS 27.007

5.1.4.4.12 Clock Management - +CCLK

+CCLK - Clock Management		SELINT 2

AT+CCLK=<time>	Set command sets the real-time clock of the **ME**.
	
	Parameter:
	<time> - current time as quoted string in the format:
	"yy/MM/dd,hh:mm:ss±zz"
	  yy - year (two last digits are mandatory), range is 00..99
	  MM - month (two last digits are mandatory), range is 01..12
	  dd - day (two last digits are mandatory);
	    The range for dd(day) depends either on the month and on the year it refers to. Available ranges are:
	  (01..28)
	  (01..29)
	  (01..30)
	  (01..31)
	    Trying to enter an out of range value will raise an error
	
	  hh - hour (two last digits are mandatory), range is 00..23
	  mm - minute (two last digits are mandatory), range is 00..59
	  ss - seconds (two last digits are mandatory), range is 00..59
	  ±zz - time zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT; two last digits are mandatory), range is -96..+96.	

AT+CCLK?	Read command returns the current setting of the real-time clock, in the format <time>. Note: the three last characters of <time>, i.e. the time zone information, are returned by +CCLK? only if the #NITZ URC 'extended' format has been enabled (see #NITZ).	
AT+CCLK=?	Test command returns the OK result code.	
Example	AT+CCLK="02/09/07,22:30:00+00" OK AT+CCLK? +CCLK: "02/09/07,22:30:25" OK	

5.1.4.4.13 Alarm Management - +CALA

+CALA - Alarm Management		SELINT 2

AT+CALA=
<time>[,<n>[,<type>
[,<text>[,<recurr>
[,<silent>]]]]]
	Set command stores in the internal Real Time Clock an alarm time with respective settings. It is possible to set up a recurrent alarm for one or more days in the week.
	Currently just one alarm can be set.
	
	When the RTC time reaches the alarm time then the alarm starts, the behaviour of the MODULE depends upon the setting **<type>** and if the device was already ON at the moment when the alarm time had come.
	
	Parameters:
	<time> - current alarm time as quoted string
	  "" - (empty string) deletes the current alarm and resets all the **+CALA** parameters to the "factory default" configuration
	  "hh:mm:ss±zz" - format to be used only when issuing **+CALA** with parameter **<recurr>** too.
	  "yy/MM/dd,hh:mm:ss±zz" - generic format: it's the same as defined for **+CCLK** (see)
	<n> - index of the alarm
	  0 - The only value supported is 0.
	<type> - alarm behaviour type	

+CALA - Alarm Management		SELINT 2
	0 - reserved for other equipment use.	
	1 - the MODULE simply wakes up fully operative as if the ON/OFF button had been pressed. If the device is already ON at the alarm time, then it does nothing (default).	
	2 - the MODULE wakes up in "alarm mode" if at the alarm time it was off, otherwise it remains fully operative. In both cases the MODULE issues an unsolicited code every 3s:	
	+CALA: <text>	
	where **<text>** is the **+CALA** optional parameter previously set.	
	The device keeps on sending the unsolicited code every 3s until a **#WAKE** or **#SHDN** command is received or a 90 seconds timer expires. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s then it shuts down.	
	3 - the MODULE wakes up in "alarm mode" if at the alarm time it was off, otherwise it remains fully operative. In both cases the MODULE starts playing the alarm tone on the selected path for the ringer (see command **#SRP**)	
	The device keeps on playing the alarm tone until a **#WAKE** or **#SHDN** command is received or a 90 s time-out occurs. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s then it shuts down.	
	4 - the MODULE wakes up in "alarm mode" if at the alarm time it was off, otherwise it remains fully operative. In both cases the MODULE brings the pin GPIO6 high, provided its **<direction>** has been set to alarm output, and keeps it in this state until a **#WAKE** or **#SHDN** command is received or a 90 seconds timer expires. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s then it shuts down.	
	5 - the MODULE will make both the actions as for type=2 and **<type>=3**.	
	6 - the MODULE will make both the actions as for type=2 and **<type>=4**.	
	7 - the MODULE will make both the actions as for type=3 and **<type>=4**.	
	8 - the MODULE wakes up in "alarm mode" if at the alarm time it was off, otherwise it remains fully operative. In both cases the MODULE sets **High** the **RI** output pin. The **RI** output pin remains **High** until next **#WAKE** issue or until a 90s timer expires. If the device is in "alarm mode" and it does not receive the **#WAKE** command within 90s. After that it shuts down.	
	<text> - unsolicited alarm code text string. It has meaning only if **<type>** is equal to 2 or 5 or 6.	
	<recurr> - string type value indicating day of week for the alarm in one of the following formats:	
	"<1..7>[,<1..7>[, …]]" - it sets a recurrent alarm for one or more days in the week; the digits 1 to 7 corresponds to the days in the week (Monday is 1).	
	"0" - it sets a recurrent alarm for all days in the week.	
	<silent> - integer type indicating if the alarm is silent or not.	
	0 - the alarm will not be silent;	
	1 - the alarm will be silent.	
	During the "alarm mode" the device will not make any network scan and will not register to any network and therefore is not able to dial or receive any call or SMS, the only commands that can be issued to the MODULE in this state are the **#WAKE** and **#SHDN**, every other command must not be issued during this state.	
AT+CALA?	Read command returns the list of current active alarm settings in the ME, in the format:	
	[+CALA: <time>,<n>,<type>,[<text>],<recurr>,<silent>]	

+CALA - Alarm Management		SELINT 2
AT+CALA=?	Test command returns the list of supported index values (currently just 0), alarm types, maximum length of the text to be displayed, maximum length of **<recurr>** and supported **<silent>**s, in the format: **+CALA: (list of supported <n>s),(list of supported <type>s),<tlength>, <rlength>,(list of supported <silent>s)**	
Example	AT+CALA="02/09/07,23:30:00+00" OK	

5.1.4.4.14   Delete Alarm - +CALD

+CALD - Delete Alarm		SELINT 2
AT+CALD=<n>	Execution command deletes an alarm in the ME Parameter: **<n>** - alarm index 0	
AT+CALD=?	Test command returns the OK result code. Test command reports the range of supported values for **<n>** parameter.	

5.1.4.4.15   Postpone alarm - +CAPD

+CAPD – postpone or dismiss an alarm		SELINT 2
AT+CAPD=[<sec>]	Set command postpones or dismisses a currently active alarm. Parameters: **<sec>**: integer type value indicating the number of seconds to postpone the alarm (maximum 60 seconds). If <sec> is set to 0 (default), the alarm is dismissed.	
AT+CAPD=?	Test command reports the supported range of values for parameter **<sec>**	

5.1.4.4.16   Setting date format - +CSDF

+CSDF – setting date format		SELINT 2
AT+CSDF=[<mode> [,<auxmode>]]	This command sets the date format of the date information presented to the user, which is specified by use of the **<mode>** parameter. The **<mode>** affects the date format on the phone display and doesn't affect the date format of the AT command serial interface, so it not used. The command also sets the date format of the TE-TA interface, which is specified by use of the **<auxmode>** parameter (i.e., the **<auxmode>** affects the **<time>** of AT+CCLK and AT+CALA). If the parameters are omitted then this sets the default value of **<mode>**. Parameters: **<mode>:** 1 DD-MMM-YYYY (default) 2 DD-MM-YY 3 MM/DD/YY 4 DD/MM/YY 5 DD.MM.YY 6 YYMMDD	

	7 YY-MM-DD
	<auxmode>: 1 yy/MM/dd (default) 2 yyyy/MM/dd Note: The <time> format of +CCLK and +CALA is "yy/MM/dd,hh:mm:ss+zz" when <auxmode>=1 and it is "yyyy/MM/dd,hh:mm:ss+zz" when <auxmode>=2.
AT+CSDF?	Read command reports the currently selected **<mode>** and **<auxmode>** in the format: **+CSDF: <mode>,<auxmode>**
AT+CSDF=?	Test command reports the supported range of values for parameters **<mode>** and **<auxmode>**

5.1.4.4.17   Setting time format - +CSTF

+CSTF – setting time format	SELINT 2
AT+CSTF=[<mode>]	This command sets the time format of the time information presented to the user, which is specified by use of the **<mode>** parameter. The **<mode>** affects the time format on the phone display and doesn't affect the time format of the AT command serial interface, so it not actually not used. Parameters: **<mode>:** 1 HH:MM (24 hour clock; default) 2 HH:MM a.m./p.m.
AT+CSTF?	Read command reports the currently selected <mode> in the format: **+CSTF: <mode>**
AT+CSTF=?	Test command reports the supported range of values for parameter **<mode>**

5.1.4.4.18   Time Zone reporting - +CTZR

+CTZR – Time Zone reporting	SELINT 2
AT+CTZR=<onoff>	This command enables and disables the time zone change event reporting. If the reporting is enabled the MT returns the unsolicited result code +CTZV: <tz> whenever the time zone is changed. Parameters: **<onoff>:** 0 Disable time zone change event reporting (default) 1 Enable time zone change event reporting
AT+CTZR?	Read command reports the currently selected **<onoff>** in the format: **+CTZR: <onoff>**
AT+CTZR=?	Test command reports the supported range of values for parameter **<onoff>**

5.1.4.4.19 Automatic Time Zone update - +CTZU

+CTZU – automatic Time Zone update	SELINT 2
AT+CTZU=<onoff>	This command enables and disables automatic time zone update via NITZ. Parameters: **<onoff>:** 0 Disable automatic time zone update via NITZ (default) 1 Enable automatic time zone update via NITZ Note: despite of the name, the command AT+CTZU=1 enables automatic update of the date and time set by AT+CCLK command (not only time zone). This happens when a Network Identity and Time Zone (NITZ) message is sent by the network. This command is the ETSI standard equivalent of Telit custom command AT#NITZ=1. If command AT+CTZU=1, or AT#NITZ=1 (or both) has been issued, NITZ message will cause a date and time update.
AT+CTZU?	Read command reports the currently selected **<onoff>** in the format: **+CTZU: <onoff>**
AT+CTZU=?	Test command reports the supported range of values for parameter **<onoff>**

5.1.4.4.20 Restricted SIM Access - +CRSM

+CRSM - Restricted SIM Access	SELINT 2

AT+CRSM=
<command>
[,<fileid>
[,<P1>,<P2>,<P3>
[,<data>]]]
	Execution command transmits to the **ME** the SIM **<command>** and its required parameters. **ME** handles internally all **SIM-ME** interface locking and file selection routines. As response to the command, **ME** sends the actual SIM information parameters and response data.
	
	Parameters:
	<command> - command passed on by the **ME** to the SIM
	  176 - READ BINARY
	  178 - READ RECORD
	  192 - GET RESPONSE
	  214 - UPDATE BINARY
	  220 - UPDATE RECORD
	  242 - STATUS
	
	<fileid> - identifier of an elementary data file on SIM. Mandatory for every command except STATUS.
	
	<P1>,<P2>,<P3> - parameter passed on by the **ME** to the SIM; they are mandatory for every command except GET RESPONSE and STATUS
	  0..255
	
	<data> - information to be read/written to the SIM (hexadecimal character format).
	
	The response of the command is in the format:
	
	+CRSM: <sw1>,<sw2>[,<response>]
	
	where:

+CRSM - Restricted SIM Access		SELINT 2
	<sw1>,**<sw2>** - information from the SIM about the execution of the actual command either on successful or on failed execution. **<response>** - on a successful completion of the command previously issued it gives the requested data (hexadecimal character format). It's not returned after a successful UPDATE BINARY or UPDATE RECORD command. Note: use only decimal numbers for parameters **<command>**, **<fileid>**, **<P1>**, **<P2>** and **<P3>**.	
AT+CRSM=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007, GSM 11.11	

5.1.4.4.21 Generic SIM access - +CSIM

+CSIM – Generic SIM access		SELINT 2
AT+CSIM=<lock>	Between two successive +CSIM command the SIM-ME interface must be locked to avoid commands can modify wrong SIM file. The locking and unlocking of the SIM-ME interface must be done explicitly respectively at the beginning and at the end of the +CSIM commands sequence. Parameters: **<lock>**=1 locking of the interface **<lock>**=0 unlocking of the interface In case that TE application does not use the unlock command in a certain timeout value, ME releases the locking.	
AT+CSIM=<length>,<command>	The ME shall send the **<command>** as it is to the SIM/UICC. As response to the command, ME sends back the actual SIM/UICC **<response>** to the TA as it is. Parameters: **<lenght>**: number of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response) **<command>**: command passed on by the ME to the SIM/UICC in the format as described in GSM TS 11.11 or 3G TS 31.101 (hexadecimal character format) The response of the command is in the format: **+CSIM: <length>,<response>** where: **<response>** : response to the command passed on by the SIM to the ME in the format as described in GSM TS 11.11 or 3G TS 31.101 (hexadecimal character format). Error case: *+CME ERROR: <err>* possible <err> values (numeric format followed by verbose format): 3 operation not allowed *(operation mode is not allowed by the ME, wrong interface lock/unlock status)* 4 operation not supported *(wrong format or parameters of the command)* 13 SIM failure *(SIM no response)*	
AT+CSIM=?	Test command returns the **OK** result code	
Example	*Lock SIM interface* **AT+CSIM=1** **OK**	

2G SIM (TS 11.11):
AT#ENAUSIM?
+ENAUSIM: 0

OK

STATUS
AT+CSIM=10,A0F2000016
+CSIM:48,"000002A87F20020000000000099300220800838A838A9000"

OK

SELECT EF 6F07
AT+CSIM=14,A0A40000026F07
+CSIM: 4,"9F0F"

OK

GET RESPONSE
AT+CSIM=10,A0C000000F
+CSIM: 34,"000000096F0704001A001A010200009000"

OK

SELECT EF 6F30
AT+CSIM=14,A0A40000026F30
+CSIM: 4,"9F0F"

OK

READ BINARY
AT+CSIM=10,A0B00000FC
+CSIM:508,"FFFFFF1300831300901300541300301300651300381300801
3018013000113110913013013009813007713005913004313008113009513
0140130023130016330420130041FFFFFFFFFFFF21436542F41922F28
822F201FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
FFFFFFFFFFFF9000"

OK

3G UICC (3G TS 31.101):

AT#ENAUSIM?
+ENAUSIM: 1

OK

STATUS
AT+CSIM=10,A0F2000016
+CME ERROR: operation not supported

STATUS
AT+CSIM=10,80F2000016
+CSIM:48,"623F8202782183027FF08410A0000000871002FFFFFF9000"

OK

	SELECT EF 6F07 No Data Returned AT+CSIM=18,00A4080C047F206F07 +CSIM: 4,"9000" OK *SELECT EF 6F30 Return FCP Template* AT+CSIM=18,00A40804047F206F30 +CSIM: 4,"6120" OK *GET RESPONSE* AT+CSIM=10,00C0000020 +CSIM:68,"621E8202412183026F30A506C00140DE01008A01058B036F0 6048002006988009000" OK *READ BINARY* AT+CSIM=10,00B0000069 +CSIM:214,"02F81012F47022F83082F63082F64022F60192F31412F6031 3006132F40102F20162 F21032F23002F60182F41012F91042F41902F46102F40242F22092F5207 2F22062F03062F86032F0 1032F11042F01032F80217F60127F42027F43027F44027F24337F62037F 0209000" OK ***Unlock SIM interface*** **AT+CSIM=0** **OK**
Note	After the locking of the SIM-ME interface (AT+CSIM=1) the SIM will be accessible only by AT+CSIM commands (#QSS: 0). The GSM and GPRS services will be automatically deregistered to avoid the TE commands alter the GSM application. They will be automatically reconditioned after the unlocking of the SIM-ME interface. After the unlocking of the SIM-ME interface if PIN is required it will be necessary to enter it another time.

5.1.4.4.22   Alert Sound Mode - +CALM

+CALM - Alert Sound Mode	SELINT 2
AT+CALM= <mode>	Set command is used to select the general alert sound mode of the device. Parameter: **<mode>** 0 - normal mode 1 - silent mode; no sound will be generated by the device, except for alarm sound 2 - stealth mode; no sound will be generated by the device Note: if silent mode is selected then incoming calls will not produce alerting sounds but only the unsolicited messages **RING** or **+CRING**.
AT+CALM?	Read command returns the current value of parameter **<mode>**.

+CALM - Alert Sound Mode		SELINT 2
AT+CALM=?	Test command returns the supported values for the parameter **<mode>** as compound value. **+CALM: (0-2)**	
Reference	3GPP TS 27.007	

5.1.4.4.23   Ringer Sound Level - +CRSL

+CRSL - Ringer Sound Level		SELINT 2

AT+CRSL=<level>	Set command is used to select the incoming call ringer sound level of the device.
	
	Parameter:
	<level> - ringer sound level
	  0 - Off
	  1 - low
	  2 - middle
	  3 - high
	  4 - progressive	

AT+CRSL?	Read command reports the current **<level>** setting of the call ringer in the format: **+CRSL: <level>**	
AT+ CRSL=?	Test command reports **<level>** supported values as compound value. **+CRSL: (0-4)**	
Reference	3GPP TS 27.007	

5.1.4.4.24   Loudspeaker Volume Level - +CLVL

+CLVL - Loudspeaker Volume Level		SELINT 2
AT+CLVL=<level>	Set command is used to select the volume of the internal loudspeaker audio output of the device. Parameter: **<level>** - loudspeaker volume 0..*max* - the value of *max* can be read by issuing the Test command **AT+CLVL=?**	
AT+CLVL?	Read command reports the current **<level>** setting of the loudspeaker volume in the format: **+CLVL: <level>**	
AT+ CLVL=?	Test command reports **<level>** supported values range in the format: **+CLVL: (0-*max*)**	
Reference	3GPP TS 27.007	

5.1.4.4.25   Microphone Mute Control - +CMUT

+CMUT - Microphone Mute Control		SELINT 2

AT+CMUT=<n>	Set command enables/disables the muting of the microphone audio line during a voice call.
	
	Parameter:
	<n>
	  0 - mute off, microphone active (factory default)
	  1 - mute on, microphone muted.
	
	Note: this command mutes/activates both microphone audio paths, internal mic and external mic.	

+CMUT - Microphone Mute Control		SELINT 2
AT+CMUT?	Read command reports whether the muting of the microphone audio line during a voice call is enabled or not, in the format: **+CMUT: <n>**	
AT+ CMUT=?	Test command reports the supported values for **<n>** parameter.	
Reference	3GPP TS 27.007	

5.1.4.4.26   Silence command - +CSIL

+CSIL – silence command		SELINT 2
AT+CSIL=[<mode>]	This command enables/disables the silent mode. When the phone is in silent mode, all signalling tones from MT are suppressed. Parameters: **<mode>:** 0 Silent mode off (default) 1 Silent mode on	
AT+CSIL?	Read command reports the currently selected **<mode>** in the format: **+CSIL: <mode>**	
AT+ CSIL=?	Test command reports the supported range of values for parameter **<mode>**	
Reference	3GPP TS 27.007	

5.1.4.4.27 Accumulated Call Meter - +CACM

+CACM - Accumulated Call Meter		SELINT 2
AT+CACM= [<pwd>]	Set command resets the Advice of Charge related Accumulated Call Meter stored in SIM (ACM): it contains the total number of home units for both the current and preceding calls. Parameter: **<pwd>** - to access this command PIN2; if PIN2 has been already input once after startup, it is required no more	
AT+CACM?	Read command reports the current value of the SIM ACM in the format: **+CACM: <acm>** where: **<acm>** - accumulated call meter in home units, string type: three bytes of the ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) Note: the value **<acm>** is in home units; price per unit and currency are defined with command **+CPUC**	
AT+CACM=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007	

5.1.4.4.28 Accumulated Call Meter Maximum - +CAMM

+CAMM - Accumulated Call Meter Maximum		SELINT 2
AT+CAMM= [<acmmax> [,<pwd>]]	Set command sets the Advice of Charge related Accumulated Call Meter Maximum Value stored in SIM (ACMmax). This value represents the maximum number of home units allowed to be consumed by the subscriber. When ACM reaches **<acmmax>** value further calls are prohibited. Parameter: **<acmmax>** - ACMmax value, integer type: it is the maximum number of home units allowed to be consumed by the subscriber. **<pwd>** - PIN2; if PIN2 has been already input once after startup, it is required no more Note: **<acmmax>** = 0 value disables the feature.	
AT+CAMM?	Read command reports the ACMmax value stored in SIM in the format: **+CAMM : <acmm>** where: **<acmm>** - ACMmax value in home units, string type: three bytes of the ACMmax value in hexadecimal format (e.g. "00001E" indicates decimal value 30)	
AT+CAMM=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007	

5.1.4.4.29 Price per Unit and Currency Table - +CPUC

+CPUC - Price Per Unit And Currency Table		SELINT 2
AT+CPUC= <currency>, <ppu>[,<pwd>]	Set command sets the values of Advice of Charge related Price per Unit and Currency Table stored in SIM (PUCT). The PUCT information can be used to convert the home units (as used in commands **+CAOC**, **+CACM** and **+CAMM**) into currency units. Parameters: **<currency>** - string type; three-character currency code (e.g. "LIT", "L. ", "USD", "DEM" etc..); used character set should be the one selected with command **+CSCS**. **<ppu>** - price per unit, string type (dot is used as decimal separator) e.g. "1989.27" **<pwd>** - SIM PIN2; if PIN2 has been already input once after startup, it is required no more	
AT+CPUC?	Read command reports the current values of **<currency>** and **<ppu>** parameters in the format: **+CPUC : <currency>,<ppu>**	
AT+CPUC=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007	

5.1.4.4.30 Call meter maximum event - +CCWE

+CCWE – Call Meter maximum event		SELINT 2
AT+CCWE=<mode>	Set command is used to enable/disable sending of an unsolicited result code +CCWV shortly before the ACM (Accumulated Call Meter) maximum value is reached. The warning is issued approximately when 30 seconds call time remains. It is also issued when starting a call if less than 30 seconds call time remains. Parameters: **<mode>:** 0 Disable the call meter warning event (default) 1 Enable the call meter warning event Note: the set command will respond with an error if the Accumulated Call Meter service is not active in SIM	
AT+CCWE?	Read command reports the currently selected <mode> in the format: **+CCWE: <mode>**	
AT+CCWE=?	Test command reports the supported range of values for parameter **<mode>**	
Reference	3GPP TS 27.007	

5.1.4.4.31 Set voice mail number - +CSVM

+CSVM – Set Voice Mail Number		SELINT 2

AT+CSVM=<mode>[,<number>[,<type>]]	The number to the voice mail server is set with this command. The parameters **<number>** and **<type>** can be left out if the parameter **<mode>** is set to 0.
	
	Parameters:
	<mode>
	  0 – disable the voice mail number
	  1 – enable the voice mail number (factory default)
	<number> - string type phone number of format specified by **<type>**	

+CSVM – Set Voice Mail Number		SELINT 2

	<type> - type of address octet in integer format
	  129 - unknown type of number and ISDN/Telephony numbering plan
	  145 - international type of number and ISDN/Telephony
	  numbering plan (contains the character "**+**")
	
	Note: Set command is dummy. It only checks for parameters values validity; it does not send any actual write request to SIM to update voice mail number, nor sends any request to network to enable/disable voice mail..	

AT+CSVM?	Read command returns the currently selected voice mail number and the status (i.e. enabled/disabled) in the format **+CSVM:<mode>,<number>,<type>**	
AT+CSVM=?	Test command reports the range for the parameters **<mode>** and **<type>**.	

5.1.4.4.32   Available AT Commands - +CLAC

+CLAC - Available AT Commands		SELINT 2
AT+CLAC	Execution command causes the ME to return the AT commands that are available for the user, in the following format: **<AT cmd1>[<CR><LF><AT cmd2>[…]]** where: **<AT cmd*n*>** - defines the AT command including the prefix **AT**	
AT+CLAC=?	Test command returns the **OK** result code	
Reference	3GPP TS 27.007	

5.1.4.4.33   Master reset - +CMAR

+CMAR – Master Reset		SELINT 2
AT+CMAR=< phone lock code>	This command requests the MT to reset user data. The user data in the phone will be reset to default values. Parameters: **<phone lock code>** - string type representing an 8 digits security code. It must be verified before performing the master reset. Note: issuing the command will cause an NVM and filesystem formatting. After the formatting is completed the module will automatically reboot. To not interfere with the formatting process, it is strongly recommended to issue an AT+CFUN=4 command before starting to format.	
AT+CMAR=?	Test command tests for command existence.	

5.1.4.4.34 Open Logical Channel - +CCHO

+CCHO – Open Logical Channel		SELINT 2
AT+CCHO=<dfname>	Execution of the command causes the MT to return <sessionid> to allow the TE to identify a channel that is being allocated by the currently selected UICC, which is attached to ME. The currently selected UICC will open a new logical channel; select the application identified by the <dfname> received with this command and return a session Id as the response. The ME shall restrict the communication between the TE and the UICC to this logical channel. This <sessionid> is to be used when sending commands with Restricted UICC Logical Channel access +CRLA or Generic UICC Logical Channel access +CGLA commands. Parameter: <dfname> : all selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes The response of the command is in the format: +CCHO: < sessionid > where: <sessionid> integer type; a session Id to be used in order to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism See 3GPP TS 31.101 for more information about defined values. Note: The logical channel number is contained in the CLASS byte of an APDU command, thus implicitly contained in all APDU commands sent to a UICC. In this case it will be up to the MT to manage the logical channel part of the APDU CLASS byte and to ensure that the chosen logical channel is relevant to the <sessionid> indicated in the AT command. See 3GPP TS 31.101 for further information on logical channels in APDU commands protocol.	
AT+CCHO=?	Test command returns the **OK** result code.	

5.1.4.4.35 Close Logical Channel - +CCHC

+CCHC – Close Logical Channel		SELINT 2
AT+CCHC=<sessionid>	This command asks the ME to close a communication session with the active UICC. The ME shall close the previously opened logical channel. The TE will no longer be able to send commands on this logical channel. The UICC will close the logical channel when receiving this command. Parameter: <sessionid> : integer type; a session Id to be used in order to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism.	
AT+CCHC=?	Test command returns the **OK** result code.	

5.1.4.4.36 Generic UICC Logical Channel Access - +CGLA

+CGLA – Generic UICC Logical Channel Access		SELINT 2
AT+CGLA=<sessionid>,<length>,<command>	Set command transmits to the MT the <command> it then shall send as it is to the selected UICC. In the same manner the UICC <response> shall be sent back by the MT to the TA as it is.	

	This command allows a direct control of the currently selected UICC by a distant application on the TE. The TE shall then take care of processing UICC information within the frame specified by GSM/UMTS.
	Parameter: **<sessionid>** : integer type; this is the identifier of the session to be used in order to send the APDU commands to the UICC. It is mandatory in order to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0") **<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) **<command>** : command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 (hexadecimal character format; refer +CSCS) The response of the command is in the format: **+CGLA: <length>,<response>** where: **<response>** : response to the command passed on by the SIM to the ME in the format as described in GSM TS 11.11 or 3G TS 31.101 (hexadecimal character format). See 3GPP TS 31.101 for more information about defined values.
AT+CGLA=?	Test command returns the **OK** result code.

5.1.4.5 Mobile Equipment Errors

5.1.4.5.1 Report Mobile Equipment Error - +CMEE

+CMEE - Report Mobile Equipment Error		**SELINT 2**

AT+CMEE=[<n>]	Set command enables/disables the report of result code:
	
	+CME ERROR: <err>
	
	as an indication of an error relating to the **+Cxxx** commands issued.
	
	When enabled, device related errors cause the **+CME ERROR: <err>** final result code instead of the default **ERROR** final result code. **ERROR** is anyway returned normally when the error message is related to syntax, invalid parameters, or **DTE** functionality.
	
	Parameter:
	<n> - enable flag
	  0 - disable **+CME ERROR:<err>** reports, use only **ERROR** report.
	  1 - enable **+CME ERROR:<err>** reports, with **<err>** in numeric format
	  2 - enable **+CME ERROR: <err>** reports, with **<err>** in verbose format	

AT+CMEE?	Read command returns the current value of subparameter **<n>**: **+CMEE: <n>**	
AT+CMEE=?	Test command returns the range of values for subparameter **<n>**	
Note	**+CMEE** has no effect on the final result code **+CMS**	
Reference	3GPP TS 27.007	

5.1.4.6   Voice Control

5.1.4.6.1   DTMF Tones Transmission - +VTS

+VTS - DTMF Tones Transmission		SELINT 2

AT+VTS=
<dtmfstring>
[,duration]
	Execution command allows the transmission of DTMF tones.
	
	Parameters:
	<dtmfstring> - string of <dtmf>s, i.e. ASCII characters in the set (0 9), #,*,(A D),P; it allows the user to send a sequence of DTMF tones, each of them with a duration that was defined through +VTD command.
	<duration> - duration of a tone in 1/100 sec.; this parameter can be specified only if the length of first parameter is just one ASCII character
	  0 - a single DTMF tone will be transmitted for a duration depending on the network, no matter what the current +VTD setting is.
	  1..255 - a single DTMF tone will be transmitted for a time <duration> (in 10 ms multiples), no matter what the current +VTD setting is.
	
	Note: this commands operates in voice mode only (see +FCLASS).
	
	Note: the character P does not correspond to any DTMF tone, but it is interpreted as a pause of 3 seconds between the preceding and succeeding DTMF string elements	

AT+VTS=?	Test command provides the list of supported **<dtmf>s** and the list of supported **<duration>s** in the format: **(list of supported <dtmf>s)[,(list of supported <duration>s)]**	
Reference	3GPP TS 27.007 and TIA IS-101	

5.1.4.6.2   Tone Duration - +VTD

+VTD - Tone Duration		SELINT 2

AT+VTD=
<duration>
	Set command sets the length of tones transmitted with **+VTS** command.
	
	Parameter:
	<duration> - duration of a tone
	  0 - the duration of every single tone is dependent on the network (factory default)
	  1..255 - duration of every single tone in 1/10 sec.
	
	NOTE: the default value for NA products is 2.	

AT+VTD?	Read command reports the current Tone Duration, in the format: **<duration>**	
AT+VTD=?	Test command provides the list of supported **<duration>s** in the format: **(list of supported <duration>s)**	
Reference	3GPP TS 27.007 and TIA IS-101	

5.1.4.7   Commands for Packet Domain

5.1.4.7.1   GPRS Mobile Station Class - +CGCLASS

+CGCLASS - GPRS mobile station class		SELINT 2
AT+CGCLASS= [<class>]	Set command sets the GPRS class according to **<class>** parameter. Parameter: **<class>** - GPRS class "A" - UMTS "B" - GSM/GPRS (factory default) "CG" - class C in GPRS only mode (GPRS only) "CC" - class C in circuit switched only mode (GSM only) Note: the setting is saved in NVM (and available on following reboot).	
AT+CGCLASS?	Read command returns the current value of the GPRS class in the format: **+CGLASS: <class>**	
AT+CGCLASS=?	Test command reports the range for the parameter **<class>**	
Reference	3GPP TS 27.007	

5.1.4.7.2   GPRS Attach Or Detach - +CGATT

+CGATT -PS Attach Or Detach		SELINT 2
AT+CGATT=[<state>]	Execution command is used to attach the terminal to, or detach the terminal from, the Packet Domain service depending on the parameter **<state>**. Parameter: **<state>** - state of Packet Domain attachment 0 - detached 1 - attached	
AT+CGATT?	Read command returns the current Packet Domain service state.	
AT+CGATT=?	Test command requests information on the supported Packet Domain service states.	
Example	AT+CGATT? +CGATT: 0 OK AT+CGATT=? +CGATT: (0,1) OK AT+CGATT=1 OK	
Reference	3GPP TS 27.007	

5.1.4.7.3   Packet Domain Event Reporting - +CGEREP

+CGEREP - Packet Domain Event Reporting		SELINT 2
AT+CGEREP= [<mode>[,<bfr>]]	Set command enables or disables sending of unsolicited result codes **+CGEV: XXX** (see below) from **TA** to **TE** in the case of certain events occurring in the **TA** or the network. Parameters: **<mode>** - controls the processing of **URCs** specified with this command	

	0 - Buffer unsolicited result codes in the **TA**. If **TA** result code buffer is full, the oldest one can be discarded. No codes are forwarded to the **TE**.
	1 - Discard unsolicited result codes when **TA-TE** link is reserved (e.g. in on-line data mode); otherwise forward them directly to the **TE**.
	2 - Buffer unsolicited result codes in the **TA** when **TA-TE** link is reserved (e.g. in on-line data mode) and flush them to the **TE** when **TA-TE** link becomes available; otherwise forward them directly to the **TE**.
	<bfr> - controls the effect on buffered codes when **<mode> 1** or **2** is entered:
	0 - **TA** buffer of unsolicited result codes defined within this command is cleared when **<mode>=1** or **2** is entered.
	1 - **TA** buffer of unsolicited result codes defined within this command is flushed to the **TE** when **<mode>=1** or **2** is entered (**OK** response shall be given before flushing the codes)
	Unsolicited Result Codes
	The following unsolicited result codes and the corresponding events are defined:
	+CGEV: REJECT <PDP_type>, <PDP_addr>
	A network request for PDN connection activation occurred when the **TA** 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 **TA**
	+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 **TA**
	+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 **TA**
	+CGEV: NW DETACH
	The network has forced a PS 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: ME CLASS <class>
	The mobile equipment has forced a change of MS class. The highest available class is reported (see **+CGCLASS**)
AT+CGEREP?	Read command returns the current <mode> and <bfr> settings, in the format: **+CGEREP: <mode>,<bfr>**
AT+CGEREP=?	Test command reports the supported range of values for the **+CGEREP** command parameters.
Reference	3GPP TS 27.007

5.1.4.7.4 Network Registration Status - +CGREG

+CGREG - GPRS Network Registration Status		SELINT 2

AT+CGREG=[<n>]	Set command controls the presentation of an unsolicited result code **+CGREG: (see format below)**.
	
	Parameter:
	<n> - result code presentation mode
	 0 - disable network registration unsolicited result code
	 1 - enable network registration unsolicited result code; if there is a change in the terminal GPRS network registration status, it is issued the unsolicited result code:
	
	+CGREG: <stat>
	
	where:
	<stat> - registration status
	 0 - not registered, terminal is not currently searching a new operator to register to
	 1 - registered, home network
	 2 - not registered, but terminal is currently searching a new operator to register to
	 3 - registration denied
	 4 - unknown
	 5 - registered, roaming
	 2 - enable network registration and location information unsolicited result code; if there is a change of the network cell, it is issued the unsolicited result code:
	
	+CGREG: <stat>[,<lac>,<ci>[,<AcT>,<rac>]]
	
	where:
	<stat> - registration status (see above for values)
	<lac> - Local Area Code (when <AcT> indicates value 0 to 6) or tracking area code (when <AcT> indicates value 7)
	<ci> - cell ID in hexadecimal format.
	<AcT>: access technology of the registered network:
	   0 GSM
	   2 UTRAN
	   3 GSM w/EGPRS
	   4 UTRAN w/HSDPA
	   5 UTRAN w/HSUPA
	   6 UTRAN w/HSDPA and HSUPA
	
	<rac>: string type; one byte routing area code in hexadecimal format
	
	Note: **<lac>, <Ci>, <AcT>** and **<rac>** are reported only if **<mode>=2** and the mobile is registered on some network cell.

AT+CGREG?	Read command returns the status of result code presentation mode **<n>** and the integer **<stat>** which shows whether the network has currently indicated the registration of the terminal in the format: **+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]]** Note: **<lac>, <Ci>, <AcT>** and **<rac>** are reported only if **<mode>=2** and the mobile is registered on some network cell.
AT+CGREG=?	Test command returns supported values for parameter **<n>**
Reference	3GPP TS 27.007

+CEREG – EPS network registration status		SELINT 2

+CEREG=[<n>]	Set command controls the presentation of an unsolicited result code **+CEREG: (see format below)**.
	
	Parameter:
	<n> - result code presentation mode
	  0 - disable network registration unsolicited result code
	  1 - enable network registration unsolicited result code; if there is a change in the terminal EPS network registration status, it is issued the unsolicited result code:
	
	+CEREG: <stat>
	
	<stat> - registration status
	  0 - not registered, terminal is not currently searching a new operator to register to
	  1 - registered, home network
	  2 - not registered, but terminal is currently searching a new operator to register to
	  3 - registration denied
	  4 - unknown
	  5 - registered, roaming
	
	  2 - enable network registration and location information unsolicited result code; if there is a change of the network cell in E-UTRAN, it is issued the unsolicited result code:
	
	+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]
	
	where:
	<stat> - registration status (see above for values)
	<tac>: string type; two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).
	<ci>: string type; four byte E-UTRAN cell ID in hexadecimal format.
	<AcT>: integer type; indicates the access technology of the serving cell.
	  7 - E-UTRAN
	
	Note:
	If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the +CREG command and +CREG: result codes and/or the +CGREG command and +CGREG: result codes apply to the registration status and location information for those services.	

+CEREG?	Read command returns the status of result code presentation mode **<n>** and the integer **<stat>** which shows whether the network has currently indicated the registration of the terminal in the format: **+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]** Note: **<tac>, <ci>,** and **<AcT>** are reported only if **<n>=2** and the mobile is registered on some network cell.	
+CEREG=?	Test command returns supported values for parameter **<n>**.	
Reference	3GPP TS 27.007	

5.1.4.7.6 Define PDP context- +CGDCONT

+CGDCONT - Define PDP context		SELINT 2

AT+CGDCONT= [<cid> [,<PDP_type> [,<APN> [,<PDP_addr> [,<d_comp> [,<h_comp> [,<IPv4AddrAlloc>[,<e mergency_indication >[,<P-CSCF_discovery>[,<I M_CN_Signalling_Fla g_Ind>]]]]]]]]]]	Set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, **<cid>**
	
	 Parameters:
	 <cid> - (PDP Context Identifier) numeric parameter which specifies a particular PDP context definition.
	    1..*max* - where the value of *max* is returned by the Test command
	 <PDP_type> - (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol
	    "IP" - Internet Protocol
	    "IPV6" - Internet Protocol version 6
	 "IPV4V6" - Virtual <PDP_type> introduced to handle dual IP stack UE capability
	 <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. If the value is empty ("") or omitted, then the subscription value will be requested.
	 <PDP_addr> - a string parameter that identifies the terminal in the address space applicable to the PDP. The allocated address may be read using the **+CGPADDR** command.
	 <d_comp> - numeric parameter that controls PDP data compression
	    0 - off
	 <h_comp> - numeric parameter that controls PDP header compression
	    0 - off (default if value is omitted)
	    1 – on
	    2 - RFC1144 (applicable for SNDCP only)
	    3- RFC2507
	    4- RFC3095 (applicable for PDCP only)
	
	 <IPv4AddrAlloc> - a numeric parameter that controls how the MT/TA requests to get the IPv4 address information
	    0 - IPv4 Address Allocation through NAS Signalling (default)
	    1 - IPv4 Address Allocated through DHCP
	
	 <emergency_indication> - a numeric parameter used to indicate whether the PDP context is for emergency bearer services or not.
	 0 - PDP context is not for emergency bearer services (default)
	 1 - PDP context is for emergency bearer services
	
	 <P-CSCF_discovery> - a numeric parameter that influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 [89] annex B and annex L.
	 0 - Preference of P-CSCF address discovery not influenced by +CGDCONT (default)
	 1 - Preference of P-CSCF address discovery through NAS Signalling
	
	 <IM_CN_Signalling_Flag_Ind> - a numeric parameter used to indicate to the network whether the PDPcontext is for IM CN subsystem-related signalling only or not.
	 0 - UE indicates that the PDP context is not for IM CN subsystem-related signaling only (default)
	 1 - UE indicates that the PDP context is for IM CN subsystem-related signaling only
	
	 Note: a special form of the Set command, **+CGDCONT=<cid>**, causes the values for context number **<cid>** to become undefined.
	
	 Note: parameters from <IPv4AddrAlloc> to <IM_CN_Signalling_Flag_Ind> are shown in the Read command only if different from default.	

+CGDCONT - Define PDP context		SELINT 2
	Note: it is not possible to set more than 11 contexts	
AT+CGDCONT?	Read command returns the current settings for each defined context in the format: **+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>, <h_comp>[<CR><LF>+CGDCONT: <cid>, <PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp> […]**	
AT+CGDCONT=?	Test command returns values supported as a compound value	
Example	AT+CGDCONT=1,"IP",*"APN"*,"10.10.10.10",0,0 OK AT+CGDCONT? +CGDCONT: 1,"IP",*"APN"*,"10.10.10.10",0,0 OK at+cgdcont=? +CGDCONT: (1-15),"IP",,,0,(0-4),(0,1),(0,1),(0,1),(0,1) +CGDCONT: (1-15),"IPV6",,,0,(0-4),(0,1),(0,1),(0,1),(0,1) +CGDCONT: (1-15),"IPV4V6",,,0,(0-4),(0,1),(0,1),(0,1),(0,1) OK	
Reference	3GPP TS 27.007	

5.1.4.7.7 PDP Context Read Dynamic Parameters - +CGCONTRDP

+CGCONTRDP - PDP Context Read Dynamic Parameters		SELINT 2
AT+CGCONTRDP= [<p_cid>]	The execution command returns the relevant information <bearer_id>, <apn>, <ip_addr>, <subnet_mask>, <gw_addr>, <DNS_prim_addr>, <DNS_sec_addr>, <P-CSCF_prim_addr> and <P-CSCF_sec_addr> for a PDP Context established by the network with the context identifier <p_cid>. If the context cannot be found an ERROR response is returned. If the parameter <p_cid> is omitted, the relevant information for all established PDP contexts are returned. Possible response(s): +CGCONTRDP: <p_cid>, <bearer_id>, <apn>[, <ip_addr and subnet_mask>[, <gw_addr>[, <DNS_prim_addr>[, <DNS_sec_addr>[, <P-CSCF_prim_addr>[, <P-CSCF_sec_addr>]]]]]] [<CR><LF> +CGCONTRDP: <p_cid>,<bearer_id>, <apn>[, <ip_addr and subnet_mask>[, <gw_addr>[,<DNS_prim_addr>[, <DNS_sec_addr>[, <PCSCF_prim_addr>[, <PCSCF_sec_addr>]]]]]] […]] **Parameters:** **<p_cid>:** a numeric parameter which specifies a particular non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. **<bearer_id>:** a numeric parameter which identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS. **<APN>:** a string parameter which is a logical name that was used to select the GGSN or the external packet data network.	

+CGCONTRDP - PDP Context Read Dynamic Parameters		SELINT 2
	<ip_addr and subnet_mask >: a string parameter which shows the IP Address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4. m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16" for IPv6. When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP. **<gw_addr>:** a string parameter which shows the Gateway Address of the MT. The string is given as dot-separated numeric (0-255) parameters. **<DNS_prim_addr>:** a string parameter which shows the IP Address of the primary DNS Server. **<DNS_sec_addr>:** a string parameter which shows the IP address of the secondary DNS Server. **<P_CSCF_prim_addr>:** a string parameter which shows the IP Address of the primary P-CSCF Server. If the **<P_CSCF_sec_addr>:** a string parameter which shows the IP Address of the secondary P-CSCF Server. **Note:** The dynamic part of the PDP context will only exist if established by the network. The test command returns a list of <p_cid>s associated with active contexts. **Note:** If the MT has dual stack capabilities, two lines of information are returned per <cid>. First one line with the IPv4 parameters followed by one line with the IPv6 parameters	
AT+CGCONTRDP=?	**+CGCONTRDP:** (list of <p_cid>s associated with active contexts)	
Reference	3GPP TS 27.007	

5.1.4.7.8   Quality Of Service Profile - +CGQMIN

+CGCONTRDP - PDP Context Read Dynamic Parameters		SELINT 2
AT+CGQMIN= **[<cid>** **[,<precedence>** **[,<delay>** **[,<reliability>** **[,<peak>** **[,<mean>]]]]]]**	Set command allows to specify a minimum acceptable profile which is checked by the terminal against the negotiated profile returned in the Activate PDP Context Accept message. Parameters: **<cid>** - PDP context identification (see **+CGDCONT** command). **<precedence>** - precedence class **<delay>** - delay class **<reliability>** - reliability class **<peak>** - peak throughput class **<mean>** - mean throughput class If a value is omitted for a particular class then this class is not checked. Note: a special form of the Set command, **+CGQMIN=<cid>** causes the requested profile for context number **<cid>** to become undefined. Note: set command can modify the 3G QoS according to 3GPP 23.107 (see **+CGEQMIN**).	
AT+CGQMIN?	Read command returns the current settings for each defined context in the format: **+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,**	

+CGCONTRDP - PDP Context Read Dynamic Parameters		SELINT 2
	<mean>[<CR><LF>+CGQMIN: <cid>,<precedence>, <delay>,<reliability>,<peak>,<mean>[…]] If no PDP context has been defined, it has no effect and OK result code is returned	
AT+CGQMIN=?	+CGCONTRDP: (list of <p_cid>s associated with active contexts) Test command returns as a compound value the type of the current PDP context and the supported values for the subparameters in the format: **+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)** Note: only the "IP" **<PDP_Type>** is currently supported.	
Example	AT+CGQMIN=1,0,0,3,0,0 OK AT+CGQMIN? +CGQMIN: 1,0,0,5,0,0 OK AT+CGQMIN=? +CGQMIN: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31) OK	
Reference	3GPP TS 27.007	

5.1.4.7.9   Quality Of Service Profile (Requested) - +CGQREQ

+CGQREQ - Quality Of Service Profile (Requested)		SELINT 2
AT+CGQREQ= [<cid> [,<precedence> [,<delay> [,<reliability> [,<peak> [,<mean>]]]]]]	Set command allows to specify a Quality of Service Profile that is used when the terminal sends an Activate PDP Context Request message to the network. It specifies a profile for the context identified by the (local) context identification parameter, **<cid>**. Parameters: **<cid>** - PDP context identification (see **+CGDCONT** command). **<precedence>** - precedence class **<delay>** - delay class **<reliability>** - reliability class **<peak>** - peak throughput class **<mean>** - mean throughput class If a value is omitted for a particular class then this class is not checked. Note: a special form of the Set command, **+CGQREQ=<cid>** causes the requested profile for context number **<cid>** to become undefined. Note: set command can modify the 3G QoS according to 3GPP 23.107 (see **+CGEQREQ**).	
AT+CGQREQ?	Read command returns the current settings for each defined context in the format: **+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>, <mean>[<CR><LF>+CGQREQ: <cid>,<precedence>, <delay>,<reliability>,<peak>,<mean>[…]]** If no PDP context has been defined, it has no effect and **OK** result code is returned.	

+CGQREQ - Quality Of Service Profile (Requested)		SELINT 2
AT+CGQREQ=?	Test command returns as a compound value the type of the current PDP context and the supported values for the subparameters in the format: **+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)** Note: only the "IP" <PDP_Type> is currently supported.	
Example	AT+CGQREQ? +CGQREQ: 1,0,0,3,0,0 OK AT+CGQREQ=1,0,0,3,0,0 OK AT+CGQREQ=? +CGQREQ: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31) OK	
Reference	3GPP TS 27.007	

5.1.4.7.10   3G Quality Of Service Profile (Requested) - +CGEQREQ

+CGEQREQ – 3G Quality Of Service Profile (Requested)		SELINT 2
- **AT+CGEQREQ=** - **[<cid>** - **[,<Traffic class>** - **[,<Maximum bitrate UL>** - **[,<Maximum bitrate DL>** - **[,<Guaranteed bitrate UL>** - **[,<Guaranteed bitrate DL>** - **[,<Delivery order>** - **[,<Maximum SDU size>** - **[,<SDU error ratio>** - **[,<Residual bit error ratio>** **[,<Delivery of erroneous SDUs>** - **[,<Transfer delay>** **[,<Traffic handling priority>** **[,<Source statistics descriptor> [,<Signalling indication>]]]]]]]]]]]]]]]**	Set command allows to specify a 3G quality of service profile for the context identified by the(local) context identification parameter <cid> which is used when the MT sends an Activate PDP Context Request message to the network. Parameters: **<cid>** - PDP context identification (see **+CGDCONT** command). **<Traffic class>** - Traffic class 0 - conversational 1 - streaming 2 - interactive 3 - background 4 - subscribed value (default value) **<Maximum bitrate UL>** - Maximum bitrate Up Link (kbits/s). This parameter should be provided if the **<Traffic class>** is specified as conversational or streaming. 0 - subscribed value (default value) 1…568 576…8640 **<Maximum bitrate DL>** - Maximum bitrate down link (kbits/s). This parameter should be provided if the **<Traffic class>** is specified as conversational or streaming. 0 - subscribed value (default value) 1…568 576…8640 8700…16000 **<Guaranteed bitrate UL>** - the guaranteed bitrate up link(kbits/s). This parameter should be provided if the **<Traffic class>** is specified as conversational or streaming. 0 - subscribed value (default value) 1…568 576…8640	

+CGEQREQ – 3G Quality Of Service Profile (Requested)	SELINT 2
	\<Guaranteed bitrate DL> - the guaranteed bitrate down link(kbits/s). This parameter should be provided if the **\<Traffic class>** is specified as conversational or streaming. 0 - subscribed value (default value) 1…568 576…8640 8700…16000 **\<Delivery order>** - SDU Delivery order 0 - no 1 – yes 2 – subscribed value (default value) **\<Maximum SDU size**> - Maximum SDU size in octets 0 - subscribed value (default value) 10…1500 1502 1510 1520 **\<SDU error ratio>** - SDU error ratio - mEe mean m*10-e , for example 1E2 mean 1*10-2 "0E0" (default value) "1E1" "1E2" "7E3" "1E3" "1E4" "1E5" "1E6" **\<Residual bit error ratio>** - Residual bitt error ratio - mEe mean m*10-e , for example 1E2 mean 1*10-2 "0E0" (default value) "5E2" "1E2" "5E3" "4E3" "1E3" "1E4" "1E5" "1E6" "6E8" **\<Delivery of erroneous SDUs>** - Delivery of erroneous SDUs 0 - no 1 – yes 2 – no detect 3 – subscribed value (default value) **\<Transfer delay >** - Transfer delay (milliseconds) 0 – subscribed value (default value) 10…150 200…950 1000…4000 **\<Traffic handling priority >** - Traffic handling priority 0 - subscribed value (default value) 1…3

+CGEQREQ – 3G Quality Of Service Profile (Requested)	SELINT 2
	<Source Statistics Descriptor> - Characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the **<Traffic class>** is specified as conversational or streaming. 0 - Characteristics of SDUs is unknown (default value) 1 - Characteristics of SDUs corresponds to a speech source **<Signalling Indication>** - Signalling content of submitted SDUs for a PDP context. This parameter should be provided if the **<Traffic class>** is specified as interactive. 0 - PDP context is not optimized for signalling (default value) 1 - PDP context is optimized for signalling **<PDP_type>** (see **+CGDCONT** command). Note: a special form of the Set command, **+CGEQREQ=<cid>** causes the requested profile for context number **<cid>** to become undefined. Note: the current settings are stored in NVM. Note: set command can modify the 2G QoS according to 3GPP 23.107 (see **+CGQREQ**).
AT+CGEQREQ?	Read command returns the current settings for each defined context in the format: **[+CGEQREQ: <cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling>,<Source statistics descriptor>,<Signalling indication><CR><LF>]** **[+CGEQREQ:…]** If no PDP context has been defined, it has no effect and **OK** result code is returned.
AT+CGEQREQ=?	Test command returns as a compound value the type of the current PDP context and the supported values for the subparameters in the format: **+CGQEQREQ: <PDP_Type>,(list of supported <Traffic class>s),** **(list of supported <Maximum bitrate UL>s),(list of supported <Maximum bitrate DL>s),(list of supported <Guaranteed bitrate UL>s),(list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s),(list of supported<Maximum SDU size>s),(list of supported<SDU error ratio>s),(list of supported<Residual bit error ratio>s),(list of supported <Delivery of erroneous SDUs>s),(list of supported <Transfer delay>s),(list of supported <Traffic handling priority>s), (list of supported <Source statistics descriptor>s), (list of supported <Signalling indication>s)** Note: only the "IP" PDP_Type is currently supported.

+CGEQOS - Define EPS quality of service		SELINT 2
AT+CGEQOS= [<cid>[,<QCI> [,<DL_GBR>, <UL_GBR> [,<DL_MBR>,<UL_M BR]]]]	Set command allows the TE to specify the EPS Quality of Service parameters for a PDP context. Possible Response(s): +CME ERROR: <err> The set command allows the TE to specify the EPS Quality of Service parameters <cid>, <QCI>, [<DL_GBR> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>] for a PDP context or Traffic Flows. When in UMTS/GPRS the MT applies a mapping function to UTMS/GPRS Quality of Service. Refer subclause 9.2 for <err> values. A special form of the set command, +CGEQOS= <cid> causes the values for context number <cid> to become undefined. Parameters: **<cid>:** a numeric parameter which specifies a particular EPS Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS. **<QCI>:** a numeric parameter that specifies a class of EPS QoS. (see 3GPP TS 23.203) 0 QCI is selected by network [1 – 4] value range for guranteed bit rate Traffic Flows [5 – 9] value range for non-guarenteed bit rate Traffic Flows **<DL_GBR>:** a numeric parameter which indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301) **<UL_GBR>:** a numeric parameter which indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301) **<DL_MBR>:** a numeric parameter which indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301) **<UL_MBR>:** a numeric parameter which indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301) Note: values are automatically saved in NVM.	
AT+CGEQOS?	The read command returns the current settings for each defined QoS. +CGEQOS: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>] [<CR>>LF>+CGEQOS: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>] […]]	
AT+CGEQOS=?	The test command returns the ranges of the supported parameters. +CGEQOS: (**range of supported** <cid>s) ,(**list of supported** <QCI>s) ,(**list of supported** <DL_GBR>s), (**list of supported** <UL_GBR>s), (**list of supported** <DL_MBR>s) ,(**list of supported** <UL_MBR>s)	

5.1.4.7.12 EPS quality of service read dynamic parameters - +CGEQOSRDP

+CGEQOSRDP - EPS quality of service read dynamic parameters		SELINT 2
AT+CGEQOSRDP=[<cid>]	The execution command returns the Quality of Service parameters of the established PDP Context associated to the provided context identifier <cid>. If the context cannot be found an ERROR response is returned. If the parameter <cid> is omitted, the Quality of Service parameters for all established PDP contexts are returned. Possible Response(s): +CGEQOSRDP: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>] [<CR>>LF>+CGEQOSRDP: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>] [...]] DParameters: **<cid>:** a numeric parameter which specifies a particular Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS. **<QCI>:** a numeric parameter that specifies a class of EPS QoS. (see 3GPP TS 23.203 [85])0 QCI is selected by network [1 – 4] value range for guranteed bit rate Traffic Flows [5 – 9] value range for non-guarenteed bit rate Traffic Flows. **<DL_GBR>:** a numeric parameter, which indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is dummyfor a non-GBR QCI. (see 3GPP TS 24.301 [83]) **<UL_GBR>:** a numeric parameter which indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is dummyfor a non-GBR QCI. (see 3GPP TS 24.301 [83]) **<DL_MBR>:** a numeric parameter which indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is dummy for a non-GBR QCI. (see 3GPP TS 24.301 [83]) **<UL_MBR>:** a numeric parameter which indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is dummy for a non-GBR QCI. (see 3GPP TS 24.301)	
AT+CGEQOSRDP=?	+CGEQOSRDP: (list of <cid>s associated with active contexts) The test command returns a list of <cid>s associated with active contexts. Parameters of both network and MT/TA initiated PDN connections will be returned.	

5.1.4.7.13 3G Quality Of Service Profile (Minimum Acceptable) - +CGEQMIN

+CGEQMIN – 3G Quality Of Service Profile (Minimum Acceptable)		SELINT 2
AT+CGEQMIN= [<cid> [,<Traffic class> [,<Maximum bitrate UL> [,<Maximum bitrate DL> [,<Guaranteed bitrate UL> [,<Guaranteed bitrate DL> [,<Delivery order>	Set command allows specifying a 3G quality of service profile for the context identified by the (local) context identification parameter **<cid>** which is checked by the MT against the negotiated profile returned in the Activate/Modify PDP Context Accept Message. Parameters: **<cid>** - PDP context identification (see +CGDCONT command).	

+CGEQMIN – 3G Quality Of Service Profile (Minimum Acceptable)	SELINT 2
[,<Maximum SDU size> **[,<SDU error ratio>** **[,<Residual bit error ratio>** **[,<Delivery of erroneous** **SDUs>** **[,<Transfer delay>** **[,<Traffic handling priority>** **[,<Source statistics** **descriptor> [,<Signalling** **indication>]]]]]]]]]]]]]**	**<Traffic class>** - Traffic class 0 – conversational (default value) 1 - streaming 2 - interactive 3 - background **<Maximum bitrate UL>** - Maximum bitrate Up Link (kbits/s) 0 (default value) 1…568 576…8640 **<Maximum bitrate DL>** - Maximum bitrate down link (kbits/s) 0 (default value) 1…568 576…8640 8700…16000 **<Guaranteed bitrate UL>** - the guaranteed bitrate up link(kbits/s) 0 (default value) 1…568 576…8640 **<Guaranteed bitrate DL>** - the guaranteed bitrate down link(kbits/s) 0 (default value) 1…568 576…8640 8700…16000 **<Delivery order>** - SDU Delivery order 0 - no (for default value) 1 – yes **<Maximum SDU size**> - Maximum SDU size in octets 0 (default value) 10…1520 1502 1510 1520 **<SDU error ratio>** - SDU error ratio - mEe mean m*10-e , for example 1E2 mean 1*10-2 "0E0" (default value) "1E1" "1E2" "7E3" "1E3" "1E4" "1E5" "1E6" **<Residual bit error ratio>** - Residual bit error ratio - mEe mean m*10-e , for example 1E2 mean 1*10-2 "0E0" (default value) "5E2" "1E2" "5E3" "4E3" "1E3"

+CGEQMIN – 3G Quality Of Service Profile (Minimum Acceptable)	SELINT 2
	"1E4" "1E5" "1E6" "6E8" **\<Delivery of erroneous SDUs\>** - Delivery of erroneous SDUs 0 - no (default value) 1 – yes 2 – no detect **\<Transfer delay \>** - Transfer delay (milliseconds) 0 (default value) 10…150 200…950 1000…4000 **\<Traffic handling priority \>** - Traffic handling priority 1…3 **\<Source Statistics Descriptor\>** - Characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the **\<Traffic class\>** is specified as conversational or streaming. 0 - Characteristics of SDUs is unknown (default value) 1 - Characteristics of SDUs corresponds to a speech source **\<Signalling Indication\>** - Signalling content of submitted SDUs for a PDP context. This parameter should be provided if the **\<Traffic class\>** is specified as interactive. 0 - PDP context is not optimized for signalling (default value) 1 - PDP context is optimized for signalling. Note: a special form of the Set command, **+CGEQMIN=\<cid\>** causes the requested profile for context number **\<cid\>** to become undefined. Note: the current settings are stored in NVM. Note: set command can modify the 2G QoS according to 3GPP 23.107 (see **+CGQMIN**).
AT+CGEQMIN?	Read command returns the current settings for each defined context in the format: **[+CGEQMIN: \<cid\>,\<Traffic class\>,\<Maximum bitrate UL\>,\<Maximum bitrate DL\>,\<Guaranteed bitrate UL\>,\<Guaranteed bitrate DL\>,\<Delivery order\>,\<Maximum SDU size\>,\<SDU error ratio\>,\<Residual bit error ratio\>,\<Delivery of erroneous SDUs\>,\<Transfer delay\>,\<Traffic handling\>,\<Source statistics descriptor\>,\<Signalling indication\>\<CR\>\<LF\>]** **[+CGEQMIN:…]** Parameters are described as for the set command except: **\<Traffic class\>** - Traffic class 0 – conversational (if the value is explicitly defined, otherwise, if the context or the QoS is undefined it is the default value as undefined) 1 - streaming 2 - interactive

+CGEQMIN – 3G Quality Of Service Profile (Minimum Acceptable)		SELINT 2
	3 – background	
	<Traffic handling priority > - Traffic handling priority 0 (default value as undefined) 1…3	
	If no PDP context has been defined, it has no effect and OK result code is returned.	
AT+CGEQMIN=?	Test command returns as a compound value the type of the current PDP context and the supported values for the subparameters in the format: **+CGQMIN: <PDP_Type>,(list of supported <Traffic class>s), (list of supported <Maximum bitrate UL>s),(list of supported <Maximum bitrate DL>s),(list of supported <Guaranteed bitrate UL>s),(list of supported <Guaranteed bitrate DL>s),(list of supported <Delivery order>s),(list of supported<Maximum SDU size>s),(list of supported<SDU error ratio>s),(list of supported<Residual bit error ratio>s),(list of supported <Delivery of erroneous SDUs>s),(list of supported <Transfer delay>s),(list of supported <Traffic handling priority>s), (list of supported <Source statistics descriptor>s), (list of supported <Signalling indication>s)** Note: only the "IP" PDP_Type is currently supported.	

5.1.4.7.14   PDP Context activate or deactivate - +CGACT

+CGACT - PDP Context Activate Or Deactivate		SELINT 2

AT+CGACT=
[<state>[,<cid>
[,<cid>[,…]]]]
	Execution command is used to activate or deactivate the specified PDP context(s)
	
	Parameters:
	<state> - indicates the state of PDP context activation
	  0 - deactivated
	  1 - activated
	<cid> - a numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** command)
	
	Note: only three **<cid>**s can be activated at the same time.
	Note: if no **<cid>**s are specified, the activation form of the command activates the first three defined contexts. The deactivation form deactivates all the active contexts.	

AT+CGACT?	Read command returns the current activation state for all the defined PDP contexts in the format: **+CGACT: <cid>,<state>[<CR><LF>+CGACT: <cid>,<state>[…]]**	
AT+CGACT =?	Test command reports information on the supported PDP context activation states parameters in the format: **+CGACT: (0,1)**	
Example	AT+CGACT=1,1 OK AT+CGACT? +CGACT: 1,1 OK	
Reference	3GPP TS 27.007	

5.1.4.7.15   3G Quality Of Service Profile (Negotiated) - +CGEQNEG

+CGEQNEG – 3G Quality Of Service Profile (Negotiated)		SELINT 2
AT+CGEQNEG= [<cid>[,<cid>[,…]]]	This command allows the TE to retrieve the negotiated 3G quality of service returned in the Activate PDP Context Accept/Modify message. Set command returns the negotiated 3G QoS profile for the specified context identifiers, <cid>s. The Qos profile consists of a number of parameters, each of which may have a separate value. Parameters: <cid> - PDP context identification (see +CGDCONT command). It returns the current settings for each specified context in the format (see +CGEQREQ): [+CGEQNEQ: <cid>,<Traffic class>,<Maximum bitrate UL>,<Maximum bitrate DL>,<Guaranteed bitrate UL>,<Guaranteed bitrate DL>,<Delivery order>,<Maximum SDU size>,<SDU error ratio>,<Residual bit error ratio>,<Delivery of erroneous SDUs>,<Transfer delay>,<Traffic handling><CR><LF>] [+CGEQNEQ:…]	
AT+CGEQNEG=?	Test command returns a list of <cid>s associated with active contexts.	
Reference	3GPP TS 27.007	

5.1.4.7.16   Show PDP Address - +CGPADDR

+CGPADDR - Show PDP Address		SELINT 2
AT+CGPADDR= [<cid>[,<cid> [,…]]]	Execution command returns a list of PDN addresses for the specified context identifiers in the format: **+CGPADDR: <cid>,<PDP_addr>[<CR><LF>+CGPADDR: <cid>,<PDP_addr>[…]]** Parameters: **<cid>** - a numeric parameter which specifies a particular PDN connection definition (see **+CGDCONT** command). If no **<cid>** is specified, the addresses for all defined contexts are returned. **<PDP_addr>** - a string that identifies the terminal 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 PDN connection activation that used the context definition referred to by **<cid>**; if no address is available the empty string ("") is represented as **<PDP_addr>**	
AT+CGPADDR=?	Test command returns a list of defined **<cid>**s.	
Example	AT#SGACT=3,1 #SGACT: xxx.yyy.zzz.www OK AT+CGPADDR=3 +CGPADDR: 3,"xxx.yyy.zzz.www" OK AT+CGPADDR=? +CGPADDR: (3)	

+CGPADDR - Show PDP Address		SELINT 2
	OK	
Reference	3GPP TS 27.007	

5.1.4.7.17 Modify PDP context - +CGCMOD

+CGCMOD – Modify PDP context		SELINT 2
AT+CGCMOD=[<cid1>[,<cid2>[,…,<cidN>]]]	The execution command is used to modify the specified PDP context(s) with respect to QoS profiles. If no **<cid*i*>** is specified the command modifies all active contexts. Parameters: **<cid*i*>:** a numeric parameter which specifies a particular PDP context	
AT+CGCMOD=?	Test command returns a list of **<cid>**s associated with active contexts.	

5.1.4.7.18 S Printing IP Address Format - +CGPIAF

+CGPIAF - Printing IP Address Format		SELINT 2
AT+CGPIAF= [<IPv6_AddressFormat>[,<IPv6_SubnetNotation>[,<IPv6_leadingZeros>[,<IPv6_compressZeros>]]]]	Set command decides what the format to print IPv6 address parameter. **Parameters:** **<IPv6_AddressFormat>** - decides the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address. 　0 – Use IPv4-like dot-notation. IP addresses, and subnetwork mask if applicable, are dot-separated. 　1 – Use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space. **<IPv6_SubnetNotation>** - decides the subnet-notation for <remote address and subnet mask> Setting does not apply if IPv6 address format **<IPv6_AddressFormat>** = 0. 　0 – Both IP address, and subnet mask are started explicitly, separated by a space. 　1 – The printout format is applying /(forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation. **<IPv6_LeadingZeros>** - decides whether leading zeros are omitted or not. Setting does not apply if IPv6 address format **<IPv6_AddressFormat>** = 0. 　0 – Leading zeros are omitted. 　1 – Leading zeros are included. **<IPv6_CompressZeros>** - decides whether 1-n instances of 16-bit- zero-values are replaced by only "::". This applies only once. Setting does not apply if IPv6 address format **<IPv6_AddressFormat>** = 0. 　0 – No zero compression. 　1 – Use zero compression.	
AT+CGPIAF?	Read command returns the current parameter setting.	
AT+CGPIAF=?	Test command returns values supported as compound parameter setting.	
Example	AT+CGPIAF=0,0,0,0 OK AT#SGACT=1,1 #SGACT: 252.1.171.171.205.205.239.224.0.0.0.0.0.0.0.1 OK at+CGPIAF=1,0,0,0	

+CGPIAF - Printing IP Address Format		SELINT 2
	OK	
	AT#SGACT=1,1 #SGACT: FC01:ABAB:CDCD:EFE0:0:0:0:1 OK	

5.1.4.7.19 Set Mode of operation for EPS - +CEMODE

+CEMODE – Set mode of operation for EPS		SELINT 2
AT+CEMODE=[<mode>]	Set command configures the mode of operation for EPS. Parameter: **<mode>:** a numeric parameter which indicates the mode of operation 0 : PS mode 2 of operation 1 : CS/PS mode 1 of operation 2 : CS/PS mode 2 of operation 3 : PS mode 1 of operation **NOTE1:** the default value depends on product and the support of VoLTE. **NOTE2:** the definition for UE modes of operation can be found in 3GPP TS 24.301 [83] Other values are reserved and will result in an ERROR response to the set command.	
AT+CEMODE?	Read command returns the currently configured values, in the format: **+CEMODE: < mode >** **NOTE:** The read command will return right values after set command, but effectively the mode of operation changes after power cycle.	
AT+CEMODE=?	Test command returns the supported range of values of parameters **< mode>.**	
Example	AT+CEMODE=1 OK AT+CEMODE? +CEMODE: 1 OK	

5.1.4.7.20 Voice domain preference - +CEVDP

+CEVDP – Voice domain preference		SELINT 2
AT+CEVDP=<domain>	Set command selects the voice domain preference. **<domain>** - voice domain preference 1 – CS voice only 2 – CS voice preferred, IMS PS voice as secondary 3 – IMS PS voice preferred, CS as secondary 4 – IMS PS voice only Note: parameter <**domain**> is saved in NVM. Note: the default value depends on product and the support of VoLTE.	
AT+CEVDP?	Read command returns the selected domain in the format **+CEVDP: <domain>**	

+CEVDP – Voice domain preference		SELINT 2
AT+CEVDP=?	Test command returns the supported range of values of the parameter **<domain>**.	
Reference	3GPP TS 27.007	

5.1.4.8 Commands for Battery Charger

5.1.4.8.1 Battery Charge - +CBC

+ CBC - Battery Charge		SELINT 2

AT+CBC	Execution command returns the current Battery Charge status in the format:
	
	+CBC: <bcs>,<bcl>
	
	where:
	<bcs> - battery status
	  0 - **ME** is powered by the battery
	  1 - **ME** has a battery connected, and charger pin is being powered
	  2 - **ME** does not have a battery connected
	  3 - Recognized power fault, calls inhibited
	<bcl> - battery charge level, only if <bcs>=0
	  0 - battery is exhausted, or **ME** does not have a battery connected
	  25 - battery charge remained is estimated to be 25%
	  50 - battery charge remained is estimated to be 50%
	  75 - battery charge remained is estimated to be 75%
	  100 - battery is fully charged.
	
	Note: **<bcs>**=1 indicates that the battery charger supply is inserted and the battery is being recharged if necessary with it. Supply for **ME** operations is taken anyway from **VBATT** pins.
	
	Note: without battery/power connected on **VBATT** pins or during a power fault the unit is not working, therefore values **<bcs>=2** and **<bcs>=3** will never appear.
	
	Note: <bcl> indicates battery charge level only if battery is connected and charger is not connected
	Note: The ME does not make differences between being powered by a battery or by a power supply on the VBATT pins, so it is not possible to distinguish between these two cases.	

AT+CBC=?	Test command returns parameter values supported as a compound value. **+CBC: (0-3),(0-100)**	
Example	AT+CBC +CBC: 0,75 OK	

5.1.5   3GPP TS 27.005 AT Commands for SMS and CBS

5.1.5.1   General Configuration

5.1.5.1.1   Select Message Service - +CSMS

+CSMS - Select Message Service		SELINT 2

AT+CSMS= <service>	Set command selects messaging service **<service>**. It returns the types of messages supported by the **ME**:
	
	Parameter:
	<service>
	  0 – 3GPP TS 23.040 and 3GPP TS 23.041. The syntax of SMS AT commands is compatible with 3GPP TS 27.005 (factory default)
	  1 – 3GPP TS 23.040 and 3GPP TS 23.041. The syntax of SMS AT commands is compatible with 3GPP TS 27.005. The requirement of **<service>** setting 1 is mentioned under corresponding command descriptions
	Set command returns the types of messages supported by the **ME**:
	
	+CSMS: <mt>,<mo>,<bm>
	
	where:
	<mt> - mobile terminated messages support
	  0 - type not supported
	  1 - type supported
	<mo> - mobile originated messages support
	  0 - type not supported
	  1 - type supported
	<bm> - broadcast type messages support
	  0 - type not supported
	  1 - type supported	

AT+CSMS?	Read command reports current service setting along with supported message types in the format: **+CSMS: <service>,<mt>,<mo>,<bm>** where: **<service>** - messaging service (see above) **<mt>** - mobile terminated messages support (see above) **<mo>** - mobile originated messages support (see above) **<bm>** - broadcast type messages support (see above)	
AT+CSMS=?	Test command reports the supported value of the parameter **<service>**.	
Reference	3GPP TS 27.005; 3GPP TS 23.040; 3GPP TS 23.041	

+CPMS - Preferred Message Storage		SELINT 2

AT+CPMS=
<memr>
[,<memw>
[,<mems>]]
	Set command selects memory storages **<memr>**, **<memw>** and **<mems>** to be used for reading, writing, sending and storing SMs.
	
	Parameters:
	<memr> - memory from which messages are read and deleted
	  "SM" - SIM SMS memory storage (default)
	  "ME" – NVM SMS storage
	<memw> - memory to which writing and sending operations are made
	  "SM" - SIM SMS memory storage (default)
	  "ME" – NVM SMS storage
	<mems> - memory to which received SMs are preferred to be stored
	  "SM" - SIM SMS memory storage (default)
	  "ME" – NVM SMS storage
	
	The command returns the memory storage status in the format:
	
	+CPMS: <usedr>,<totalr>,<usedw>,<totalw>,<useds>,<totals>
	
	where:
	<usedr> - number of SMs stored into **<memr>**
	<totalr> - max number of SMs that **<memr>** can contain
	<usedw> - number of SMs stored into **<memw>**
	<totalw> max number of SMs that **<memw>** can contain
	<useds> - number of SMs stored into **<mems>**
	<totals> - max number of SMs that **<mems>** can contain
	
	Note: when **<memr>** is set to a memory, also **<memw>** and **<mems>** are set to the same memory.
	
	Note: the set memory is automatically saved in NVM.		

AT+CPMS?	Read command reports the message storage status in the format: **+CPMS: <memr>,<usedr>,<totalr>,<memw>,<usedw>,<totalw>, <mems>,<useds>,<totals>** where **<memr>**, **<memw>** and **<mems>** are the selected storage memories for reading, writing and storing respectively.		
AT+CPMS=?	Test command reports the supported values for parameters **<memr>**, **<memw>** and **<mems>**		
Example	*AT+CPMS?* *+CPMS: "SM",5,10,"SM",5,10,"SM",5,10* *OK* *(you have 5 out of 10 SMS SIM positions occupied)* *AT+CPMS="ME"* *+CPMS: "ME",15,100,"ME",15,100,"ME",15,100* *OK* *(change memory to ME where there are 15 SMS positions occupied)*		
Reference	3GPP TS 27.005		

5.1.5.1.3 Message Format - +CMGF

+CMGF - Message Format		SELINT 2

AT+CMGF=
[<mode>]
	Set command selects the format of messages used with send, list, read and write commands.
	
	Parameter:
	<mode>
	  0 - PDU mode, as defined in 3GPP TS 23.040 and 3GPP TS 23.041
	        (factory default)
	  1 - text mode	

AT+CMGF?	Read command reports the current value of the parameter **<mode>**.	
AT+CMGF=?	Test command reports the supported value of **<mode>** parameter.	
Reference	3GPP TS 27.005	

5.1.5.2 Message Configuration

5.1.5.2.1 Service Center Address - +CSCA

+CSCA -Service Center Address		SELINT 2

AT+CSCA=
<number>
[,<type>]
	Set command sets the Service Center Address to be used for mobile originated SMS transmissions.
	
	Parameter:
	<number> - SC phone number in the format defined by **<type>**
	<type> - the type of number
	  129 - national numbering scheme
	  145 - international numbering scheme (contains the character "**+**")
	
	Note: to use the SM service, is mandatory to set a Service Center Address at which service requests will be directed.
	
	Note: in Text mode, this setting is used by send and write commands; in PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into the **<pdu>** parameter equals zero.
	
	Note: the current settings are stored through **+CSAS**	

AT+CSCA?	Read command reports the current value of the SCA in the format: **+CSCA: <number>,<type>** Note: if SCA is not present the device reports an error message.	
AT+CSCA=?	Test command returns the **OK** result code.	
Reference	3GPP TS 27.005	

5.1.5.2.2   Set Text Mode Parameters - +CSMP

+CSMP - Set Text Mode Parameters		SELINT 2

AT+CSMP= [<fo> [,<vp> [,<pid> [,<dcs>]]]]	Set command is used to select values for additional parameters for storing and sending SMs when the text mode is used (**AT+CMGF=1**)
	
	Parameters:
	<fo> - first octet of 3GPP TS 23.040 SMS-SUBMIT or SMS-DELIVER, in integer format (default 17, i.e. SMS-SUBMIT with validity period in relative format). As first octet of a PDU has the following bit field description (**bit[7]bit[6]bit[5]bit[4]bit[3]bit[2]bit[1]bit[0]**):
	bit[1]bit[0]: Message Type Indicator, 2-bit field describing the message type;
	  [00] - SMS-DELIVER;
	  [01] - SMS-SUBMIT (default) ;
	bit[2]: Reject Duplicates, 1-bit field: user is not responsible for setting this bit and, if any set, it will have no meaning (default is [0]);
	bit[4]bit[3]: Validity Period Format, 2-bit field indicating whether or not the Validity Period field is present (default is [10]):
	  [00] - Validity Period field *not present*
	  [01] - Validity Period field present in *enhanced format*(i.e. quoted time-string type, see below)
	  [10] - Validity Period field present in *relative format*, (i.e. integer type, see below)
	  [11] - Validity Period field present in *absolute format* (i.e. quoted time-string type, see below)
	bit[5]: Status Report Request, 1-bit field indicating the MS is requesting a status report (default is [0]);
	  [0] - MS is not requesting a status report
	  [1] - MS is requesting a status report
	bit[6]: User Data Header Indicator, 1-bit field: user is not responsible for setting this bit and, if any set, it will have no meaning (default is [0]);
	bit[7]: Reply Path, 1-bit field indicating the request for Reply Path (default is [0]);
	  [0] - Reply Path not requested
	  [1] - Reply Path requested
	<vp> - depending on **<fo>** setting:
	  a) if **<fo>** asks for a *Not Present* Validity Period, **<vp>** can be any type and it will be not considered;
	  b) if **<fo>** asks for a Validity Period in *relative format*, **<vp>** shall be integer type (default 167, i.e. 24 hours);
	    0..143 - (**<vp>** + 1) x 5 minutes
	    144..167 - 12 hours + ((**<vp>** - 143) x 30 minutes)
	    168..196 - (**<vp>** - 166) x 1 day
	    197..255 - (**<vp>** - 192) x 1 week
	  c) if **<fo>** asks for a Validity Period in *absolute format*, **<vp>** shall be quoted time-string type (see **+CCLK**)
	  d) if **<fo>** asks for a Validity Period in *enhanced format*, **<vp>** shall be the quoted hexadecimal representation (string type) of 7 octets, as follows:
	    • the first octet is the **Validity Period Functionality Indicator**, indicating the way in which the other 6 octets are used; let's consider its bit field description:
	    bit[7]: extension bit
	     [0] - there are no more VP Fuctionality Indicator extension octets to follow
	    bit[6]: Single Shot SM;
	     [0] - the SC is not required to make up to one delivery attempt
	     [1] - the SC is required to make up to one delivery attempt
	    bit[5]bit[4]bit[3]: reserved
	     [000]

+CSMP - Set Text Mode Parameters	SELINT 2
	bit[2]bit[1]bit[0]: Validity Period Format [000] - No Validity Period specified [001] - Validity Period specified as for the relative format. The following octet contains the VP value as described before; all the other octets are 0's. [010] - Validity Period is relative in integer representation. The following octet contains the VP value in the range 0 to 255, representing 0 to 255 seconds; all the other octets are 0's. [011] - Validity Period is relative in semi-octet representation. The following 3 octets contain the relative time in Hours, Minutes and Seconds, giving the length of the validity period counted from when the SMS-SUBMIT is received by the SC; all the other octets are 0's. **<pid>** - 3GPP TS 23.040 TP-Protocol-Identifier in integer format (default 0). **<dcs>** - depending on the command or result code: 3GPP TS 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme Note: the current settings are stored through **+CSAS** Note: we're storing through **+CSAS** the **<vp>** value too, but only as integer type, i.e. only in its *relative format* Note: **<vp>**, **<pid>** and **<dcs>** default values are loaded from first SIM *SMS Parameters* profile, if present. If it is not present, then the default values are those above indicated.
AT+CSMP?	Read command reports the current setting in the format: **+CSMP: <fo>,<vp>,<pid>,<dcs>** Note: if the Validity Period Format (**<fo>**'s **bit[4]bit[3]**) is [00] (i.e. *Not Present*), **<vp>** is represented just as a quoted empty string ("").
AT+CSMP=?	Test command returns the **OK** result code.
Example	*Set the parameters for an outgoing message with 24 hours of validity period and default properties:* AT+CSMP=17,167,0,0 OK *Set the parameters for an outgoing message with validity period in enhanced format: the <vp> string actually codes 24 hours of validity period.* AT+CSMP=9,"01A80000000000" OK *Set the parameters for an outgoing message with validity period in enhanced format: the <vp> string actually codes 60 seconds of validity period.* AT+CSMP=9,"023C0000000000" OK *Set the parameters for an outgoing message with validity period in enhanced format: the <vp> string actually codes 29 hours 85 minutes 30 seconds of validity period.* AT+CSMP=9,"03925803000000"

+CSMP - Set Text Mode Parameters		SELINT 2
	OK	
Reference	3GPP TS 27.005; 3GPP TS 23.040; 3GPP TS 23.038	

5.1.5.2.3   Show Text Mode Parameters - +CSDH

+CSDH - Show Text Mode Parameters		SELINT 2

AT+CSDH=
[<show>]
	Set command controls whether detailed header information is shown in text mode (**AT+CMGF=1**) result codes.
	
	Parameter:
	
	<show>
	  0 - do not show header values defined in commands **+CSCA** and **+CSMP** (**<sca>**, **<tosca>**, **<fo>**, **<vp>**, **<pid>** and **<dcs>**) nor **<length>**, **<toda>** or **<tooa>** in **+CMT**, **+CMGL**, **+CMGR** result codes for SMS-DELIVERs and SMS-SUBMITs in text mode. For SMS-COMMANDs in **+CMGR** result code do not show **<pid>**, **<mn>**, **<da>**, **<toda>**, **<length>** or **<cdata>**
	  1 - show the values in result codes	

AT+CSDH?	Read command reports the current setting in the format: **+CSDH: <show>**	
AT+CSDH=?	Test command reports the supported range of values for parameter **<show>**	
Reference	3GPP TS 27.005	

5.1.5.2.4   Select Cell Broadcast - +CSCB

+CSCB -Select Cell Broadcast Message Types		SELINT 2

AT+CSCB=
[<mode>[,<mids>
[,<dcss>]]]
	Set command selects which types of Cell Broadcast Messages are to be received by the device.
	
	Parameters:
	<mode>
	  0 - the message types defined by **<mids>** and **<dcss>** are accepted (factory default)
	  1 - the message types defined by **<mids>** and **<dcss>** are rejected
	<mids> - Message Identifiers, string type: all different possible combinations of the CBM message identifiers; default is empty string ("").
	<dcss> - Data Coding Schemes, string type: all different possible combinations of CBM data coding schemes; default is empty string ("").
	
	Note: the current settings are stored through **+CSAS**	

AT+CSCB?	Read command reports the current value of parameters **<mode>**, **<mids>** and **<dcss>**.	
AT+CSCB=?	Test command returns the range of values for parameter **<mode>**.	
Example	AT+CSCB? +CSCB: 1,"","" OK *(all CBMs are accepted, none is rejected)* AT+CSCB=0,"0,1,300-315,450","0-3" OK	
Reference	3GPP TS 27.005, 3GPP TS 23.041, 3GPP TS 23.038.	

5.1.5.2.5　　Save Settings - +CSAS

+CSAS - Save Settings		SELINT 2
AT+CSAS [=<profile>]	Execution command saves settings which have been made by the **+CSCA**, **+CSMP** and **+CSCB** commands in local non volatile memory. Parameter: **<profile>** 　0 - it saves the settings to NVM (factory default). 　1..n - SIM profile number; the value of n depends on the SIM and its max is 3. Note: certain settings may not be supported by the SIM and therefore they are always saved to NVM, regardless the value of **<profile>**. Note: If parameter is omitted the settings are saved in the non volatile memory. Note: +CSCB <mids> (Message Identifiers) parameter can be saved to SIM only if the "Cell broadcast message identifier selection" file is present on the SIM itself. This file, if present, has storage for only a single set of data. Therefore, it is not possible to save different <mids> in different SIM profiles; <mids> value, once changed and saved, will be the same for all SIM profiles.	
AT+CSAS=?	Test command returns the possible range of values for the parameter **<profile>**.	
Reference	3GPP TS 27.005	

5.1.5.2.6　　Restore Settings - +CRES

+CRES - Restore Settings		SELINT 2
AT+CRES [=<profile>]	Execution command restores message service settings saved by **+CSAS** command from either NVM or SIM. Parameter: **<profile>** 　0 - it restores message service settings from NVM. 　1..n - it restores message service settings from SIM. The value of n depends on the SIM and its max is 3. Note: certain settings may not be supported by the SIM and therefore they are always restored from NVM, regardless the value of **<profile>**. Note: If parameter is omitted the command restores message service settings from NVM.	
AT+CRES=?	Test command returns the possible range of values for the parameter **<profile>**.	
Reference	3GPP TS 27.005	

5.1.5.2.7　　More message to send - +CMMS

+CMMS – More Message to Send		SELINT 2
AT+CMMS=[<n>]	Set command controls the continuity of SMS relay protocol link. When feature is enabled (and supported by network) multiple messages can be sent much faster as link is kept open. Parameter:	

+CMMS – More Message to Send	SELINT 2
	\<n\> 0 - disable (factory default) 1 - keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 5 seconds, then the link is closed and the parameter **\<n\>** is automatically reset to 0 2 - enable (if the time between the response of the latest message send command and the next send command exceeds 5 seconds, the link is closed but the parameter **\<n\>** remains set to 2)
AT+CMMS?	Read command reports the current value of the parameter **\<n\>** in the format: **+CMMS: \<n\>**
AT+CMMS=?	Test command returns the range of supported **\<n\>**
Reference	3GPP TS 27.005

5.1.5.3　Message Receiving and Reading

5.1.5.3.1　New Message Indications - +CNMI

+CNMI - New Message Indications To Terminal Equipment	SELINT 2
AT+CNMI=[<mode>[,<mt> [,<bm>[,<ds> [,<bfr>]]]]]	Set command selects the behaviour of the device on how the receiving of new messages from the network is indicated to the **DTE**. Parameter: **<mode>** - unsolicited result codes buffering option 　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 in case the **DTE** is busy and flush them to the TE after reservation. Otherwise forward them directly to the TE. 　3 - if **<mt>** is set to 1 the hardware ring line is enabled for 1 s. when a SMS is received while the module is in GPRS online mode. **<mt>** - result code indication reporting for SMS-DELIVER 　0 - No SMS-DELIVER indications are routed to the TE and messages are stored in SIM. 　1 - If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using the following unsolicited result code: 　　**+CMTI: <mems>,<index>** 　　where: 　　　**<mems>** - memory storage where the new message is stored (see **+CPMS**) 　　　**<index>** - location on the memory where SMS is stored. 　2 - SMS-DELIVERs (except class 2 messages and messages in the "store" message waiting indication group) are routed directly to the TE using the following unsolicited result code: 　　　　**(PDU Mode)** 　**+CMT: <alpha>,<length><CR><LF><pdu>** 　　where: 　　　**<alpha>** - alphanumeric representation of originator/destination number corresponding to the entry found in MT phonebook; used character set should be the one selected with command **+CSCS**. 　　　**<length>** - PDU length 　　　**<pdu>** - PDU message 　　　　**(TEXT Mode)** 　**+CMT:<oa>,<alpha>,<scts>[,<tooa>,<fo>,<pid>,<dcs>, <sca>,<tosca>,<length>]<CR><LF><data>** (the information written in italics will be present depending on **+CSDH** last setting) 　　where: 　　　**<oa>** - originating address, string type converted in the currently selected character set (see **+CSCS**) 　　　**<alpha>** - alphanumeric representation of **<oa>**; used character set should be the one selected with command **+CSCS**. 　　　**<scts>** - arrival time of the message to the SC 　　　**<tooa>, <tosca>** - type of number **<oa>** or **<sca>**: 　　　　129 - number in national format 　　　　145 - number in international format (contains the "**+**") 　　　**<fo>** - first octet of 3GPP TS 23.040 　　　**<pid>** - Protocol Identifier 　　　**<dcs>** - Data Coding Scheme 　　　**<sca>** - Service Centre address, string type, converted in the currently selected character set (see **+CSCS**)

<length> - text length

<data> - TP-User-Data

- If **<dcs>** indicates that GSM03.38 default alphabet is used and **<fo>** indicates that GSM03.40 TP-User-Data-Header-Indication is not set (bit 6 of **<fo>** is 0), each character of GSM alphabet will be converted into current TE character set (see **+CSCS**)
- If **<dcs>** indicates that 8-bit or UCS2 data coding scheme is used or **<fo>** indicates that GSM03.40 TP-User-Data-Header-Indication is set (bit 6 of **<fo>** is 1), each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41)

Class 2 messages and messages in the "store" message waiting indication group result in indication as defined in **<mt>=1**.

3 - Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in **<mt>=2**. Messages of other data coding schemes result in indication as defined in **<mt>=1**.

<bm> - broadcast reporting option

0 - Cell Broadcast Messages are not sent to the **DTE**

2 - New Cell Broadcast Messages are sent to the **DTE** with the unsolicited result code:

(PDU Mode)
+CBM: <length><CR><LF><PDU>
where:
  <length> - PDU length
  <PDU> - message PDU

(TEXT Mode)
+CBM:<sn>,<mid>,<dcs>,<pag>,<pags><CR><LF><data>
where:
  <sn> - message serial number
  <mid> - message ID
  <dcs> - Data Coding Scheme
  <pag> - page number
  <pags> - total number of pages of the message
  <data> - CBM Content of Message

- If **<dcs>** indicates that GSM03.38 default alphabet is used , each character of GSM alphabet will be converted into current TE character set (see **+CSCS**)
- If **<dcs>** indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41)

<ds> - SMS-STATUS-REPORTs reporting option

0 - status report receiving is not reported to the **DTE** and is not stored

1 - the status report is sent to the **DTE** with the following unsolicited result code:

(PDU Mode)
+CDS: <length><CR><LF><PDU>
where:
  <length> - PDU length
  <PDU> - message PDU

(TEXT Mode)
+CDS: <fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>
where:
  <fo> - first octet of the message PDU

+CNMI - New Message Indications To Terminal Equipment	SELINT 2

	<mr> - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format
	<ra> - recipient address, string type, represented in the currently selected character set (see **+CSCS**)
	<tora> - type of number **<ra>**
	<scts> - arrival time of the message to the SC
	<dt> - sending time of the message
	<st> - message status as coded in the PDU
	
	2 - if a status report is stored, then the following unsolicited result code is sent:
	
	    +CDSI: <memr>,<index>
	
	where:
	    <memr> - memory storage where the new message is stored "SM"
	    <index> - location on the memory where SMS is stored
	<bfr> - buffered result codes handling method:
	  0 - **TA** buffer of unsolicited result codes defined within this command is flushed to the **TE** when **<mode>=1..3** is entered (**OK** response shall be given before flushing the codes)
	  1 - **TA** buffer of unsolicited result codes defined within this command is cleared when **<mode>=1..3** is entered.

AT+CNMI?	Read command returns the current parameter settings for **+CNMI** command in the form: **+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>**
AT+CNMI=?	Test command reports the supported range of values for the **+CNMI** command parameters.
Reference	3GPP TS 27.005
Note	**DTR** signal is ignored, hence the indication is sent even if the **DTE** is inactive (**DTR** signal is **Low**). In this case the unsolicited result code may be lost so if MODULE remains active while **DTE** is not, at **DTE** startup is suggested to check whether new messages have reached the device meanwhile with command **AT+CMGL=0** that lists the new messages received.
Note	It has been necessary to take the following decisions to get over any incoherence problem, due to the possibility to have contemporaneous different settings of parameter **<mt>** in different sessions (see #PORTCFG and +CMUX): _(see table below)_

Message Class or Indication group, as in the DCS **<mt>** settings in different sessions	SM **Class** is **No Class** *OR* SM **Class** is **0** or **1** or **3** *OR* SM is an **Indication** with group "Discard"	SM **Class** is **3**
<mt>=2 for session "0" *AND* **<mt>=anyvalue** for other session(s)	**URC is shown only on session "0"**	
<mt>=3 for session "0" *AND* **<mt>=0** or **1** for other session(s)		**URC is shown only on session "0"**

Note	The following table clarifies which URC is shown and if the DELIVER SM is stored, depending on the **<mt>** parameter value and the SM class.

		SM CLASS

+CNMI - New Message Indications To Terminal Equipment						SELINT 2

		0 / msg waiting discard	**1 / no class**	**2**	**3**	**msg waiting store**
<mt>	**0**	Store in <mems>	Store in <mems>	Store in SIM	Store in <mems>	Store in <mems>
	1	Store in <mems> - Send ind **+CMTI**	Store in <mems> - Send ind **+CMTI**	Store in SIM - Send ind **+CMTI**	Store in <mems> - Send ind **+CMTI**	Store in <mems> - Send ind **+CMTI**
	2	*Route msg to TE:* **+CMT** [1]	*Route msg to TE:* **+CMT**[1]	Store in SIM - Send ind **+CMTI**	*Route msg to TE:* **+CMT**[1]	Store in <mems> - Send ind **+CMTI**
	3	Store in <mems> - Send ind **+CMTI**	Store in <mems>- Send ind **+CMTI**	Store in SIM - Send ind **+CMTI**	*Route msg to TE:* **+CMT**[1]	Store in <mems> - Send ind **+CMTI**

where <mems> is the memory where the received messages are stored (see **+CPMS**)

Note	It has been necessary to take the following decision to get over an incoherence problem, due to the possibility to have contemporaneous different settings of parameter **<ds>** in different sessions (see #PORTCFG and +CMUX):

<ds> settings in different sessions	
<ds>=1 for session "0" *AND* **<ds>=2** for at least one of the other sessions	**URC +CDS is shown only on session "0" and no status report is stored on SIM**
<ds>=0 for session "0" *AND* **<ds>=2** for at least one of the other sessions	**no URC is shown on any session and no status report is stored on SIM**

---

[1] The SM is not stored!

5.1.5.3.2 New message acknowledgement - +CNMA

+CNMA – New Message Acknowledgement		SELINT 2
AT+CNMA	Execution command confirms correct reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. Acknowledge with **+CNMA** is possible only if the **+CSMS** parameter is set to 1 (**+CSMS=1**) when a **+CMT** or **+CDS** indication is shown. If no acknowledgement is given within the network timeout (17 seconds), 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). If command is executed, but no acknowledgement is expected, or some other ME related error occurs, final result code **+CMS ERROR: <err>** is returned. The AT command syntax and functionalities are different between SMS PDU Mode and SMS Text Mode, as explained below.	
(PDU Mode) **AT+CNMA[=<n>[,<length>[<CR>PDU is given<ctrl-Z/ESC]]]**	Either positive (RP-ACK) or negative (RP-ERROR) acknowledgement to the network is possible. Parameter **<n>** defines which one will be sent. Optionally (when **<length>** is greater than zero) an acknowledgement TPDU (SMS-DELIVER-REPORT for RP-ACK or RP-ERROR) may be sent to the network. The entering of PDU is done similarly as specified in command Send Message **+CMGS**, except that the SMSC address field is not present. Parameter: **<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.	
(Text Mode) **AT+CNMA**	Only positive acknowledgement to network (RP-ACK) is possible.	
(PDU Mode) *AT+CNMA=?*	Test command returns the possible range of values for the parameter **<n>**	
(Text Mode) *AT+CNMA=?*	Test command returns the **OK** result code.	
Notes	1 - In case that a directly routed message must be buffered in ME/TA (possible when **+CNMI** parameter **<mode>** equals 0 or 2) or AT interpreter remains too long in a state where result codes cannot be sent to TE (e.g. user is entering a message using **+CMGS**), acknowledgement (RP-ACK) is sent to the network without waiting **+CNMA** command from TE. 2 - It has been necessary to take the following decision to get over any incoherence problem, due to the possibility to have contemporaneous different settings of parameter **<mt>** and **<ds>** of the **+CNMI** command in different sessions (see #PORTCFG and +CMUX): only the **<mt>** and **<ds>** setting for session "0" are considered as valid to decide if **+CNMA** acknowledgment is expected or not.	
Example	**(PDU Mode)** AT+CSMS=1 +CSMS: 1,1,1	

+CNMA – New Message Acknowledgement	SELINT 2

	OK
	Set PDU mode.
	AT+CMGF=0
	OK
	AT+CNMI=2,2,0,0,0
	OK
	Message is received from network.
	+CMT: "",70
	0681600058542600048098060 0F170110370537284…
	Send positive acknowledgement to the network.
	AT+CNMA=0
	OK
	Message is received from network.
	+CMT: "",70
	0681600058542600048098060 0F170110370537284…
	Send negative acknowledgment (Unspecified error) to the network.
	AT+CNMA=2,3<CR>
	> 00FF00 <Ctrl-Z>
	OK
	(Text Mode)
	AT+CSMS=1
	+CSMS: 1,1,1
	OK
	Set Text mode.
	AT+CMGF=1
	OK
	AT+CNMI=2,2,0,0,0
	OK
	Message is received from network.
	+CMT: "+821020955219",,"07/07/26,20:09:07+36"
	TEST MESSAGE
	Send positive acknowledgement to the network.
	AT+CNMA
	OK
Reference	3GPP TS 27.005

5.1.5.3.3   List Messages - +CMGL

+CMGL - List Messages		SELINT 2
AT+CMGL [=<stat>]	Execution command reports the list of all the messages with status value **<stat>** stored into **<memr>** message storage (**<memr>** is the message storage for read and delete SMs as last settings of command **+CPMS**). The parameter type and the command output depend on the last settings of command **+CMGF** (message format to be used) **(PDU Mode)**	

+CMGL - List Messages		**SELINT 2**

Parameter:

<stat>

 0 - new message

 1 - read message

 2 - stored message not yet sent

 3 - stored message already sent

 4 - all messages.

If there is at least one message to be listed the representation format is:

+CMGL: <index>,<stat>,<alpha>,<length><CR><LF><pdu>[<CR><LF>

+CMGL: <index>,<stat>,<alpha>,<length><CR><LF><pdu>[...]]

where:

<index> - message position in the memory storage list.

<stat> - status of the message

<alpha> - string type alphanumeric representation of **<da>** or **<oa>**, corresponding to an entry found in the phonebook; used character set is the one selected with command **+CSCS**.

<length> - length of the PDU in bytes

<pdu> - message in PDU format according to 3GPP TS 23.040

(Text Mode)

Parameter:

<stat>

 "REC UNREAD" - new message

 "REC READ" - read message

 "STO UNSENT" - stored message not yet sent

 "STO SENT" - stored message already sent

 "ALL" - all messages.

The representation format for stored messages (either sent or unsent) or received messages (either read or unread, not message delivery confirm) is (the information written in italics will be present depending on **+CSDH** last setting):

**+CMGL: <index>,<stat>,<oa/da>,<alpha>,<scts>*[,<tooa/toda>,*
<length>]<CR><LF><data>[<CR><LF>**

**+CMGL: <index>,<stat>,<oa/da>,<alpha>,<scts>*[,<tooa/toda>,*
<length>]<CR><LF><data>[...]]**

where:

<index> - message position in the storage

<stat> - message status

<oa/da> - originator/destination address, string type , represented in the currently selected character set (see **+CSCS**)

<alpha> - string type alphanumeric representation of **<da>** or **<oa>**, corresponding to an entry found in the phonebook; used character set is the one selected with command **+CSCS**.

<scts> - TP-Service Centre Time Stamp in Time String Format

<tooa/toda> - type of number **<oa/da>**

 129 - number in national format

 145 - number in international format (contains the "**+**")

<length> - text length

<data> - TP-User-Data

- If **<dcs>** indicates that GSM03.38 default alphabet is used , each character of GSM alphabet will be converted into current TE character set (see **+CSCS**)

- If **<dcs>** indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long

+CMGL - List Messages	SELINT 2

	hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41) • If <fo> indicates that a UDH is present each 8-bit octet will be converted into two IRA character long hexadecimal number. The <length> indicates text length in characters without UDH length. If there is at least one message delivery confirm to be listed the representation format is: **+CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>** **[<CR><LF>** **+CMGL: <index>,<stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>** **[...]]** where **<index>** - message position in the storage **<stat>** - message status **<fo>** - first octet of the message PDU **<mr>** - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format **<ra>** - recipient address, string type , represented in the currently selected character set (see **+CSCS**) **<tora>** - type of number <ra> **<scts>** - arrival time of the message to the SC **<dt>** - sending time of the message **<st>** - message status as coded in the PDU Note: If parameter is omitted the command returns the list of sms with "**REC UNREAD**" status. Note: the order in which the messages are reported by **+CMGL** corresponds to their position in the memory storage
AT+CMGL=?	Test command returns a list of supported **<stat>**s
Reference	3GPP TS 27.005, 3GPP TS 23.040

5.1.5.3.4 Read Message - +CMGR

+CMGR - Read Message		SELINT 2
AT+CMGR= **<index>**	Execution command reports the message with location value **<index>** from **<memr>** message storage (**<memr>** is the message storage for read and delete SMs as last settings of command **+CPMS**). Parameter: **<index>** - message index. The output depends on the last settings of command **+CMGF** (message format to be used) **(PDU Mode)** If there is a message in location **<index>**, the output has the following format: **+CMGR: <stat>,<alpha>,<length><CR><LF><pdu>** where **<stat>** - status of the message 0 - new message 1 - read message 2 - stored message not yet sent 3 - stored message already sent **<alpha>** - string type alphanumeric representation of **<da>** or **<oa>**, corresponding to an entry found in the phonebook; used character set is the one selected with command **+CSCS**. **<length>** - length of the PDU in bytes. **<pdu>** - message in PDU format according to 3GPP TS 23.040. The status of the message and entire message data unit **<pdu>** is returned. **(Text Mode)** If there is a **Received** message in location **<index>** the output format is (the information written in *italics* will be present depending on **+CSDH** last setting)*:* **+CMGR: <stat>,<oa>,<alpha>,<scts>*[,<tooa>,<fo>,<pid>, <dcs>,<sca>,<tosca>,<length>]*<CR><LF><data>** If there is either a **Sent** or an **Unsent** message in location **<index>** the output format is: **+CMGR: <stat>,<da>,<alpha>*[,<toda>,<fo>,<pid>,<dcs>,[<vp>], <sca>,<tosca>,<length>]*<CR><LF><data>** If there is a **Message Delivery Confirm** in location **<index>** the output format is: **+CMGR: <stat>,<fo>,<mr>,<ra>,<tora>,<scts>,<dt>,<st>** where: **<stat>** - status of the message "REC UNREAD" - new received message unread "REC READ" - received message read "STO UNSENT" - message stored not yet sent "STO SENT" - message stored already sent *<fo>* - first octet of the message PDU **<mr>** - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format **<ra>** - recipient address, string type, represented in the currently selected character set (see **+CSCS**) **<tora>** - type of number **<ra>** **<scts>** - arrival time of the message to the SC **<dt>** - sending time of the message	

+CMGR - Read Message	SELINT 2

	<st> - message status as coded in the PDU
	<pid> - Protocol Identifier
	<dcs> - Data Coding Scheme
	<vp> - Validity Period; its format depends on SMS-SUBMIT **<fo>** setting (see **+CSMP**):
	    a) *Not Present* if **<fo>** tells that the *Validity Period Format is **Not Present***
	    b) *Integer* type if **<fo>** tells that the *Validity Period Format is **Relative***
	    c) *Quoted time-string type* if **<fo>** tells that the *Validity Period Format is **Absolute***
	    d) Quoted hexadecimal representation of 7 octets if **<fo>** tells that the *Validity Period Format is **Enhanced***.
	<oa> - Originator address, string type represented in the currently selected character set (see **+CSCS**)
	<da> - Destination address, string type represented in the currently selected character set (see **+CSCS**)
	<alpha> - string type alphanumeric representation of **<da>** or **<oa>**, corresponding to an entry found in the phonebook; used character set is the one selected with command **+CSCS**.
	<sca> - Service Centre number
	<tooa>,<toda >,<tosca> - type of number **<oa>,<da>,<sca>**
	  129 - number in national format
	  145 - number in international format (contains the "**+**")
	<length> - text length
	<data> - TP-User_data
	• If **<dcs>** indicates that GSM03.38 default alphabet is used , each character of GSM alphabet will be converted into current TE character set (see **+CSCS**)
	• If **<dcs>** indicates that 8-bit or UCS2 data coding scheme is used, each 8-bit octet will be converted into two IRA character long hexadecimal number (e.g. octet 0x2A will be converted as two characters 0x32 0x41)
	
	Note: in both cases if status of the message is 'received unread', status in the storage changes to 'received read'.

AT+CMGR=?	Test command returns the **OK** result code
Reference	3GPP TS 27.005

5.1.5.4 Message Sending And Writing

5.1.5.4.1 Send Message - +CMGS

+CMGS - Send Message	SELINT 2
(PDU Mode) **AT+CMGS= <length>**	**(PDU Mode)** Execution command sends to the network a message. Parameter: **<length>** - length of the PDU to be sent in bytes (excluding the SMSC address octets). 7..164 After command line is terminated with **<CR>**, the device responds sending a four character sequence prompt: **<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)** and waits for the specified number of bytes. Note: the **DCD** signal shall be in **ON** state while PDU is given. Note: the echoing of given characters back from the TA is controlled by echo command **E** Note: the **PDU** shall be hexadecimal format (each octet of the **PDU** is given as two IRA character long hexadecimal number) and given in one line. Note: when the length octet of the SMSC address (given in the **PDU**) equals zero, the SMSC address set with command **+CSCA** is used; in this case the SMSC Type-of-Address octet shall not be present in the **PDU**. To send the message issue **Ctrl-Z** char (**0x1A** hex). To exit without sending the message issue **ESC** char (**0x1B** hex). If message is successfully sent to the network, then the result is sent in the format: **+CMGS: <mr>** where **<mr>** - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format. Note: if message sending fails for some reason, an error code is reported. Note: care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.

(Text Mode)
AT+CMGS=<da>[,<toda>]
	(Text Mode)
	Execution command sends to the network a message.
	
	Parameters:
	<da> - destination address, string type represented in the currently selected character set (see **+CSCS**).
	<toda> - type of destination address
	  129 - number in national format
	  145 - number in international format (contains the "**+**")
	
	After command line is terminated with **<CR>**, the device responds sending a four character sequence prompt:
	
	<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)

+CMGS - Send Message	SELINT 2
	After this prompt text can be entered; the entered text should be formatted as follows: - if current **<dcs>** (see **+CSMP**) indicates that GSM03.38 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A; **backspace** can be used to delete last character and **carriage returns** can be used; after every **<CR>** entered by the user the sequence **<CR><LF><greather_than><space>** is sent to the TE. - if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the **'asterisk'** will be entered as **2A** (IRA50 and IRA65**) and this will be converted to an octet with integer value **0x2A**) Note: the **DCD** signal shall be in **ON** state while text is entered. Note: the echoing of entered characters back from the TA is controlled by echo command **E** To send the message issue **Ctrl-Z** char (**0x1A** hex). To exit without sending the message issue **ESC** char (**0x1B** hex). If message is successfully sent to the network, then the result is sent in the format: **+CMGS: <mr>** where **<mr>** - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format. Note: if message sending fails for some reason, an error code is reported. Note: care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued. Note: it is possible to send a concatenation of at most 10 SMs; the maximum number of chars depends on the **<dcs>**: 1520 chars if 3GPP TS 23.038 default alphabet is used, 1330 chars if 8-bit is used, 660 chars if UCS2 is used. If entered text is longer than this maximum value an error is raised
AT+CMGS=?	Test command resturns the **OK** result code.
Note	To avoid malfunctions is suggested to wait for the **+CMGS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.
Reference	3GPP TS 27.005

5.1.5.4.2 Send Message From Storage - +CMSS

+CMSS - Send Message From Storage		SELINT 2

**AT+CMSS=
<index>[,<da>
[,<toda>]]**
	Execution command sends to the network a message which is already stored in the **<memw>** storage (see **+CPMS**) at the location **<index>**.
	
	Parameters:
	<index> - location value in the message storage **<memw>** of the message to send
	<da> - destination address, string type represented in the currently selected character set (see **+CSCS**); if it is given it shall be used instead of the one stored with the message.
	<toda> - type of destination address
	  129 - number in national format
	  145 - number in international format (contains the "**+**")
	
	If message is successfully sent to the network then the result is sent in the format:
	
	+CMSS: <mr>
	where:
	<mr> - message reference number.
	
	If message sending fails for some reason, an error code is reported:
	
	+CMS ERROR:<err>
	
	Note: to store a message in the **<memw>** storage see command **+CMGW.**
	
	Note: care must be taken to ensure that during the command execution, which may take several seconds, no other **SIM** interacting commands are issued.	

AT+CMSS=?	Test command resturns the **OK** result code.	
Note	To avoid malfunctions is suggested to wait for the **+CMSS: <mr>** or **+CMS ERROR: <err>** response before issuing further commands.	
Reference	3GPP TS 27.005	

5.1.5.4.3 Write Message To Memory - +CMGW

+CMGW - Write Message To Memory		SELINT 2

(PDU Mode)
**AT+CMGW=
<length>
[,<stat>]**
	(PDU Mode)
	Execution command writes in the **<memw>** memory storage a new message.
	
	Parameter:
	<length> - length in bytes of the PDU to be written.
	  7..164
	<stat> - message status.
	  0 - new message (received unread message; default for DELIVER messages (3GPP TS 23.040 SMS-DELIVER messages))
	  1 - read message
	  2 - stored message not yet sent (default for SUBMIT messages(3GPP TS 23.040 SMS-SUBMIT messages))
	  3 - stored message already sent
	
	The device responds to the command with the prompt '>' and waits for the specified number of bytes.
	
	To write the message issue **Ctrl-Z** char (**0x1A** hex).
	To exit without writing the message issue **ESC** char (**0x1B** hex).	

	If message is successfully written in the memory, then the result is sent in the format:
	+CMGW: <index>
	where: **<index>** - message location index in the memory **<memw>**.
	If message storing fails for some reason, an error code is reported.
	Note: care must be taken to ensure that during the command execution, no other SIM interacting commands are issued.
	Note: in PDU mode, not only SUBMIT messages can be stored in SIM, but also DELIVER and STATUS REPORT messages (3GPP TS 23.040 SMS-STATUS-REPORT messages). SUBMIT messages can only be stored with status 2 or 3; DELIVER and STATUS REPORT messages can only be stored with status 0 or 1.

(Text Mode)
AT+CMGW[=<da>
[,<toda>
[,<stat>]]]
	(Text Mode)
	Execution command writes in the **<memw>** memory storage a new message.
	
	Parameters:
	<da> - destination address, string type represented in the currently selected character set (see **+CSCS**).
	<toda> - type of destination address.
	  129 - number in national format
	  145 - number in international format (contains the "**+**")
	<stat> - message status.
	  "REC UNREAD" - new received message unread (default for DELIVER messages)
	
	  "REC READ" - received message read
	
	  "STO UNSENT" - message stored not yet sent (default for SUBMIT messages)
	  "STO SENT" - message stored already sent
	
	After command line is terminated with **<CR>**, the device responds sending a four character sequence prompt:
	
	<CR><LF><greater_than><space> (IRA 13, 10, 62, 32)
	
	After this prompt text can be entered; the entered text should be formatted as follows:
	
	- if current **<dcs>** (see **+CSMP**) indicates that GSM03.38 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A; **backspace** can be used to delete last character and **carriage returns** can be used; after every **<CR>** entered by the user the sequence **<CR><LF><greather_than><space>** is sent to the TE.
	- if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the **'asterisk'** will be entered as **2A** (**IRA50** and **IRA65**) and this will be converted to an octet with integer value **0x2A**)
	
	Note: the **DCD** signal shall be in ON state while text is entered.

+CMGW - Write Message To Memory		SELINT 2
	Note: the echoing of entered characters back from the TA is controlled by echo command **E**	
	To write the message issue **Ctrl-Z** char (**0x1A** hex).	
	To exit without writing the message issue **ESC** char (**0x1B** hex).	
	If message is successfully written in the memory, then the result is sent in the format:	
	+CMGW: <index> where: **<index>** - message location index in the memory **<memw>**.	
	If message storing fails for some reason, an error code is reported.	
	Note: care must be taken to ensure that during the command execution, no other SIM interacting commands are issued.	
	Note: it is possible to save a concatenation of at most 10 SMs; the maximum number of chars depends on the **<dcs>**: 1530 chars if 3GPP TS 23.038 default alphabet is used, 1340 chars if 8-bit is used, 670 chars if UCS2 is used. If entered text is longer than this maximum value an error is raised.	
	Note: in text mode, not only SUBMIT messages can be stored in SIM, but also DELIVER messages. The type of saved message depends upon the current <fo> parameter (see **+CSMP**). For a DELIVER message, current <vp> parameter (see **+CSMP**) is used to set the message Service Centre Time Stamp <scts>, so it has to be an absolute time string, e.g. "09/01/12,11:15:00+04". SUBMIT messages can only be stored with status "STO UNSENT" or "STO SENT"; DELIVER messages can only be stored with status "REC UNREAD" or "REC READ".	
AT+CMGW=?	Test command returns the **OK** result code.	
Reference	3GPP TS 27.005	
Note	To avoid malfunctions is suggested to wait for the **+CMGW: <index>** or **+CMS ERROR: <err>** response before issuing further commands.	

5.1.5.4.4   Delete Message - +CMGD

+CMGD - Delete Message		SELINT 2

**AT+CMGD=
<index>
[,<delflag>]**
	Execution command deletes from memory **<memr>** the message(s).
	
	Parameter:
	<index> - message index in the selected storage **<memr>** that can have values form 1 to N, where N depends on the available space (see **+CPMS**)
	<delflag> - an integer indicating multiple message deletion request.
	  0 (or omitted) - delete message specified in **<index>**
	  1 - delete all read messages from **<memr>** storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched
	  2 - delete all read messages from **<memr>** storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched
	  3 - delete all read messages from **<memr>** storage, sent and unsent mobile originated messages, leaving unread messages untouched
	  4 - delete all messages from **<memr>** storage.	

+CMGD - Delete Message		SELINT 2
	Note: if **<delflag>** is present and not set to 0 then, if <index> is greater than 0, **<index>** is ignored and ME shall follow the rules for **<delflag>** shown above.	
AT+CMGD=?	Test command shows the valid memory locations and optionally the supported values of **<delflag>**. **+CMGD: (supported <index>s list)[,(supported <delflag>s list)]**	
Example	AT+CMGD=? +CMGD: (1,2,3,6,7,17,18,19,20,37,38,39,47),(0-4) OK	
Reference	3GPP TS 27.005	

5.1.5.4.5   Select service for MO SMS messages - +CGSMS

+CGSMS – Select service for MO SMS messages		SELINT 2
AT+CGSMS= [<service>]	The set command is used to specify the service or service preference that the MT will use to send MO SMS messages. <**service**>: a numeric parameter which indicates the service or service preference to be used 0 - GPRS 1 - circuit switched (default) 2 - GPRS preferred (use circuit switched if SMS via GPRS service not available or GPRS not registered) 3 - circuit switched preferred (use GPRS if SMS via GSM service not available or GSM not registered) Note: the <**service**> value is saved on NVM as global parameter	
AT+CGSMS?	The read command returns the currently selected service or service preference in the form: **+CGSMS: <service>**	
AT+ CGSMS=?	Test command reports the supported list of currently available <service>s.	
Reference	3GPP TS 27.005	

5.1.5.5 Message Sending And Writing (3GPP2 mode)

5.1.5.5.1 Send Message From storage - +CMSS

+CMSS - Send Message From Storage		SELINT 2
AT+CMSS=<index>[,<da>[,<toda>]]	Execution command sends to the network a message which is already stored in the <memw> storage (see +CPMS) at the location <index>. Parameters: <index> - location value in the message storage <memw> of the message to send <da> - destination address, string type represented in the currently selected character set (see +CSCS); if it is given it shall be used instead of the one stored with the message. <toda> - type of destination address 129 - number in national format 145 - number in international format (contains the "+") If message is successfully sent to the network then the **OK** result is shown. If message sending fails for some reason, an error code is reported: **+CMS ERROR:<err>** Note: to store a message in the <memw>storage see command +CMGW. Note: care must be taken to ensure that during the command execution, which may take several seconds, no other SIM interacting commands are issued.	
AT+CMSS=?	Test command returns the **OK** result code.	

5.1.5.5.2 Set Text Mode Parameters - +CSMP

+CSMP - Set Text Mode Parameters		SELINT 2
AT+CSMP=[<callback_addr>[,<tele_id>[,<priority>[,<enc_type>]]]]	Set command is used to select values for additional parameters for storing and sending SMs when the text mode is used (**AT+CMGF=1**) **Parameters:** <callback_addr>- Callback address. Note: The maximum length is different with every carrier. In case of Sprint and Aeris.Net: Maximum length is 32 characters In case of Verizon: Maximum length is 20 characters Note: Initially, this parameter is null. Some carrier networks discard SMS's without a callback number. Therefore, we recommend that customer setup callback number using AT+CSMP command. Note: The <callback_addr> isn't used and saved for only Aeris.Net <tele_id>- Teleservice ID 4097 - page 4098 - SMS message (factory default) <priority> - Priority Note: The priority is different with every carrier. In case of Sprint and Aeris.Net: 0 - Normal (factory default) 1 - Interactive 2 - Urgent 3 - Emergency In case of Verizon: 0 - Normal (factory default) 1 – High	

+CSMP - Set Text Mode Parameters		SELINT 2
	\<enc_type\>- data coding scheme: 0 - 8-bit Octet (factory default for only Aeris.Net) 2 - 7-bit ASCII (factory default) 4 - 16-bit Unicode (Sprint does not support) Note: the current settings are stored through +CSAS	
AT+CSMP?	Read command reports the current setting in the format: **+CSMP: \<callback_addr\>,\<tele_id\>,\<priority\>,\<enc_type\>**	
AT+CSMP=?	Test command returns the OK result code.	
Example	AT+CSMP=? OK AT+CSMP? +CSMP: ,4098,0,0 OK AT+CSMP="1234567890",4097,1,2 OK AT+CSMP? +CSMP: "1234567890",4097,1,2 OK	

5.1.5.5.3 Save Settings - +CSAS

+CSAS - Save Settings		SELINT 2
AT+CSAS[= \<profile\>]	Execution command saves settings made by + CSMP command in local non-volatile memory **Parameter:** **\<profile\>** 0 - it saves the settings to NVM. Note: If parameter is omitted the settings are saved to profile 0 in the non-volatile memory.	
AT+CSAS=?	Test command returns the possible range of values for the parameter **\<profile\>**.	
Example	AT+CSAS=? +CSAS: (0) OK AT+CSAS OK AT+CSAS=0 OK	

5.1.5.5.4 Restore Settings - +CRES

+CRES - Restore Settings		SELINT 2
AT+CRES[= [\<profile\>]	Execution command restores message service settings saved by +CSAS command from NVM. Parameter: **\<profile\>** 0 - it restores message service settings from NVM. Note: If parameter is omitted the command restores message service settings from NVM.	
AT+CRES=?	Test command returns the possible range of values for the parameter **\<profile\>**.	
Example	AT+CRES=?	

+CRES - Restore Settings	SELINT 2
+CRES: (0) OK AT+CRES OK AT+CRES=0 OK	

5.1.5.5.5 Send Message (3GPP2) - +CMGS

+CMGS - Send Message (3GPP2)	SELINT 2
(PDU Mode) **AT+CMGS=** **<length>**	**(PDU Mode)** Execution command sends to the network a message. After command line is terminated with <CR>, the device responds sending a four character sequence prompt: <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) and waits for the specified number of bytes. Parameter: **<length>**- length of the PDU to be sent in bytes (excluding the Destination address octets). 5..183 Note: the echoing of given characters back from the TA is controlled by echo command **E** Note: the PDU shall be hexadecimal format (each octet of the PDU is given as two IRA character long hexadecimal number) and given in one line. To send the message issue **Ctrl-Z** char (0x1A hex). To exit without sending the message issue ESC char (0x1B hex). If message is successfully sent to the network then the **OK** result is shown. Note: if message sending fails for some reason, an error code is reported. Note: The limit of user data is 160 characters.
Example – PDU mode	AT+CMGF=0 OK AT+CMGS=35 > 07801091346554F307801096224658F110020000166262626262626262626262 6262626 2626262626262626262 OK 07 <addr_len: 7byte> 80 <type_addr: 128> 1091346554F3 <Destination_address:01194356453> 07 <addr_len: 7byte> 80 <type_addr: 128> 1096224658F1 <callback_address:01692264851> 1002 <Teleservice_id: 4098(decimal)> 00 <priority: normal> 00 <encoding_type: octet> 16 <data_len: 22> 62626262626262626262626262626262626262626262 <user_data: bbbbbbbbbbbbbbbbbbbbbb> AT+CMGS=31 > 07801091346554F307801091346554F31002020212C3870E1C3870E1C3 87162C5 8B162C58B1620 OK 07 <addr_len: 7byte>

+CMGS - Send Message (3GPP2)		SELINT 2
	80 <type_addr: 128> 1091346554F3 <destination_address:01194356453> 07 <addr_len: 7byte> 80 <type_addr: 128> 1091346554F3 <callback_address: 01194356453> 1002 <Teleservice_id: 4098(decimal)> 02 <priority: ungent > 02 <encoding_type: 7-bit ASCII > 12 <data_len: 18> C3870E1C3870E1C387162C58B162C58B1620 <user_data: aaaaaaaaaabbbbbbbbbb>	
(Text Mode) **AT+CMGS=** **<da>** **[,<toda>]**	**(Text Mode)** Execution command sends to the network a message. Parameters: **<da>**- destination address, string type represented in the currently selected character set (see **+CSCS**); ASCII characters in the set (0 9), #,*,(A D); Note: The maximum length is different with every carrier. In case of Sprint and Aeris.Net: Maximum length is 32 characters In case of Verizon: Maximum length is 20 characters. **<toda>**- type of destination address 129 - number in national format 145 - number in international format (contains the "+") To send the message issue **Ctrl-Z** char **(0x1A** hex). To exit without sending the message issue **ESC** char **(0x1B** hex). If message is successfully sent to the network then the **OK** result is shown. Note: if message sending fails for some reason, an error code is reported. Note: To discard SMS, press the "ESC" key, an "OK" response will be returned.	
Example – Text mode	AT+CMGF=1 OK AT+CMGS="9194547830" > Test SMS OK	
AT+CMGS=?	Test command returns the OK result code.	
Note	To avoid malfunctions is suggested to wait for the **OK** or **+CMS** **ERROR: <err>** response before issuing further commands.	

5.1.5.5.6   List Messages (3GPP2) - +CMGL

+CMGL – List Messages		SELINT 2
AT+CMGL= **[=<stat>]**	Execution command reports the list of all the messages with status value **<stat>** stored into **<memr>** message storage (**<memr>** is the message storage for read and delete SMs as last settings of command +CPMS). The parameter type and the command output depend on the last settings of command **+CMGF** (message format to be used) **(PDU Mode)** Parameter: **<stat>** 0 - new message 1 - read message	

+CMGL – List Messages	SELINT 2

2 - stored message not yet sent
3 - stored message already sent
4 - all messages.

Each message to be listed is represented in the format:

+CMGL: <index>,<stat>,"",<length><CR><LF><pdu>

Case of received message from base station:
<PDU>:
<orig_num><date><tele_id><priority><enc_type><length><data>
Case of sending message to base station:
<PDU>:
<da><callback><tele_id><priority><enc_type><length><data>

where:
<index> - message position in the memory storage list.
<stat> - status of the message
<length> - length of the PDU in bytes
<pdu> - message in PDU format

(Text Mode)
Parameter:
<stat>
"REC UNREAD" - new message
"REC READ" - read message
"STO UNSENT" - stored message not yet sent
"STO SENT" - stored message already sent
"ALL" - all messages.

Each message to be listed is represented in the format (the information written in italics will be present depending on **+CSDH** last setting):
If there is at least a Received message to be listed the representation format is:

+CMGL:
<index>,<stat>,<orig_num>,<callback>,<date>[,*<tooa>,<tele_id>,<priority>,<enc_type>,<length>*]<CR><LF> <data>

If there is at least a Sent or an Unsent message to be listed the representation format is:

+CMGL:
<index>,<stat>,<da>,<callback>[,,*<toda>,<tele_id>,<priority>,<enc_type>,<length>*]<CR><LF><data>

Where
<orig_num> - Origination number.
<da> - Destination number.
<callback> - Callback number.
<date> - Received date in form as "YYYYMMDDHHMMSS".
<tooa> - Type of <orig_num>.
<toda> - Type of <da>.
<tele_id> - Teleservice ID.
4097 - page
4098 - SMS message
4099 - voice mail notification
262144 - voice mail notification

<priority> - Priority.
Note: The priority is different with every carrier.

	0 - Normal (factory default) 1 - High <**enc_type**>- Encoding type of message. 0 - Octet, unspecified (8-bit) 2 - ASCII (7-bit) 3 - IA5 (7-bit) 4 - Unicode (16-bit) 8 - ISO 8859 Latin 1 (8-bit) 9 - GSM (7-bit) <**length**> - Length of message. <**data**> - Message data. (Indicates the new voice mail count, if <tele_id> is voice mail notification) **Note:** If parameter is omitted the command returns the list of sms with "**REC UNREAD**" status.
AT+CMGL=?	Test command returns a list of supported <**stat**>s
Example	<PDU Mode> Case of received message from base station: AT+CMGL=1 +CMGL: 29,1,"",52 0780281149534635080804094727100202021C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C20 OK Where: 07 <addr_len: 7byte> 80 <type_addr: 128> 281149534635 <Origination number: 821194356453> 080804094727 <Date: 08/08/04,09:47:27> 1002 <Teleservice_id: 4098(decimal)> 02 <priority: urgent > 02 <encoding_type: 7-bit ASCII > 21 <data_len: 33> C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C20 <user_data: aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa> Else: AT+CMGL=2 +CMGL: 31,2,"",23 07801091346554F307801091346554F3100200000A6161616161616161616161 OK 07 <addr_len: 7byte> 80 <type_addr:128> 1091346554F3 <Destination_addr: 01194356453> 07 <addr_len: 7byte> 80 <type_addr:128> 1096224658F1 <Callback_Number: 01692264851> 1002 <Teleservice_id: 4098(decimal)> 00 <priority: normal > 00 <encoding_type: 8-bit Octet > 0A <data_len: 10> 6161616161616161616161 <data: aaaaaaaaaa> <PDU Mode>

+CMGL – List Messages	SELINT 2

<table>
<tr><td></td><td>

AT+CMGF=0
OK

AT+CMGF?
+CMGF: 0
OK

AT+CMGL=?
(0-4)
OK

AT+CMGL=4
+CMGL: 0,2,"",12
0680104139430600100200000006313233343536
+CMGL: 1,2,"",15
068010413943060010020000009313233343536363737
+CMGL: 2,2,"",18
0680104139430600100200000C313132323334343434343434
+CMGL: 3,2,"",21
0680104139430600100200000F6166666173646565656565656565656565
OK

<Text Mode>
AT+CMGF=1
OK

AT+CMGF?
+CMGF: 1
OK

AT+CMGL=?
("REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL")
OK

at+cmgl="ALL"
+CMGL: 0,"STO UNSENT","My Number","",
123456
+CMGL: 1,"STO UNSENT","My Number","",
123456677
+CMGL: 2,"STO UNSENT","My Number","",
112234444444
+CMGL: 3,"STO UNSENT","My Number","",
affasdeeeeeeeee
OK

</td></tr>
</table>

5.1.5.5.7   Read Message (3GPP2) - +CMGR

+CMGR - Read Message	SELINT 2
AT+CMGR= **<index>**	Execution command reports the message with location value **<index>** from **<memr>** message storage (**<memr>** is the message storage for read and delete SMs as last settings of command +CPMS). **Parameter:** **<index>** - message index. The output depends on the last settings of command +CMGF (message format to be used) **(PDU Mode)**

If there is at least one message to be listed the representation format is:
+CMGR:<stat>,"",<length><CR><LF><PDU>

Case of received message from base station :
<PDU>:
<orig_num>,<date><tele_id><priority><enc_type><length><data>
Case of sending message to base station:
<PDU>:
<da><callback><tele_id><priority><enc_type><length><data>

where
<stat> - status of the message
0 - new message
1 - read message
2 - stored message not yet sent
3 - stored message already sent

<length> - length of the PDU in bytes.

<pdu> - message in PDU format

(Text Mode)
Output format for received messages (the information written in italics will be present depending on **+CSDH** last setting):
Output format for message delivery confirm:
+CMGR:
<stat>,<orig_num>,<callback>,<date>[,*<tooa>,<tele_id>,<priority>,<enc_type>,<length>*]<CR><LF><data>

If there is either a Sent or an Unsent message in location <index> the output format is:
+CMGR:
<stat>,<da>,<callback>,[,*<toda>,<tele_id>,<priority>,<enc_type>,<length>*]<CR><LF><data>

where:
<stat> - status of the message
"REC UNREAD" - new received message unread
"REC READ" - received message read
"STO UNSENT" - message stored not yet sent
"STO SENT" - message stored already sent

<orig_num> - Origination number.

<callback> - Callback number.

<date> - Received date in form as "YYYYMMDDHHMMSS".

<tooa> - Type of <orig_num>.

<toda> - Type of <da>.

<tele_id> - Teleservice ID.
4097 - page
4098 - SMS message
4099 - voice mail notification
262144 - voice mail notification

<priority> - Priority.
Note: The priority is different with every carrier.
0 - Normal (factory default)

+CMGR - Read Message		SELINT 2
	1 - High <enc_type>- Encoding type of message. 0 - Octet, unspecified (8-bit) 2 - ASCII (7-bit) 3 - IA5 (7-bit) 4 - Unicode (16-bit) 8 - ISO 8859 Latin 1 (8-bit) 9 - GSM (7-bit) <length> - Length of message. <data> - Message data. (Indicates the new voice mail count, if <tele_id> is voice mail notification)	
AT+CMGR=?	Test command returns the OK result code	
Example	<PDU Mode> Case of received message from base station: AT+CMGR=29 +CMGR: 1,"",52 07802811495346350808040947271002020221C3870E1C3870E1C3870E1C3870 E1C3870E1C3870E1C3870E1C3870E1C3870E1C20 OK Where: 07 <addr_len: 7byte> 80 <type_addr: 128> 281149534635 <Origination number: 821194356453> 080804094727 <Date: 08/08/04,09:47:27> 1002 <Teleservice_id: 4098(decimal)> 02 <priority: urgent > 02 <encoding_type: ascii > 21 <data_len: 33> C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E1C3870E 1C20 <user_data: aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa> Else: at+cmgr=31 +CMGR: 2,"",23 07801091346554F307801091346554F3100200000A61616161616161616161 OK Where: 07 <addr_len: 7byte> 80 <type_addr:128> 1091346554F3 <Origination number: 01193645534 > 07 <addr_len: 7byte> 80 <type_addr:128> 1091346554F3 < Callback number: 01193645534 > 1002 <Teleservice_id: 4098(decimal)> 00 <priority: Normal > 00 <encoding_type: 8-bit Octet > 0A <data_len: 10> 61616161616161616161 <usr data: aaaaaaaaaa> <Text Mode> AT+CSDH=1 OK AT+CMGR=1 +CMGR: "REC READ","","01191775982",20071217190804,,4098,,16,12	

+CMGR - Read Message	SELINT 2
TEST MESSAGE OK AT+CMGR=2 +CMGR: "REC READ","","01191775982",20071221160610,,4098,,16,9 TEST MESSAGE2 OK AT+CMGR=3 +CMGR: "STO SENT","01191775982","01096529157",,4098,,16,9 TEST MESSAGE2 OK	

5.1.5.5.8 Write Message to Memory (3GPP2) - +CMGW

+CMGW - Write Message To Memory	SELINT 2
(PDU Mode) **AT+CMGW=** **<length>** **[,<stat>]**	Execution command writes in the **<memw>** memory storage a new message. **Parameter:** **<length>** - length in bytes of the PDU to be written. 5..183 **<stat>** - message status. 0 - new message 1 - read message 2 - stored message not yet sent (default) 3 - stored message already sent The device responds to the command with the prompt '>' and waits for the specified number of bytes. To write the message issue **Ctrl-Z** char (**0x1A** hex). To exit without writing the message issue **ESC** char (**0x1B** hex). If message is successfully written in the memory, then the result is sent in theformat: **+CMGW: <index>** where: **<index>** - message location index in the memory **<memw>**. If message storing fails for some reason an "error" code reported. **Note:** to ensure that during the command execution, no other SIM interacting commands issued care must be taken of.
Example – PDU mode	AT+CMGF=0 OK AT+CMGW=35 >07801091346554F307801096224658F11002000016262626262626262626262626262626262626262 +CMGW: 4 OK Where: 07 <addr_len: 7byte> 80 <type_addr: 128> 1091346554F3 <Destination_address:01194356453> 07 <addr_len: 7byte> 80 <type_addr: 128>

+CMGW - Write Message To Memory	SELINT 2

	1096224658F1 <callback_address:01692264851>
	1002 <Teleservice_id: 4098(decimal)>
	00 <priority: normal>
	00 <encoding_type: octet>
	16 <data_len: 22>
	626262626262626262626262626262626262626262
	<user_data: bbbbbbbbbbbbbbbbbbbbbb>
(Text Mode) **AT+CMGW[=<da>** **[,<toda>** **[,<stat>]]]**	Execution command writes in the **<memw>** memory storage a new message. **Parameters:** **<da>** - destination address, string type represented in the currently selected character set (see +CSCS); ASCII characters in the set (0 9), #,*,(A D); **<toda>** - type of destination address 129 - number in national format 145 - number in international format (contains the "+") **<stat>** - message status. "REC UNREAD" - new received message unread "REC READ" - received message read "STO UNSENT" - message stored not yet sent (default) "STO SENT" - message stored already sent After command line is terminated with **<CR>**, the device responds sending a four character sequence prompt: <CR><LF><greater_than><space> **(IRA 13, 10, 62, 32)** Note: the echoing of entered characters back from the TA is controlled by echo command **E**. To write the message issue **Ctrl-Z** char (**0x1A** hex). To exit without writing the message issue **ESC** char (**0x1B** hex). If message is successfully written in the memory, then the result is sent in theformat: **+CMGW: <index>** where: **<index>** - message location index in the memory <memw>.
AT+CMGW=?	Test command returns the **OK** result code.
Example – TEXT mode	AT+CMGW=? OK AT+CMGF=1 OK AT+CMGW > Test message > Ctrl+Z must be used to write message +CMGW: 1 OK AT+CMGW="9194397977" > Test SMS +CMGW: 2 OK AT+CMGW="9194397977",129 > Test SMS +CMGW: 3 OK

+CMGW - Write Message To Memory		SELINT 2
Note	It is not possible to write a SMS in 7 bit ASCII character set (see **<enc_type>** parameter of **+CSMP (3GPP2)**) when current memory storage is **SM** (see **+CPMS** command). Therefore, in that case the SMS will be automatically converted and stored in GSM 7bit character set.	
Note	To avoid malfunctions is suggested to wait for the **+CMGW: <index>** or **+CMS ERROR: <err>** response before issuing further commands.	

5.1.6　　　Custom AT Commands

5.1.6.1　　　General Configuration AT Commands

5.1.6.1.1　　　Hang Up Call - #CHUP

#CHUP - Hang Up Call		SELINT 2
AT#CHUP	Execution command ends all active and held calls, also if a multi-party session is running. It also allows disconnecting of a data call from a CMUX instance different from the one that was used to start the data call.	
AT#CHUP=?	Test command returns the **OK** result code	

5.1.6.1.2　　　USB Configuration - #USBCFG

#USBCFG – USB Configuration		SELINT 2
AT#USBCFG=<mode>	Set command specify USB configuration on the modem device. New configuration mode applied at the next boot up time. Parameter: **<mode>** - USB configuration mode 0 – All the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is disabled; NCM is enabled; VID 0x1BC7 PID 0x0036 **(default value)** 1 – All the USB ports (Telit Mobile (USBx) are in ACM Data Only mode; Selective Suspend is disabled; NCM and MBIM are disabled; VID 0x1BC7 PID 0x0034 2 – All the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is disabled; NCM and MBIM are disabled; VID 0x1BC7 PID 0x0035 3 – All the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is disabled; NCM and MBIM are enabled; VID 0x1BC7 PID 0x0032 4 – All the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is enabled; NCM is enabled; VID 0x1BC7 PID 0x0037 5 – All the USB ports (Telit Mobile (USBx) are in ACM mode; Selective Suspend is enabled; NCM and MBIM are enabled; VID 0x1BC7 PID 0x0033 Note: the modem device doesn't reset automatically; use AT#REBOOT or a complete power cycle. Note: the default value depends on the software version	

Mode	Ports	SS	MBIM	NCM	DLINK	VID	PID
0	ACM	NO	NO	YES	TBD	0x1BC7	0x0036

#USBCFG – USB Configuration								SELINT 2
	1	ACM Data Only	NO	NO	NO	TBD	0x1BC7	0x0034
	2	ACM	NO	NO	NO	TBD	0x1BC7	0x0035
	3	ACM	NO	YES	YES	TBD	0x1BC7	0x0032
	4	ACM	YES	NO	YES	TBD	0x1BC7	0x0037
	5	ACM	YES	YES	YES	TBD	0x1BC7	0x0033
AT#USBCFG?	Read command shows the current **<mode>** in the following format **#USBCFG: <mode>**							
AT#USBCFG=?	Test command returns the list of supported values.							

5.1.6.1.3   Connect physical ports to Service Access Points - #PORTCFG

#PORTCFG – Connect physical ports to Service Access Points	SELINT 2
AT#PORTCFG=<Variant>	**AT#PORTCFG** command allows to connect Service Access Points (software anchorage points) to the external physical ports giving a great flexibility. Examples of Service Access Points: AT Parser Instance #1,#2, #3, TT(Telit Trace). **<Variant>** parameter range: depends on the product, use the test command to get the supported values; factory setting: 0. Please, refer to "LE910 V2 Series Ports Arrangements" document for a detailed explanation of all port configurations Note: in order to enable the set port configuration, the module has to be rebooted.
AT#PORTCFG?	Read command reports: **<requested>** value shows the requested configuration that will be activated on the next power off /on of the module; **<active>** value shows the actual configuration. **#PORTCFG: <requested>,<active>**
AT#PORTCFG=?	Test command reports a brief description of the supported ports arrangement solutions. For each **<Variant>** parameter value are displayed, on one row, the allowed couples formed by: a physical port and the logically connected internal software Access Point (AT, TT). On each row are reported the couples concerning both configurations: USB cable plugged into USB port or not plugged in. AT, indicated on each command row result, can be AT0, AT1, or AT2.

5.1.6.1.4   MBIM Configuration - #MBIMCFG

#MBIMCFG – MBIM Configuration	SELINT 2
AT#MBIMCFG=<cid>[,<cid2>[… ,<cidN>]]	The command allows the user to set a list of CIDs which will be used by MBIM when one or more connection(s) will be established. **<cid>** - (PDP Context Identifier) numeric parameter which specifies a particular PDP context definition. The allowed range depends on the product, then use the test command to get it.

#MBIMCFG – MBIM Configuration	SELINT 2
	<cid2> - <cidN> (PDP Context Identifier) numeric parameter which specifies a particular PDP context definition. The allowed range dep ends on the product, then use the test command to get it. These CIDs are optional and useful only when the user want to esta blish more MBIM connections (using different APNs) simultaneously . Note: the value is set immediately so that the next MBIM connect wi ll use the new value; it is also saved in NVM. Note: MBIM and internal stack (AT+CGACT, AT#SGACT …) are m utually exclusive: they can share the same APN on different or the s ame cid, but they can't be both active at the same time. Note: the list of CIDs cannot contain duplicates
AT#MBIMCFG?	Read command returns the current value of the MBIM <cid> list in the format: **#MBIMCFG: <cid>[,cid2[... ,cidN]]** Note: only the CIDs in the list are displayed by the read command.
AT#MBIMCFG=?	Test command returns the supported values for **<cid>**.
Example	AT# MBIMCFG=14 OK AT#MBIMCFG? #MBIMCFG: 14 OK AT# MBIMCFG=? #MBIMCFG: (1-15),(1-15),(1-15),(1-15),(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) ,(1-15) OK

5.1.6.1.5   NCM Configuration - #NCM

#NCM - NCM Configuration	SELINT 2

AT#NCM=<Mode>,<Cid>[,<Did >[,<UserId>,<Pwd>[,<DhcpSer verEnable>]]]	This command sets up a Network Control Model (NCM) session.
	
	Parameters:
	<Mode> - NCM mode
	1 – manual PDP context activation using AT+CGACT (default)
	2 – automatic PDP context and NCM activation (AT+CGACT and AT+CGDATA are managed internally)
	
	<Cid> - Context id
	   - For all product except LE910-SV_V2 and LE910-SV1:
	     the default is 15
	   - For LE910-SV_V2 and LE910-SV1:
	     the default is 3
	
	<Did> - Device id, currently limited to 0 (only one device)
	<UserId> - string type, used only if context requires it
	<Pwd> - string type, used only if context requires it
	<DhcpServerEnable> - dhcp server abilitation

#NCM - NCM Configuration		SELINT 2
	Note: the optional parameter **<DhcpServerEnable>** is **not yet supported**. Note: mode 2 activates a context, so all necessary setup has to be done before (registration, APN).	
AT#NCM?	Read command reports the session state in the following format: **#NCM: <Mode>,<Cid>,<Did>,<State>** … **OK** Where **<Mode>** is the selected NCM mode, **<Did>** is currently 0, **<Cid>** is the Context id associated to NCM, and **<State>** can be: 0 – disabled 1 – enabled	
AT#NCM=?	Test command reports the supported range of values for all the parameters.	

5.1.6.1.6   NCM Disable - #NCMD

#NCMD - NCM Disable		SELINT 2
AT#NCMD=<Did>	This command ends the Network Control Model session (NCM). Parameters: **<Did>** - Device id, currently limited to 0 (only one device) Note: this command also deactivates the context.	
AT#NCMD?	Read command reports the session state in the following format: **#NCMD: <Did>,<State>** … **OK** where **<Did>** is currently 0 and **<State>** can be: 0 – disabled 1 – enabled	
AT#NCMD=?	Test command reports the supported range of values for all the parameters.	

5.1.6.1.7   Initializes modem serial port with SPI protocol - #SPIOPEN

#SPIOPEN – Initializes modem serial port with SPI protocol		SELINT 2

AT#SPIOPEN=<ID>,<speed>,< mode>	This command initializes the provided modem serial port for SPI protocol.
	
	Parameters:
	<ID> - supported value is 3
	<speed> - supported speed value:
	      1 for 1 Mhz
	      2 for 3 Mhz
	      3 for 6 Mhz
	      4 for 12 Mhz
	<mode> - CPOL CPH setting:
	0 Clock signal is active high and data is sampled in rising edge.	

#SPIOPEN – Initializes modem serial port with SPI protocol		SELINT 2
	1 Clock signal is active high and data is sampled in falling edge. 2 Clock signal is active low and data is sampled in rising edge. 3 Clock signal is active low and data is sampled in falling edge	
AT#SPIOPEN?	Read command returns (0,0,0) if SPI is not opened, otherwise it returns the last provided Parameters value.	
AT#SPIOPEN=?	Test command reports available values for parameters **<ID>**, **<speed>** and **<mode>**.	

5.1.6.1.8   De-initializes modem serial port with SPI protocol - #SPICLOSE

#SPICLOSE – De - Initializes modem serial port with SPI protocol		SELINT 2
AT#SPICLOSE=<ID>	This command de-initializes the provided modem serial port for the SPI protocol . Parameters: **<ID>** - supported value is 3 Note: returns OK if de-initialization complete, ERROR otherwise	
AT#SPICLOSE?	Read command returns current initialized **<ID>** (0 as default).	
AT#SPICLOSE=?	Test command reports available values for parameter **<ID>**.	

5.1.6.1.9   Writes a buffer to the SPI and prints the read data - #SPIRW

#SPIRW – Writes a buffer to the SPI and prints the read data		SELINT 2
AT#SPIRW=[<length>]	This command writes a buffer to the SPI and prints the read data. Parameters: <length> - buffer length : MIN 1 byte MAX 128 bytes The module responds to the command with the prompt <greater_than><space> and waits for the data to send. When **<length>** bytes have been sent, operation is automatically completed. If data are successfully sent, the module answer with the bytes read on the SPI RX channel. The received data can be read on the AT console, the amount of printed data is the same received that is the length of the sent data. Note: the modem serial port on which the SPI data must be sent has to be initialized previously with an AT#SPIOPEN command, otherwise it will return ERROR.	
AT#SPIRW=?	Test command reports available value for parameter **<length>**.	

5.1.6.1.10   Network Selection Menu Availability - +PACSP

+PACSP - Network Selection Menu Availability		SELINT 2
AT+PACSP?	Read command returns the current value of the **<mode>** parameter in the format: **+PACSP<mode>** where:	

	<mode> - PLMN mode bit (in CSP file on the SIM)
	  0 - restriction of menu option for manual PLMN selection.
	  1 - no restriction of menu option for Manual PLMN selection.

AT+PACSP=?	Test command returns the **OK** result code.

5.1.6.1.11   Manufacturer Identification - #CGMI

#CGMI - Manufacturer Identification		**SELINT 2**
AT#CGMI	Execution command returns the device manufacturer identification code with command echo.	
AT#CGMI=?	Test command returns the **OK** result code.	

5.1.6.1.12   Model Identification - #CGMM

#CGMM - Model Identification		**SELINT 2**
AT#CGMM	Execution command returns the device model identification code with command echo.	
AT#CGMM=?	Test command returns the **OK** result code.	

5.1.6.1.13   Revision Identification - #CGMR

#CGMR - Revision Identification		**SELINT 2**
AT#CGMR	Execution command returns device software revision number with command echo.	
AT#CGMR=?	Test command returns the **OK** result code.	

5.1.6.1.14   Product Serial Number Identification - #CGSN

#CGSN - Product Serial Number Identification		**SELINT 2**
AT#CGSN	Execution command returns the product serial number, identified as the IMEI of the mobile, with command echo.	
AT#CGSN=?	Test command returns the **OK** result code.	

5.1.6.1.15   Request International Mobile station Equipment Identity and Software Version - +IMEISV

+IMEISV – Request International Mobile station Equipment Identity and Software Version		**SELINT 2**
AT+IMEISV	Execution command returns the International Mobile station Equipment Identity and Software Version Number, identified as the IMEISV of the mobile, without command echo. The IMEISV is composed of the following elements (each element shall consist of decimal digits only): • Type Allocation Code (TAC). Its length is 8 digits; • Serial Number (SNR) is an individual serial number uniquely identifying each equipment within each TAC. Its length is 6 digits; • Software Version Number (SVN) identifies the software version number of the mobile equipment. Its length is 2 digits.	
AT+IMEISV=?	Test command returns **OK** result code.	
Reference	3GPP TS 23.003	

5.1.6.1.16　International Mobile Subscriber Identity (IMSI) - #CIMI

#CIMI - International Mobile Subscriber Identity (IMSI)		SELINT 2
AT#CIMI	Execution command returns the international mobile subscriber identity, identified as the IMSI number, with command echo.	
AT#CIMI=?	Test command returns the **OK** result code.	

5.1.6.1.17　Read ICCID (Integrated Circuit Card Identification) - #CCID

#CCID - Read ICCID		SELINT 2
AT#CCID	Execution command reads on SIM the ICCID (card identification number that provides a unique identification number for the SIM)	
AT#CCID=?	Test command returns the **OK** result code.	

5.1.6.1.18　Service Provider Name - #SPN

#SPN - Service Provider Name		SELINT 2
AT#SPN	Execution command returns the service provider string contained in the SIM field **SPN**, in the format: **#SPN: <spn>** where: **<spn>** - service provider string contained in the SIM field **SPN**, represented in the currently selected character set (see **+CSCS**). Note: if the SIM field SPN is empty, the command returns just the **OK** result code.	
AT#SPN=?	Test command returns the **OK** result code.	

5.1.6.1.19　Extended Numeric Error report - #CEER

#CEER – Extended numeric error report		SELINT 2
AT#CEER	Execution command causes the TA to return a numeric code in the format **#CEER: <code>** which should offer the user of the TA a report of the reason for • the failure in the last unsuccessful call setup (originating or answering); • the last call release; • the last unsuccessful GPRS attach or unsuccessful PDN connection activation; • the last GPRS detach or PDN connection deactivation. Note: if none of the previous conditions has occurred since power up then **0** is reported (i.e. **No error**, see below) **<code>** values as follows <table><tr><th>Value</th><th>Diagnostic</th></tr><tr><td>0</td><td>No error</td></tr><tr><td>1</td><td>Unassigned (unallocated) number</td></tr><tr><td>3</td><td>No route to destination</td></tr><tr><td>6</td><td>Channel unacceptable</td></tr><tr><td>8</td><td>Operator determined barring</td></tr><tr><td>16</td><td>Normal call clearing</td></tr><tr><td>17</td><td>User busy</td></tr></table>	

#CEER – Extended numeric error report		SELINT 2
	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
	GPRS related errors	
	224	MS requested detach
	225	NWK requested detach
	226	Unsuccessful attach cause NO SERVICE
	227	Unsuccessful attach cause NO ACCESS
	228	Unsuccessful attach cause GPRS SERVICE REFUSED
	229	PDP deactivation requested by NWK
	230	PDP deactivation cause LLC link activation Failed
	231	PDP deactivation cause NWK reactivation with same TI
	232	PDP deactivation cause GMM abort
	233	PDP deactivation cause LLC or SNDCP failure
	234	PDP unsuccessful activation cause GMM error
	235	PDP unsuccessful activation cause NWK reject
	236	PDP unsuccessful activation cause NO NSAPI available

#CEER – Extended numeric error report			SELINT 2
	237	PDP unsuccessful activation cause SM refuse	
	238	PDP unsuccessful activation cause MMI ignore	
	239	PDP unsuccessful activation cause Nb Max Session Reach	
	256	PDP unsuccessful activation cause wrong APN	
	257	PDP unsuccessful activation cause unknown PDP address or type	
	258	PDP unsuccessful activation cause service not supported	
	259	PDP unsuccessful activation cause QOS not accepted	
	260	PDP unsuccessful activation cause socket error	
	Other custom values		
	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	
AT#CEER=?	Test command returns **OK** result code.		
Reference	GSM 04.08		

5.1.6.1.20   Extended Numeric Error report - #CEERNET

#CEERNET – Ext error report for Network reject cause		SELINT 2
AT#CEERNET	Execution command causes the TA to return a numeric code in the format **#CEERNET: <code>** which should offer the user of the TA a report for the last mobility management (MM/GMM/EMM) or session management (SM/ESM) procedure not accepted by the network. **<code>** values as follows valid for (MM/GMM) or session management (SM) i.e. for 2G and 3G networks	

Value	Diagnostic
2	IMSI UNKNOWN IN HLR
3	ILLEGAL MS
4	IMSI UNKNOWN IN VISITOR LR
5	IMEI NOT ACCEPTED
6	ILLEGAL ME
7	GPRS NOT ALLOWED
8	OPERATOR DETERMINED BARRING(SM cause failure)/ GPRS AND NON GPRS NOT ALLOWED(GMM cause failure)
9	MS IDENTITY CANNOT BE DERIVED BY NETWORK
10	IMPLICITLY DETACHED
11	PLMN NOT ALLOWED
12	LA NOT ALLOWED
13	ROAMING NOT ALLOWED
14	GPRS NOT ALLOWED IN THIS PLMN
15	NO SUITABLE CELLS IN LA
16	MSC TEMP NOT REACHABLE
17	NETWORK FAILURE
20	MAC FAILURE
21	SYNCH FAILURE
22	CONGESTION
23	GSM AUTHENTICATION UNACCEPTABLE

#CEERNET – Ext error report for Network reject cause			SELINT 2
	24	MBMS BEARER CAPABILITIES INSUFFICIENT FOR THE SERVICE	
	25	LLC OR SNDCP FAILURE	
	26	INSUFFICIENT RESOURCES	
	27	MISSING OR UNKNOWN APN	
	28	UNKNOWN PDP ADDRESS OR PDP TYPE	
	29	USER AUTHENTICATION FAILED	
	30	ACTIVATION REJECTED BY GGSN	
	31	ACTIVATION REJECTED UNSPECIFIED	
	32	SERVICE OPTION NOT SUPPORTED	
	33	REQ. SERVICE OPTION NOT SUBSCRIBED	
	34	SERV.OPTION TEMPORARILY OUT OF ORDER	
	35	NSAPI ALREADY USED	
	36	REGULAR DEACTIVATION	
	37	QOS NOT ACCEPTED	
	38	CALL CANNOT BE IDENTIFIED(MM cause failure) / SMN NETWORK FAILURE(SM cause failure)	
	39	REACTIVATION REQUIRED	
	40	NO PDP CTXT ACTIVATED(GMM cause failure)/ FEATURE NOT SUPPORTED(SM cause failure)	
	41	SEMANTIC ERROR IN TFT OPERATION	
	42	SYNTACTICAL ERROR IN TFT OPERATION	
	43	UNKNOWN PDP CNTXT	
	44	SEM ERR IN PKT FILTER	
	45	SYNT ERR IN PKT FILTER	
	46	PDP CNTXT WITHOUT TFT ACTIVATED	
	47	MULTICAST GROUP MEMBERSHIP TIMEOUT	
	48	RETRY ON NEW CELL BEGIN(if MM cause failure) / ACTIVATION REJECTED BCM VIOLATION(if SM cause failure)	
	50	PDP TYPE IPV4 ONLY ALLOWED	
	51	PDP TYPE IPV6 ONLY ALLOWED	
	52	SINGLE ADDRESS BEARERS ONLY ALLOWED	
	63	RETRY ON NEW CELL END	
	81	INVALID TRANSACTION IDENTIFIER	
	95	SEMANTICALLY INCORRECT MESSAGE	
	96	INVALID MANDATORY INFORMATION	
	97	MSG TYPE NON EXISTENT OR NOT IMPLEMENTED	
	98	MSG TYPE NOT COMPATIBLE WITH PROTOCOL STATE	
	99	IE NON_EXISTENT OR NOT IMPLEMENTED	
	100	CONDITIONAL IE ERROR	
	101	MSG NOT COMPATIBLE WITH PROTOCOL STATE	
	111	PROTOCOL ERROR UNSPECIFIED	
	112	APN RESTRICTION VALUE INCOMPATIBLE WITH ACTIVE PDP CONTEXT	
	In 4G network the **<code>**s meaning are included in tables 9.9.4.4.1 (for ESM causes) and 9.9.3.9.1 (for EMM cause) of 3GPP TS 24.301 Release 9.		
AT#CEERNET =?	Test command returns **OK** result code.		
Reference	3GPP 24.008 24.301		

5.1.6.1.21   Extended error report for Network reject cause - #CEERNETEXT

#CEERNETEXT – Extended error report for Network reject cause		SELINT 2
AT#CEERNETEXT=<func>	Set command allows to configure the functions of #CEERNETEXT. Parameters:	

#CEERNETEXT – Extended error report for Network reject cause		SELINT 2
	\<func\> - function 0 – Disable the #CEERNETEXT URC (factory default) 1 – Enable the #CEERNETEXT URC 2 – Delete last info of Network Code, AcT, MCC and MNC The URC will occur every time a mobility management (MM/GMM/EMM) or session management (SM/ESM) procedure is not accepted by the network. The URC format is: **#CEERNETEXT: \<code\>,\<AcT\>,\<MCC\>,\<MNC\>** where: \<code\> is last numeric Network Reject Cause from network, see \<code\> in AT#CEERNET \<AcT\> is the access technology: 0 GSM 2 UTRAN 7 E-UTRAN \<MCC\> is the Mobile Country Code of the used network when last numeric code has received \<MNC\> is the Mobile Network Code of the used network when last numeric code has received Note. The values 0 and 1 of **\<func\>** parameter are saved in the NVM issuing AT&W command. The value 2 is not stored and does not change the current **\<func\>** value. 1..10 - if the device is waiting either SIM PUK or SIM PUK2 to be given.	
AT#CEERNETEXT	Execution command causes the TA to return the last numeric Network Reject Cause code, AcT, MCC and MNC received by the network **#CEERNETEXT: \<code\>,\<AcT\>,\<MCC\>,\<MNC\>**	
AT#CEERNETEXT?	Read command returns the current value of parameter **\<func\>** in the format: **AT#CEERNETEXT: \<func\>** Where **\<func\>** can assume the following values: 0 – if CEERNETEXT URC is disabled 1 – if CEERNETEXT URC is enabled	
AT#CEERNETEXT=?	Test command reports the supported range of values for the **\<func\>** parameter only, in the format: **#CEERNETEXT: (0-2)**	

5.1.6.1.22   Display PIN Counter - #PCT

#PCT - Display PIN Counter		SELINT 2
AT#PCT	Execution command reports the PIN/PUK or PIN2/PUK2 input remaining attempts, depending on **+CPIN** requested password in the format: **#PCT: \<n\>** where:	

#PCT - Display PIN Counter	SELINT 2

	\<n\> - remaining attempts
	  0 - the SIM is blocked.
	  1..3 - if the device is waiting either SIM PIN or SIM PIN2 to be given.
	  1..10 - if the device is waiting either SIM PUK or SIM PUK2 to be given.

AT#PCT=?	Test command returns the OK result code.

5.1.6.1.23   Software Shut Down - #SHDN

#SHDN - Software Shutdown	SELINT 2
AT#SHDN	Execution command causes device detach from the network and shut down. Before definitive shut down an **OK** response is returned. Note: after the issuing of this command any previous activity is terminated and the device will not respond to any further command. Note: to turn it on again Hardware pin ON/OFF must be tied **low**.
AT#SHDN=?	Test command returns the OK result code.

5.1.6.1.24   Fast shutdown configuration - #FASTSHDN

#FASTSHDN - Fast shutdown configuration	SELINT 2
AT#FASTSHDN[= \<Enable\>,\<Gpio\>[, \<spare\>[,\<spare\>[,\<s pare\>[,\<spare\>]]]]]	Set the GPIO fast shutdown configuration. Parameters: **\<Enable\>** It is used to enable or disable the fast shutdown execution via GPIO: **0** - The fast shutdown execution via GPIO is disabled **1** - The fast shutdown execution via GPIO is enabled This parameter is stored in NVM. **\<Gpio\>** It sets which Gpio execute the fast shdn. When the GPIO number configured with **\<Gpio\> goes from the High level to the low level and the \<Enable\>** is set to 1, the module execute immediately the fast shutdown. This parameter is stored in NVM. The format **AT#FASTSHDN** forces the module to execute immediately the fast shutdown Note: it is necessary that the Gpio set whit **\<Gpio\>** is used for the fast shutdown purpose only. If you want to use the Gpio set via **AT#FASTSHDN** you have to disable the fastshutdown purpose for that pin: AT#FASTSHDN=0**,\<Gpio\>**
AT#FASTSHDN?	Read command reports the currently selected configuration in the format: **AT#FASTSHDN: \<Enable\>,\<Gpio\>,0,0,0,0**
AT#FASTSHDN=?	Test command returns the supported range of values for all the parameters.
Example	//enable fast shutdown on GPIO 5 AT#FASTSHDN=1,5 OK AT#FASTSHDN? $GPSGPIO: 1,5,0,0,0,0

#FASTSHDN - Fast shutdown configuration	SELINT 2
	OK //force immediate fast shutdown AT#FASTSHDN OK

5.1.6.1.25   Extended Reset - #Z

#Z – Extended reset		SELINT 2

AT#Z=<profile>	Set command loads both base section and extended section of the specified user profile stored with AT&W and selected with AT&P.
	
	Parameter
	<profile>
	  0 – user profile 0
	  1 – user profile 1	

AT#Z=?	Test command tests for command existence.	

5.1.6.1.26 Periodic Reset - #ENHRST

#ENHRST – Periodic ReseT		SELINT 2
AT#ENHRST=<mod>,<delay>	Set command enables/disables the unit reset after **<delay>** minutes. Parameters: **<mod>** 0 – disables the unit reset (factory default) 1 – enables the unit reset only for one time 2 – enables the periodic unit reset **<delay>** - time interval after that the unit reboots; numeric value in minutes Note: the settings are saved automatically in NVM only if old or new mod is 2. Any change from 0 to 1 or from 1 to 0 is not stored in NVM Note: the particular case AT#ENHRST=1,0 causes the immediate module reboot. In this case if AT#ENHRST=1,0 follows an AT command that stores some parameters in NVM, it is recommended to insert a delay of at least 5 seconds before to issue AT#ENHRST=1,0, to permit the complete NVM storing.	
AT#ENHRST?	Read command reports the current parameter settings for **# EHNRST** command in the format: **# EHNRST: < mod >[,<delay>,<remainTime>]** **<remainTime>** - time remaining before next reset	
AT#ENHRST=?	Test command reports supported range of values for parameters **<mod>** and **<delay>**.	
Examples	AT#ENHRST=1,60 …. Module reboots after 60 minutes … AT#ENHRST=1,0 …. Module reboots now … AT#ENHRST=2,60 …. Module reboots after 60 minutes and indefinitely after every following power on …	

5.1.6.1.27 Wake From Alarm Mode - #WAKE

#WAKE - Wake From Alarm Mode		SELINT 2
AT#WAKE= [<opmode>]	Execution command stops any eventually present alarm activity and, if the module is in **alarm mode**, it exits the **alarm mode** and enters the **normal operating mode**. Parameter: **<opmode>** - operating mode 0 - normal operating mode; the module exits the **alarm mode**, enters the **normal operating mode**, any alarm activity is stopped (e.g. alarm tone playing) and an **OK** result code is returned. Note: the **alarm mode** is indicated by status **ON** of hardware pin **CTS** and by status **ON** of pin **DSR**; the **power saving** status is indicated by a	

#WAKE - Wake From Alarm Mode		SELINT 2
	CTS - OFF and DSR - OFF status; the **normal operating status** is indicated by **DSR - ON**. Note: during the **alarm mode** the device will not make any network scan and will not register to any network and therefore is not able to dial or receive any call or SM, the only commands that can be issued to the MODULE in this state are the **#WAKE** and **#SHDN**, every other command must not be issued during this state. Note: if **#WAKE=0** command is issued after an alarm has been set with **+CALA** command, but before the alarm has expired, it will answer **OK** but have no effect.	

AT#WAKE?	Read command returns the **operating status** of the device in the format:
	
	#WAKE: <status>
	
	where:
	<status>
	  0 - normal operating mode
	  1 - alarm mode or normal operating mode with some alarm activity.	

AT#WAKE=?	Test command returns **OK** result code.	

5.1.6.1.28   Temperature Monitor - #TEMPMON

#TEMPMON - Temperature Monitor		SELINT 2

AT#TEMPMON=
<mod>
[,<urcmode>
[,<action>
[,<hyst_time>
[,<GPIO>]]]]
	Set command sets the behaviour of the module internal temperature monitor.
	
	Parameters:
	
	<mod>
	  0 - sets the command parameters.
	  1 - triggers the measurement of the module internal temperature, reporting the result in the format:
	
	    #TEMPMEAS: <level>,<value>
	
	    where:
	    <level> - threshold level
	      -2 - extreme temperature lower bound (see Note)
	      -1 - operating temperature lower bound (see Note)
	      0 - normal temperature
	      1 - operating temperature upper bound (see Note)
	      2 - extreme temperature upper bound (see Note)
	
	    <value> - actual temperature expressed in Celsius degrees.
	
	Setting of the following optional parameters has meaning only if <mod>=0
	
	<urcmode> - URC presentation mode.
	  0 - it disables the presentation of the temperature monitor URC
	  1 - it enables the presentation of the temperature monitor URC, whenever the module internal temperature reaches either operating or extreme levels; the unsolicited message is in the format:
	
	    #TEMPMEAS: <level>,<value>	

	where: **\<level\>** and **\<value\>** are as before

	\<action\> - sum of integers, each representing an action to be done whenever the module internal temperature reaches either operating or extreme levels (default is 0). If **\<action\>** is not zero, it is mandatory to set the **\<hyst_time\>** parameter too.
	  0..7 - as a sum of:
	    0 - no action
	    1 - automatic shut-down when the temperature is beyond the extreme bounds
	    2 - RF RX and TX circuits automatically disabled (using **+CFUN=4**) when operating temperature bounds are reached. When the temperature is back to normal the module is brought back to the previous state, before RF RX and TX disabled.
	    4 - the output pin **\<GPIO\>** is tied HIGH when operating temperature bounds are reached; when the temperature is back to normal the output pin **\<GPIO\>** is tied LOW. If this **\<action\>** is required, it is mandatory to set the **\<GPIO\>** parameter too.
	
	\<hyst_time\> - hysteresis time: all the actions happen only if the extreme or operating bounds are maintained at least for this period. This parameter is needed and required if **\<action\>** is not zero.
	  0..255 - time in seconds
	
	\<GPIO\> - GPIO number. valid range is "any output pin" (see "Hardware User's Guide"). This parameter is needed and required only if **\<action\>=4** is required.
	
	Note: the URC presentation mode **\<urcmode\>** is related to the current AT instance only (see **+cmux**); last **\<urcmode\>** settings are saved for every instance as extended profile parameters, thus it is possible to restore them either if the multiplexer control channel is released and set up, back and forth.
	
	Note: in case that action 4 is set, the chosen GPIO has to be configured in alternate function ALT3 through AT#GPIO command
	
	Note: last **\<action\>**, **\<hyst_time\>** and **\<GPIO\>** settings are saved in NVM too, but they are not related to the current CMUX instance only (see **+cmux**).

AT#TEMPMON?	Read command reports the current parameter settings for **#TEMPMON** command in the format: **#TEMPMON: \<urcmode\>,\<action\>[,\<hyst_time\>[,\<GPIO\>]]**
AT#TEMPMON=?	Test command reports the supported range of values for parameters **\<mod\>**, **\<urcmode\>**, **\<action\>**, **\<hyst_time\>** and **\<GPIO\>**
Note	The following table is describing the temperature levels. {{TABLE}}

Temperature levels table:

Extreme Temperature Lower Bound	-30°C
Operating Temperature Lower Bound	-10°C
Operating Temperature	
Operating Temperature Upper Bound	55°C
Extreme Temperature Upper Bound	80°C

5.1.6.1.29   Temperature monitor configuration - #TEMPCFG

#TEMPCFG – Temperature monitor configuration		SELINT 2
AT#TEMPCFG= <TempExLowBound> [,<TempOpLowBound> [,<TempOpUpBound> [,<TempExUpBound>]]]	This parameter command manages the temperature range used by the TEMPMON command Parameters: **<TempExLowBound>** **-** the extreme temperature lower limit **<TempOpLowBound>** **-** the operating temperature lower limit **<TempOpUpBound>** **-** the operating temperature upper limit **<TempExUpBound>** **-** the extreme temperature upper limit Note 1: The extreme temperature lower limit must not be lower than lower limit (see TEMPMON for temperature limits); Note 2: the operating temperature lower limit must be bigger than the extreme temperature lower limit, and not lower than its minimum admitted value (see TEMPMON for temperature limits); Note 3: the operating temperature upper limit must be bigger than the operating temperature lower limit, and not lower than its minimum admitted value (see TEMPMON for temperature limits); Note 4: the extreme temperature upper limit must be bigger than the operating temperature upper limit Note 5: The extreme temperature upper limit must be lower than its upper limit (see TEMPMON for temperature limits). Note 5: the temperature correctly set are saved in NvM, so at the next reboot the last temperature set is active instead of the factory default values. Note 6: a factory reset restores the factory default values.	
AT#TEMPCFG?	read the currently active temperature range : **#TEMPCFG: <TempExLowBound>,** **<TempOpLowBound>,** **<TempOpUpBound>,** **<TempExUpBound>**	
AT#TEMPCFG =?	Test command returns the supported range of **<TempExLowBound>,** **<TempOpLowBound>,** **<TempOpUpBound>,** **<TempExUpBound>** parameters**.**	

Example	//test the currently set values
	AT#TEMPCFG?
	#TEMPCFG: -30,-10,55,80
	
	OK
	
	//set a new temperature range
	AT#TEMPCFG=-40,-15,55,85
	OK
	
	//read the currently set values
	AT#TEMPCFG?
	#TEMPCFG: -40,-15,55,85
	
	OK

5.1.6.1.30   General Purpose Input/Output Pin Control - #GPIO

#GPIO - General Purpose Input/Output Pin Control		SELINT 2

AT#GPIO=[<pin>, <mode>[,<dir>[,<save]]]	Execution command sets the value of the general purpose output pin GPIO<pin> according to <dir> and <mode> parameter.
	Not all configurations for the three parameters are valid.
	
	Parameters:
	<pin> - GPIO pin number; supported range is from 1 to a value that depends on the hardware.
	<mode> - its meaning depends on <dir> setting:
	 0 - if <dir>=0 – INPUT, remove any Pull-up/Pull-down
	  - output pin cleared to 0 (**Low**) if <dir>=1 - OUTPUT
	  - no meaning if <dir>=2 - ALTERNATE FUNCTION
	  - no meaning if <dir>=3 – TRISTATE PULL DOWN
	 1 - if <dir>=0 – INPUT, if <dir>=0 – INPUT, remove any Pull-up/Pull-down
	  - output pin set to 1 (**High**) if <dir>=1 - OUTPUT
	  - no meaning if <dir>=2 - ALTERNATE FUNCTION
	  - no meaning if <dir>=3 – TRISTATE PULL DOWN
	 2 - Reports the read value from the input pin if <dir>=0 - INPUT
	  - Reports the read value from the input pin if <dir>=1 - OUTPUT
	  - Reports a no meaning value if <dir>=2 - ALTERNATE FUNCTION
	 3 - if <dir>=0 – INPUT, enable Pull-Up
	 4 - if <dir>=0 – INPUT, enable Pull-Down
	
	<dir> - GPIO pin direction
	 0 - pin direction is INPUT
	 1 - pin direction is OUTPUT
	 2,3,4,5,6 - pin direction is Alternate Function ALT1, ALT2, ALT3, ALT4, ALT5 respectively (see Note).
	
	<save> - GPIO pin save configuration
	 0 – pin configuration is not saved
	1 – pin configuration is saved
	
	Note: when <save> is omitted the configuration is stored only if user set or reset ALTx function on <dir> parameter.
	Note: if values of <dir> is set in output and save omitted then it is set automatically in input on next power cycle.
	
	Note: when <mode>=2 (and <dir> is omitted) the command reports the direction and value of pin **GPIO<pin>** in the format:

#GPIO - General Purpose Input/Output Pin Control	SELINT 2
	#GPIO: <dir>,<stat> where: **<dir>** - current direction setting for the **GPIO<pin>** **<stat>** • logic value read from pin **GPIO<pin>** in the case the pin **<dir>** is set to input; • logic value present in output of the pin **GPIO<pin>** in the case the pin **<dir>** is currently set to output; • no meaning value for the pin **GPIO<pin>** in the case the pin **<dir>** is set to alternate function or Tristate pull down
AT#GPIO?	Read command reports the read direction and value of all **GPIO** pins, in the format: **#GPIO: <dir>,<stat>[<CR><LF>#GPIO: <dir>,<stat>[…]]** where **<dir>** - as seen before **<stat>** - as seen before If <mode> = 3,4 the ouput format is **#GPIO:<dir>,<stat>,<mode>[<CR><LF>#GPIO:<dir>,<stat>,<mode>[…]]**
AT#GPIO=?	Test command reports the supported range of values of the command parameters **<pin>**, **<mode>** , **<dir> and <save>**.
Example	AT#GPIO=3,0,1 OK AT#GPIO=3,2 #GPIO: 1,0 OK AT#GPIO=4,1,1 OK AT#GPIO=5,0,0 OK AT#GPIO=6,2 #GPIO: 0,1 OK

5.1.6.1.31 STAT_LED GPIO Setting - AT#SLED

#SLED - STAT_LED GPIO Setting		SELINT 2

AT#SLED=<mode>
[,<on_duration>
[,<off_duration>]]
	Set command sets the behaviour of the **STAT_LED** GPIO
	
	Parameters:
	<mode> - defines how the **STAT_LED** GPIO is handled
	  0 - GPIO tied **Low**
	  1 - GPIO tied **High**
	  2 - GPIO handled by Module Software (factory default) with the following timings:
	   - not registered : always on - registered in idle: blinking 1s on and 2s off - registered in idle with powersaving : blinking time depends on network condition in order to minimize power consumption 3 - GPIO is turned on and off alternatively, with period defined by the sum **<on_duration> + <off_duration>**
	  4 - GPIO handled by Module Software with the following timings:
	   - not registered : blinking 0,5s on and 0,5s off - registered in idle: blinking 300ms on and 2,7s off - registered in idle with powersaving : blinking time depends on network condition in order to minimize power consumption **<on_duration>** - duration of period in which **STAT_LED** GPIO is tied **High** while **<mode>=3**
	  1..100 - in tenth of seconds (default is 10)
	
	<off_duration> - duration of period in which **STAT_LED** GPIO is tied **Low** while **<mode>=3**
	  1..100 - in tenth of seconds (default is 10)
	
	Note: values are saved in NVM by command **#SLEDSAV**
	
	Note: at module boot the **STAT_LED** GPIO is always tied **High** and holds this value until the first NVM reading.
	
	Note: to have STAT_LED operative, the first time enter AT#GPIO=1,0,2 setting the GPIO1 as alternate function.

AT#SLED?	Read command returns the STAT_LED GPIO current setting, in the format: **#SLED: <mode>,<on_duration>,<off_duration>**
AT#SLED=?	Test command returns the range of available values for parameters **<mode>**, **<on_duration>** and **<off_duration>**.

5.1.6.1.32 Save STAT_LED GPIO Setting - #SLEDSAV

#SLEDSAV - Save STAT_LED GPIO Setting		SELINT 2
AT#SLEDSAV	Execution command saves **STAT_LED** setting in NVM.
AT#SLED=?	Test command returns **OK** result code.

5.1.6.1.33   SMS Ring Indicator - #E2SMSRI

#SLED - STAT_LED GPIO Setting		SELINT 2

AT#E2SMSRI=
[<n>]
	Set command enables/disables the Ring Indicator pin response to an incoming SMS message. If enabled, a negative going pulse is generated on receipt of an incoming SMS message. The duration of this pulse is determined by the value of **<n>**.
	
	Parameter:
	<n> - **RI** enabling
	  0 - disables **RI** pin response for incoming SMS messages (factory default)
	  50..1150 - enables **RI** pin response for incoming SMS messages. The value of **<n>** is the duration in ms of the pulse generated on receipt of an incoming SM.
	
	Note: if **+CNMI=3,1** command is issued and the module is in a GPRS connection, a 100 ms break signal is sent and a 1 sec. pulse is generated on **RI** pin, no matter if the **RI** pin response is either enabled or not.	

AT#E2SMSRI?	Read command reports the duration in ms of the pulse generated on receipt of an incoming SM, in the format: **#E2SMSRI: <n>** Note: as seen before, the value **<n>=0** means that the **RI** pin response to an incoming SM is disabled.	
AT#E2SMSRI=?	Reports the range of supported values for parameter **<n>**	

5.1.6.1.34   Event Ring Indicator - #E2RI

#E2RI – Event Ring Indicator		SELINT 2

AT#E2RI=<event_mask>,<duration>	Set command enables/disables the Ring Indicator pin response to one or more events. If an event has been enabled, a negative going pulse is generated when event happens. The duration of this pulse is determined by the value of **<duration>**.
	
	Parameters:
	<event_mask> :
	  0 – disables all events
	  hexadecimal number representing the list of events: 1 – Power Saving Mode
	    2 – Socket Listen (same as **AT#E2SLRI=<duration>**)
	    4 – OTA firmware upgrade (same as **AT#OTASETRI=<duration>**)
	    8 – MT SMS has been received (same as **AT#E2SMSRI=<duration>**)
	    10 – +CREG will change status
	    20 – +CGREG will change status
	    40 – #QSS become 2 (SIM INSERTED and PIN UNLOCKED)
	    80 – MO SMS has been delivered
	    100 – Jamming Detection & Reporting (JDR)
	
	The hexadecimal number is actually a bit mask, where each bit, when set/not set, indicates that the corresponding event has been enabled/disabled.
	
	<duration> :
	  50..1150 - the duration in ms of the pulse generated	

#E2RI – Event Ring Indicator		SELINT 2
	Note: The values set by the command are stored in the profile extended section and they don't depend on the specific AT instance. Note: Enabling JDR event when the Enhanced Jamming Detection & Reporting feature has been previously enabled (see #JDRENH2)	
AT#E2RI?	Read command reports a line for each event and the duration in ms of the pulse generated, in the format: **#E2RI: <event_mask>,<duration>**	
AT#E2RI=?	Test command returns supported values of parameters **<event_mask>** and **<duration>**	

5.1.6.1.35   Read Analog/Digital Converter input - #ADC

#ADC - Read Analog/Digital Converter input		SELINT 2

AT#ADC=
[<adc>,<mode>
[,<dir>]]
	Execution command reads pin**<adc>** voltage, converted by ADC, and outputs it in the format:
	    #ADC: <value>
	
	    where:
	    <value> - pin**<adc>** voltage, expressed in mV
	
	Parameters:
	<adc> - index of pin
	For the number of available ADCs see HW User Guide
	<mode> - required action
	  2 - query ADC value
	<dir> - direction; its interpretation is currently not implemented
	  0 - no effect.
	
	Note: The command returns the last valid measure.	

AT#ADC?	Read command reports all pins voltage, converted by ADC, in the format: **#ADC: <value>[<CR><LF>#ADC: <value>[…]]**	
AT#ADC=?	Test command reports the supported range of values of the command parameters **<adc>**, **<mode>** and **<dir>**.	

5.1.6.1.36   V24 Output Pins Configuration - #V24CFG

#V24CFG - V24 Output Pins Configuration		SELINT 2

AT#V24CFG=<pin>,
<mode>[,<save>]
	Set command sets the AT commands serial port interface output pins mode.
	
	Parameters:
	<pin> - AT commands serial port interface hardware pin:
	  0 – **DCD** (Data Carrier Detect)
	  1 – **CTS** (Clear To Send)
	  2 – **RI** (Ring Indicator)
	  3 – **DSR** (Data Set Ready)
	  4 – **DTR** (Data Terminal Ready). This is not an output pin, so its state cannot be set through the **AT#V24** command.
	  5 – **RTS** (Request To Send). This is not an output pin, so its state cannot be set through the **AT#V24** command.
	<mode> - AT commands serial port interface hardware pins mode:
	  0 – AT commands serial port mode: the V24 pins are controlled by the serial port device driver (default)	

#V24CFG - V24 Output Pins Configuration		SELINT 2

	1 – GPIO mode: the V24 output pins can be managed through the **AT#V24** command
	<save> - Save V24 pin configuration:
	  0 – Pin configuration is not saved
	  1 – Pin configuration is saved
	
	Note: when **<mode>=1,** the V24 pins, both output and input, can be set to control an external GNSS receiver through the **AT$GPSGPIO** command.
	
	Note: when the **<save>** parameter is omitted, the pin configuration is NOT stored.
	
	Note: changing V24 pins configuration may affect the cellular module functionality set through **AT+CFUN**.	

AT#V24CFG?	Read command returns the current configuration for all the pins (both output and input) in the format: **#V24CFG: <pin1>,<mode1>[<CR><LF><CR><LF>** **#V24CFG: <pin2>,<mode2>[...]]** Where: **<pin*n*>** - AT command serial port interface HW pin **<mode*n*>** - AT commands serial port interface hardware pin mode	
AT#V24CFG=?	Test command reports supported range of values for parameters **<pin>**, **<mode>** and **<save>**.	

5.1.6.1.37   V24 Output Pins Control - #V24

#V24 - V24 Output Pins Control		SELINT 2

AT#V24=<pin> [,<state>]	Set command sets the AT commands serial port interface output pins state.
	
	Parameters:
	<pin> - AT commands serial port interface hardware pin:
	
	  0 - **DCD** (Data Carrier Detect)
	  1 - **CTS** (Clear To Send)
	  2 - **RI** (Ring Indicator)
	  3 - **DSR** (Data Set Ready)
	  4 - **DTR** (Data Terminal Ready). This is not an output pin: we maintain this value only for backward compatibility, but trying to set its state raises the result code "**ERROR**" (not yet implemented)
	  5 - **RTS** (Request To Send). This is not an output pin: we maintain this value only for backward compatibility, but trying to set its state raises the result code "**ERROR**"
	
	<state> - State of AT commands serial port interface output hardware pins(0, 1, 2, 3) when pin is in GPIO mode (see **#V24CFG**):
	
	  0 - Low
	  1 - High
	
	Note: if **<state>** is omitted the command returns the actual state of the pin **<pin>**.	

AT#V24?	Read command returns actual state for all the pins (either output and input) in the format: **#V24: <pin1>,<state1>[<CR><LF>** **#V24: <pin2>,<state2>[...]]** where **<pin*n*>** - AT command serial port interface HW pin	

#V24 - V24 Output Pins Control		SELINT 2
	<state*n*> - AT commands serial port interface hardware pin state	
AT#V24=?	Test command reports supported range of values for parameters **<pin>** and **<state>**.	

5.1.6.1.38 Battery and charger status - #CBC

#CBC- Battery And Charger Status		SELINT 2

AT#CBC	Execution command returns the current Battery and Charger state in the format:
	
	#CBC: <ChargerState>,<BatteryVoltage>
	
	where:
	<ChargerState> - battery charger state
	  0 - charger not connected
	  1 - charger connected and charging
	  2 - charger connected and charge completed
	<BatteryVoltage> - battery voltage in units of ten millivolts: it is the real battery voltage only if charger is not connected; if the charger is connected this value depends on the charger voltage.	

AT#CBC=?	Test command returns the **OK** result code.	

5.1.6.1.39 GPRS Auto-Attach Property - #AUTOATT

#AUTOATT - Auto-Attach Property		SELINT 2

AT#AUTOATT= [<auto>]	Set command enables/disables the TE GPRS auto-attach property.
	
	Parameter:
	<auto>
	  0 - disables GPRS auto-attach property
	  1 - enables GPRS auto-attach property (factory default): after the command #AUTOATT=1 has been issued (and at every following startup) the terminal will automatically try to attach to the GPRS service.
	
	Note: for Verizon products setting AT#AUTOATT returns OK but has no effect.	

AT#AUTOATT?	Read command reports whether the auto-attach property is currently enabled or not, in the format: **#AUTOATT: <auto>**	
AT#AUTOATT=?	Test command reports available values for parameter **<auto>**.	

5.1.6.1.40 Multislot Class Control - #MSCLASS

#MSCLASS - Multislot Class Control		SELINT 2

AT#MSCLASS= [<class>[, <autoattach>]]	Set command sets the multislot class
	
	Parameters:
	<class> - multislot class; take care: class 7 is not supported.
	  (1-12),(30-33),(35-38) - GPRS (EGPRS) class
	
	<autoattach>
	  0 - the new multislot class is enabled only at the next detach/attach or after a reboot.
	  1 - the new multislot class is enabled immediately, automatically forcing a detach / attach procedure.
	
	Note: DTM multislot class is automatically chosen with maximum allowed value for every GPRS (EGPRS) subset	

#MSCLASS - Multislot Class Control		SELINT 2
AT#MSCLASS?	Read command reports the current value of the multislot class in the format: **#MSCLASS: <class>**	
AT#MSCLASS=?	Test command reports the range of available values for both parameters **<class>** and **<autoattach>**.	

5.1.6.1.41   Cell Monitor - #MONI

#MONI - Cell Monitor		SELINT 2

AT#MONI[=
[<number>]]
	#MONI is both a set and an execution command.
	
	Set command sets one cell out of seven, in the neighbour list of the serving cell including it, from which extract GSM /UMTS-related information.
	
	Parameter:
	<number>
	(GSM network)
	  0..6 - it is the ordinal number of the cell, in the neighbour list of the serving cell (default 0, serving cell).
	  7 - it is a special request to obtain GSM-related information from the whole set of seven cells in the neighbour list of the serving cell.
	
	(UMTS network)
	  0 – it is the serving cell in idle; Active set cells are also reported in CELL_DCH state, i.e. during a call (default)
	  1 – it is the candidate set (cells that belong to the Active set, only reported in CELL_DCH state, i.e. during a call)
	  2 – it is the synchronized neighbour set (cells that belong to the Virtual Active set, only reported in CELL_DCH state, i.e. during a call)
	  3 – it is the asynchronized neighbour set (cells which are not suitable cells to camp on)
	  4 – it is the ranked neighbour set (cells which are suitable cells to camp on)
	  7 - it is a special request to obtain information from the whole set of detected cells in the neighbour list of the serving cell.
	  5..6 – it is not available
	
	<LTE network>
	0 – it is the serving cell
	1 – it is the intra-frequency cells
	2 – it is the inter-frequency cells
	3 – it is the WCDMA neighbour cells
	4 – it is the GSM neighbour cells
	5..7 – it is not available
	
	Execution command (**AT#MONI<CR>)** reports GSM/UMTS-related information for selected cell and dedicated channel (if exists).
	
	 1. If the last setting done by **#MONI** is in the range **[0..6]**, the output format is as follows:
	
	 a) When extracting data for the serving cell and the network name is known the format is:
	(GSM network)
	#MONI: <netname> BSIC:<bsic> RxQual:<qual> LAC:<lac> Id:<id> ARFCN:<arfcn> PWR:<dBm> dBm TA: <timadv>
	(UMTS network)	

#MONI - Cell Monitor	SELINT 2

#MONI: <netname> PSC:<psc> RSCP:<rscp> LAC:<lac>
Id:<id>Eclo:<ecio> UARFCN:<uarfcn> PWR:<dBm> dBm DRX:<drx>
SCR:<scr>
(LTE network)
#MONI: <netmame> RSRP:<rsrp> RSRQ:<rsrq> TAC:<tac> Id:<id>
EARFCN:<earfcn> PWR:<dBm>dbm DRX:<drx> pci:<pci>
QRxLevMin:<QRxLevMin>

b)   When the network name is unknown, the format is:
(**GSM network**)
#MONI: <cc> <nc> BSIC:<bsic> RxQual:<qual> LAC:<lac> Id:<id>
ARFCN:<arfcn> PWR:<dBm> dBm TA: <timadv>
    (**UMTS network**)
      #MONI: <cc> <nc> PSC:<psc> RSCP:<rscp>   LAC:,<lac> Id:<id>
Eclo:<ecio> UARFCN:<uarfcn> PWR:<dBm> dBm DRX:<drx>SCR:<scr>
(**LTE network**)
#MONI: Cc:<cc> Nc:<nc> RSRP:<rsrp> RSRQ:<rsrq> TAC:<tac>
Id:<id> EARFCN:<earfcn> PWR:<dBm>dbm DRX:<drx> pci:<pci>
QRxLevMin:<QRxLevMin>

c)   When extracting data for an adjacent cell (or active set cell), the format is:
(**GSM network**)
#MONI: Adj Cell<n> [LAC:<lac> Id:<id>] ARFCN:<arfcn> PWR:<dBm>
dBm
(**UMTS network**)
#MONI: PSC:<psc> RSCP:<rscp> Eclo:<ecio> UARFCN:<uarfcn>
SCR:<scr>
(**LTE network**)
(**LTE intra-frequency and inter-frequency cells**)
#MONI: RSRP:<rsrp> RSRQ:<rsrq> Id:<id> EARFCN:<earfcn>
PWR:<dBm>dbm pci:<pci> QRxLevMin:<QRxLevMin>

(**LTE WCDMA neighbour cells**)
#MONI: PSC:<psc> RSCP:<rscp> Eclo:<ecio> UARFCN:<uarfcn>
SCR:<scr>
(**LTE GSM neighbour cells**)
#MONI: Adj Cell<n> BSIC:<bsic> ARFCN:<arfcn> PWR:<dBm>dbm
where:
<netname> - name of network operator
<cc> - country code
<nc> - network operator code
<n> - progressive number of adjacent cell
<bsic> - base station identification code
<qual> - quality of reception
  0..7
<lac> - localization area code
<id> - cell identifier
<arfcn> - assigned radio channel
<dBm> - received signal strength in dBm; for serving cell in UMTS network
this is not available during a call, and is displayed as 0
<timadv> - timing advance
<psc> - Primary Scrambling Code
<rscp> - Received Signal Code Power in dBm; for serving cell this is not
available during a call, and is displayed as 255
<ecio> - chip energy per total wideband power in dBm; for serving cell this is
not available during a call, and is displayed as 255
<uarfcn> - UMTS assigned radio channel
<drx> - Discontinuous reception cycle length

#MONI - Cell Monitor	SELINT 2

<scr> - Scrambling code
<rsrp> - Reference Signal Received Power
<rsrq> - Reference Signal Received Quality
<tac> - Tracking Area Code
<earfcn> - E-UTRA Assigned Radio Channel
<ura_id> - UTRAN Registration Area Identity
<pci> - Physical Cell Id
<QRxLevMin> - Minimum required RX level in the cell

Note: TA: **<timadv>** is reported only for the serving cell.

2. If the last setting done by **#MONI** is **7**, the execution command produces a table-like formatted output, as follows:
(**GSM network**)

    a. First row reports the identifying name of the 'columns'
#MONI:
Cell BSIC LAC CellId ARFCN   Power C1 C2 TA RxQual PLMN<CR><LF>

    b. Second row reports a complete set of GSM-related information for the serving cell:
#MONI:
S: <bsic> <lac> <id> <arfcn> <dBm> <C1value> <C2value> <timadv> <qual> <netname><CR><LF>

    c. 3rd to 8th rows report a reduced set of GSM-related information for the cells in the neighbours:
#MONI:
N<n> <bsic> <lac> <id> <arfcn> <dBm> <C1value> <C2value>[<CR><LF>]

where:
<C1value> - C1 reselection parameter
<C2value> - C2 reselection parameter
other parameters as before

(UMTS network)

    a. First row reports a set of information for the serving cell:
#MONI: <netname> PSC:<psc> RSCP:<rscp> LAC:<lac> Id:<id>Eclo:<ecio> UARFCN:<uarfcn> PWR:<dBm> dBm DRX:<drx> SCR:<scr>

b. the other rows report a set of information for all detected neighbour cells:
#MONI: PSC:<psc> RSCP:<rscp> Eclo:<ecio> UARFCN:<uarfcn> SCR:<scr>

See above for parameters description.

AT#MONI=?	Test command reports the maximum number of cells, in the neighbour list of the serving cell excluding it, from which we can extract GSM/UMTS-related information, along with the ordinal number of the current selected cell, in the format: **#MONI: (<MaxCellNo>,<CellSet>)** where:

#MONI - Cell Monitor		SELINT 2
	<MaxCellNo> - maximum number of cells, in the neighbour list of the serving cell and excluding it, from which we can extract GSM-related information. This value is always **6**. **<CellSet>** - the last setting done with command **#MONI**.	
Examples	Set command selects the cell 0 in GSM network at#moni=0 OK Execution command reports GSM-related information for cell 0 at#moni #MONI: I WIND BSIC:70 RxQual:0 LAC:55FA Id:1D23 ARFCN:736 PWR:-83dbm TA:1 Set command selects the cell 0 in UMTS network at#moni=0 OK Execution command reports UMTS-related information for serving cell and active cell at#moni #MONI: I TIM PSC:65535 RSCP:255 LAC:EF8D Id:52D2388 EcIo:255 UARFCN:65535 PWR:0dbm DRX:128 SCR:0 #MONI: PSC:49 RSCP:-96 EcIo:-2.0 UARFCN:10638 SCR:784 OK Set command selects the special request to obtain GSM-related information from the whole set of seven cells in the neighbour list of the serving cell at#moni=7 OK Execution command reports the requested information in table-like format at#moni #MONI: Cell BSIC LAC CellId ARFCN Power C1 C2 TA RxQual PLMN #MONI: S 70 55FA 1D23 736 -83dbm 19 33 1 0 I WIND #MONI: N1 75 55FA 1297 983 -78dbm 26 20 #MONI: N2 72 55FA 1289 976 -82dbm 22 16 #MONI: N3 70 55FA 1D15 749 -92dbm 10 18 #MONI: N4 72 55FA 1D0D 751 -92dbm 10 18 #MONI: N5 75 55FA 1296 978 -95dbm 9 3 #MONI: N6 70 55FA 1D77 756 -99dbm 3 11 OK
Note	The timing advance value is meaningful only during calls or GPRS transfers active.
Note	The serving cell is the current serving cell or the last available serving cell, if the module loses coverage.

5.1.6.1.42   Compressed Cell Monitor - #MONIZIP

#MONIZIP – Compressed Cell Monitor		SELINT 2
AT#MONIZIP[= [<number>]]	**#MONIZIP** is both a set and an execution command. Set command sets one cell out of seven, in a the neighbour list of the serving cell including it, from which extract GSM/UMTS-related information. Parameter: **<number>** **(GSM network)**	

0..6 - it is the ordinal number of the cell, in a the neighbour list of the serving cell (default 0, serving cell).

7 - it is a special request to obtain GSM-related information from the whole set of seven cells in the neighbour list of the serving cell.

(UMTS network)

0 – it is the serving cell in idle; Active set cells are also reported in CELL_DCH state, i.e. during a call (default)

1 – it is the candidate set (cells that belong to the Active set, only reported in CELL_DCH state, i.e. during a call)

2 – it is the synchronized neighbour set (cells that belong to the Virtual Active set, only reported in CELL_DCH state, i.e. during a call)

3 – it is the asynchronized neighbour set (cells which are not suitable cells to camp on)

4 – it is the ranked neighbour set (cells which are suitable cells to camp on)

7 - it is a special request to obtain information from the whole set of detected cells in the neighbour list of the serving cell.

5..6 – it is not available

<LTE network>
0 – it is the serving cell
1 – it is the intra-frequency cells
2 – it is the inter-frequency cells
3 – it is the WCDMA neighbour cells
4 – it is the GSM neighbour cells
5..7 – it is not available

Execution command (**AT#MONIZIP<CR>**) reports GSM/UMTS/LTE-related information for selected cell and dedicated channel (if exists).

1. If the last setting done by **#MONIZIP** is in the range **[0..6]**, the output format is as follows:

a) When extracting data for the serving cell the format is:
(**GSM network**)
#MONIZIP:
<cc><nc>,<bsic>,<qual>,<lac>,<id>,<arfcn>,<dBm>,<timadv>
   (**UMTS network**)
   #MONIZIP: <cc><nc>,<psc>,<rscp>,<lac>,<id>,<ecio>,<uarfcn>,<dBm>,<drx>,<scr>
   (**LTE network**)
#MONIZIP:
<netname>,<rsrp>,<rsrq>,<tac>,<id>,<earfcn>,<dBm>,<drx>,<pci>,<QRxLevMin>

b) When extracting data for an adjacent cell (or active set cell), the format is:
(**GSM network**)
#MONIZIP: <lac>,<id>,<arfcn>,<dBm>
(**UMTS network**)
#MONIZIP: <psc>,<rscp>,<ecio>,<uarfcn>,<scr>
   (**LTE network**)
 (**LTE intra-frequency and inter-frequency cells**)
 #MONIZIP: <rsrp>,<rsrq>,<id>,<earfcn>,<dBm>,<pci>,<QRxLevMin>
 (**LTE WCDMA neighbour cells**)
 #MONIZIP: <psc>,<rscp>,<ecio>,<uarfcn>,<scr>
 (**LTE GSM neighbour cells**)
 #MONIZIP: <n>,<bsic>,<arfcn>,<dBm>

#MONIZIP – Compressed Cell Monitor		SELINT 2

	where:
	<cc> - country code
	<nc> - network operator code
	<n> - progressive number of adjacent cell
	<bsic> - base station identification code
	<qual> - quality of reception
	  0..7
	<lac> - localization area code
	<id> - cell identifier
	<arfcn> - assigned radio channel
	<dBm> - received signal strength in dBm
	<timadv> - timing advance
	<psc> - Primary Scrambling Code
	<rscp> - Received Signal Code Power in dBm; for serving cell this is not available during a call, and is displayed as 255
	<ecio> - chip energy per total wideband power in dBm; for serving cell this is not available during a call, and is displayed as 255
	<uarfcn> - UMTS assigned radio channel
	<drx> - Discontinuous reception cycle length
	<scr> - Scrambling code
	<rsrp> - Reference Signal Received Power
	<rsrq> - Reference Signal Received Quality
	<tac> - Tracking Area Code
	<earfcn> - E-UTRA Assigned Radio Channel
	<ura_id> - UTRAN Registration Area Identity
	<pci> - Physical Cell Id
	<**QRxLevMin**> - Minimum required RX level in the cell
	
	Note: TA: **<timadv>** is reported only for the serving cell.
	
	  2. If the last setting done by **#MONIZIP** is **7**, the execution command produces a table-like formatted output, as follows:
	
	(**GSM network**)
	  a. First row reports a complete set of GSM-related information for the serving cell:
	#MONIZIP: <bsic>,<lac>,<id>,<arfcn>,<dBm>,<C1value>, <C2value>,<timadv>,<qual>,<cc><nc><CR><LF>
	
	  b. 2nd to 7th rows report a reduced set of GSM-related information for the cells in the neighbours:
	#MONIZIP: <bsic>,<lac>,<id>,<arfcn>,<dBm>,<C1value>, <C2value>[<CR><LF>]
	
	where:
	<C1value> - C1 reselection parameter
	<C2value> - C2 reselection parameter
	other parameters as before
	(UMTS network)
	
	  a. First row reports a set of information for the serving cell:
	#MONIZIP: <netname>,<psc>,<rscp>,<lac>,<id>,<ecio>,<uarfcn>, <dBm>,<drx>,<scr>
	
	b. the other rows report a set of information for all detected neighbour cells:
	#MONIZIP: <psc>,<rscp>,<ecio>,<uarfcn>,<scr>
	
	See above for parameters description	

AT#MONIZIP=?	Test command reports the maximum number of cells, in the neighbour list of the serving cell excluding it, from which we can extract GSM-related	

#MONIZIP – Compressed Cell Monitor		SELINT 2
	information, along with the ordinal number of the current selected cell, in the format: **#MONIZIP: (<MaxCellNo>,<CellSet>)** where: **<MaxCellNo>** - maximum number of cells, in the neighbour list of the serving cell and excluding it, from which we can extract GSM-related information. This value is always **6**. **<CellSet>** - the last setting done with command **#MONIZIP**.	
Note	The refresh time of the measures is preset to 3 sec. The timing advance value is meaningful only during calls or GPRS transfers active.	
Note	The serving cell is the current serving cell or the last available serving cell, if the module loses coverage.	

5.1.6.1.43 Serving Cell Information - #SERVINFO

#SERVINFO - Serving Cell Information		SELINT 2

AT#SERVINFO	Execution command reports information about serving cell, in the format:
	
	(**GSM network**)
	#SERVINFO: <B-ARFCN>,<dBM>,<NetNameAsc>,<NetCode>, <BSIC>,<LAC>,<TA>,<GPRS>[,[<PB-ARFCN>],[<NOM>], <RAC>,[<PAT>]]
	
	(**UMTS network**)
	#SERVINFO: <UARFCN>, <dBM>, <NetNameAsc>,<NetCode>, <PSC>,<LAC>,<DRX>,<SD>,<RSCP>, <NOM>,<RAC>
	
	(**LTE network**)
	#SERVINFO:
	<EARFCN>,<dBM>,[<NetNameAsc>],<NetCode>,<PhysicalCellId>,<TAC >,<DRX>,<
	SD>,<RSRP>
	
	where:
	<B-ARFCN> - BCCH ARFCN of the serving cell
	<dBM> - received signal strength in dBm
	<NetNameAsc> - operator name, quoted string type
	<NetCode> - string representing the network operator in numeric format: 5 or 6 digits [country code (3) + network code (2 or 3)]
	<BSIC> - Base Station Identification Code
	<LAC> - Localization Area Code
	<TA> - Time Advance: it's available only if a GSM or GPRS is running
	<GPRS> - GPRS supported in the cell
	  0 - not supported
	1 - supported
	
	The following information will be present only if GPRS is supported in the cell
	<PB-ARFCN> -
	• if PBCCH is supported by the cell
	  o if its content is the PBCCH ARFCN of the serving cell, then **<PB-ARFCN>** is available
	  o else the label **"hopping"** will be printed
	• else **<PB-ARFCN>** is not available
	<NOM> - Network Operation Mode
	.."I"
	"II"	

#SERVINFO - Serving Cell Information		SELINT 2
	.."lll" **<RAC>** - Routing Area Colour Code **<PAT>** - Priority Access Threshold ..0 ..3..6 **<UARFCN>** - UMTS ARFCN of the serving cell **<PSC>** - Primary Synchronisation Code **<DRX>** - Discontinuous reception cycle length **<SD>** - Service Domain 0 – No Service 1 – CS Only 2 – PS Only 3 – CS & PS **<RSCP>** - Received Signal Code Power in dBm **<EARFCN>** - E-UTRA Assigned Radio Channel **<PhysicalCellId>** - Physical Cell ID **<TAC>** - Tracking Area Code **<RSRP>** - Reference Signal Received Power **<URA>** - UTRAN Registration Area Identity During a call, a SMS sending/receiving or a location update the value of **<GPRS>**, **<PB-ARFCN>**, **<NOM>**, **<RAC>** and **<PAT>** parameters don't make sense.	
AT#SERVINFO=?	Test command tests for command existence.	

5.1.6.1.44   Read current network status - #RFSTS

#RFSTS – Read current network status		SELINT 2
AT#RFSTS	Execution command reads current network status, in the format: (**GSM network**) **#RFSTS:<PLMN>,<ARFCN>,<RSSI>,<LAC>,<RAC>,<TXPWR>,<MM>, <RR>,<NOM>,<CID>,<IMSI>,<NetNameAsc>,<SD>,<ABND>** Where: **<PLMN>** - Country code and operator code(MCC, MNC) **<ARFCN>** - GSM Assigned Radio Channel **<RSSI>** - Received Signal Strength Indication **<LAC>** - Localization Area Code **<RAC>** - Routing Area Code **<TXPWR>** - Tx Power **<MM>** - Mobility Management state (for debug purpose only) 0 - NULL 3 - LOCATION UPDATING INITIATED 5 - WAIT FOR OUTGOING MM CONNECTION 6 - CONNECTION ACTIVE 7 - IMSI DETACH INITIATED 8 - PROCESS CM SERVICE PROMPT 9 - WAIT FOR NETWORK COMMAND 10 - LOCATION UPDATE REJECTED 13 - WAIT FOR RR CONNECTION LOCATION UPDATE 14 - WAIT FOR RR CONNECTION MM 15 - WAIT FOR RR CONNECTION IMSI DETACH 17 - WAIT FOR REESTABLISHMENT 18 - WAIT FOR RR ACTIVE 19 - IDLE	

#RFSTS – Read current network status	SELINT 2

20 - WAIT FOR ADDITIONAL OUTGOING MM CONNECTION
21 - CONNECTION ACTIVE GROUP TRANSMIT
22 - WAIT RR CONNECTION GROUP TRANSMIT
23 - LOCATION UPDATING PENDING
24 –IMSI DETACH PENDING
25 - RR CONNECTION RELEASE NOT ALLOWED
255 - UNKNOWN

<RR> - Radio Resource state (for debug purpose only)
2 - CELL SELECTION
3 - WAIT CELL SELECTION
4 - DEACTIVATION CELL SELECTION
5 - SELECT ANY CELL
6 - WAIT SELECT ANY CELL
7 - DEACTIVATION SELECT ANY CELL
8 - WAIT INACTIVE
9 - INACTIVE
10 WAIT IDLE
11 - IDLE
12 - PLMN SEARCH
13 - CELL RESELECTION
14 - WAIT CELL RESELECTION
15 - DEACTIVATION PLMN SEARCH
16 - CELL CHANGE
17 - CS CELL CHANGE
18 - WAIT CELL CHANGE
19 - SINGLE BLOCK ASSIGNMENT
20 - DOWNLINK TBF ESTABLISH
21 - UPLINK TBF ESTABLISH
22 - WAIT TBF
23 - TRANSFER
24 - WAIT SYNC
25 - DTM ENHANCED CALL ESTABLISH
26 - DTM
27 - DTM ENHANCED MO CALL ESTABLISH
28 - MO CONNECTION ESTABLISH
29 - MT CONNECTION ESTABLISH
30 - RR CONNECTION
31 - DTM ESTABLISH
32 - DTM RELEASE
33 - CALL REESTABLISH
34 – DEACTIVATION CALL REESTABLISH
35 - NORMAL CHANNEL RELEASE
36 - LOCAL CHANNEL RELEASE
37 - DEACTIVATION
38 - ENHANCED DTM CS CALL ESTABLISH
39 - CELL RESELECTION TO UTRAN
40 - DTM ENHANCED CS CALL ESTABLISH
41 – INTER RAT ACTIVE ON HOLD

42 – INTER RAT RESEL ABORT
43 – INTER RAT WAIT INTER RAT
44 – INTER RAT WAIT FOR RSRC
45 - DSIM SUSPEND
46 - DSIM WAIT SUSPEND
47 - DSIM WAIT SUSPEND IDLE

<NOM> - Network Operator Mode
<CID> - Cell ID
<IMSI> - International Mobile Subscriber Identity
<NetNameAsc> - Operator name
<SD> -   Service Domain

#RFSTS – Read current network status	SELINT 2

<table>
<tr><td></td><td>
0 - No Service
1 - CS only
2 - PS only
3 - CS+PS

<ABND> - Active Band
1 - GSM 850
2 - GSM 900
3 - DCS 1800
4 - PCS 1900

(WCDMA network)
#RFSTS:
[<PLMN>],<UARFCN>,<PSC>,<Ec/Io>,<RSCP>, RSSI>,[<LAC>],
[<RAC>],<TXPWR>,<DRX>,<MM>,<RRC>,<NOM>,<BLER>,<CID>,<IMSI>,
<NetNameAsc>,<SD>,<nAST>[,<nUARFCN><nPSC>,<nEc/Io>]

Where:
<PLMN> - Country code and operator code(MCC, MNC)
<UARFCN> - UMTS Assigned Radio Channel
<PSC> - Active PSC(Primary Synchronization Code)
<Ec/Io> - Active Ec/Io(chip energy per total wideband power in dBm)
<RSCP> - Active RSCP (Received Signal Code Power in dBm)
<RSSI> - Received Signal Strength Indication
<LAC> - Localization Area Code
<RAC> - Routing Area Code
<TXPWR> - Tx Power
<DRX> - Discontinuous reception cycle Length (cycle length in ms)
<MM> - Mobility Management state (for debug purpose only)
0 - NULL
 3 - LOCATION UPDATING INITIATED
 5 - WAIT FOR OUTGOING MM CONNECTION
 6 - CONNECTION ACTIVE
 7 - IMSI DETACH INITIATED
 8 - PROCESS CM SERVICE PROMPT
 9 - WAIT FOR NETWORK COMMAND
 10 - LOCATION UPDATE REJECTED
 13 - WAIT FOR RR CONNECTION LOCATION UPDATE
 14 - WAIT FOR RR CONNECTION MM
 15 - WAIT FOR RR CONNECTION IMSI DETACH
 17 - WAIT FOR REESTABLISHMENT
 18 - WAIT FOR RR ACTIVE
 19 - IDLE
 20 - WAIT FOR ADDITIONAL OUTGOING MM CONNECTION
 21 - CONNECTION ACTIVE GROUP TRANSMIT
 22 - WAIT RR CONNECTION GROUP TRANSMIT
 23 - LOCATION UPDATING PENDING
 24 –IMSI DETACH PENDING
 25 - RR CONNECTION RELEASE NOT ALLOWED
 255 - UNKNOWN
<RRC> - Radio Resource state (for debug purpose only)
0 - CELL DCH
1 - CELL FACH
2 - CELL PCH
3 - URA PCH
4 - IDLE
5 - IDLE CCCH
<NOM> - Network Operator Mode
<BLER> - Block Error Rate (e.g., 005 means 0.5 %)
<CID> - Cell ID
</td></tr>
</table>

#RFSTS – Read current network status	SELINT 2

	<IMSI> - International Mobile Station ID **<NetNameAsc>** - Operator name **<SD>** - Service Domain (see above) **<nAST>** - Number of Active Set (Maximum 6) **<nUARFCN>** UARFCN of n th active set **<nPSC>** PSC of n th active set **<nEc/Io >** Ec/Io of n th active Set **(LTE network)** **#RFSTS:** **<PLMN>,<EARFCN>,<RSRP>,<RSSI>,<RSRQ>,<TAC>,<RAC>,[<TXPWR>],<DRX>,<MM >,<RRC>,<CID>,<IMSI>,[<NetNameAsc>],<SD>,<ABND>,<T3402>,<T3412>** **Where:** <**PLMN**> - Country code and operator code(MCC, MNC) <**EARFCN**> **-** E-UTRA Assigned Radio Channel <**RSRP**> **-** Reference Signal Received Power <**RSSI**> **-** Received Signal Strength Indication <**RSRQ** **-** Reference Signal Received Quality <**TAC**> **-** Tracking Area Code **<RAC>** - Routing Area Code <**TXPWR**> **-** Tx Power (In traffic only) <**DRX**> - Discontinuous reception cycle Length (cycle length in ms) <**MM**> **-** Mobility Management state (for debug purpose only; see above) <**RRC**> - Radio Resource state (for debug purpose only; see above) <**CID**> **-** Cell ID <**IMSI**> - International Mobile Station ID**<SD>** - Service Domain 0 - No Service 1 - CS only 2 - PS only 3 - CS+PS **<ABND>** - Active Band 1..63according to 3GPP TS 36.101<T3402> - Timer T3402 in seconds <T3412> - Timer T3412 in seconds
AT#RFSTS=?	Test command tests for command existence.

5.1.6.1.45 Query SIM Status - #QSS

#QSS - Query SIM Status	SELINT 2

**AT#QSS=
[<mode>]**
	Set command enables/disables the Query SIM Status unsolicited indication in the ME.
	
	Parameter:
	<mode> - type of notification
	  0 - disabled (factory default); it's possible only to query the current SIM status through Read command **AT#QSS?**
	  1 - enabled; the ME informs at every SIM status change through the following basic unsolicited indication:
	
	       #QSS: <status>
	
	       where:
	       <status> - current SIM status
	        0 - SIM NOT INSERTED
	        1 - SIM INSERTED
	
	  2 - enabled; the ME informs at every SIM status change through the following unsolicited indication:

#QSS - Query SIM Status		SELINT 2

	#QSS: <status>
	
	where:
	<status> - current SIM status
	  0 - SIM NOT INSERTED
	  1 - SIM INSERTED
	  2 - SIM INSERTED and PIN UNLOCKED
	  3 - SIM INSERTED and READY (SMS and Phonebook access are possible).	

AT#QSS?	Read command reports whether the unsolicited indication **#QSS** is currently enabled or not, along with the SIM status, in the format: **#QSS: <mode>,<status>** (**<mode>** and **<status>** are described above).	
AT#QSS=?	Test command returns the supported range of values for parameter **<mode>**.	

5.1.6.1.46 Delete all phonebook entries - #CPBD

#CPBD – Delete All Phonebook Entries		SELINT 2
AT#CPBD	Execution command deletes all phonebook entries in the current phonebook memory storage selected with **+CPBS**.	
AT#CPBD=?	Test command tests for command existence	

5.1.6.1.47 ATD Dialing Mode - #DIALMODE

#DIALMODE - Dialing Mode		SELINT 2

AT#DIALMODE= [<mode>]	Set command sets dialing modality.
	
	Parameter:
	<mode>
	  0 - (voice call only) **OK** result code is received as soon as it starts remotely ringing (factory default)
	  1 – (voice call only) **OK** result code is received only after the called party answers. Any character typed aborts the call and **OK** result code is received.
	  2 - (voice call and data call) the following custom result codes are received, monitoring step by step the call status:
	DIALING (MO in progress)
	RINGING (remote ring)
	CONNECTED (remote call accepted)
	RELEASED (after **ATH**)
	DISCONNECTED (remote hang-up)
	
	Any character typed before the CONNECTED message aborts the call
	
	Note: In case a BUSY tone is received and at the same time **ATX0** is enabled **ATD** will return **NO CARRIER** instead of **DISCONNECTED.**
	
	Note: The setting is saved in NVM and available on following reboot.	

AT#DIALMODE?	Read command returns current **ATD** dialling mode in the format: **#DIALMODE: <mode>**	
AT#DIALMODE=?	Test command returns the range of values for parameter **<mode>**	

5.1.6.1.48   Automatic call - #ACAL

#ACAL - Automatic Call		SELINT 2

AT#ACAL=
[<mode>]
	Set command enables/disables the automatic call function.
	
	Parameter:
	<mode>
	  0 - disables the automatic call function (factory default)
	  1 - enables the automatic call function. If enabled (and **&D2** has been issued), the transition **OFF/ON** of **DTR** causes an automatic call to the first number (position 0) stored in the internal phonebook.
	
	    Note: type of call depends on the last issue of command **+FCLASS**.	

AT#ACAL?	Read command reports whether the automatic call function is currently enabled or not, in the format: **#ACAL: <mode>** Note: as a consequence of the introduction of the command **#ACALEXT** (Extended Automatic Call) it is possible that the Read Command returns a value supported by **#ACALEXT** but **NOT** supported by **#ACAL**. **AT#ACAL?** **#ACAL : 2** **OK** Due to this possible situation it is strongly recommended not to use contemporaneously both commands.	
AT#ACAL=?	Test command returns the supported range of values for parameter **<mode>**.	
Note	See **&Z** to write and **&N** to read the number on module internal phonebook.	

5.1.6.1.49   Extended automatic call - #ACALEXT

#ACALEXT – Extended Automatic Call		SELINT 2

AT#ACALEXT=
<mode>,<index>
	Set command enables/disables the extended automatic call function.
	
	Parameters:
	<mode>
	  0 - disables the automatic call function (factory default)
	  1 - enables the automatic call function from internal phonebook.
	  2 - enables the automatic call function from "SM" phonebook.
	<index> - it indicates a position in the currently selected phonebook.
	
	If the extended automatic call function is enabled and **&D2** has been issued, the transition **OFF/ON** of **DTR** causes an automatic call to the number stored in position **<index>** in the selected phonebook.
	
	Note: type of call depends on the last issue of command **+FCLASS**.	

AT#ACALEXT?	Read command reports either whether the automatic call function is currently enabled or not, and the last **<index>** setting in the format: **#ACALEXT: <mode>,<index>**	
AT#ACALEXT=?	The range of available positions in a phonebook depends on the selected phonebook. This is the reason why the test command returns three ranges o values: the first for parameter **<mode>,** the second for parameter **<index>** when is chosen the internal phonebook, the third for parameter **<index>** when "SM" is the chosen phonebook.	
Note	Issuing **#ACALEXT** causes the **#ACAL <mode>** to be changed.	

#ACALEXT – Extended Automatic Call		SELINT 2
	Issuing **AT#ACAL=1** causes the **#ACALEXT <index>** to be set to default. It is recommended to NOT use contemporaneously either **#ACALEXT** and **#ACAL**	
Note	See **&Z** to write and **&N** to read the number on module internal phonebook.	

5.1.6.1.50 Extended Call Monitoring - #ECAM

#ECAM - Extended Call Monitoring		SELINT 2

AT#ECAM= [<onoff>]	This command enables/disables the call monitoring function in the ME.
	
	Parameter:
	<onoff>
	  0 - disables call monitoring function (factory default)
	  1 - enables call monitoring function; the ME informs about call events, such as incoming call, connected, hang up etc. using the following unsolicited indication:
	
	#ECAM: <ccid>,<ccstatus>,<calltype>,,,[<number>,<type>]
	
	where
	<ccid> - call ID
	<ccstatus> - call status
	  0 - idle
	  1 - calling (MO)
	  2 - connecting (MO)
	  3 - active
	  4 - hold
	  5 - waiting (MT)
	  6 - alerting (MT)
	  7 - busy
	<calltype> - call type
	  1 - voice
	  2 - data
	<number> - called number (valid only for **<ccstatus>=1**)
	<type> - type of **<number>**
	  129 - national number
	  145 - international number
	
	Note: the unsolicited indication is sent along with usual codes (**OK**, **NO CARRIER**, **BUSY**...).	

AT#ECAM?	Read command reports whether the extended call monitoring function is currently enabled or not, in the format: **#ECAM: <onoff>**	
AT#ECAM=?	Test command returns the list of supported values for **<onoff>**.	

5.1.6.1.51 Circuit Switched Fallback - #CSFB

#CSFB – Circuit Switched Fallback		SELINT 2
AT#CSFB=<mode>	This command is available for LE910-xx V2 variants supporting with 2G/3G fallback technologies. Set command configures the mode of operation for Circuit Switched Fallback. Parameter: <n>: unsolicited and mode of operation for Circuit Switched Fallback	

#CSFB – Circuit Switched Fallback		SELINT 2
	0 - disable reporting of CSFB related CS paging requests and disable automatic acceptance/rejection of CSFB calls. 1 - enable reporting of CSFB related CS paging requests and disable automatic acceptance/rejection of CSFB calls. 2 - enable reporting of CSFB related CS paging requests and enable automatic acceptance of CSFB calls. CSFB is always preferred over PS. (default) 3 - enable reporting of CSFB related CS paging requests and enable automatic rejection of CSFB calls. 4 - accept CSFB call. This value can be used only after having received the unsolicited result code #CSFBI. 5 - reject CSFB call. This value can be used only after having received the unsolicited result code #CSFBI. The format of the enabled unsolicited is: #CSFBI: <m>,<ph_no>,<ss_code>,<lcs_indicator>, <lcs_client_identity> where: **<m>:** Notification parameter 0 - No user response required. This could be because of last user settings AT#CSFB=2 or 3. 1 - User response required. User should respond with AT#CSFB=4 or 5. 2 - CSFB operation failed due to some error. **<ph_no>:** string with the identification of the calling line for the mobile terminating call in the CS domain, which triggered the paging via SGs. **<ss_code>:** information on the supplementary service transaction in the CS domain, which triggered the paging via SGs. **<lcs_indicator>**: indicates that the paging was triggered by a terminating LCS request in the CS domain. **<lcs_client_identity>:** string with the information related to the requestor of the terminating LCS request in the CS domain. Note 1: options 4 and 5 has to be sent only when the CSFB indication(URC) is sent with <m> = 1. Note 2: options 4 and 5 will not be reported in AT#CSFB? command. Note 3: In case CSFB indication is reported and there is no answer before the timer expires, a timeout scenario is handled. Note 4: the setting is saved in NVM.	
AT#CSFB?	Read command returns the currently configured values, in the format: **#CSFB**: **< mode >**	
AT#CSFB=?	Test command returns the supported range of values of parameters **< mode>** **#CSFB**: (0-5)	

5.1.6.1.52   SMS Overflow - #SMOV

#SMOV - SMS Overflow		SELINT 2
AT#SMOV= [<mode>]	Set command enables/disables the SMS overflow signaling function.	

#SMOV - SMS Overflow		SELINT 2
	Parameter: **<mode>** 0 - disables SMS overflow signaling function (factory default) 1 - enables SMS overflow signaling function; when the maximum storage capacity has been reached, the following network initiated notification is sent: **#SMOV: <memo>** **where <memo> is a string indicating the SMS storage that has reached maximum capacity:** **"SM" – SIM Memory** **"ME" – NVM SMS storage**	
AT#SMOV?	Read command reports whether the SMS overflow signaling function is currently enabled or not, in the format: **#SMOV: <mode>**	
AT#SMOV=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.1.53   Mailbox Numbers - #MBN

#MBN - Mailbox Numbers		SELINT 2
AT#MBN	Execution command returns the mailbox numbers stored on SIM, if this service is provided by the SIM. The response format is: **[#MBN: <index>,<number>,<type>[,<text>][,mboxtype][<CR><LF>** **#MBN: <index>,<number>,<type>[,<text>][,mboxtype][...]]]** where: **<index>** - record number **<number>** - string type mailbox number in the format **<type>** **<type>** - type of mailbox number octet in integer format 129 - national numbering scheme 145 - international numbering scheme (contains the character "**+**") **<text>** - the alphanumeric text associated to the number; used character set should be the one selected with command **+CSCS** **<mboxtype>** - the message waiting group type of the mailbox, if available: "VOICE" - voice "FAX" - fax "EMAIL" - electronic mail "OTHER" - other Note: if all queried locations are empty (but available), no information text lines will be returned.	
AT#MBN=?	Test command returns the **OK** result code.	

5.1.6.1.54   Message Waiting Indication - #MWI

#MWI - Message Waiting Indication		SELINT 2
AT#MWI=<enable>	Set command enables/disables the presentation of the **message waiting indicator** URC. Parameter: **<enable>** 0 - disable the presentation of the **#MWI** URC	

	1 - enable the presentation of the **#MWI** URC each time a new message waiting indicator is received from the network and, at startup, the presentation of the status of the **message waiting indicators**, as they are currently stored on SIM..
	
	 The URC format is:
	
	 #MWI: <status>,<indicator>[,<count>]
	
	 where:
	 <status>
	   0 - clear: it has been deleted one of the messages related to the indicator **<indicator>**.
	   1 - set: there's a new waiting message related to the indicator **<indicator>**
	 <indicator>
	   1 - either Line 1 (CPHS context) or Voice (3GPP context)
	   2 - Line 2 (CPHS context only)
	   3 - Fax
	   4 - E-mail
	   5 - Other
	 <count> - message counter: network information reporting the number of pending messages related to the message waiting indicator **<indicator>**.
	
	 The presentation at startup of the **message waiting indicators** status, as they are currently stored on SIM, is as follows:
	
	 #MWI: <status>[,<indicator>[,<count>][<CR><LF>
	 #MWI: <status>,<indicator>[,<count>][...]]]
	
	 where:
	 <status>
	   0 - no waiting message indicator is currently set: if this the case no other information is reported
	   1 - there are waiting messages related to the message waiting indicator **<indicator>**.
	 <indicator>
	   1 - either Line 1 (CPHS context) or Voice (3GPP context)
	   2 - Line 2 (CPHS context)
	   3 - Fax
	   4 - E-mail
	   5 - Other
	 <count> - message counter: number of pending messages related to the message waiting indicator **<indicator>** as it is stored on SIM.

AT#MWI?	Read command reports wheter the presentation of the **message waiting indicator** URC is currently enabled or not, and the current status of the **message waiting indicators** as they are currently stored on SIM. The format is: **#MWI: <enable>,<status>[,<indicator>[,<count>][<CR><LF>** **#MWI: <enable>,<status>,<indicator>[,<count>][...]]]**
AT#MWI=?	Test command returns the range of available values for parameter **<enable>**.

5.1.6.1.55 Network Emergency Number Update - #NWEN

#NWEN – Network Emergency Number Update		SELINT 2

AT#NWEN=[<en>]	Set command enables/disables unsolicited indication of emergency number update.
	
	Parameters:
	<en>
	  0 - disables unsolicited indication of emergency number update (factory default)
	  1 - enables unsolicited indication of emergency number update
	
	#NWEN: <type>
	
	where:
	<type>
	  1 number list update from internal ME
	  2 number list update from SIM
	  3 number list update from network	

AT#NWEN?	Read command reports whether the unsolicited indication of network emergency number update is currently enabled or not, in the format: **#NWEN: <en>**	
AT#NWEN=?	Test command reports the range for the parameter **<en>**	

5.1.6.1.56   Update PLMN List - #PLMNUPDATE

#PLMNUPDATE – Update PLMN List		SELINT 2
AT#PLMNUPDATE=[<action>, <MCC>,<MNC>[,<PLMNname>]]	Set command adds a new entry or updates an existing entry of the module PLMN list. Parameter: **<action>** - command action 0 - remove the entry with selected <MCC> and <MNC>. Parameter <PLMNname> will be ignored 1 - update the entry with selected <MCC> and <MNC> if it is already present, otherwise add it. 2 – remove all entries. Parameters <MCC> and <MNC> are not used in this case. **<MCC>** - Mobile Country Code. String value, length 3 digits. **<MNC>** - Mobile Network Code. String value, min length 2 digits, max length 3 digits. **<PLMNname>** - Name of the PLMN; string value, max length 30 characters. NOTE: the entries will be saved in NVM. NOTE: this command supports up to 30 entries. NOTE: entries added or updated with **#PLMNUPDATE** are effective only if **#PLMNMODE** is set to 2.	
AT#PLMNUPDATE?	Read command returns the list of entries added or updated with set command, in the format: **#PLMNUPDATE**: **<MCC>,<MNC>,<PLMNname>** **#PLMNUPDATE**: **<MCC>,<MNC>,<PLMNname>** … **OK** NOTE: the entries are in increasing order by MCC and MNC	
AT#PLMNUPDATE=?	Test command returns the range of **<action>** parameter and the maximum length of **<MCC>**, **<MNC>** and **<PLMNname>** parameters.	

5.1.6.1.57   PLMN List Selection - #PLMNMODE

#PLMNMODE – PLMN List Selection		SELINT 2
AT#PLMNMODE= [<mode>]	Set command selects the list of PLMN names to be used currently Parameter: **<mode>** 1 – disable PLMN list updates set with **#PLMNUPDATE** command (factory default) 2 – enable PLMN list updates set with **#PLMNUPDATE** command. Note: **<mode>** parameter is saved in NVM	
AT#PLMNMODE?	Read command reports whether the currently used list of PLMN names is fixed or not, in the format: **#PLMNMODE: <mode>** (**<mode>** described above)	

AT#PLMNMODE=?	Test command returns the supported range of values for parameter **<mode>**.

5.1.6.1.58 Periodical FPLMN cleaning - #FPLMN

#FPLMN – Periodically FPLMN clearing		SELINT 2
AT#FPLMN=<action>[,<period>]	Periodically delete the Forbidden PLMN list stored inside the SIM card. Parameters: **<action>** : 0 – disable periodic FPLMN clearing (default) 1 – enable periodic FPLMN clearing with period **<period>** 2 – clear FPLMN file on SIM (one shot) 3 – list contents of forbidden PLMN list file **<period>** : interval in minutes from FPLMN clearing, range 1...60, default value is 60 Note: the disable/enable value set by command is directly stored in NVM.	
AT#FPLMN?	Read command reports whether the periodic deletion is currently enabled or not, and the deletion period, in the format: **#FPLMN: <action>,<period>**	
AT#FPLMN=?	Test command reports available values for parameters <**action**> and <**period**>.	

5.1.6.1.59 Show Call Timers - #SCT

#SCT – Show Call Timers		SELINT 2
AT#SCT	Execution command returns the value stored in USIM field Incoming Call Timer, which contains the accumulated incoming call timer duration value for the current call and previous calls, and the value stored in the USIM field Outgoing Call Timer, that contains the accumulated outgoing call timer duration value for the current call and previous calls, in the format: **#SCT: <ICT>,<OCT>** where: **<ICT>** - Incoming Call Timer string, in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds **<OCT> -** Outgoing Call Timer string, in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds	
AT#SCT=?	Test command returns the **OK** result code.	

5.1.6.1.60 #Show Call Information - #SCI

#SCI – Show Call Information		SELINT 2
AT#SCI	Execution command returns the value stored in USIM field Incoming Call Information, which contains the time of the call and duration of the last calls, and the value stored in the USIM field Outgoing Call Information, that contains time of the call and duration of the last calls, in the format: **#SCI:** **<index1>,<number>,<text>,<callTime>,<callDuration>[,<status>]<CR><LF>** **#SCI:** **<index2>,<number>,<text>,<callTime>,<callDuration>[,<status>][...]]]** where: **<index*n*>** - the type of the entry (1: incoming call; 2: outgoing call) **<number>** - string type phone number **<text>** - the alphanumeric text associated to the number; used character set should be the one selected with command **+CSCS** **<callTime>** - call time yy/MM/dd,hh:mm:ss±zz, where yy - year MM - month dd - day hh - hour mm - minute ss - seconds ±zz - time zone **<callDuration>** - call duration in the format: "hh:mm:ss", where hh - hour mm - minute ss - seconds **<status>** - only for incoming calls, call status (0: answered: 1: not answered)	
AT#SCI=?	Test command returns the **OK** result code.	

5.1.6.1.61   Packet Service Network Type - #PSNT

#PSNT – Packet Service Network Type		SELINT 2

AT#PSNT=[<mode>]	Set command enables/disables unsolicited result code for packet service network type (PSNT).
	
	Parameter:
	<mode>
	  0 - disable PSNT unsolicited result code (factory default)
	  1 - enable PSNT unsolicited result code
	  2 - PSNT unsolicited result code enabled; read command reports HSUPA and HSDPA related info	

AT#PSNT?	Read command reports the **<mode>**,**<nt>** and HSUPA and HSDPA related info in the format:
	
	(<mode> = 2)
	#PSNT: <mode>,<nt>,<is_hsupa_available>,< is_hsupa_used>,<is_hsdpa_available>,<is_hsdpa_used>
	
	(<mode> = 0 or <mode> = 1)
	#PSNT: <mode>,<nt>
	
	where
	<mode>
	
	  0 - PSNT unsolicited result code disabled
	  1 - PSNT unsolicited result code enabled
	  2 - PSNT unsolicited result code enabled; read command reports HSUPA and HSDPA related info
	
	<nt> - network type
	
	0 - GPRS network
	1 - EGPRS network
	2 - WCDMA network
	3 - HSDPA network
	4 – LTE network
	5 - unknown or not registered.
	
	<is_hsupa_available> - HSUPA available
	
	  0 – HSUPA is not supported by network
	  1 – HSUPA is supported by network
	
	<is_hsupa_used> - HSUPA used
	
	  0 – HSUPA is not in use
	  1 – HSUPA is in use
	
	<is_hsdpa_available> - HSDPA available
	
	  0 – HSDPA is not supported by network
	  1 – HSDPA is supported by network
	
	<is_hsdpa_used> - HSPA used
	
	  0 – HSDPA is not in use
	  1 – HSDPA is in use
	
	Note: when the reported type of network **<nt>** is 2, the **<nt>** indication could be not complete in idle, because it depends on some not always	

#PSNT – Packet Service Network Type	SELINT 2
	broadcasted network parameters (HSDPA could be supported anyway); it is valid during traffic.
AT#PSNT=?	Test command reports the range for the parameter **<mode>**

5.1.6.1.62 SIM Presence status - #SIMPR

#SIMPR – SIM Presence status	SELINT 2
AT#SIMPR=[<mode>]	Set command enables/disables the SIM Presence Status unsolicited indication in the ME. This command reports also the status of the remote SIM, if the SAP functionality is supported and has been enabled. Parameter: **<mode>** - type of notification 0 - disabled (factory default) 1 - enabled; the ME informs at every (local and remote) SIM status change through the following unsolicited indication: **#SIMPR: <SIM>,<status>** where: **<SIM>** - local or remote SIM 0 local SIM 1 remote SIM **<status>** - current SIM status 0 - SIM NOT INSERTED 1 - SIM INSERTED
AT#SIMPR?	Read command reports whether the unsolicited indication #SIMPR is currently enabled or not, along with the local and remote SIM status, in the format: **#SIMPR: <mode>,0,<status><CR><LF>** **#SIMPR: <mode>,1,<status>** If SAP functionality is not supported or enabled the remote SIM status will always be 0.
AT#SIMPR=?	Test command reports the range for the parameter **<mode>**

5.1.6.1.63   Call Forwarding Flags - #CFF

#CFF – Call Forwarding Flags		SELINT 2

AT#CFF=<enable>	Set command enables/disables the presentation of the **call forwarding flags** URC.
	
	Parameter:
	<enable>
	  0 - disable the presentation of the **#CFF** URC (default value)
	  1 - enable the presentation of the **#CFF** URC each time the Call Forwarding Unconditional (CFU) SS setting is changed or checked and, at startup, the presentation of the status of the **call forwarding flags**, as they are currently stored on SIM.
	
	The URC format is:
	
	#CFF: <status>,<fwdtonum>
	
	where:
	<status>
	  0 – CFU disabled
	  1 – CFU enabled
	
	< fwdtonum > - number incoming calls are forwarded to
	
	The presentation at start up of the **call forwarding flags** status, as they are currently stored on SIM, is as follows:
	
	#CFF: <status>,< fwdtonum >
	
	where:
	<status>
	  0 – CFU disabled
	  1 – CFU enabled
	< fwdtonum > - number incoming calls are forwarded to	

AT#CFF?	Read command reports whether the presentation of the **call forwarding flags** URC is currently enabled or not, and, if the flags field is present in the SIM, the current status of the **call forwarding flags** as they are currently stored on SIM, and the number incoming calls are forwarded to. The format is: **#CFF: <enable>[,<status>,< fwdtonum >]**	
AT#CFF=?	Test command returns the range of available values for parameter **<enable>**.	

5.1.6.1.64   GSM and UMTS Audio Codec - #CODEC

#CODEC – GSM and UMTS Audio Codec		SELINT 2

AT#CODEC=
[<codec>]
	Set command sets the GSM and UMTS audio codec mode.
	
	Parameter:
	<codec>
	  0 - all the codec modes are enabled
	  1..255 - sum of integers each representing a specific codec mode:
	
	1 - **FR**, full rate mode enabled
	2 - **EFR**, enhanced full rate mode enabled
	4 - **HR**, half rate mode enabled
	8 - **AMR-FR**, AMR full rate mode enabled
	16 - **AMR-HR**, AMR half rate mode enabled	

#CODEC – GSM and UMTS Audio Codec		SELINT 2
	32 – **FAWB**, full rate AMR wide band 64 – **UAMR2**, UMTS AMR version 2 128 – **UAWB**, UMTS AMR wide band Note: the default value is 0 for all products except LE910-NA-V2 and LE910-NA1. Note: the full rate mode is added by default to any setting in the SETUP message (as specified in ETSI 04.08), but the call drops if the network assigned codec mode has not been selected by the user. Note: AT#CODEC=4 and AT#CODEC= 16 are not recommended; better using AT#CODEC=5 and AT#CODEC=24 respectively Note: the setting 0 is equivalent to the setting 255. Note: The codec setting is saved in the profile parameters. Note: 3G only products support **<codec>** parameter value 0 or sum of integers 64 and 128 only.	
AT#CODEC?	Read command returns current audio codec mode in the format: **#CODEC: <codec>**	
AT#CODEC=?	Test command returns the range of available values for parameter **<codec>**	
Example	AT#CODEC=14 OK *sets the codec modes HR (4), EFR (2) and AMR-FR (8)*	

5.1.6.1.65   Network Timezone - #NITZ

#NITZ - Network Timezone		SELINT 2
AT#NITZ= [<val> [,<mode>]]	Set command enables/disables (a) automatic date/time updating, (b) Full Network Name applying and (c) **#NITZ** URC; moreover it permits to change the **#NITZ** URC format. Date and time information can be sent by the network after GSM registration or after GPRS attach. Parameters: **<val>** 0 - disables (a) automatic data/time updating, (b) Full Network Name applying and (c) **#NITZ** URC; moreover it sets the **#NITZ** URC *'basic'* format (see **<datetime>** below) 1..15 - as a sum of: 1 - enables automatic date/time updating 2 - enables Full Network Name applying 4 - it sets the **#NITZ** URC *'extended'* format (see **<datetime>** below) 8 - it sets the **#NITZ** URC *'extended'* format with Daylight Saving Time (DST) support (see **<datetime>** below) (default: 7) **<mode>** 0 - disables **#NITZ** URC (factory default) 1 - enables **#NITZ** URC; after date and time updating the following unsolicited indication is sent: **#NITZ: <datetime>** where: **<datetime>** - string whose format depends on subparameter **<val>** **"yy/MM/dd,hh:mm:ss"** - *'basic'* format, if **<val>** is in (0..3) **"yy/MM/dd,hh:mm:ss±zz"** - *'extended'* format, if **<val>** is in (4..7) **"yy/MM/dd,hh:mm:ss±zz,d"** - *'extended'* format with DST support, if **<val>** is in (8..15)	

#NITZ - Network Timezone		SELINT 2

	where:
	   yy - year
	   MM - month (in digits)
	   dd - day
	   hh - hour
	   mm - minute
	   ss - second
	   zz - time zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT; two last digits are mandatory, range is -47..+48)
	   d – number of hours added to the local TZ because of Daylight Saving Time (summertime) adjustment; range is 0-3.
	
	Note: If the DST information isn't sent by the network, then the **<datetime>** parameter has the format **"yy/MM/dd,hh:mm:ss±zz"**	

AT#NITZ?	Read command reports whether (a) automatic date/time updating, (b) Full Network Name applying, (c) **#NITZ** URC (as well as its format) are currently enabled or not, in the format: **#NITZ: <val>,<mode>**	
AT#NITZ=?	Test command returns supported values of parameters **<val>** and **<mode>**	

5.1.6.1.66   Clock management - #CCLK

#CCLK - Clock Management		SELINT 2

AT#CCLK=<time>	Set command sets the real-time clock of the **ME**.
	
	Parameter:
	<time> - current time as quoted string in the format:
	     "yy/MM/dd,hh:mm:ss±zz,d"
	 yy - year (two last digits are mandatory), range is 00..99
	 MM - month (two last digits are mandatory), range is 01..12
	 dd - day (two last digits are mandatory)
	   The range for dd(day) depends either on the month and on the year it refers to. Available ranges are:
	     (01..28)
	     (01..29)
	     (01..30)
	     (01..31)
	        Trying to enter an out of range value will raise an error
	
	 hh - hour (two last digits are mandatory), range is 00..23
	 mm - minute (two last digits are mandatory), range is 00..59
	 ss - seconds (two last digits are mandatory), range is 00..59
	 ±zz - time zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT; two last digits are mandatory), range is -47..+48
	 d – number of hours added to the local TZ because of Daylight Saving Time (summertime) adjustment; range is 0-2.	

AT#CCLK?	Read command returns the current setting of the real-time clock, in the format **<time>**. Note: if the time is set by the network but the DST information is missing, or the time is set by +CCLK command, then the **<time>** format is: **"yy/MM/dd,hh:mm:ss±zz"**	
AT#CCLK=?	Test command returns the **OK** result code.	
Example	AT#CCLK="02/09/07,22:30:00+04,1" OK AT#CCLK? #CCLK: "02/09/07,22:30:25+04,1"	

#CCLK - Clock Management		SELINT 2
	OK	

5.1.6.1.67   Clock Mode - #CCLKMODE

#CCLKMODE – Clock Mode		SELINT 2
AT#CCLKMODE= <mode>	Set command enables the local time or the UTC time in AT+CCLK and AT#CCLK commands and in #NITZ URC Parameter: **<mode>** - time and date mode 0 - Local time + local time zone offset (default) 1 – UTC time + local time zone offset Note: the setting is saved automatically in NVM.	
AT#CCLKMODE?	Read command reports whether the local time or the UTC time is enabled, in the format: **#CCLKMODE: <mode>** (**<mode>** described above)	
AT#CCLKMODE=?	Test command reports the supported range of values for parameter **<mode>**	
Example	at#cclkmode? #CCLKMODE: 0 OK #NITZ: 13/03/05,15:20:33+04,0 at+cclk? +CCLK: "13/03/05,15:20:37+04" OK at#cclkmode=1 OK at+cclk? +CCLK: "13/03/05,14:20:45+04" OK at#cclkmode? #CCLKMODE: 1 OK #NITZ: 13/03/05,14:20:53+04,0 at+cclk? +CCLK: "13/03/05,14:20:55+04" OK at#cclkmode=0 OK at+cclk? +CCLK: "13/03/05,15:20:59+04" OK	

#NTP – Calculate and update date and time		SELINT 2

AT#NTP=
<NTPaddr>,
<NTPPort>,
<update_module_cloc
k>,
<timeout>[,<TimeZone
>]
	This command permits to calculate and update date and time through NTP protocol(RFC2030), sending a request to a NTP server.
	
	Parameters:
	
	<NTPaddr> - address of the NTP server, string type. This parameter can be either:
	  - any valid IP address in the format: "xxx.xxx.xxx.xxx"
	  - any host name to be solved with a DNS query
	
	<NTPPort> - NTP server port to contact
	  1..65535
	
	<update_module_clock>
	 0 - no update module clock
	 1 – update module clock
	
	<timeout> - waiting timeout for server response in seconds
	1..10
	
	<TimeZone> - Time Zone (indicates the difference, expressed in quarter of an hour, between the local time and GMT), range is -47..+48; default is 0.
	
	Note: the Time Zone is applied directly in the Date and Time received by the NTP Server, that is, by definition, GMT+0	

AT#NTP=?	Test command reports the supported range of values for parameters **<NTPaddr>,<NTPPort>,<update_module_clock>, <timeout>** and **<TimeZone>**	
Example	at#ntp="ntp1.inrim.it",123,1,2,4 #NTP: 12/01/27,14:42:38+04 OK …. at+cclk? +CCLK: "12/01/27,14:42:39+04" OK	

5.1.6.1.69 Enhanced Network Selection - #ENS

#ENS - Enhanced Network Selection		SELINT 2

AT#ENS=[<mode>]	Set command is used to activate the ENS functionality.
	
	Parameter:
	<mode>
	0 - disable ENS functionality (default for all products except LE910-NA V2/NA1)
	1 - enable ENS functionality
	
	if **AT#ENS=1** has been issued, the following values will be automatically set:
	
	- at every next power-up
	  b SIM Application Toolkit enabled on user interface 0 if not previously enabled on a different user interface (**AT#STIA=2**).
	
	- just at first next power-up
	  a Automatic Band Selection enabled (**AT#AUTOBND=2**) only if the previous setting was equal to **AT#AUTOBND=0**
	
	Note: the new setting will be available just at first next power-up.	

AT#ENS?	Read command reports whether the ENS functionality is currently enabled or not, in the format: **#ENS: <mode>** where: **<mode>** as above	
AT#ENS=?	Test command reports the available range of values for parameter **<mode>**.	
Reference	Cingular Wireless LLC Requirement	

5.1.6.1.70   Band Selection - #BND

#BND - Select Band		SELINT 2

AT#BND=<band>[,<UMTS band>[,<LTE band>]]	Set command selects the current GSM,UMTS and LTE bands.
	
	Parameter
	<band>:
	  0 - GSM 900MHz + DCS 1800MHz (default value)
	  1 - GSM 900MHz + PCS 1900MHz; this value is not available if the ENS functionality has been activated (see **#ENS**)
	  2 - GSM 850MHz + DCS 1800MHz (available only on quadri-band modules); this value is not available if the ENS functionality has been activated (see **#ENS**)
	  3 - GSM 850MHz + PCS 1900MHz (available only on quadri-band modules)
	
	<UMTS band>:
	0 - 1900 / 2100MHz(FDD I)
	1 - 1900MHz(FDD II) (default value depending on product)
	2 - 850MHz(FDD V)
	3 - 2100MHz(FDD I) + 1900MHz(FDD II) + 850MHz(FDD V)
	4 - 1900MHz(FDD II) + 850MHz(FDD V)
	5 - 900MHz(FDD VIII) (default value, depending on the product)
	6 - 2100MHz(FDD I) + 900MHz(FDD VIII)
	7 – 1700/ 2100MHz(FDD IV, AWS)
	
	<LTE band> values in the range 1 – 4294967295 as a sum of:
	1 - B1
	2 - B2
	4 - B3
	8 - B4
	…
	i - B(2exp(i-1))
	…
	2147483648 - B32
	
	Note: This setting is maintained even after power off.
	
	Note: if the automatic band selection is enabled (**AT#AUTOBND=2**) then you can issue **AT#BND=<band>,<UMTS band>,<LTE band>** but it will have no functional effect; nevertheless every following read command **AT#BND?** will report that setting.
	
	Note: not all products support all the values of parameter **<band>**: please refer to test command to find the supported range of values.
	Note: not all products support all the values of parameter **<UMTS band>**: please refer to test command to find the supported range of values.
	Note: not all products support all the values of parameter **<LTE band>**: please refer to test command to find the supported range of values (maximum value is the sum representation of supported bands).
	
	Note: for 4G only product use fixed unused value 0 for **<band>** and **<UMTS band>** parameters.
	Note: for 4G/3G only product use fixed unused value 0 for **<band>** parameter.
	Note: for 4G/2G only product use fixed unused value 0 for **<UMTS band>** parameter.

AT#BND?	Read command returns the current selected band in the format: **#BND: <band>,<UMTS band>,<LTE band>**

#BND - Select Band	SELINT 2
AT#BND=?	Test command returns the supported range of values of parameters **<band>**, **<UMTS band>** and **<LTE band>**.

5.1.6.1.71   Automatic Band Selection - #AUTOBND

#AUTOBND - Automatic Band Selection	SELINT 2
AT#AUTOBND= [<value>]	Set command enables/disables the automatic band selection at power-on. Parameter: **<value>**: 0 - disables automatic band selection at *next* power-up 1 – value not supported. 2 – (default) enables automatic band selection in all supported bands at *next* power-up Note: if the current setting is equal to **AT#AUTOBND=0** and we're issuing **AT#ENS=1**, at *first next* power-up after the ENS functionality has been activated (see **#ENS**) the automatic band selection (**AT#AUTOBND=2**) is enabled.
AT#AUTOBND?	Read command returns whether the automatic band selection is enabled or not in the form: **#AUTOBND: <value>**
AT#AUTOBND=?	Test command returns the range of supported values for parameter **<value>**.

5.1.6.1.72   PPP-GPRS Connection Authentication Type - #GAUTH

#GAUTH – PPP Data Connection Authentication Type	SELINT 2
AT#GAUTH= [<type>]	Set command sets the authentication type used in PDP Context Activation during PPP-GPRS connections. Parameter **<type>** 0 - no authentication 1 - PAP authentication (factory default) 2 - CHAP authentication Note: if the settings on the server side (the host application) of the PPP are not compatible with the AT#GAUTH setting, then the PDP Context Activation will use no authentication.
AT#GAUTH?	Read command reports the current authentication type, in the format: **#GAUTH: <type>**
AT#GAUTH=?	Test command returns the range of supported values for parameter **<type>**.

5.1.6.1.73   PPP-GPRS Parameters Configuration - # GPPPCFG

#GPPPCFG - PPP-GPRS Parameters Configuration		SELINT 2
AT#GPPPCFG= <hostIPaddress> [,<unused_A>] [,<unused_B>]]	Set command sets one parameter for a PPP-GPRS connection. Parameters: <hostIPaddress> - **Host IP Address** that is assigned to the PPP server side (the host application); Sstring type, it can be any valid IP address in the format: xxx.xxx.xxx.xxx. Note: if **<hostIPaddress>="000.000.000.000"** (factory default) host address is not included in the IPCP Conf Req, host address choice is left to the peer	
AT# GPPPCFG?	Read command reports the current PPP-GPRS connection parameters in the format: **#GPPPCFG: <hostIPaddress>,,<unused_A>,<unused_B>**	
AT# GPPPCFG=?	Test command returns the range of supported values for parameters **#GPPPCFG: (25),(0)**	

5.1.6.1.74   Skip Escape Sequence - #SKIPESC

#SKIPESC - Skip Escape Sequence		SELINT 2

AT#SKIPESC=
[<mode>]
	Set command enables/disables skipping the escape sequence +++ while transmitting during a data connection.
	
	Parameter:
	<mode>
	  0 - doesn't skip the escape sequence; its transmission is enabled (factory default).
	  1 - skips the escape sequence; its transmission is not enabled.
	  2 - skips the escape sequence; its transmission is not enabled. If there are data pending in the receiving buffer from the serial port driver, they are deleted.
	
	Note: in case of an FTP connection, the escape sequence is not transmitted, regardless of the command setting.	

AT#SKIPESC?	Read command reports whether escape sequence skipping is currently enabled or not, in the format: **#SKIPESC: <mode>**	
AT#SKIPESC=?	Test command reports supported range of values for parameter **<mode>**.	

5.1.6.1.75   Subscriber number - #SNUM

#SNUM – Subscriber Number		SELINT 2
AT#SNUM= <index>[,<number>[,< alpha>]]	Set command writes the MSISDN information related to the subscriber (own number) in the EFmsisdn SIM file. Parameter: <index> - record number The number of record in the EFmsisdn depends on the SIM. If only <index> value is given, then delete the EFmsisdn record in location <index> is deleted. <number> - string containing the phone number <alpha> - alphanumeric string associated to <number>. Default value is empty string (""), otherwise the used character set should be the one selected with +CSCS. The string could be written between quotes, the number of characters depends on the SIM. If empty string is given (""), the corresponding <alpha> will be an empty string. Note: the command return ERROR if EFmsisdn file is not present in the SIM or if MSISDN service is not allocated and activated in the SIM Service Table (see 3GPP TS 11.11).	
AT#SNUM=?	Test command returns the **OK** result code	

5.1.6.1.76   SIM detection mode - #SIMDET

#SIMDET - SIM Detection Mode		SELINT 2

AT#SIMDET=
<mode>
	Set command specifies the SIM Detection mode
	
	Parameter:
	<mode> - SIM Detection mode
	  0 - ignore SIMIN pin and simulate the status 'SIM Not Inserted'
	  1 - ignore SIMIN pin and simulate the status 'SIM Inserted'
	2 - automatic SIM detection through SIMIN Pin (default)
	
	Note: with Sim-On-Chip products, **#SIMDET** allows to switch between internal and external SIM, as described below:
	0 – switch to internal SIM
	1 – switch to external SIM, ignore SIMIN pin.
	2 – automatic external SIM detection through SIMIN Pin (default).
	NOTE: with **#SIMDET**=1, although SIMIN pin is ignored, SIM removal is detected	

AT#SIMDET?	Read command returns the currently selected Sim Detection Mode in the format:
	
	#SIMDET: <mode>,<simin>
	
	where:
	<mode> - SIM Detection mode, as before
	<simin> - SIMIN pin real status
	  0 - SIM not inserted
	  1 - SIM inserted	

AT#SIMDET=?	Test command reports the supported range of values for parameter **<mode>**	

5.1.6.1.77   SIMIN pin configuration - #SIMINCFG

#SIMINCFG – SIMIN pin configuration		SELINT 2
AT#SIMINCFG= <reserved>, <Simin_det_mode>	This command allows to set Simin pin status for SIM detection Parameters: **<reserved>** **<Simin_det_mode>** - status of Simin pin for sim detection: 0 – Simin pin to ground means SIM inserted, to Vcc means SIM removed, for normal sim holder 1 – Simin pin to ground means SIM removed, to Vcc means SIM inserted, for micro sim holder	
AT#SIMINCFG?	Read command reports the selected GPIO pin in the format: #SIMINCFG: **<0>**, **<Simin_det_mode>**	
AT#SIMINCFG=?	Test command reports **<0>** and supported range of values for parameter **<Simin_det_mode>**	

5.1.6.1.78   Alarm Pin - #ALARMPIN

#ALARMPIN – Alarm Pin		SELINT 2
AT#ALARMPIN= <pin>	Set command sets the GPIO pin for the ALARM pin Parameters: **<pin>** defines which GPIO shall be used as ALARM pin. For the **< pin >** actual range check the "Hardware User Guide". Default value is 0, which means no ALARM pin set. Note: the setting is saved in NVM Note: ALARM pin function of a GPIO corresponds to ALT2 function of the GPIO. So it can be also set through AT#GPIO command, ALT2 function.	
AT#ALARMPIN?	Read command returns the current parameter settings for **#ALARMPIN** command in the format: **#ALARMPIN: <pin>**	
AT#ALARMPIN=?	Test command reports the supported range of values for parameter **<pin>**.	

5.1.6.1.79   GSM Context Definition - #GSMCONT

#GSMCONT - GSM Context Definition		SELINT 2

AT#GSMCONT= <cid>[,<P_type>, <CSD_num>]	Set command specifies context parameter values for the only GSM context, identified by the (local) context identification parameter 0.
	
	Parameters:
	<cid> - context Identifier; numeric parameter which specifies the only GSM context
	  0
	<P_type> - protocol type; a string parameter which specifies the type of protocol
	  "IP" - Internet Protocol
	<CSD_num> - phone number of the internet service provider
	
	Note: issuing **#GSMCONT=0** causes the values for context number **0** to become undefined.	

AT#GSMCONT?	Read command returns the current settings for the GSM context, if defined, in the format: **+GSMCONT: <cid>,<P_type>,<CSD_num>**	
AT#GSMCONT?	Test command returns the supported range of values for all the parameters.	

#CGPADDR - Show Address		SELINT 2
AT#CGPADDR= [<cid>[,<cid> [,...]]]	Execution command returns a list of PDN addresses for the specified PDN connection identifiers Parameters: **<cid>** - context identifier 　1..5 - numeric parameter which specifies a particular PDN connection definition (see **+CGDCONT** command). Note: if no **<cid>** is specified, the addresses for all **defined** contexts are returned. Note: issuing the command with more than 6 parameters raises an error. Note: the command returns only one row of information for every specified **<cid>**, even if the same **<cid>** is present more than once. The command returns a row of information for every specified **<cid>** whose context has been already defined. No row is returned for a **<cid>** whose context has not been defined yet. Response format is: **#CGPADDR: <cid>,<address>[<CR><LF>** **#CGPADDR: <cid>,<address>[…]]** where: **<cid>** - context identifier, as before **<address>** - its meaning depends on the value of **<cid>** **<cid>** in (1..5)) it is a string that identifies the terminal in the address space applicable to the PDN. 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 PDN connection activation that used the context definition referred to by **<cid>.** Note: if no address is available the empty string ("") is represented as **<address>.**	
AT#CGPADDR=?	Test command returns a list of defined **<cid>**s.	
Example	AT#SGACT=0,1 #SGACT: xxx.yyy.zzz.www OK AT#CGPADDR=0 #CGPADDR: 0,"xxx.yyy.zzz.www" OK AT#CGPADDR=? #CGPADDR: (0) OK	

5.1.6.1.81   Call Establishment Lock - #CESTHLCK

#CESTHLCK – Call establishment lock		SELINT 2
AT#CESTHLCK= [<closure_type >]	This command can be used to disable call abort before the DCE enters connected state. **<closure_type >:** 0 - Aborting the call setup by reception of a character is generally possible at any time before the DCE enters connected state (default) 1 - Aborting the call setup is disabled until the DCE enters connected state	
AT#CESTHLCK?	Read command returns the current setting of **<closure_type>** parameter in the format: **#CESTHLCK: <closure_type>**	
AT#CESTHLCK=?	Test command returns the supported range of values for the **<closure_type>** parameter	

5.1.6.1.82 Write to I2C - #I2CWR

#I2CWR – Write to I2C		SELINT 2
AT#I2CWR= <sdaPin>, <sclPin>, <deviceId>, <registerId>, <len>	This command is used to Send Data to an I2C peripheral connected to module GPIOs **<sdaPin >:** GPIO number for SDA . Valid range is "any input/output pin" (see Test Command.) **<sclPin>:** GPIO number to be used for SCL. Valid range is "any output pin" (see Test Command). **<deviceId>:** address of the I2C device, with the LSB, used for read\write command. It doesn't matter if the LSB is set to 0 or to 1. 10 bit addressing supported. Value has to be written in hexadecimal form (without 0x). **<registerId>:** Register to write data to , range 0..255. Value has to be written in hexadecimal form (without 0x). **<len>:** number of data to send. Valid range is 1-254. The module responds to the command with the prompt '**>**' and awaits for the data to send. To complete the operation send **Ctrl-Z** char (**0x1A** hex); to exit without writing the message send **ESC** char (**0x1B** hex). Data shall be written in Hexadecimal Form. If data are successfully sent, then the response is **OK**. If data sending fails for some reason, an error code is reported. Example if CheckAck is set and no Ack signal was received on the I2C bus NOTE: At the end of the execution GPIO will be restored to the original setting (check AT#GPIO Command) NOTE: device address, register address where to read from\ write to, and date bytes have to be written in hexadecimal form without 0x.	
AT#I2CWR=?	Test command reports the supported list of currently available <service>s.	
Example	AT#I2CWR=2,3,20,10,14 > 00112233445566778899AABBCCDD<ctrl-z> OK Set GPIO2 as SDA, GPIO3 as SCL; Device I2C address is 0x20; 0x10 is the address of the first register where to write I2C data; 14 data bytes will be written since register 0x10	

5.1.6.1.83 Read to I2C - #I2CRD

#I2CRD – Read to I2C		SELINT 2
AT#I2CRD= <sdaPin>, <sclPin>, <deviceId>, <registerId>, <len>	This command is used to Send Data to an I2C peripheral connected to module GPIOs <sdaPin >: GPIO number for SDA . Valid range is "any input/output pin" (see Test Command.) <sclPin>: GPIO number to be used for SCL. Valid range is "any output pin" (see Command Test). <deviceId>: address of the I2C device, with the LSB, used for read\write command. It doesn't matter if the LSB is set to 0 or to 1. 10 bit addressing supported. Value has to be written in hexadecimal form (without 0x before). <registerId>: Register to read data from, range 0..255. Value has to be written in hexadecimal form (without 0x before). <len>: number of data to receive. Valid range is 1-254. Data Read from I2C will be dumped in Hex: NOTE: If data requested are more than data available in the device, dummy data (normally 0x00 or 0xff) will be dumped. NOTE: At the end of the execution GPIO will be restored to the original setting (check AT#GPIO Command) NOTE: device address, register address where to read from\ write to, and date bytes have to be written in hexadecimal form without 0x.	
AT#I2CRD=?	Test command reports the supported list of currently available <service>s.	
Example	AT#I2CRD=2,3,20,10,12 #I2CRD: 00112233445566778899AABBCC OK	

5.1.6.1.84 I2C Combined Format - #I2CCF

#I2CCF – I2C Write and Read Data in Combined Format		SELINT 2

AT#I2CCF=
<sdaPin>,
<sclPin>,
<deviceId>,
<lenwr>,
<lenrd>
	The module, as master, transmits data to a slave and then reads data from the same slave through two GPIOs. Transfer direction is changed after all write bytes have been sent.
	<sdaPin>: GPIO number for SDA . Valid range is "any input/output pin" (see Command Test)
	<sclPin>: GPIO number to be used for SCL. Valid range is "any output pin" (see Command Test).
	<deviceId>: address of the I2C device, with the LSB, used for read\write command.
	  It doesn't matter if the LSB is set to 0 or to 1.
	  10 bit addressing is supported.
	  Value has to be written in hexadecimal form (without 0x before).
	<lenwr>: number of data to send. Valid range is 1-254.
	<lenrd>: number of data to receive. Valid range is 1-254.	

AT#I2CCF=?	Test command returns the supported range of values for all the parameters.	
Example	AT#I2CCF=2,3,20,1,4 >0a<ctrl-z> OK Set GPIO2 as SDA, GPIO3 as SCL;	

#I2CCF – I2C Write and Read Data in Combined Format	SELINT 2
	Device I2C address is 0x20; First is send data 0x0a; after a "restart" 4 data bytes are read The sequence is the following: *START* - 0x20- 0x0a -*RESTART* - 0X21 - *data read 1 -...- data read 4 -* *STOP*

5.1.6.1.85   Power Saving Mode Ring - #PSMRI

#PSMRI – Power Saving Mode Ring		SELINT 2
AT#PSMRI= <x>	Set command enables/disables the Ring Indicator pin response to an URC message while modem is in power saving mode. If enabled, a negative going pulse is generated, when URC message for specific event is invoked. The duration of this pulse is determined by the value of <x>. Parameter: <x> - RI enabling 0 - disables RI pin response for URC message(factory default) 50-1150 - enables RI pin response for URC messages. Note: when RING signal from incoming call/SMS/socket listen is enabled, the behaviour for #PSMRI will be ignored. Note: the behavior for #PSMRI is invoked, only when modem is in sleep mode (AT+CFUN=5 and AT+CFUN=9) Note: in case of AT+CFUN=9, the pulse is generated also when a GPRS packet is received. Note: the value set by command is stored in the profile extended section and doesn't depend on the specific AT instance	
AT#PSMRI?	Read command reports the duration in ms of the pulse generated, in the format: **#PSMRI: <x>**	
AT#PSMRI=?	Test command reports the supported range of values for parameter **<x>**	

5.1.6.1.86   Control Command Flow - #CFLO

#CFLO – Command Flow Control		SELINT 2

AT#CFLO=
<enable>
	Set command enables/disables the flow control in command mode. If enabled, current flow control is applied to both data mode and command mode.
	
	Parameter:
	
	<enable> -
	  0 – disable flow control in command mode <default value>
	  1 – enable flow control in command mode
	
	Note: setting value is saved in the profile	

AT#CFLO?	Read command returns current setting value in the format **#CFLO: <enable>**	
AT#CFLO=?	Test command returns the range of supported values for parameter **<enable>**	

5.1.6.1.87   Report concatenated SMS indexes - #CMGLCONCINDEX

#CMGLCONCINDEX – Report concatenated SMS indexes		SELINT 2
AT#CMGLCONCINDEX	The command will report a line for each concatenated SMS containing: **#CMGLCONCINDEX: N,i,j,k,...** where N is the number of segments that form the whole concatenated SMS i,j,k are the SMS indexes of each SMS segment , 0 if segment has not been received If no concatenated SMS is present on the SIM, only **OK** result code will be returned.	
AT#CMGLCONCINDEX=?	Test command returns **OK** result code.	
Example	at#cmglconcindex #CMGLCONCINDEX: 3,0,2,3 #CMGLCONCINDEX: 5,4,5,6,0,8 OK	

5.1.6.1.88   Codec Information - #CODECINFO

#CODECINFO – Codec Information		SELINT 2
AT#CODECINFO[=<format>[, <mode>]]	This command is both a set and an execution command. Set command enables/disables codec information reports depending on the parameter **<mode>**, in the specified **<format>**. Parameters: **<format>** 0 – numeric format (default) 1 – textual format **<mode>** 0 - disable codec information unsolicited report (default) 1 - enable codec information unsolicited report only if the codec changes 2 - enable short codec information unsolicited report only if the codec changes If **<mode>=1** the unsolicited channel mode information is reported in the following format: (if **<format>=0**) **#CODECINFO: <codec_used>,<codec_set>** (if **<format>=1**) **#CODECINFO: <codec_used>,<codec_set1>** **[,<codec_set2>[..[,codec_setn]]]** If **<mode>=2** the unsolicited codec information is reported in the following format: **#CODECINFO: <codec_used>** The reported values are described below. Execution command reports codec information in the specified **<format>**. (if **<format>=0**) **#CODECINFO: <codec_used>,<codec_set>**	

#CODECINFO – Codec Information	SELINT 2

(if **<format>=1**)
#CODECINFO: <codec_used>,<codec_set1>
[,<codec_set2>[..[,codec_setn]]]

The reported values are:

(if **<format>=0**)
<codec_used> - one of the following channel modes:
 0 – no TCH
 1 - full rate speech 1 on TCH
 2 - full rate speech 2 on TCH
 4 - half rate speech 1 on TCH
 8 - full rate speech 3 – AMR on TCH
 16 - half rate speech 3 – AMR on TCH
 128 – full data 9.6
 129 – full data 4.8
 130 – full data 2.4
 131 – half data 4.8
 132 – half data 2.4
 133 – full data 14.4
 134 – full rate AMR wide band
 135 – UMTS AMR version 2
 136 – UMTS AMR wide band

<codec_set>
 1..255 - sum of integers each representing a specific codec mode:
1 - FR, full rate mode enabled
2 - EFR, enhanced full rate mode enabled
4 - HR, half rate mode enabled
8 - FAMR, AMR full rate mode enabled
16 - HAMR, AMR half rate mode enabled
32 – FR-AMR-WB, full rate AMR wide band
64 – UMTS-AMR-V2, UMTS AMR version 2
128 – UMTS-AMR-WB, UMTS AMR wide band

(if **<format>=1**)
<codec_used> - one of the following channel modes:
 None – no TCH
 FR - full rate speech 1 on TCH
 EFR - full rate speech 2 on TCH
 HR - half rate speech 1 on TCH
 FAMR - full rate speech 3 – AMR on TCH
 HAMR - half rate speech 3 – AMR on TCH
 FD96 - full data 9.6
 FD48 - full data 4.8
 FD24 - full data 2.4
 HD48 - half data 4.8
 HD24 - half data 2.4
 FD144 - full data 14.4
 FAWB - full rate AMR wide band
 UAMR2 – UMTS AMR version 2
 UAWB – UMTS AMR wide band

<codec_setn>
 FR - full rate mode enabled
 EFR - enhanced full rate mode enabled
 HR - half rate mode enabled
 FAMR - AMR full rate mode enabled
 HAMR - AMR half rate mode enabled
 FAWB - full rate AMR wide band

#CODECINFO – Codec Information		SELINT 2
	UAMR2 - UMTS AMR version 2 UAWB - UMTS AMR wide band Note: The command refers to codec information in speech call and to channel mode in data call. Note: if AT#CODEC is 0, the reported codec set for **<format>=0** is 255 (all codec). Note: This command is not supported in LTE-only variants.	
AT#CODECINFO?	Read command reports **<format>** and **<mode>** parameter values in the format: **#CODECINFO: <format>,<mode>**	
AT#CODECINFO=?	Test command returns the range of supported **<format>** and **<mode>**.	

5.1.6.1.89   Select language - #LANG

#LANG – select language		SELINT 2
AT#LANG=<lan>	Set command selects the currently used language for displaying different messages Parameter: **<lan>** - selected language "en" – English (factory default) "it" – Italian	
AT#LANG?	Read command reports the currently selected <lan> in the format: **#LANG: <lan>**	
AT#LANG=?	Test command reports the supported range of values for parameter **<lan>**	

5.1.6.1.90   Enable RX Diversity and set DARP - #RXDIV

#RXDIV – enable RX Diversity and set DARP		SELINT 2

AT#RXDIV=<DIV_enable>[,<DARP_mode>]	This command enables/disables the RX Diversity and sets the DARP.
	
	Parameters:
	<DIV_enable>
	RX Diversity
	  0 - disable the RX Diversity
	  1 - enable RX Diversity (default value)
	
	<DARP_mode>
	DARP mode
	  0 – DARP not supported
	  1 – DARP phase 1
	  2 – DARP phase 2 traffic only
	  3 – DARP always on (default value)
	
	Note: the values set by command are directly stored in NVM and don't depend on the specific CMUX instance. They are available at next power on.	

#RXDIV – enable RX Diversity and set DARP		SELINT 2
	Note: if **<DIV_enable>** is set to 0, then **<DARP_mode>** is automatically set to 1 regardless the set value	
AT#RXDIV?	Read command reports the currently selected **<DIV_enable>** and **<DARP_mode>** parameters in the format: **#RXDIV: <DIV_enable>,<DARP_mode>**	
AT#RXDIV=?	Test command reports the supported range of values for parameters **<DIV_enable>** and **<DARP_mode>**	

5.1.6.1.91   Swap 3G or 4G RX from main to diversity - #RXTOGGLE

#RXTOGGLE– Swap 3G or 4G RX from main to diversity		SELINT 2

AT#RXTOGGLE=<TOGGLE_enable>	Set command moves the 3G-RX receiver from the main antenna to the diversity antenna
	
	Parameters:
	<TOGGLE_enable>
	  0 – set the RX to the main antenna
	  1 – set the RX to the diversity antenna
	  2 – set the RX to both main and diversity antenna
	
	Note: the command is available only for HSPA(HE910) and LTE products that support the diversity
	Note: value 2 for TOGGLE_enable parameter is available only for LTE products
	Note: this command is only for test purpose, do not use it in Normal Operation
	Note: the correct way to use this command is that shown in the example	

AT#RXTOGGLE?	Read command reports the currently selected **<TOGGLE_enable>** in the format: **#RXTOGGLE: <TOGGLE_enable>**	
AT#RXTOGGLE=?	Test command reports the supported range of values	
Example	AT+COPS=2 *module deregistered from GSM network* OK AT+WS46=22 *select 3G cellular network* OK AT#RXTOGGLE=1 *set the RX to the diversity antenna* OK AT+COPS = 0 *register to the GSM network* OK AT+CREG =1 *enable network registration unsolicited result code* OK AT+CREG? *read **<mode>** and **<stat>** parameters*	

#RXTOGGLE– Swap 3G or 4G RX from main to diversity		SELINT 2
	+CREG: 1,1	
	OK	

5.1.6.1.92   Set Encryption algorithm - #ENCALG

#ENCALG – Set Encryption Algorithm		SELINT 2

AT#ENCALG=[<encG SM>][,<encGPRS>]	This command enables or disables the GSM and/or GPRS encryption algorithms supported by the module.
	
	Parameters:
	<encGSM>:
	  0 – no GSM encryption algorithm
	  1..7 - sum of integers each representing a specific GSM encryption algorithm:
	1 – A5/1
	2 – A5/2
	4 – A5/3
	  255 - reset the default values
	
	<encGPRS>:
	  0 – no GPRS encryption algorithm
	  1..7 - sum of integers each representing a specific GPRS encryption algorithm:
	1 – GEA1
	2 – GEA2
	4 – GEA3
	  255 - reset the default values
	
	Note: the values are stored in NVM and available on following reboot.
	
	Note: For possible **<encGSM>** and **<encGPRS>** encryptions see test command response.
	
	Note: If no parameter is issued, the set command returns ERROR.
	
	Note: This command is not supported in LTE-only variants.	

AT#ENCALG?	Read command reports the currently selected **<encGSM>** and **<encGPRS>**, and the last used **<useGSM>** and **<useGPRS>** in the format: **#ENCALG: <encGSM>,<encGPRS>,<usedGSM>,<usedGPRS>** Parameters: **<usedGSM>:** 0 – no GSM encryption algorithm 1 – A5/1 2 – A5/2 4 – A5/3 255 – not available **<usedGPRS>:** 0 – no GPRS encryption algorithm 1 – GEA1 2 – GEA2 4 – GEA3 255 – not available	
AT#ENCALG=?	Test command reports the supported range of values for parameters in the format:	

#ENCALG – Set Encryption Algorithm		SELINT 2
	< encGSM > and <encGPRS>.	
Example	AT#ENCALG? #ENCALG: 5,2,1,1 OK AT#ENCALG=5,1 OK *sets the GSM encryption algorithm A5/1 and A5/3, and the GPRS encryption algorithm GEA1.* *It will be available at the next reboot.* AT#ENCALG? #ENCALG: 5,2,1,1 *The last two values indicate that the last used GSM encryption algorithm is A5/1 and the last used GPRS encryption algorithm is GEA1* *After reboot* AT#ENCALG? #ENCALG: 5,1,1,1	

5.1.6.1.93   Escape Sequence Guard Time - #E2ESC

#ENCALG – Set Encryption Algorithm		SELINT 2

AT#E2ESC=
[<gt>]
	Set command sets a guard time in seconds for the escape sequence in
	GPRS to be considered a valid one (and return to on-line command mode).
	
	Parameter:
	<gt>
	  0 - guard time defined by command S12 (factory default)
	  1..10 - guard time in seconds
	
	Note: if the Escape Sequence Guard Time is set to a value different from
	zero, it overrides the one set with **S12**.	

AT#E2ESC?	Read command returns current value of the escape sequence guard time, in the format: **#E2ESC: <gt>**	
AT#E2ESC=?	Test command returns the range of supported values for parameter **<gt>**.	

5.1.6.1.94   No Carrier Indication Handling - #NCIH

#NCIH – NO CARRIER Indication Handling		SELINT 2

AT#NCIH =
<enable>
	Set command enables/disables sending of a NO CARRIER indication when
	a remote call that is ringing is dropped by calling party before it is answered
	at called party.
	
	Parameter:
	<enable> - NO CARRIER indication sending
	  0 - disabled (factory default)
	  1 - enabled	

AT#NCIH?	Read command reports whether the feature is currently enabled or not, in the format: **#NCIH: <enable>**	

#NCIH – NO CARRIER Indication Handling		SELINT 2
AT#NCIH=?	Test command returns the supported range of values for parameter **<enable>**.	

5.1.6.1.95   Digital/Analog Converter Control - #DAC

#DAC - Digital/Analog Converter Control		SELINT 2

AT#DAC= [<enable> [,<value>]]	Set command enables/disables the **DAC_OUT** pin.
	
	Parameters:
	<enable> - enables/disables DAC output.
	  0 - disables pin; it is in high impedance status (factory default)
	  1 - enables pin; the corresponding output is driven
	<value> - scale factor of the integrated output voltage; it must be present if **<enable>=1**
	  0..1023 - 10 bit precision
	
	Note: **integrated output voltage = MAX_VOLTAGE * value / 1023**
	Note: the command automatically sets the GPIO_07 in alternate function ALT1	

AT#DAC?	Read command reports whether the **DAC_OUT** pin is currently enabled or not, along with the integrated output voltage scale factor, in the format: **#DAC: <enable>,<value>**	
AT#DAC=?	Test command reports the range for the parameters **<enable>** and **<value>**.	
Example	*Enable the DAC out and set its integrated output to the 50% of the max value:* AT#DAC=1,511 OK *Disable the DAC out:* AT#DAC=0 OK	
Note	With this command the DAC frequency is selected internally. D/A converter must not be used during POWERSAVING. **DAC_OUT** line must be integrated (for example with a low band pass filter) in order to obtain an analog voltage. For a more in depth description of the integration filter refer to the hardware user guide.	

5.1.6.1.96   Change and insert file system password - #FILEPWD

#FILEPWD – Change and insert file system password	SELINT 2
AT#FILEPWD=<Mode>,<Pwd>[,<NewPwd>]	This command changes and inserts file system password. File system password is always enabled (see notes for factory default empty string ""). If current password is different from the empty string "" and password is not inserted then AT commands that make use of the file system will not work (see notes for insertion and AT response). Parameters: **<Mode>:**

#FILEPWD – Change and insert file system password		SELINT 2
	1 – insert file system password; 2 – change file system password. **<Pwd>:** current password when inserting password, old password when changing password, string type (factory default is the empty string ""). **<NewPwd>:** new password when changing password, string type (only allowed if **<Mode>** parameter is 2). Note: maximum password length is 12 characters. Note: password is saved in NVM. Note: password value doesn't depend on the specific CMUX instance. Note: in default configuration current password is equal to the empty string "" and password will be always considered inserted. Note: if current password is different from the empty string "", password will be always not inserted at power on. Note: if current password is different from the empty string "", after successful password insertion (<Mode> 1) password will remain inserted until power off. Note: after successful password change (<Mode> 2) password will be not inserted. Note: if current password is different from the empty string "" and password is not inserted then AT commands that make use of the file system (SCRIPT, M2M, MMS) will have either ERROR or +CME ERROR: 16 or +CME ERROR: incorrect password response depending on AT+CMEE setting.	
AT#FILEPWD=?	Test command reports the supported range of values for parameters.	
Example	First time: change default password AT#FILEPWD=2,"","mynewpwd" OK and insert password AT#FILEPWD=1,"mynewpwd" OK At next power on: insert password AT#FILEPWD=1,"mynewpwd" OK	

5.1.6.1.97 User Determined User Busy - #UDUB

#UDUB – User Determined User Busy		SELINT 2
AT#UDUB	Execution command disconnects all active calls (like **ATH** or **AT+CHUP**), but setting the "user busy" cause for disconnection (only if we have an incoming call that has not been answered yet, and that we want to reject).	
AT#UDUB=?	Test command returns the **OK** result code	

5.1.6.1.98 Enable Test Mode command in not signalling mode - #TESTMODE

#TESTMODE – Enable Test Mode command in not signalling mode		SELINT 2
AT#TESTMODE=<command>	The command allows setting module in not signaling mode. The functionality has to be first activated by sending **AT#TESTMODE="TM"**,	

which sets the module in Test Mode. Only after this set, **AT#TESTMODE** can be used with the other allowed commands. To exit from Test Mode and go back to Operative Mode, the command **AT#TESTMODE ="OM"** has to be sent.

Parameter:
<command>:

- "*TM'*→ forces the module in Test Mode;
- "*OM'*→ forces the module in Operative Mode

2G Commands:
- "*TCH'*→starts the non-stop module transmission. It enables one Tx Slot (Note, edge not supported)
- "*TCH2*" →starts the non-stop module transmission. It enables two TX slots (Note, edge not supported)
- "*TQ <training_sequence>*"→ sets the training sequence; *<training_sequence>* has the range: 0 ÷ 7
- "*PL <power_lev>*"→ sets the Power Control Level for lower and upper bands; power_lev has the range: 0 ÷ 19
- "*PL2 <power_lev0> <power_lev1>*"→ sets the Power Control Level for both TX slots; power_lev0 is related to the first slot and power_lev1 to the second one; power_lev0 and power_lev1 has the range: 0 ÷ 19
- "RL" → Read Rx power level
- "RXTOGGLE *<antenna>*"→ Selects the receiving antenna path depending on *<antenna>* value: *<antenna>* = 0 for the primary antenna, *<antenna>* = 1 for the secondary (diversity) antenna.
- "ESC"→ exits the current non-stop sequence. It must be used to stop TCH/TCH2 transmission
- "*SetPCSBand <band>*"→ sets the PCS band;

band	Band
0	850/900/1800
1	850/900/1900

- "*CH <GSM_ETSI_Index>*"→ sets the ARFCH;

GSM_ETSI_Index	Band
1 ÷ 124	GSM (Standard Band)
975 ÷ 1023	E GSM (Extended Band)
955 ÷ 974	R GSM (Railway Band)
512 ÷ 885	DCS Band (1800 MHz)
512 ÷ 810	PCS Band (1900 MHz)
128 ÷ 251	GSM 850 (850 MHz)

3G Commands:

- "*INIT3G*"→ initialize Radio for 3G transmission
- "*TX3G*"→ starts the 3G module transmission if Radio is initialized (Default UARFCN UL is 9612 and power is -19.5 dBm)
- "PL3G *<power>* → change the 3G transmission power
Power has the range -736 to 384 in sixteenths of dBm
- "CH3G *<uarfcn ul>*"→ change the 3G uarfcn ul on which to transmit or to receive. If TX3G is called previously CH3G sets a UARFCN for transmission, otherwise it will accept a channel for reception.

#TESTMODE – Enable Test Mode command in not signalling mode		SELINT 2

UMTS_UARFCN UL	Band
9612 ÷ 9888	1
9262 ÷ 9538	2
1312 ÷ 1513	4
4132 ÷ 4233	5
2712 ÷ 2863	8

UMTS_UARFCN DL	Band
10562 ÷ 10838	1
9662 ÷ 9938	2
1537 ÷ 1738	4
4357 ÷ 4458	5
2937 ÷ 3088	8

- "RL3G" → provides the Rx power level for the channel set with ""CH3G *<uarfcn dl>"* command.
- "RXTOGGLE *<antenna>*" → Selects the receiving antenna path depending on *<antenna>* value: *<antenna>* = 0 for the primary antenna, *<antenna>* = 1 for the secondary (diversity) antenna.

4G Commands:

- "*INIT4G*" → initialize Radio for 4G transmission
- "*TX4G*" → starts the 4G module transmission if Radio is initialized
- "PL4G <power> → change the 4G transmission power

Power has the range -736 to 384 in sixteenths of dBm

- "CH4G *<earfcn> <bw>*" → changes the 4G earfcn ul or dl for transmitting or receiving, and sets the bandwith:

LTE_EARFCN UL	Band
18000 ÷ 18599	1
18600 ÷ 19199	2
19200 ÷ 19949	3
19950 ÷ 20399	4
20400 ÷ 20649	5
20750 ÷ 21449	7
21450 ÷ 21799	8
22150 ÷ 22749	11
23010 ÷ 23179	12
23180 ÷ 23279	13
23730 ÷ 23849	17
24000 ÷ 24149	19
24150 ÷ 24449	20
24450 ÷ 24599	21
26690 ÷ 27039	26
27210 ÷ 27659	28

LTE_EARFCN DL	Band
0 ÷ 599	1
600 ÷ 1199	2
1200 ÷ 1949	3
1950 ÷ 2399	4
2400 ÷ 2649	5
2750 ÷ 3449	7

3450 ÷ 3799	8
4750 ÷ 4949	11
5010 ÷ 5179	12
5180 ÷ 5279	13
5730 ÷ 5849	17
6000 ÷ 6149	19
6150 ÷ 6449	20
6450 ÷ 6599	21
8690 ÷ 9039	26
9210 ÷ 9659	28

<bw>	Band (MHz)
0	1,4
1	3,0
2	5,0
3	10,0
4	15,0
5	20,0

- "RL4G" → provides the Rx power level for the channel set with ""CH4G *<earfcn dl>*" command.
- "RXTOGGLE *<antenna>*"→ Selects the receiving antenna path depending on *<antenna>* value: *<antenna>* = 0 for the primary antenna, *<antenna>* = 1 for the secondary (diversity) antenna, 2 for both antennas.
- "DE*INIT4G*"→ de-initialize Radio for 4G transmission

Note:
- Bands support varies depending on the product
- In Test Mode the transmission simultaneously on both 2g or 3g or 4g is not allowed

Note 1: in Test Mode the other AT commands doesn't work.
Note 2: in Test Mode the DTE speed is the same as in OM; it must be saved using **AT&W&P** before switching to TM.
Note 3: in Test Mode the multiplexing protocol control channel can't be enabled (see **+CMUX**)
Note 4: after issuing AT#TESTMODE="TM" or "OM", the module reboots.
Note 5: the Test Mode Status is stored in NVM
Note 6: it's not possible to read RX power level during an ongoing TX

AT#TESTMODE?	Read command reports the currently selected <command> in the format: **#TESTMODE: <TestModeStatus>** Where: **<TestModeStatus>** can assume the following values: - 1 if the module is in Test Mode - 0 if the module is in Operative Mode
AT#TESTMODE =?	Test command returns the OK result code

5.1.6.1.99   TX Calibration - #TXCALEDGE

#TXALEDGE – TX Calibration		SELINT 2

AT#TXCALEDGE=<bnd>[,<value_1>,<value_2>,….,<value_20>]	Set command sets the output power
	
	Parameters:
	<bnd> - numeric parameter indicating the band
	  0 – GSM 850
	  1 - GSM 900
	  2 - DCS 1800
	  3 - PCS 1900
	
	<value_i> - numeric parameter indicating the TX output power. The range is (0; 432). Every 16 units represent a dBm.
	
	Note: the following set command:
	
	#TXCALEDGE=<bnd>
	
	causes the values for **<bnd>** band to reuse the default ones	

AT#TXCALEDGE?	Read command returns the current parameter settings for **#TXCALEDGE** command for all bands in the format: **#TXCALEDGE: <value_1>,<value_2>,….,<value_20>** **#TXCALEDGE: <value_1>,<value_2>,….,<value_20>** **#TXCALEDGE: <value_1>,<value_2>,….,<value_20>** **#TXCALEDGE: <value_1>,<value_2>,….,<value_20>** where every row corresponds to the values set for a band in increasing order starting from **<bnd>** = 0	
AT#TXCALEDGE=?	Test command reports the supported range of parameters values.	

5.1.6.1.100   HSDPA Channel Quality Inication - #CQI

#CQI – HSDPA Channel Quality Indication		SELINT 2

AT#CQI	Execution command reports channel quality indication in the form:
	
	#CQI: <cqi>
	where
	<cqi> - cqi value
	  0 - 30
	  31 - not known or not detectable
	
	Note: values are valid only if the module is registered on a WCDMA network with HSDPA/HSUPA established. There will be no CQI if HSDPA/HSUPA is not established.
	Note: This command is not supported in LTE-only variants.	

AT#CQI=?	Test command returns the supported range of values of the parameters **<cqi>.**	

5.1.6.1.101   Ciphering Indication - #CIPHIND

#CIPHIND – Ciphering Indication		SELINT 2
AT#CIPHIND =[<mode>]	Set command enables/disables unsolicited result code for cipher indication. The ciphering indicator feature allows to detect that ciphering is not switched on and to indicate this to the user. The ciphering indicator feature may be disabled by the home network operator setting data in the SIM/USIM. If this feature is not disabled by the SIM/USIM, then whenever a connection is in place, which is unenciphered, or changes from ciphered to	

#CIPHIND – Ciphering Indication		SELINT 2

	unenciphered or vice versa, an unsolicited indication shall be given to the user.
	
	Parameter:
	<mode>
	  0 - disable #CIPHIND unsolicited result code (factory default)
	  1 - enable #CIPHIND unsolicited result code
	
	   #CIPHIND: <mode>	

AT#CIPHIND?	Read command reports the **<mode>**,**<cipher>** and **<SIM/USIM flag>**:
	
	#CIPHIND: <mode>,<cipher>,<SIM/USIM flag>
	
	where
	<mode>
	
	  0 - #CIPHIND unsolicited result code disabled
	  1 - #CIPHIND unsolicited result code enabled
	
	<cipher> - cipher status
	
	0 – cipher off
	1 – cipher on
	2 - unknown (missing network information)
	
	< SIM/USIM flag > - SIM/USIM cipher status indication enabling
	
	0 – disabled
	1 – enabled
	2 - unknown (flag not read yet)	

AT#CIPHIND =?	Test command reports the range for the parameter **<mode>**	

#CMUXMODE – CMUX Mode Set		SELINT 2
AT#CMUXMODE =<mode>[,<buffer_size>]	Set command specifies the CMUX mode Parameter: **<mode>:** 1 – Ignore DTR feature is disabled, a transition of the physical DTR line instructs the DCE to disable the CMUX and switches to the normal command mode 5 – Ignore DTR feature is enabled, the DCE doesn't care the physical DTR line transitions (default) 13 – Ignore DTR feature is enabled, so the DCE will continue the CMUX session, but the transition of the physical DTR will be broadcasted to all opened logical channel. The behaviour of the particular channel depends on its own configuration, e.g. AT&D[<n>] **<buffer_size>:** If not set explicitly, the module preserves the previous value 0 – Disable the buffer_size limitation (default) 28 – 16384 Resize the internal cmux output buffer to the selected value. When a cmux session will be started using AT+CMUX, this value might be increased; if it is less than (N1 * 4), it becomes exactly N1 * 4. The current value can be gotten using the read command. The cmux out buffer contains the frames ready to be sent for every DLCI. If the modules receives an MSC indicating a RTS state to lock the data flow, these frames (already in the buffer) will be sent. The default size of these buffer is about 32k. Note: a software or hardware reset restores the default value. Note: during a cmux session the set command will fail, only the read and test command can be used Note: **reducing the buffer_size will change the behaviour of cmux**. Several test have been performed using N1=122 at 115200bps => buffer_size = 488: - the bandwidth is decreased by 15% - the bandwidth is not equally distributed, the first channel has the max priority, then the second and the third Note: if the module is downloading a lot of data and the application processor lock the flow moving the logical RTS (with MSC), the module can send more than buffer_size data	
AT#CMUXMODE?	Read command reports the currently selected **<mode>** in the format: **#CMUXMODE: <mode>,<buffer_size>**	
AT#CMUXMODE =?	Test command reports the supported range of values for parameter **<mode>** and **<buffer_size>** Response: #CMUXMODE: (1,5,13),(0,28-16384)	

5.1.6.1.103 Fast Dormancy - #FDOR

#FDOR– Fast dormancy		SELINT 2
AT#FDOR=<mode>[,<FDDelayTimer>[,<SCRITimer>]]	This command triggers fast dormancy; if all conditions are passed successful SCRI will be send towards the network. SCRI will be sent as a one shot or for every delay timer expiry, depending on the mode specified. Parameters: **<mode>:** 1 – indicate application driven (1 shot) Fast Dormancy to modem 2 – switch ON autonomous Fast Dormancy (AFD) 3 – switch OFF autonomous Fast Dormancy (AFD) – default value **<FDDelayTimer>:** 1..60 – integer value in seconds **<SCRITimer>:** 0..120 – integer value in seconds Note: the setting of **<mode>** is not saved in NVM. The setting of timers is saved in NVM. Note: the reject cause from lower layers is reported by the unsolicited indication: **#FDOR: <cause>** where **<cause>** 0 - Reject is default cause. 1 - Reject because T323 timer is running 2 - Reject because Protocol Stack is in wrong states. 3 - Reject when No PS signalling connection exists. 4 - Reject when CS signalling connection exists. 5 - Reject when Protocol Stack component (RRC) procedures are running. 6 - Reject when Network deactivated FD, by not sending timer T323 in SIB1. 7 - Reject when from lower layers FD STOP Request is received. 8 - Reject when Protocol Stack component (PDCP) rejects the FD mode. 9 - FD Reject when Protocol Stack component (RLC) buffers are not EMPTY. 10 - Reject due to peer message received when FD procedure is running. 11 - Reject when there is no PAS RAB is established and if we receive FD_START_REQ. 12 - Reject due to cell_pch/ura_pch states when v316 is reached max limit. 13 - Reject due to ongoing/pending Emergency call. 14 - Reject due to ongoing Call re-establishment. 15 - Reject due to Establishment of Full rate TCH Channel. 16 - Reject due to Establishment of Half rate TCH Channel. 17 - Reject due to Establishment of Half rate TCH Channel for Data Transfer. 18 - Reject due to Location update. 19 - Reject due to MT Paging. 20 - Reject due to other causes, such as Ongoing SS transactions, etc. 21 - Reject due to an ongoing CS procedure while the cell does not support DTM.

#FDOR– Fast dormancy		SELINT 2
	22 - Reject due to Originating Conversational call. 23 - Reject due to Originating Streaming call. 24 - Reject due to Originating Interactive call. 25 - Reject due to Originating Background call. 26 - Reject due to Originating Subscribed Traffic call. 27 - Reject due to Terminating Conversational call. 28 - Reject due to Terminating Streaming call. 29 - Reject due to Terminating Interactive call. 30 - Reject due to Terminating Background call. 31 - Reject due to Inter RAT Cell Selection. 32 - Reject due to Inter RAT Cell Change 33 - Reject due to Registration. 34 - Reject due to Detach. 35 - Reject due to Originating Higher Priority.signalling. 36 - Reject due to Originating Low Priority.signalling. 37 - Reject due to Terminating Higher Priority.signalling. 38 - Reject due to Terminating Lower Priority.signalling. 39 -Reject due to Active RAT not being UMTS. 40 - Reject due to Access Stratum being Inactive/Searching. 41 - Reject due to RRC connection is not active. 42 - Reject due to Active Packet Switch connection.	
AT#FDOR?	Read command returns "OK" string along with last accepted mode and timer values, in the format: **#FDOR: <mode>,< FDDelayTimer >,< SCRITimer>**	
AT#FDOR=?	Test command returns "OK" string along with supported modes and timer values.**>**.	

5.1.6.1.104   IMS PDP APN Name Set - #IMSPDPSET

#IMSPDPSET – IMS PDP APN Name Set		SELINT 2
AT#IMSPDPSET=< pdpApnName >	Set command sets IMS Pdp APN Name. This name should be one of the APN names set in **+CGDCONT** command and appropriated context will be opened for IMS. Parameter: **<pdpApnName>** - from 1 to 255 symbols ANSI fixed string Note: It can be used with or without quotes.	
AT#IMSPDPSET?	Read command reports the current setting of string parameter <**pdpApnName**>, in the format: **#IMSPDPSET: <pdpApnName>** (<**pdpApnName**> is described above)	
AT#IMSPDPSET=?	Test command returns the maximum length for string parameter <**pdpApnName**>.	

5.1.6.1.105   PDP authentication parameters - #PDPAUTH

#PDPAUTH – PDP authentication parameters		SELINT 2
AT#PDPAUTH= <cid>,<auth_type>,[< username>,[<passwo rd >]]	Set command specifies PDP authentication parameters values for a PDP context identified by the (local) context identification parameter **<cid>**. Parameters: **<cid>** - context identifier 1..*max* - numeric parameter which specifies a particular PDP context definition. The value of *max* is returned by the Test command.	

#PDPAUTH – PDP authentication parameters		SELINT 2
	<auth_type> - authentication type 0 - no authentication (factory default) 1 - PAP authentication 2 - CHAP authentication **<username> -** string type, supplied by network provider. Required for <auth_type> = 1 and 2 **<password> -** string type, supplied by network provider. Required for <auth_type> = 1 and 2. Note: values are automatically saved in NVM.	
AT#PDPAUTH?	Read command returns the PDP authentication parameters, excluding **<password>,** set for every PDP, in the format: #PDPAUTH: <cid1>,< auth_type1 >,<username1><CR><LF> … #PDPAUTH:<cid*max*>,<auth_type*max*>,<username*max*><CR><LF>]]	
AT#PDPAUTH=?	Test command reports the supported range of values for parameters **<cid>** and **<auth_type>** and the maximum allowed length of the string parameters **<password>** and **<username>**	

5.1.6.1.106   User Determined User Busy - #CREJ

#CREJ – User Determined User Busy		SELINT 2
AT#CREJ	Execution command disconnects all active calls (like **ATH** or **AT+CHUP**), but setting the "call rejected" cause (cause #21) for disconnection (only if we have an incoming call that has not been answered yet, and that we want to reject).	
AT#CREJ=?	Test command returns the **OK** result code	

5.1.6.1.107   Reboot - #REBOOT

#REBOOT - Reboot		SELINT 2
AT#REBOOT	Execution command reboots immediately the unit. It can be used to reboot the system after a remote update of the script in order to have the new one running. Note: if AT#REBOOT follows an AT command that stores some parameters in NVM, it is recommended to insert a delay of at least 5 seconds before to issue AT#REBOOT, to permit the complete NVM storing Note: AT#REBOOT is an obsolete AT command; please refer to AT#ENHRST to perform a module reboot	
AT#REBOOT=?	Test command returns **OK** result code.	
Example	AT#REBOOT OK … Module Reboots …	

#CHDIR - File System Change Current Directory		SELINT 2
AT#CHDIR=<path_name>	Set command sets the current working directory in the current drive in the file system. Parameter: <path_name> - directory name, quoted string type (up to max 16 chars depending on current working directory, case sensitive) or relative path name, quoted string type (up to max 124 chars depending on current working directory, case sensitive) or absolute path name, quoted string type (max 124 chars, case sensitive) Note: the directory name, relative path name or absolute path name should be passed between quotes; directory and path names are case sensitive. Note: path separator can be either \ or /. Directory name begins with a character different from path separator and is relative to the current working directory. Relative path name begins with a character different from path separator and is relative to the current working directory. Absolute path name begins with path separator. System max path name length (current directory name length + file name length) is 128. System reserves 2 characters for internal use. Note: if the the directory name, relative path name or absolute path name <path_name> is not present an error code is reported. Note: the current directory in the drive 0 in the file system at every power on is \.	
AT#CHDIR?	Read command reports the current working directory in the current drive in the file system in the format: #CHDIR: <path_name> Where: <path_name> - absolute path name, quoted string type (max 124 chars, case sensitive)	
AT#CHDIR=?	Test command returns OK result code.	
Example	AT#CHDIR? #CHDIR: "\MOD" OK AT#CHDIR="dir1" OK AT#CHDIR? #CHDIR: "\MOD\dir1" OK	

5.1.6.1.109 File System Make Directory - #MKDIR

#MKDIR – File System Make Directory		SELINT 2
AT#MKDIR=<dir_nam e>	Set command makes a new directory in the current working directory in the file system. Parameter: <dir_name> - directory name, quoted string type (up to max 16 chars depending on current working directory, case sensitive) Note: the directory name should be passed between quotes; directory names are case sensitive.	
AT#MKDIR=?	Test command returns **OK** result code.	
Example	AT#MKDIR="dir1" OK	

5.1.6.1.110 File System Remove Directory - #RMDIR

#RMDIR – File System Remove Directory		SELINT 2
AT#RMDIR=<dir_nam e>	Set command removes the directory from the current working directory in the file system. Parameter: <dir_name> - directory name, quoted string type (max 16 chars, case sensitive) Note: the directory name should be passed between quotes; directory names are case sensitive. Note: if the directory <dir_name> is not present in the current working directory an error code is reported. Note: if the directory <dir_name> is not empty, it is not possible to remove it and an error code is reported.	
AT#RMDIR=?	Test command returns **OK** result code.	
Example	AT#RMDIR="dir1" OK	

5.1.6.1.111 Set Active Firmware Image – AT#FWSWITCH

#FWSWITCH – Set Active Firmware Image		SELINT 2
AT#FWSWITCH =<image_number> [,<storage_conf>]	Set command allows enabling a specific firmware image on products embedding 2 different firmware images. Parameters: **<image_number>** - Firmware Image To Be Enabled 0 – Image 1 (Default) 1 – Image 2 **<storage_conf>** - Setting Storage Configuration 0 – Save the **<image_number>** value in RAM (Default) 1 – Save the **<image_number>** value in NVM	
AT#FWSWITCH?	Read command reports the current active firmware image: **#FWSWITCH =<image_number>**	
AT#FWSWITCH=?	Test command reports the range of supported values for parameters **<image_number>,<storage_conf>**	
Example	Switch to Image 1:	

	AT#FWSWITCH =1,1 OK
Note	This AT command performs a system reboot. With the current AT command implementation, the 0 value for **<storage_conf>** does not have any effect, i.e. a system reboot is performed but the **<image_number>** value is not actually saved. Therefore, the enabled **<image_number>** can be currently saved using only the 1 value for **<storage_conf>.** The behaviour described above is only temporary; future implementations will allow the enabled **<image_number>** to be saved in RAM also.

5.1.6.1.112   Selective master reset - #CMAR

#CMAR – Selective Master Reset		SELINT 2

AT#CMAR=<phone lock code>[,<reset type>]	This command requests the MT to reset user data. The user data in the phone will be reset to default values.
	
	Parameters:
	<phone lock code> - string type representing an 8 digits security code. It must be verified before performing the master reset.
	
	<reset type> - the user can select which kind of format to perform. If omitted, the command performs a complete format (0 by default)
	
	       0 – format all
	       1 – format NVM dynamic
	       2 – format NVM static fixed
	       3 – format firmware and AppZone filesystem
	
	Note: issuing the command will cause an NVM and filesystem formatting. After the formatting is completed the module will automatically reboot. To not interfere with the formatting process, it is strongly recommended to issue an AT+CFUN=4 command before starting to format.	

AT#CMAR=?	Test command returns length of phone lock code string and reset type values**.**	

5.1.6.1.113   Change maximum TX power level for a supported band - #TXCAL4G

#TXCAL4G - change maximum TX power level for a supported band		SELINT 2
AT#TXCAL4G=<band>[,<tx_pwr_lev>]	Set command change the maximum power level for the band specified. Parameters: **<band>**: number of the LTE band whose TX maximum power level must be changed **<tx_pwr_lev>**: maximum tx power level for the band specified, in 1/16dBm (368 = 23dBm) NOTE: if *<tx_pwr_lev>* is not specified, the default value for maximum TX power level is set for the band *<band>*	
AT#TXCAL4G?	Read command returns the bands supported and the maximum power level set for each band in the format; **#TXCALEDGE: <band>,<tx_pwr_lev>**	

#TXCAL4G - change maximum TX power level for a supported band	SELINT 2
	#TXCALEDGE: <band>,<tx_pwr_lev> #TXCALEDGE: <band>,<tx_pwr_lev> #TXCALEDGE: <band>,<tx_pwr_lev> #TXCALEDGE: <band>,<tx_pwr_lev> …
AT#TXCAL4G=?	Test command reports the supported range of parameters values.

5.1.6.1.114   Security Keys management - #SECKEY

#SECKEY – Security Keys management	SELINT 2

AT#SECKEY=
<Action>
[,<keyID>[,<property>]]
	This command allows to set, read and store 3 types of security keys: key0 and key1 are 128bit long, key3 is 64bit long. Keys could be saved only in RAM for test purposes
	
	Parameters:
	< **Action** > - specify the action to do
	        0 set in RAM the binary value for specified Key
	          (requires at least keyID to be specified,
	           Property = 1 if OTP)
	
	        1 store in FLASH alle keys present in RAM
	          (requires no other parameters)
	
	        2 read specified Key binary value
	          (requires keyID to be specified)
	
	< **keyID** > - specify the key to operate with
	      (must be specified for set or read operation)
	      0,1 are 128 bit keys
	      2 is 64 bit key
	
	< **property** > - specify if the key is OTP, only one time programmable. If OTP, it
	        can not be re-write
	        Used only in SET action
	        0 key re-write is allowed
	        1 key is OTP
	
	Note: returns OK if the command has been executed,
	      Error in case of parameters not allowed
	     In set mode, if property is not specified, it is automatically set as 0, not
	     OTP.
	     AT#SECKEY=0,1
	     Is the same as AT#SECKEY=0,1,0
	     (set Key1 as not OTP if allowed, that is not already OTP)
	
	     Using SET action, a copy of the keys in RAM is created until STORE
	     command is applied.
	     Therefore any READ of any key before the STORE,
	     will return the value of the key present in RAM, which
	     could be different from its value in FLASH
	
	Example of use:
	
	Store in flash any modified keys

	at#seckey=1
	read key0 value
	at#seckey=2,0
	#SECKEY: 5555666677778888
	set new key0 without OTP property (In RAM) if allowed
	at#seckey=0,0
	> 9999111155557777
	OK
	set new key0 with OTP property (In RAM)
	at#seckey=0,0,1
	> 0000111122223333
	OK
	Re-write no more allowed for key0
	at#seckey=0,0
	ERROR
	Doing
	at#seckey=1
	re-write of Key0 is not allowed anymore
AT# SECKEY?	Get only the information about OTP properties of all the keys
	and if there exist a copy in RAM.
	1 = OTP
	0 = not OTP
	In case not a copy in RAM is present
	AT#SECKEY?
	#SECKEY: keys property (IN ROM): 0, 0, 0
	If a copy in RAM exists:
	#SECKEY: keys property (IN RAM only): 1, 0, 0
	note that Key1 here is OTP
AT# SECKEY =?	Returns allowed parameters values
	AT#SECKEY=?
	#SECKEY: (0-2),(0-2),(0,1)

5.1.6.1.115   Configure the MTU Size - #MTUSIZE

#MTUSIZE – Configure the MTU size		SELINT 2
AT#MTUSIZE=<MTU>	This command permits to set a fixed MTU size by issuing this AT command before activating a pdp context.	
	Parameters:	
	<MTU>- Numeric parameter indicating the MTU size.	
	0 – Default MTU size used by the network operator .	
	1 to 1500 – Possible values of MTU size.	
	Note: **<MTU>** is automatically saved in NVM.	
AT#MTUSIZE?	Read command returns the current settings for **<MTU>**in the format:	
	# MTUSIZE: <MTU>	
AT# MTUSIZE =?	Test command returns the supported range of parameter **<MTU>.**	

5.1.6.2   Easy Scan® Extension AT Commands

> NOTE: It is **mandatory** to issue all the Easy Scan® Extension AT commands with the module configured in **+COPS: 2** mode, that is in detached mode, to avoid any potential conflict with normal module operations, such as "incoming call", "periodic location update, "periodic routing area update" and so on.
> Any possible trigger of competing network activity must be deactivated. In this logic SIM toolkit must be deactivated.

5.1.6.2.1   Network Survey - #CSURV

#CSURV - Network Survey		SELINT 2
AT#CSURV[= [<s>,<e>]]	Execution command allows to perform a quick survey through band channels, starting from channel **<s>** to channel **<e>**. Issuing **AT#CSURV<CR>**, a full band scan is performed. Parameters: **<s>** - starting channel **<e>** - ending channel After issuing the command the device responds with the string: **Network survey started…** and, after a while, a list of informations, one for each received carrier, is reported, each of them in the format: _In 2G_ **(For BCCH-Carrier)** **arfcn: <arfcn> bsic: <bsic> rxLev: <rxLev> ber: <ber> mcc: <mcc> mnc: <mnc> lac: <lac> cellId: <cellId> cellStatus: <cellStatus> numArfcn: <numArfcn> arfcn: [<arfcn1> ..[<arfcn64>]] [numChannels: <numChannels> array: [<ba1> ..[<ba32>]] [pbcch: <pbcch> [nom: <nom> rac: <rac> spgc: <spgc> pat: <pat> nco: <nco> t3168: <t3168> t3192: <t3192> drxmax: <drxmax> ctrlAck: <ctrlAck> bsCVmax: <bsCVmax> alpha: <alpha> pcMeasCh: <pcMeasCh>]]] mstxpwr: <mstxpwr> rxaccmin: <rxaccmin> croffset: <croffset> penaltyt: <penaltyt> t3212: <t3212> CRH: <CRH>** **<CR><LF><CR><LF><CR><LF>** where: **<arfcn>** - the cell carrier assigned radio channel (BCCH - Broadcast Control Channel) **<bsic>** - base station identification code; if **#CSURVF** last setting is 0, **<bsic>** is a decimal number, else it is **at the most** a 2-digits octal number **<rxLev>** - decimal number; it is the receiption level (in dBm) **<ber>** - decimal number; it is the bit error rate (in %) **<mcc>** - hexadecimal 3-digits number; it is the mobile country code **<mnc>** - hexadecimal 2-digits number; it is the mobile network code **<lac>** - location area code; if **#CSURVF** last setting is 0, **<lac>** is a decimal number, else it is a 4-digits hexadecimal number **<cellId>** - cell identifier; if **#CSURVF** last setting is 0, **<cellId>** is a decimal number, else it is a 4-digits hexadecimal number

#CSURV - Network Survey	SELINT 2

\<cellStatus\> - string type; it is the cell status

..CELL_SUITABLE - the cell is a suitable cell.

CELL_LOW_PRIORITY - the cell is low priority based on the received system information.

CELL_FORBIDDEN - the cell is forbidden.

CELL_BARRED - the cell is barred based on the received system information.

CELL_LOW_LEVEL - the cell **\<rxLev\>** is low.

CELL_OTHER - none of the above e.g. exclusion timer running, no BCCH available…etc.

\<numArfcn\> - decimal number; it is the number of valid channels in the Cell Channel Description

\<arfcn*n*\> - decimal number; it is the arfcn of a valid channel in the Cell Channel Description (*n* is in the range **1..\<numArfcn\>**)

\<numChannels\> - decimal number; it is the number of valid channels in the BCCH Allocation list; the output of this information for non-serving cells depends on last **#CSURVEXT** setting:

1. if **#CSURVEXT=0** this information is displayed only for serving cell
2. if **#CSURVEXT=1, 2** or **3** this information is displayed also for every valid scanned BCCH carrier.

\<ba*n*\> - decimal number; it is the arfcn of a valid channel in the BA list (*n* is in the range **1..\<numChannels\>**); the output of this information for non-serving cells depends on last **#CSURVEXT** setting:

1. if **#CSURVEXT=0** this information is displayed only for serving cell
2. if **#CSURVEXT=1** or **2** this information is displayed also for every valid scanned BCCH carrier.

(The following informations will be printed only if GPRS is supported in the cell)

\<pbcch\> - packet broadcast control channel

0 - pbcch not activated on the cell

1 - pbcch activated on the cell

\<nom\> - network operation mode

1

2

3

\<rac\> - routing area code

0..255 -

\<spgc\> - SPLIT_PG_CYCLE support

..0 - SPLIT_PG_CYCLE is not supported on CCCH on this cell

..1 - SPLIT_PG_CYCLE is supported on CCCH on this cell

\<pat\> - priority access threshold

0 -

3..6 -

\<nco\> - network control order

0..2 -

\<t3168\> - timer 3168

\<t3192\> - timer 3192

\<drxmax\> - discontinuous reception max time (in seconds)

\<ctrlAck\> - packed control ack

\<bsCVmax\> - blocked sequenc countdown max value

\<alpha\> - alpha parameter for power control

\<pcMeasCh\> - type of channel which shall be used for downlink measurements for power control

0 - BCCH

1 - PDCH

(The following informations will be printed only for #CSURVEXT=3 setting)

\<mstxpwr\> - decimal TX power level

\<rxaccmin\> - decimal RX level access min, range 0 - 63

\<croffset\> - decimal Cell Reselection Offset, range 0 - 63

#CSURV - Network Survey	SELINT 2

<penaltyt> - decimal Penalty Time, range 0 - 31
<t3212> - decimal T3212 Periodic Location Update Timer
<CRH> - decimal Cell Reselection Offset

(For non BCCH-Carrier)
arfcn: <arfcn> rxLev: <rxLev>

where:
<arfcn> - decimal number; it is the RF channel
<rxLev> - decimal number; it is the reception level (in dBm)

In 3G

(For BCCH-Carrier)

uarfcn: <uarfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> scr code:
<scrcode> cellId: <cellId> lac: <lac> cellStatus: <cellStatus> rscp: <rscp>
ecio: <ecio>
<CR><LF><CR><LF><CR><LF>

where:
<uarfcn> - the cell carrier frequency designated by UTRA Absolute Radio
Frequency Channel Number
<rxLev> - decimal number; it is the reception level (in dBm)
<mcc> - hexadecimal 3-digits number; it is the mobile country code
<mnc> - hexadecimal 2-digits number; it is the mobile network code
<scrcode> - decimal number; it is the scrambling code
<cellId> - cell identifier; if **#CSURVF** last setting is 0, **<cellId>** is a decimal
number, else it is a 8-digits hexadecimal number
<lac> - location area code; if **#CSURVF** last setting is 0, **<lac>** is a decimal
number, else it is a 4-digits hexadecimal number
<cellStatus> - string type; it is the cell status
..CELL_SUITABLE - the cell is a suitable cell.
  CELL_LOW_PRIORITY - the cell is low priority based on the received system
information.
  CELL_FORBIDDEN - the cell is forbidden.
  CELL_BARRED - the cell is barred based on the received system information.
  CELL_LOW_LEVEL - the cell **<rxLev>** is low.
  CELL_OTHER - none of the above e.g. exclusion timer running, no BCCH
available…etc.
<rscp> - decimal number; it is the RSCP level (in dBm)
<ecio> - decimal number; it is the EC/IO ratio level (in dB)

(For non BCCH-Carrier)
uarfcn: <uarfcn> rxLev: <rxLev>

where:
<uarfcn> - decimal number; it is the RF channel
<rxLev> - decimal number; it is the reception level (in dBm)

In 4G

(For BCCH-Carrier)

earfcn: <earfcn> rxLev: <rxLev> mcc: <mcc> mnc: <mnc> phyCellId:
<phyCellId> cellId: <cellId> tac: <tac> cellStatus: <cellStatus> rsrp: <rsrp>
rsrq: <rsrq> bw: <bw>
<CR><LF><CR><LF><CR><LF>

where:

	<earfcn> - the cell carrier frequency designated by EUTRA Absolute Radio Frequency Channel Number
	<rxLev> - decimal number; it is the reception level (in dBm); in SW versions up to 20.00.xx2 included it unused and set to 0
	<mcc> - hexadecimal 3-digits number; it is the mobile country code
	<mnc> - hexadecimal 2-digits number; it is the mobile network code
	<phyCellId> - decimal number; it is the physical cell id; if **#CSURVF** last setting is 0, **<phyCellId>** is a decimal number, else it is a 8-digits hexadecimal number
	<cellId> - cell identifier; if **#CSURVF** last setting is 0, **<cellId>** is a decimal number, else it is a 8-digits hexadecimal number
	<tac> - tracking area code; if **#CSURVF** last setting is 0, **<tac>** is a decimal number, else it is a 4-digits hexadecimal number
	<cellStatus> - string type; it is the cell status
	..CELL_SUITABLE - the cell is a suitable cell.
	CELL_LOW_PRIORITY - the cell is low priority based on the received system information.
	CELL_FORBIDDEN - the cell is forbidden.
	CELL_BARRED - the cell is barred based on the received system information.
	CELL_LOW_LEVEL - the cell **<rxLev>** is low.
	CELL_OTHER - none of the above e.g. exclusion timer running, no BCCH available…etc.
	<rsrp> - decimal number; it is the RSRP level (in dBm)
	<rsrq> - decimal number; it is the RSRQ level (in dB)
	<bw> - decimal number; it is downlink the bandwidth (in MHz); in SW versions up to 20.00.xx2 included it unused and set to 0
	(For non BCCH-Carrier)
	earfcn: <earfcn> rxLev: <rxLev>
	where:
	<earfcn> - decimal number; it is the RF channel
	<rxLev> - decimal number; it is the reception level (in dBm)
	Lastly, the **#CSURV** output ends in two ways, depending on the last **#CSURVF** setting:
	if **#CSURVF=0** or **#CSURVF=1**
	The output ends with the string:
	Network survey ended
	if **#CSURVF=2**
	the output ends with the string:
	Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)
	where
	<NoARFCN> - number of scanned frequencies
	<NoBCCH> - number of found BCCh
Example	AT#CSURV
	Network survey started…
	arfcn: 36 bsic: 49 rxLev: -77 ber: 0.00 mcc: 222 mnc: 10 lac: 20060 cellId: 2716 2 cellStatus: CELL_SUITABLE numArfcn: 0 arfcn: numChannels: 0 array: pbcch: 0 no
	m: 0 rac: 0 spgc: 0 pat: 0 nco: 0 t3168: 0 t3192: 0 drxmax: 0 ctrlAck: 0 bsCVmax : 0 alpha: 0 pcMeasCh: 0 mstxpwr: 0 rxaccmin: 0 croffset: 0 penaltyt: 0 t3212: 0 CRH: 0

	uarfcn: 10588 rxLev: -92 mcc: 222 mnc: 88 scr code: 54 cellId: 19406101 lac: 2406
	5 cellStatus: CELL_SUITABLE rscp: -101 ecio: -9.0
	Network survey ended
	OK
Notes and Platform limits	This command execution takes a long time especially if the full band scan is performed.
	The module must be configured in +COPS: 2 mode.
	If present, the parameters:
	<s> - starting channel
	<e> - ending channel
	are only allowed in fixed couples indicating a band.
	Only BCCH-carriers are reported.
	Non BCCH-carriers are never reported.
	In 2G
	<s>,<e> fixed couples and the corresponding band, if supported by the product:
	0,124 GSM900
	975,1023 GSM900
	512,885 DCS1800
	128,251 GSM850
	512,810 PCS1900
	0,1023 all supported GSM bands
	<ber> is always 0.0.
	<numArfcn> is always 0.
	<arfcn*n*> is always empty.
	<numChannels> is always 0.
	<ba*n*> is always empty.
	GPRS parameters like **<pbcch>** are printed only if GPRS is supported in the cell but their value is not available and will be always 0.
	Parameters like **<mstxpwr>** are printed only for #CSURVEXT=3 setting but their value is not available and will be always 0.
	In 3G
	<s>,<e> fixed couples and the corresponding band, if supported by the product:
	10562,10838 UMTS BAND I
	9662,9938 UMTS BAND II
	1537,1738 UMTS BAND IV
	4357,4458 UMTS BAND V
	4387,4413 UMTS BAND VI
	2937,3088 UMTS BAND VIII
	712,763 UMTS BAND XIX
	0,65535 all supported UMTS bands
	In 4G
	<s>,<e> fixed couples and the corresponding band, if supported by the product:
	0,599 LTE BAND 1
	600,1199 LTE BAND 2

1200,1949	LTE BAND 3
1950,2399	LTE BAND 4
2400,2649	LTE BAND 5
2750,3449	LTE BAND 7
3450,3799	LTE BAND 8
4750,4949	LTE BAND 11
5010,5179	LTE BAND 12
5180,5279	LTE BAND 13
5730,5849	LTE BAND 17
6000,6149	LTE BAND 19
6150,6449	LTE BAND 20
6450,6599	LTE BAND 21
8690,9039	LTE BAND 26
0,65534	all supported LTE bands

Consistent scan results are available only if, depending on technology, RXLev or RSCP or RSRP are better than -100 dBm.

5.1.6.2.2   Network Survey (Numeric Format) - #CSURVC

#CSURVC - Network Survey (Numeric Format)	SELINT 2
AT#CSURVC[= [<s>,<e>]]	Execution command allows to perform a quick survey through band channels, starting from channel **<s>** to channel **<e>**. Issuing **AT#CSURVC<CR>**, a full band scan is performed. Parameters: **<s>** - starting channel **<e>** - ending channel After issuing the command the device responds with the string: **Network survey started…** and, after a while, a list of information lines, one for each received carrier, is reported, each of them in the format: _In 2G_ **(For BCCH-Carrier)** **<arfcn>,<bsic>,<rxLev>,<ber>,<mcc>,<mnc>,<lac>,<cellId>,<cellStatus>,<numArfcn>[,<arfcn1>..[<arfcn64>]]** **[,<numChannels>[,<ba1>..[<ba32>]]][,<pbcch>[,<nom>,<rac>,<spgc>,<pat>,<nco>,<t3168>,<t3192>,<drxmax>,<ctrlAck>,<bsCVmax>,<alpha>,<pcMeasCh>]]],** **<mstxpwr>,<rxaccmin>,<croffset>,<penaltyt>,<t3212>,<CRH>** **<CR><LF><CR><LF><CR><LF>** where: **<arfcn>** - the cell carrier assigned radio channel (BCCH - Broadcast Control Channel) **<bsic>** - base station identification code; if **#CSURVF** last setting is 0, **<bsic>** is a decimal number, else it is **at the most** a 2-digits octal number **<rxLev>** - decimal number; it is the reception level (in dBm) **<ber>** - decimal number; it is the bit error rate (in %) **<mcc>** - hexadecimal 3-digits number; it is the mobile country code **<mnc>** - hexadecimal 2-digits number; it is the mobile network code **<lac>** - location area code; if **#CSURVF** last setting is 0, **<lac>** is a decimal number, else it is a 4-digits hexadecimal number

#CSURVC - Network Survey (Numeric Format)	SELINT 2

<cellId> - cell identifier; if **#CSURVF** last setting is 0, <cellId> is a decimal number, else it is a 4-digits hexadecimal number

<cellStatus> - string type; it is the cell status
..0 - the cell is a suitable cell (CELL_SUITABLE).
 1 - the cell is low priority based on the received system information (CELL_LOW_PRIORITY).
 2 - the cell is forbidden (CELL_FORBIDDEN).
 3 - the cell is barred based on the received system information (CELL_BARRED).
 4 - the cell <rxLev> is low (CELL_LOW_LEVEL).
 5 - none of the above e.g. exclusion timer running, no BCCH available…etc.. (CELL_OTHER).

<numArfcn> - decimal number; it is the number of valid channels in the Cell Channel Description

<arfcn*n*> - decimal number; it is the arfcn of a valid channel in the Cell Channel Description (*n* is in the range **1..<numArfcn>**)

<numChannels> - decimal number; it is the number of valid channels in the BCCH Allocation list; the output of this information for non-serving cells depends on last **#CSURVEXT** setting:
  1. if **#CSURVEXT=0** this information is displayed only for serving cell
  2. if **#CSURVEXT=1, 2 or 3** this information is displayed also for every valid scanned BCCH carrier.

<ba*n*> - decimal number; it is the arfcn of a valid channel in the BA list (*n* is in the range **1..<numChannels>**); the output of this information for non-serving cells depends on last **#CSURVEXT** setting:
  1. if **#CSURVEXT=0** this information is displayed only for serving cell
  2. if **#CSURVEXT=1, 2 or 3** this information is displayed also for every valid scanned BCCH carrier.

(The following information will be printed only if GPRS is supported in the cell)
<pbcch> - packet broadcast control channel
 0 - pbcch not activated on the cell
 1 - pbcch activated on the cell
<nom> - network operation mode
 1
 2
 3
<rac> - routing area code
 0..255 -
<spgc> - SPLIT_PG_CYCLE support
..0 - SPLIT_PG_CYCLE is not supported on CCCH on this cell
..1 - SPLIT_PG_CYCLE is supported on CCCH on this cell
<pat> - priority access threshold
 0 -
 3..6 -
<nco> - network control order
 0..2 -
<t3168> - timer 3168
<t3192> - timer 3192
<drxmax> - discontinuous reception max time (in seconds)
<ctrlAck> - packed control ack
<bsCVmax> - blocked sequenc countdown max value
<alpha> - alpha parameter for power control
<pcMeasCh> - type of channel which shall be used for downlink measurements for power control
 0 - BCCH
 1 - PDCH

(The following information will be printed only for #CSURVEXT=3 setting)

<mstxpwr> - decimal TX power level
<rxaccmin> - decimal RX level access min, range 0 - 63
<croffset> - decimal Cell Reselection Offset, range 0 - 63
<penaltyt> - decimal Penalty Time, range 0 - 31
<t3212> - decimal T3212 Periodic Location Update Timer
<CRH> - decimal Cell Reselection Offset

(For non BCCH-Carrier)
<arfcn>,<rxLev>

where:
<arfcn> - decimal number; it is the RF channel
<rxLev> - decimal number; it is the reception level (in dBm)

In 3G

(For BCCH-Carrier)

<uarfcn>,<rxLev>,<mcc>,<mnc>,<scrcode>,<cellId>,<lac>,<cellStatus>,<rscp>,<ecio>
<CR><LF><CR><LF><CR><LF>

where:
<uarfcn> - the cell carrier frequency designated by UTRA Absolute Radio Frequency Channel Number
<rxLev> - decimal number; it is the reception level (in dBm)
<mcc> - hexadecimal 3-digits number; it is the mobile country code
<mnc> - hexadecimal 2-digits number; it is the mobile network code
<scrcode> - decimal number; it is the scrambling code
<cellId> - cell identifier; if **#CSURVF** last setting is 0, **<cellId>** is a decimal number, else it is a 8-digits hexadecimal number
<lac> - location area code; if **#CSURVF** last setting is 0, **<lac>** is a decimal number, else it is a 4-digits hexadecimal number
<cellStatus> - string type; it is the cell status
  0 - CELL_SUITABLE - the cell is a suitable cell.
  1 - CELL_LOW_PRIORITY - the cell is low priority based on the received system information.
  2 - CELL_FORBIDDEN - the cell is forbidden.
  3 - CELL_BARRED - the cell is barred based on the received system information.
  4 - CELL_LOW_LEVEL - the cell **<rxLev>** is low.
  5 - CELL_OTHER - none of the above e.g. exclusion timer running, no BCCH available…etc.
<rscp> - decimal number; it is the RSCP level (in dBm)
<ecio> - decimal number; it is the EC/IO ratio level (in dB)

(For non BCCH-Carrier)
<uarfcn>,<rxLev>

where:
<uarfcn> - decimal number; it is the RF channel
<rxLev> - decimal number; it is the reception level (in dBm)

In 4G

(For BCCH-Carrier)

<earfcn>,<rxLev>,<mcc>,<mnc>,<phyCellId>,<cellId>,<tac>,<cellStatus>,<rsrp>,<rsrq>,<bw>
<CR><LF><CR><LF><CR><LF>

#CSURVC - Network Survey (Numeric Format)	SELINT 2

where:

<earfcn> - the cell carrier frequency designated by EUTRA Absolute Radio Frequency Channel Number

<rxLev> - decimal number; it is the received level (in dBm); in SW versions up to 20.00.xx2 included it unused and set to 0

<mcc> - hexadecimal 3-digits number; it is the mobile country code

<mnc> - hexadecimal 2-digits number; it is the mobile network code

<phyCellId> - decimal number; it is the physical cell id; if **#CSURVF** last setting is 0, **<phyCellId>** is a decimal number, else it is a 8-digits hexadecimal number

<cellId> - cell identifier; if **#CSURVF** last setting is 0, **<cellId>** is a decimal number, else it is a 8-digits hexadecimal number

<tac> - tracking area code; if **#CSURVF** last setting is 0, **<tac>** is a decimal number, else it is a 4-digits hexadecimal number

<cellStatus> - string type; it is the cell status

..CELL_SUITABLE - the cell is a suitable cell.
  CELL_LOW_PRIORITY - the cell is low priority based on the received system information.
  CELL_FORBIDDEN - the cell is forbidden.
  CELL_BARRED - the cell is barred based on the received system information.
  CELL_LOW_LEVEL - the cell **<rxLev>** is low.
  CELL_OTHER - none of the above e.g. exclusion timer running, no BCCH available…etc.

<rsrp> - decimal number; it is the RSRP level (in dBm)

<rsrq> - decimal number; it is the RSRQ level (in dB)

<bw> - decimal number; it is the downlink bandwidth (in MHz); in SW versions up to 20.00.xx2 included it unused and set to 0

(For non BCCH-Carrier)
earfcn: <earfcn> rxLev: <rxLev>

where:
<earfcn> - decimal number; it is the RF channel
<rxLev> - decimal number; it is the reception level (in dBm)

The last information from **#CSURVC** depends on the last **#CSURVF** setting:

#CSURVF=0 or **#CSURVF=1**
The output ends with the string:
Network survey ended

#CSURVF=2
the output ends with the string:
Network survey ended (Carrier: <NoARFCN> BCCh: <NoBCCh>)
where
<NoARFCN> - number of scanned frequencies
<NoBCCH> - number of found BCCh

Example	AT#CSURVC
	Network survey started…
	36,49,-80,0.00,222,10,20060,27162,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
	10588,-92,222,88,54,19406101,24065,0-100,-8.0
	Network survey ended
	OK
Notes and Platform limits	This command execution takes a long time especially if the full band scan is performed.

#CSURVC - Network Survey (Numeric Format)		SELINT 2
	The information provided by **#CSURVC** is the same as that provided by **#CSURV**. The difference is that the output of **#CSURVC** is in numeric format only. The module must be configured in +COPS: 2 mode. The limits described for **#CSURV** are also valid for **#CSURVC**.	

5.1.6.2.3   Network Survey Format - #CSURVF

#CSURVF - Network Survey Format		SELINT 2
AT#CSURVF= [<format>]	Set command controls the format of the numbers output by all the Easy Scan® Parameter: **<format>** - numbers format 0 - Decimal 1 - Hexadecimal values, no text 2 - Hexadecimal values with text	
AT#CSURVF?	Read command reports the current number format, as follows: **<format>**	
AT#CSURVF=?	Test command reports the supported range of values for the parameter **<format>**.	

5.1.6.2.4   <CR><LF> Removing On Easy Scan® Commands - #CSURVNFL

#CSURVNLF - <CR><LF> Removing On Easy Scan® Commands Family		SELINT 2
AT#CSURVNLF= [<value>]	Set command enables/disables the automatic **<CR><LF>** removing from each information text line. Parameter: **<value>** 0 - disables **<CR><LF>** removing; they'll be present in the information text (factory default) 1 - remove **<CR><LF>** from information text	
AT#CSURVNLF?	Read command reports whether automatic **<CR><LF>** removing is currently enabled or not, in the format: **<value>**	
AT#CSURVNLF=?	Test command reports the range of values for parameter **<value>.**	

5.1.6.2.5   Extended network survey - #CSURVEXT

#CSURVNLF - <CR><LF> Removing On Easy Scan® Commands Family		SELINT 2
AT#CSURVEXT [=<value>]	Set command enables/disables extended network survey. Parameter: <value> 0 - disables extended network survey (factory default) 1 - enables extended network survey; all the network survey execution commands (#CSURV, #CSURVC) display the BAList for every valid scanned BCCh carrier 2 - enables extended network survey; all the network survey execution commands (#CSURV, #CSURVC) display the BAList for every valid scanned BCCh carrier and, if GPRS is supported in the cell, they report	

#CSURVNLF - <CR><LF> Removing On Easy Scan® Commands Family		SELINT 2
	some GPRS informations carried by the System Information 13 of the BCCh 3 - enables more extended network survey; all the network survey execution commands (#CSURV, #CSURVC). It displays transmit power level, receiving level access min, Cell Reselection Offset, Penalty Time, T3212 Periodic Location Update Timer and Cell Reselection Offset	
AT#CSURVEXT?	Read command reports whether extended network survey is currently enabled or not, in the format: **<value>**	
AT#CSURVEXT=?	Test command reports the range of values for parameter **<value>.**	
Notes and Platform limits	**#CSURVEXT** configuration has effect on 2G cells only.	

5.1.6.3   AT Run Commands

5.1.6.3.1   Enable SMS Run AT Service - #SMSATRUN

#SMSATRUN – Enable SMS AT Run service		SELINT 2

AT#SMSATRUN=
<mod>
	Set command enables/disables the SMS AT RUN service.
	
	Parameter:
	< mod >
	      0: Service Disabled
	      1: Service Enabled
	
	Note1: When the service is active on a specific AT instance (see AT#SMSATRUNCFG), that instance cannot be used for any other scope, except for OTA service that has the highest priority.
	For example in the multiplexer request to establish the Instance, the request will be rejected.
	
	Note2: the current settings are stored in NVM.	

AT#SMSATRUN?	Read command returns the current settings of <mode> and the value of <stat> in the format:
	
	# SMSATRUN: <mod>,<stat>
	
	   where:
	   <stat> - service status
	    0 – not active
	    1 - active	

AT#SMSATRUN =?	Test command returns the supported values for the SMSATRUN parameters	
Notes:	• By default the SMS ATRUN service is disabled It can be activated by the command AT#SMSATRUN.	

#SMSATRUNCFG – Set SMS AT Run Parameters		SELINT 2

AT#SMSATRUNCFG=
<instance>
[,<urcmod>
[,<timeout>]]
	Set command configures the SMS AT RUN service.
	
	Parameter:
	<instance>:
	AT instance that will be used by the service to run the AT Command. Range 1 - 5, default 3.
	
	<urcmod>:
	    0 – disable unsolicited message
	    1 - enable an unsolicited message when an AT command is requested via SMS (default).
	
	When unsolicited is enabled, the AT Command requested via SMS is indicated to TE with unsolicited result code:
	
	#SMSATRUN: <Text>
	
	e.g.:
	#SMSATRUN: AT+CGMR;+CGSN;+GSN;+CCLK
	
	Unsolicited is dumped on the instance that requested the service activation.
	
	<timeout>:
	It defines in minutes the maximum time for a command execution. If timeout expires the module will be rebooted. Range 1 – 60, default 5.
	
	Note 1: the current settings are stored in NVM.
	
	Note 2: the instance used for the SMS AT RUN service is the same used for the EvMoni service. Therefore, when the #SMSATRUNCFG sets the <instance> parameter, the change is reflected also in the <instance> parameter of the #ENAEVMONICFG command, and viceversa.
	
	Note 3: the set command returns ERROR if the command AT#ENAEVMONI? returns 1 as <mod> parameter or the command AT#SMSATRUN? returns 1 as <mod> parameter	

AT#SMSATRUNCFG?	Read command returns the current settings of parameters in the format: **#SMSATRUNCFG:<instance>,<urcmod>,<timeout>**	
AT#SMSATRUNCFG=?	Test command returns the supported values for the SMSATRUNCFG parameters	

5.1.6.3.3 SMS AT Run White List - #SMSATWL

#SMSATWL – SMS AT Run White List		SELINT 2

AT#SMSATWL= <action> ,<index> [,<entryType> [,<string>]]	Set command to handle the white list.
	
	<action >:
	    0 – Add an element to the WhiteList
	    1 – Delete an element from the WhiteList
	    2 – Print and element of the WhiteList
	
	< index >: Index of the WhiteList. Range 1-8
	
	< entryType >:
	    0 – Phone Number
	    1 – Password
	
	NOTE: A maximum of two Password Entry can be present at same time in the white List
	
	<string>: string parameter enclosed between double quotes containing or the phone number or the password
	
	Phone number shall contain numerical characters and/or the character "+" at the beginning of the string and/or the character "*" at the end of the string.
	Password shall be 16 characters length
	
	NOTE: When the character "*" is used, it means that all the numbers that begin with the defined digit are part of the white list.
	
	E.g.
	"+39*" All Italian users can ask to run AT Command via SMS
	"+39349*" All vodafone users can ask to run AT Command via SMS.	

AT#SMSATWL?	Read command returns the list elements in the format: **#SMSATWL: [<entryType>,<string>]**	
AT#SMSATWL=?	Test command returns the supported values for the parameter **<action>, <index>** and **<entryType>**	
Note	It will return ERROR if executed using SMSATRUN digest mode or TCPATRUN server mode	

#TCPATRUNCFG– Set TCP AT Run Service Parameters		SELINT 2

AT#TCPATRUNCFG=
<connId>
,<instance>
,<tcpPort>
,<tcpHostPort>
,<tcpHost>
[,<urcmod>
[,<timeout>
[,<authMode>
[,<retryCnt>
[,<retryDelay>]]]]]
	Set command configures the TCP AT RUN service Parameters:
	
	<connId>
	socket connection identifier. Default 1.
	
	Range 1..6. This parameter is mandatory.
	<instance>:
	AT instance that will be used by the service to run the AT Command. Default 2. Range 1 - 5. This parameter is mandatory.
	
	<tcpPort>
	Tcp Listen port for the connection to the service in server mode. Default 1024. Range 1...65535. This parameter is mandatory.
	
	<tcpHostPort>
	Tcp remote port of the Host to connect to, in client mode. Default 1024. Range 1...65535. This parameter is mandatory.
	
	<tcpHost>
	IP address of the Host, string type.
	This parameter can be either:
	- any valid IP address in the format: "xxx.xxx.xxx.xxx"
	- any host name to be solved with a DNS query
	This parameter is mandatory. Default "".
	
	<urcmod>:
	    0 – disable unsolicited messages
	    1 - enable an unsolicited message when the TCP socket is connected or disconnect (default).
	
	When unsolicited is enabled, an asynchronous TCP Socket connection is indicated to TE with unsolicited result code:
	
	#TCPATRUN: <iphostaddress>
	
	When unsolicited is enabled, the TCP socket disconnection is indicated to TE with unsolicited result code:
	
	#TCPATRUN: <DISCONNECT>
	
	Unsolicited is dumped on the instance that requested the service activation.
	
	<timeout>:
	Define in minutes the maximum time for a command execution. If timeout expires the module will be rebooted. The default value is 5 minutes. Range 1…5.
	
	<authMode>:
	
	determines the authentication procedure in server mode:
	
	    0 – (default) when connection is up, username and password (in this order and each of them followed by a Carriage Return) have to be sent to the module before the first AT command.
	    1 – when connection is up, the user receives a request for username and, if username is correct, a request for password. Then a message of "Login successfull" will close authentication phase.

#TCPATRUNCFG– Set TCP AT Run Service Parameters		SELINT 2
	Note: if username and/or password are not allowed (see AT#TCPATRUNAUTH) the connection will close immediately. **\<retryCnt\>:** in client mode, at boot or after a socket disconnection, this parameter represents the number of attempts that are made in order to re-connect to the Host. Default: 0. Range 0…5. **\<retryDelay\>:** in client mode, delay between one attempt and the other. In minutes. Default: 2. Range 1…3600. Note2: the current settings are stored in NVM. Note 4: the set command returns ERROR if the command AT#TCPATRUNL? returns 1 as \<mod\> parameter or the command AT# TCPATRUND? returns 1 as \<mod\> parameter	
AT#TCPATRUNCFG?	Read command returns the current settings of parameters in the format: **#TCPATRUNCFG:** **\<connId\>,\<instance\>,\<tcpPort\>,\<tcpHostPort\>,\<tcpHost\>,\<urcmod\>,\<timeout\>,\<authMode\>,\<retryCnt\>,\<retryDelay\>**	
AT#TCPATRUNCFG=?	Test command returns the supported values for the TCPATRUNCFG parameters	

5.1.6.3.5   TCP Run AT Service in listen (server) mode - #TCPATRUNL

#TCPATRUNL– Enables TCP AT Run Service in listen (server) mode		SELINT 2

AT#TCPATRUNL=
\<mod\>
	Set command enables/disables the TCP AT RUN service in server mode. When this service is enabled, the module tries to put itself in TCP listen state.
	
	Parameter:
	\< mod \>
	    0: Service Disabled
	    1: Service Enabled
	
	Note1: If SMSATRUN is active on the same instance (see AT#TCPATRUNCFG) the command will return ERROR.
	
	Note2: when the service is active it is on a specific AT instance (see AT#TCPATRUNCFG), that instance cannot be used for any other scope. For example, if the multiplexer requests to establish the Instance, the request will be rejected.
	
	Note3: the current settings are stored in NVM.	

AT#TCPATRUNL?	Read command returns the current settings of \<mode\> and the value of \<stat\> in the format:
	
	#TCPATRUNL: \<mod\>,\<stat\>
	
	    where:
	    \<stat\> - connection status
	      0 – not in listen
	      1 - in listen or active	

#TCPATRUNL– Enables TCP AT Run Service in listen (server) mode	SELINT 2
AT#TCPATRUNL=?	Test command returns the supported values for the TCPATRUNL parameters

5.1.6.3.6 TCP AT Run Firewall List - #TCPATRUNFRWL

#TCPATRUNFRWL - TCP AT Run Firewall List	SELINT 2

AT#TCPATRUNFRWL=
<action>,
<ip_addr>,
<net_mask>
	Set command controls the internal firewall settings for the TCPATRUN connection.
	
	Parameters:
	<action> - command action
	 0 - remove selected chain
	 1 - add an **ACCEPT** chain
	 2 - remove all chains (**DROP** everything); **<ip_addr>** and
	   <net_mask> has no meaning in this case.
	<ip_addr> - remote address to be added into the **ACCEPT** chain;
	   string type, it can be any valid IP address in the
	   format: xxx.xxx.xxx.xxx
	<net_mask> - mask to be applied on the **<ip_addr>**; string type,
	   it can be any valid IP address mask in the format:
	   xxx.xxx.xxx.xxx
	
	Command returns **OK** result code if successful.
	
	Firewall general policy is **DROP**, therefore all packets that are not included into an **ACCEPT** chain rule will be silently discarded.
	
	When a packet comes from the IP address **incoming_IP**, the firewall chain rules will be scanned for matching with the following criteria:
	
	incoming_IP & <net_mask> = <ip_addr> & <net_mask>
	
	If criteria is matched, then the packet is accepted and the rule scan is finished; if criteria is not matched for any chain the packet is silently dropped.
	
	Note1: A maximum of 5 firewall can be present at same time in the List.
	
	Note2: the firewall list is saved in NVM

AT# TCPATRUNFRWL?	Read command reports the list of all **ACCEPT** chain rules registered in the Firewall settings in the format: **#TCPATRUNFRWL: <ip_addr>,<net_mask>** **#TCPATRUNFRWL: <ip_addr>,<net_mask>** **…** **OK**
AT#TCPATRUNFRWL=?	Test command returns the allowed values for parameter **<action>.**
Note	It will return ERROR if executed using SMSATRUN digest mode or TCPATRUN server mode

#TCPATRUNAUTH - TCP AT Run Authentication Parameters List		SELINT 2

AT#TCPATRUNAUTH=
\<action\>,
\<userid\>,
\<passw\>
	Execution command controls the authentication parameters for the TCPATRUN connection.
	
	Parameters:
	\<action\> - command action
	  0 - remove selected chain
	  1 - add an **ACCEPT** chain
	  2 - remove all chains (**DROP** everything); **< userid >** and **< passw >** has no meaning in this case.
	
	< userid > - user to be added into the **ACCEPT** chain; string type, maximum length 50
	< passw > - password of the user on the **< userid >**; string type, maximum length 50
	
	Command returns **OK** result code if successful.
	
	Note1: A maximum of 3 entry (password and userid) can be present at same time in the List.
	
	Note2: the Authentication Parameters List is saved in NVM.	

AT#TCPATRUNAUTH?	Read command reports the list of all ACCEPT chain rules registered in the Authentication settings in the format: **#TCPATRUNAUTH: \<user_id\>,\<passw\>** **#TCPATRUNAUTH: \<user_id\>,\<passw\>** **….** **OK**	
AT#TCPATRUNAUTH=?	Test command returns the allowed values for parameter **\<action\>**.	

5.1.6.3.8 TCP AT Run in dial (client) mode - #TCPATRUND

#TCPATRUND – Enables TCP Run AT Service in dial (client) mode		SELINT 2

AT#TCPATRUND=<mod>	Set command enables/disables the TCP AT RUN service in client mode. When this service is enabled, the module tries to open a connection to the Host (the Host is specified in AT#TCPATRUNCFG).
	
	Parameter:
	< mod >
	     0: Service Disabled
	     1: Service Enabled
	
	Note1: If SMSATRUN is active on the same instance (see AT#TCPATRUNCFG) the command will return ERROR.
	
	Note2: when the service is active it is on a specific AT instance (see AT#TCPATRUNCFG), that instance cannot be used for any other scope. For example if the multiplexer request to establish the Instance, the request will be rejected.
	
	Note3: the current setting are stored in NVM
	
	Note4: if the connection closes or at boot, if service is enabled and context is active, the module will try to reconnect for the number of attempts specified in AT#TCPATRUNCFG; also the delay between one attempt and the other will be the one specified in AT#TCPATRUNCFG.	

AT#TCPATRUND?	Read command returns the current settings of <mode> and the value of <stat> in the format:
	
	#TCPATRUND: <mod>,<stat>
	
	    where:
	    <stat> - connection status
	     0 - not connected
	     1 – connected or connecting at socket level
	     2 - not connected but still trying to connect, attempting every delay time (specified in AT#TCPATRUNCFG)	

AT#TCPATRUND =?	Test command returns the supported values for the TCPATRUND parameters	

5.1.6.3.9 Closing TCP Run AT Socket - #TCPATRUNCLOSE

#TCPATRUNCLOSE – Closes TCP Run AT Socket		SELINT 2
AT#TCPATRUNCLOSE	Closes the socket used by TCP ATRUN service. Note: TCP ATRUN status is still enabled after this command, so the service re-starts automatically.	
AT#TCPATRUNCLOSE =?	Test command returns OK	

5.1.6.3.10   TCP AT Run Command Sequence - #TCPATCMDSEQ

#TCPATCMDSEQ – TCP AT Run Command Sequence		SELINT 2

AT#TCPATCMDSEQ=
<mod>
	Set command enable/disable, for TCP Run AT service, a feature that allows giving more than one AT command without waiting for responses.
	It does not work with commands that uses the prompt '**>**' to receive the message body text (e.g. "at+cmgs")
	
	Parameter:
	< mod >
	     0: Service Disabled (default)
	     1: Service Enabled	

AT# TCPATCMDSEQ?	Read command returns the current settings of parameters in the format: **#TCPATCMDSEQ: <mod>**	
AT# TCPATCMDSEQ =?	Test command returns the supported values for the TCPATCMDSEQ parameters	

5.1.6.3.11   TCP Run AT service to a serial port - #TCPATCONSER

#TCPATCONSER – Connects the TCP Run AT service to a serial port		SELINT 2
AT#TCPATCONSER= <port>,<rate>	Set command sets the TCP Run AT in transparent mode, in order to have direct access to the hardware port specified. Data will be transferred directly, without being elaborated, between the TCP Run AT service and the hardware port specified. If the CMUX protocol is running the command will return ERROR. Parameter: **< port >** 0 – USIF0 1 – USIF1 2 – USB0 3 – USB1 4 – USB2 5 – USB3 6 – USB4 Not all of these ports will be available at the same time. The ports available will be displayed by the test command. They depend on the AT#PORTCFG command. Please refer to that AT command and to the "HE Family Ports Arrangements User Guide" for a detailed explanation of all port configurations **< rate >** baud rate for data transfer. Allowed values are 300,1200,2400,4800,9600,19200,38400,57600,115200. Note1: the command has to be issued from the TCP ATRUN instance Note2: After this command has been issued, if no error has occurred, then a "CONNECT" will be returned by the module to advise that the TCP ATRUN instance is in *online mode* and connected to the port specified. Note3: To exit from online mode and close the connection, the escape sequence (+++) has to be sent on the TCP ATRUN instance Note4: for USB ports and SPI the rate parameter is dummy	

#TCPATCONSER – Connects the TCP Run AT service to a serial port		SELINT 2
AT#TCPATCONSER =?	Test command returns the supported values for the TCPATCONSER parameters	

5.1.6.3.12   Run AT command execution - #ATRUNDELAY

#ATRUNDELAY – Set the delay on Run AT command execution		SELINT 2

AT#ATRUNDELAY= <srv>,<delay>	Set command enables the use of a delay before the execution of AT command received by Run AT service (TCP and SMS). It affects just AT commands given through Run AT service.
	
	<srv>
	        0 – TCP Run AT service
	        1 - SMS Run AT service
	
	<delay> Value of the delay, in seconds. Range 0..30.
	Default value 0 for both services (TCP and SMS).
	
	Note1 - The use of the delay is recommended to execute some AT commands that require network interaction. For more details see the RUN AT User Guide.
	
	Note2: The delay is valid till a new AT#ATRUNDELAY is set.	

AT#ATRUNDELAY?	Read command returns the current settings of parameters in the format: **#ATRUNDELAY: 0, <delayTCP>** **#ATRUNDELAY: 1, <delaySMS>** **OK**	
AT#ATRUNDELAY=?	Test command returns the supported values for the ATRUNDELAY parameters	

5.1.6.4 Consume Commands

5.1.6.4.1 Configure consume parameters - #CONSUMECFG

#CONSUMECFG – configure consume parameters		SELINT 2

AT#CONSUMECFG=<rule_id>[,<service_type>[,<rule_enable>[,<period>[,<limit_amount>[,<action_id>]]]]]	This command sets the parameters related to the consume functionality
	
	Parameters:
	<rule_id>
	Index of the rule to apply to a defined **<service_type>**
	Range: (0-10)
	The available rules are 10 and their identifier ranges from 1 to 10. The special case of **<rule_id>**=0 is explained below in a note.
	
	<service_type>
	Type of service to count:
	  0 – No service (default)
	  1 – SMS Sent
	  2 – SMS Received
	  3 – Total SMS
	  4 – CS MO Calls
	  5 – CS MT Calls
	  6 – Total CS Calls
	  7 – IP All Data Sent
	  8 – IP All Data Received
	  9 – IP All Data
	  10 – IP All Data Sent (with Header)
	  11 – IP All Data Received (with Header)
	  12 – IP All Data (with Header)
	
	<rule_enable>
	Enable the counter on the rule
	  0 – rule disabled (default)
	  1 – rule enabled
	
	<period>
	Time period over which the service type data are counted:
	  0 – life (entire module life) (default)
	  1 – 8760 (hours)
	
	<limit_amount>
	Limit amount of data to count. 0 is default value and means no set lelimit: in this case only the counter is active.
	  0 – 4294967295 KBytes, for **<service_type>**=7,8,9,10,11 and 12
	  0 – 65535 number of SMS, for **<service_type>**=1,2, and 3
	  0 – 65535 minutes, for **<service_type>**=4,5 and 6
	
	<action_id>
	Identifier of the action to trigger when the threshold limit has been reached. It corresponds to the AT command associated to the event CONSUMEX, where X=1,…5. (Refer to **#EVMONI** command)
	Range: (0-5); 0 means no action associated: in this case only the counter is active.
	
	Note: the Set command **#CONSUMECFG=0** has a special behaviour: for all the enabled rules, the data and time of related counters are reset (<u>if they are not-life counters</u>)
	
	Note: the values set by command are directly stored in NVM and don't depend on the specific AT instance
	
	Note: the life counters are disabled if **<enable>** parameter of **AT#ENACONSUME** is equal to 0	

#CONSUMECFG – configure consume parameters		SELINT 2
	Note: a rule can be changed only setting **<rule_enable>**=0. The data and time of related counter are also reset (<u>if it's not a life counter</u>). Note: when the period expires, the counted data are reset, so the counting in the next period starts from 0. Note: if a service is blocked, then the related (life or not) counter is stopped also in terms of time (as well as in terms of data obviously).	
AT#CONSUMECFG?	Read command returns the current settings for each rule in the format: **#CONSUMECFG: <rule_id>,<service_type>,<rule_enable>,<period>,<limit_amount>,<action_id>**	
AT#CONSUMECFG=?	Test command reports the supported range of values for all parameters	

5.1.6.4.2   Enable consume funztionality - #ENACONSUME

#ENACONSUME – enable consume functionality		SELINT 2

AT#ENACONSUME=<
enable>[,<storing_mo
de>[,<storing_period
>]]
	Set command enables/disables the consume functionality.
	
	Parameters:
	<enable>
	  0 – disable consume functionality (default)
	  1 – disable consume functionality except life counters
	  2 – enable consume functionality
	
	<storing_mode>:
	  0 – the counters are saved in NVM at every shutdown (default)
	  1 – the counters are saved in NVM at every shutdown and periodically at regular intervals specified by **<storing_period>** parameter
	
	<storing_period> - number of hours after that the counters are saved; numeric value in hours; range (0,8-24); 0 is default value and means no set period (as **<storing_mode>**=0)
	
	Note: the values set by command are directly stored in NVM and don't depend on the specific AT instance
	
	Note: when the functionality is disabled with **<enable>**=0, the data counters are stopped but not reset: to reset them (<u>except life counters</u>) set **<rule_enable>**=0 with **AT#CONSUMECFG** command.
	
	Note: when the functionality is disabled with **<enable>**=1, the data counters are stopped <u>except life counters</u>.
	
	Note: the life counters are never reset, neither in terms of counted data nor in terms of time	

AT#ENACONSUME?	Read command returns the current settings for all parameters in the format: **#ENACONSUME: <enable>,<storing_mode>,<storing_period>**	
AT#ENACONSUME=?	Test command reports the supported range of values for all parameters	

#STATSCONSUME – report consume statistics		SELINT 2
AT#STATSCONSUME[= <counter_type>]	Execution command reports the values of the life counters for every type of service or the values of period counters for every rule. Parameter: **<counter_type>** Type of counter: range (0-1) 0 – period counter: the command returns the values of period counters for every rule defined with **AT#CONSUMECFG** command in the format: **#STATSCONSUME: <rule_1>,<service_type>,<counted_data>,<threshold>,<current_time>,<period><CR><LF>#STATSCONSUME: <rule_2>,<service_type>,<counted_data>,<threshold>,<current_time>,<period><CR><LF>….<CR><LF>>#STATSCONSUME: <rule_10>,<service_type>,<counted_data>,<threshold>,<current_time>,<period>** where **<rule_i>** Index of the rule defined with **AT#CONSUMECFG** **<service_type>** Type of service: 1 – SMS Sent 2 – SMS Received 3 – Total SMS 4 – CS MO Calls 5 – CS MT Calls 6 – Total CS Calls 7 – IP All Data Sent 8 – IP All Data Received 9 – IP All Data 10 – IP All Data Sent (with Header) 11 – IP All Data Received (with Header) 12 – IP All Data (with Header) **<counted_data>** Number of data counted during **<current_time>** **<threshold>** Limit amount of data to count (set in parameter **<limit_amount>** with **AT#CONSUMECFG**) **<current_time>** Number of passed hours in the current **<period>** **<period>** Number of total hours in the period where the data are counted (corresponds to the value set in **<period>** with **AT#CONSUMECFG**) 1 – life counter: the command returns the values of life counters for every service type in the format: **#STATSCONSUME: <service_1>,<life_data>,<current_time><CR><LF>#STATSCONSUME: <service_2>,<life_data>,<current_time><CR><LF>…<CR><LF>#STATSCONSUME: <service_12>,<life_data>,<current_time>**

#STATSCONSUME – report consume statistics		SELINT 2
	where **<service_i>** is defined as **<service_type>** above **<life_data>** Number of data counted during entire life time period **<current_time>** Number of passed hours during entire life time period Note: issuing **AT#STATSCONSUME** without parameters has the same effect as **AT#STATSCONSUME**=0	
AT#STATSCONSUME= ?	Test command returns **OK** result code	

5.1.6.4.4 Block/unblock a type of service - #BLOCKCONSUME

#BLOCKCONSUME – block/unblock a type of service		SELINT 2
AT#BLOCKCONSUME=<s ervice_type>,<block>	Execution command blocks/unblocks a type of service Parameter: **<service_type>** Type of service: 1 – SMS Sending 2 – SMS Receiving 3 – SMS Sending/ Receiving 4 – CS MO Calls 5 – CS MT Calls 6 – MO/MT CS Calls 7 – IP Data **<block>** 0 – unblock the service specified in **<service_type>** 1 – block the service specified in **<service_type>** Note: even if the service "SMS Received" has been blocked, an SMS ATRUN digest SMS can be received and managed. Note: the type of service 7 "IP Data" comprises all the IP services (i.e. IP ,with or without header, sent, receive and sent/receive data)	
AT# BLOCKCONSUME?	Read command reports the status blocked/unblocked of every type of service in the following format: **#BLOCKCONSUME: <service_type>,<block>**	
AT# BLOCKCONSUME=?	Test command reports the supported range of values for **<service_type>** and **<block>** parameters	

5.1.6.4.5 #SGACT/#SSENDLINE configuration - #IPCONSUMECFG

#IPCONSUMECFG – #SGACT/#SSENDLINE configuration		SELINT 2
AT#IPCONSUMECFG= [<connId> [,<txProt> [,<remoteHost> [,<remotePort> [,<authIMEI/ICCIDEna> [,<unused_A> [,<unused_B>	This command configures **#SGACT** authentication and **#SSENDLINE** connection parameters. Parameters: Following settings take effect on successive **#SSENDLINE** command:	

#IPCONSUMECFG – #SGACT/#SSENDLINE configuration		SELINT 2

[,<unused_C>]]]]]]]]]	**<connId>:** - socket connection identifier
	1(default)..6
	Note: verify **<connId>** is currently available(i.e: not already connected) by multisocket commands(**#SD**,**#SL**,…) before entering successive **#SSENDLINE** command
	
	<txProt> - transmission protocol
	0 – TCP(default)
	1 – UDP
	
	<remoteHost> - address of the remote host, string type.
	This parameter can be either:
	    - any valid IP address in the format: "xxx.xxx.xxx.xxx"
	    - any host name to be solved with a DNS query.
	Default ""
	
	<remotePort> - remote host port to contact
	1..65535
	Default 1024
	
	Following setting takes effect on successive **#SGACT** command:
	
	<authIMEI/ICCIDEna> - enables PDP context activation (#SGACT) authentication(user/pwd) with ICCID/IMEI
	
	0 – disable **#SGACT** authentication with IMEI/ICCID as user/pwd(default)
	1 – enable **#SGACT** authentication with with IMEI/ICCID as user/pwd
	Note: **<authIMEI/ICCIDEna>** setting takes effect when successive **#SGACT** not indicating **<userId>** and **<pwd>** will be used
	
	Note: the values set by command are directly stored in NVM and doesn't depend on the specific CMUX instance.	

AT#IPCONSUMECFG?	Read command reports the currently configuration parameters in the format: **#IPCONSUMECFG: <connId>,<txProt>,<remoteHost> ,<remotePort>,<authIMEI/ICCIDEna>,<0>,<0>,<0>** **<CR><LF>**	
AT#IPCONSUMECFG=?	Test command reports the supported range of values for all the parameters	

5.1.6.4.6   Open a connection, send data, close connection - #SSENDLINE

#SSENDLINE – #SGACT/#SSENDLINE configuration		SELINT 2
AT#SSENDLINE=<data>	This command permits to open a TCP/UDP connection, send specified data and close the TCP/UDP connection. The remote host/port of the connection have to be previously specified with **#IPCONSUMECFG** command. Parameters: **<data>** - text to send, shall be enclosed between double quotes. Note: maximum allowed amount of data is 380 octets Note: in case of UDP obviously only local opening/closure is done, datagram is sent with **<data>** contained in the payload.	

#SSENDLINE – #SGACT/#SSENDLINE configuration		SELINT 2
AT#SSENDLINE=?	Test command reports the maximum length of **\<data\>** parameter	

Example	at+cgdcont=1,"IP","APN"
	OK
	
	at#ipconsumecfg=1,0,"remoteHost",remotePort
	OK
	// Socket with \<connId\> 1 will be used by #ssendline;
	// TCP will be the transmission protocol;
	// connection will be opened with "remoteHost"/remotePort
	
	at#sgact=1,1
	#SGACT: xxx.xxx.xxx.xxx
	
	OK
	
	at#ssendline="test sample"
	// TCP connection with "remoteHost"/remotePort is opened ,
	// data between double quotes are sent,
	// then TCP connection is closed
	OK	

5.1.6.5 *Event Monitor Commands*

5.1.6.5.1 **Enable EvMoni Service - #ENAEVMONI**

#ENAEVMONI – Enable EvMoni Service		SELINT 2

**AT#ENAEVMONI=
<mod>**
	Set command enables/disables the EvMoni service.
	
	Parameter:
	< mod >
	     0: Service Disabled (default)
	     1: Service Enabled
	
	Note1: When the service is active on a specific AT instance, that instance cannot be used for any other scope, except for OTA service that has the highest priority. For example in the multiplexer request to establish the Instance, the request will be rejected.
	
	Note2: the current settings are stored in NVM.	

AT#ENAEVMONI?	Read command returns the current settings of <mode> and the value of <stat> in the format:
	
	# ENAEVMONI: <mod>,<stat>
	
	   where:
	   <stat> - service status
	    0 – not active (default)
	    1 - active	

AT#ENAEVMONI=	Test command returns the supported values for the ENAEVMONI parameters	

5.1.6.5.2 EvMoni Service parameter - #ENAEVMONICFG

#ENAEVMONICFG – Set EvMoni Service Parameters		SELINT 2

AT#ENAEVMONICFG=<instance>
[,<urcmod>
[,<timeout>]]
	Set command configures the EvMoni service.
	
	Parameter:
	<instance>:
	AT instance that will be used by the service to run the AT Command. Range 1 - 5. (Default: 3)
	
	<urcmod>:
	      0 – disable unsolicited message
	      1 - enable an unsolicited message when an AT command is executed after an event is occurred (default)
	
	When unsolicited is enabled, the AT Command is indicated to TE with unsolicited result code:
	
	#EVMONI: <Text>
	
	e.g.:
	#EVMONI: AT+CGMR;+CGSN;+GSN;+CCLK
	
	Unsolicited is dumped on the instance that requested the service activation.
	
	<timeout>:
	It defines in minutes the maximum time for a command execution. If timeout expires the module will be rebooted. (Default: 5)
	
	Note 1: the current settings are stored in NVM.
	
	Note 2: the instance used for the EvMoni service is the same used for the SMS AT RUN service. Therefore, when the #ENAEVMONICFG sets the <instance> parameter, the change is reflected also in the <instance> parameter of the #SMSATRUNCFG command, and viceversa.
	
	Note 3: the set command returns ERROR if the command AT#ENAEVMONI? returns 1 as <mod> parameter or the command AT#SMSATRUN? returns 1 as <mod> parameter	

AT#ENAEVMONICFG?	Read command returns the current settings of parameters in the format: **#ENAEVMONICFG:<instance>,<urcmod>,<timeout>**	
AT# ENAEVMONICFG=?	Test command returns the supported values for the ENAEVMONICFG parameters	

5.1.6.5.3 Event Monitoring - #EVMONI

#EVMONI – Set the single Event Monitoring		SELINT 2

AT#EVMONI=
<label>,
<mode>,
[,<paramType >
,<param>]
	Set command enables/disables the single event monitoring, configures the related parameter and associates the AT command
	
	<label>: string parameter (that has to be enclosed between double quotes) indicating the event under monitoring. It can assume the following values:
	• VBATT - battery voltage monitoring (not yet implemented)
	• DTR - DTR monitoring (not yet implemented)
	• ROAM - roaming monitoring
	• CONTDEACT - context deactivation monitoring
	• RING - call ringing monitoring (not yet implemented)
	• STARTUP – module start-up monitoring
	• REGISTERED – network registration monitoring
	• GPIO1 – monitoring on a selected GPIO in the GPIO range (not yet implemented)
	• GPIO2 – monitoring on a selected GPIO in the GPIO range (not yet implemented)
	• GPIO3 – monitoring on a selected GPIO in the GPIO range (not yet implemented)
	• GPIO4 – monitoring on a selected GPIO in the GPIO range (not yet implemented)
	• GPIO5 – monitoring on a selected GPIO in the GPIO range (not yet implemented)
	• ADCH1 – ADC High Voltage monitoring (not yet implemented)
	• ADCL1 – ADC Low Voltage monitoring (not yet implemented)
	• DTMF1 –monitoring on user defined DTMF string (not yet implemented)
	• DTMF2 –monitoring on user defined DTMF string (not yet implemented)
	• DTMF3 –monitoring on user defined DTMF string (not yet implemented)
	• DTMF4 –monitoring on user defined DTMF string (not yet implemented)
	• SMSIN – monitoring on incoming SMS
	• CONSUME1 – used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command) (not yet implemented)
	• CONSUME2 – used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command) (not yet implemented)
	• CONSUME3 – used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command) (not yet implemented)
	• CONSUME4 – used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command) (not yet implemented)
	• CONSUME5 – used to define an action to be used in consume functionality (see parameter <action_id> in #CONSUMECFG command) (not yet implemented)
	
	<mode>:
	    0 – disable the single event monitoring (default)
	    1 – enable the single event monitoring
	
	< paramType >: numeric parameter indicating the type of parameter contained in **<param>**. The 0 value indicates that **<param>** contains the AT command string to execute when the related event has occurred. Other values depend from the type of event.
	
	<param>: it can be a numeric or string value depending on the value of **<paramType>** and on the type of event.
	If **<paramType>** is 0, then **<param>** is a string containing the AT command:

#EVMONI – Set the single Event Monitoring	SELINT 2

- It has to be enclosed between double quotes
- It has to start with the 2 chars AT (or at)
- If the string contains the character ", then it has to be replaced with the 3 characters \22
- the max string length is 96 characters
- if it is an empty string, then the AT command is erased

- If **\<label\>** is VBATT, **\<paramType\>** can assume values in the range 0 - 2.
  - if **\<paramType\>** = 1, **\<param\>** indicates the battery voltage threshold in the range 0 – 500, where one unit corresponds to 10 mV (therefore 500 corresponds to 5 V). (Default: 0)
  - if **\<paramType\>** = 2, **\<param\>** indicates the time interval in seconds after that the voltage battery under the value specified with **\<paramType\>** = 1 causes the event. The range is 0 – 255. (Default: 0)
- If **\<label\>** is DTR, **\<paramType\>** can assume values in the range 0 - 2.
  - if **\<paramType\>** = 1, **\<param\>** indicates the status high or low under monitoring. The values are 0 (low) and 1 (high). (Default: 0)
  - if **\<paramType\>** = 2, **\<param\>** indicates the time interval in seconds after that the DTR in the status specified with **\<paramType\>** = 1 causes the event. The range is 0 – 255. (Default: 0)
- If **\<label\>** is ROAM, **\<paramType\>** can assume only the value 0. The event under monitoring is the roaming state.
- If **\<label\>** is CONTDEACT, **\<paramType\>** can assume only the value 0. The event under monitoring is the context deactivation.
- If **\<label\>** is RING, **\<paramType\>** can assume values in the range 0 - 1.
  - if **\<paramType\>** = 1, **\<param\>** indicates the numbers of call rings after that the event occurs. The range is 1-50. (Default: 1)
- If **\<label\>** is STARTUP, **\<paramType\>** can assume only the value 0. The event under monitoring is the module start-up.
- If **\<label\>** is REGISTERED, **\<paramType\>** can assume only the value 0. The event under monitoring is the network registration (to home network or in roaming) after the start-up and the SMS ordering.
- If **\<label\>** is GPIOX, **\<paramType\>** can assume values in the range 0 - 3.
  - if **\<paramType\>** = 1, **\<param\>** indicates the GPIO pin number; supported range is from 1 to a value that depends on the hardware. (Default: 1)
  - if **\<paramType\>** = 2, **\<param\>** indicates the status high or low under monitoring. The values are 0 (low) and 1 (high) . (Default: 0)
  - if **\<paramType\>** = 3, **\<param\>** indicates the time interval in seconds after that the selected GPIO pin in the status specified with **\<paramType\>** = 1 causes the event. The range is 0 – 255. (Default: 0)
- If **\<label\>** is ADCH1, **\<paramType\>** can assume values in the range 0 - 3.
  - if **\<paramType\>** = 1, **\<param\>** indicates the ADC pin number; supported range is from 1 to a value that depends on the hardware. (Default: 1)
  - if **\<paramType\>** = 2, **\<param\>** indicates the ADC High voltage threshold in the range 0 – 2000 mV. (Default: 0)
  - if **\<paramType\>** = 3, **\<param\>** indicates the time interval in seconds after that the selected ADC pin above the value specified with **\<paramType\>** = 1 causes the event. The range is 0 – 255. (Default: 0)
- If **\<label\>** is ADCL1, **\<paramType\>** can assume values in the range 0 - 3.
  - if **\<paramType\>** = 1, **\<param\>** indicates the ADC pin number; supported range is from 1 to a value that depends on the hardware. (Default: 1)

#EVMONI – Set the single Event Monitoring		SELINT 2

	o if **<paramType>** = 2, **<param>** indicates the ADC Low voltage threshold in the range 0 – 2000 mV. (Default: 0)
	o if **<paramType>** = 3, **<param>** indicates the time interval in seconds after that the selected ADC pin under the value specified with **<paramType>** = 1 causes the event. The range is 0 – 255. (Default: 0)
	• If **<label>** is DTMFX, **<paramType>** can assume values in the range 0 - 2.
	   o if **<paramType>** = 1, **<param>** indicates the DTMF string; the single DTMF characters have to belong to the range ((0-9),#,*,(A-D)); the maximum number of characters in the string is 15
	   o if **<paramType>** = 2, **<param>** indicates the timeout in milliseconds. It is the maximum time interval within which a DTMF tone must be detected after detecting the previous one, to be considered as belonging to the DTMF string. The range is (500 – 5000). (Default: 1000)
	• If **<label>** is SMSIN, **<paramType>** can assume values in the range 0-1.
	   o if **<paramType>** = 1, **<param>** indicates the text that must be received in incoming SMS to trigger AT command execution rings after that the event occurs; the maximum number of characters in the SMS text string is 15. If no text is specified, AT command execution is triggered after each incoming SMS
	• If **<label>** is CONSUMEX, **<paramType>** can assume only the value 0.
	
	Note: the DTMF string monitoring is available only if the DTMF decode has been enabled (see **#DTMF** command)	

AT# EVMONI?	Read command returns the current settings for each event in the format: **#EVMONI: <label>,<mode>,<param0>[,<param1>[,<param2>[,<param3>]]]** Where **<param0>**, **<param1>**, **<param2>** and **<param3>** are defined as before for **<param>** depending on **<label>** value	
AT#EVMONI=?	Test command returns values supported as a compound value	

5.1.6.5.4   Send Message - #CMGS

#CMGS - Send Message		SELINT 2
(PDU Mode) ***AT#CMGS= <length>,<pdu>***	**(PDU Mode)** Execution command sends to the network a message. Parameter: **<length>** - length of the PDU to be sent in bytes (excluding the SMSC address octets). 7..164 **<pdu>** - PDU in hexadecimal format (each octet of the PDU is given as two IRA character long hexadecimal number) and given in one line. Note: when the length octet of the SMSC address (given in the **<pdu>**) equals zero, the SMSC address set with command **+CSCA** is used; in this case the SMSC Type-of-Address octet shall not be present in the **<pdu>**. If message is successfully sent to the network, then the result is sent in the format: **#CMGS: <mr>** where	

#CMGS - Send Message		SELINT 2

<table>
<tr><td colspan="2"><mr> - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format.

Note: if message sending fails for some reason, an error code is reported.</td></tr>
<tr><td><i>(Text Mode)</i>
AT#CMGS=<da>
,<text></td><td>(Text Mode)
Execution command sends to the network a message.

Parameters:
<da> - destination address, string type represented in the currently selected character set (see +CSCS).
<text> - text to send

The entered text should be enclosed between double quotes and formatted as follows:

- if current <dcs> (see +CSMP) indicates that GSM03.38 default alphabet is used and current <fo> (see +CSMP) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A.
- if current <dcs> (see +CSMP) indicates that 8-bit or UCS2 data coding scheme is used or current <fo> (see +CSMP) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the 'asterisk' will be entered as 2A (IRA50 and IRA65) and this will be converted to an octet with integer value 0x2A)

If message is successfully sent to the network, then the result is sent in the format:

#CMGS: <mr>

where
<mr> - message reference number; 3GPP TS 23.040 TP-Message-Reference in integer format.

Note: if message sending fails for some reason, an error code is reported.</td></tr>
<tr><td>AT#CMGS=?</td><td>Test command returns the OK result code.</td></tr>
<tr><td>Reference</td><td>3GPP TS 27.005</td></tr>
<tr><td>Note</td><td>To avoid malfunctions is suggested to wait for the #CMGS: <mr> or #CMS ERROR: <err> response before issuing further commands.</td></tr>
</table>

5.1.6.5.5 Write Message To Memory - #CMGW

#CMGW - Write Message To Memory		SELINT 2

<table>
<tr><td><i>(PDU Mode)</i>
AT#CMGW=
<length>,<pdu></td><td>(PDU Mode)
Execution command writes in the <memw> memory storage a new message.

Parameter:
<length> - length in bytes of the PDU to be written.
 7..164
<pdu> - PDU in hexadecimal format (each octet of the PDU is given as two IRA character long hexadecimal number) and given in one line.</td></tr>
</table>

	If message is successfully written in the memory, then the result is sent in the format: **#CMGW: <index>** where: **<index>** - message location index in the memory **<memw>**. If message storing fails for some reason, an error code is reported.
(Text Mode) **AT#CMGW=<da> ,<text>**	**(Text Mode)** Execution command writes in the **<memw>** memory storage a new message. Parameters: **<da>** - destination address, string type represented in the currently selected character set (see **+CSCS**). **<text>** - text to write The entered text should be enclosed between double quotes and formatted as follows: - if current **<dcs>** (see **+CSMP**) indicates that GSM03.38 default alphabet is used and current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is not set, then ME/TA converts the entered text into GSM alphabet, according to 3GPP TS 27.005, Annex A. - if current **<dcs>** (see **+CSMP**) indicates that 8-bit or UCS2 data coding scheme is used or current **<fo>** (see **+CSMP**) indicates that 3GPP TS 23.040 TP-User-Data-Header-Indication is set, the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. the **'asterisk'** will be entered as **2A** (**IRA50** and **IRA65**) and this will be converted to an octet with integer value **0x2A**) If message is successfully written in the memory, then the result is sent in the format: **#CMGW: <index>** where: **<index>** - message location index in the memory **<memw>**. If message storing fails for some reason, an error code is reported.
AT#CMGW=?	Test command returns the **OK** result code.
Reference	3GPP TS 27.005
Note	To avoid malfunctions is suggested to wait for the #**CMGW: <index>** or **+CMS ERROR: <err>** response before issuing further commands.

5.1.6.5.6   AT Command Delay - #ATDELAY

#ATDELAY – AT Command Delay	SELINT 2
AT#ATDELAY= <delay>	Set command sets a delay in second for the execution of following AT command. Parameters: **<delay>** - delay in 100 milliseconds intervals; 0 means no delay

#ATDELAY – AT Command Delay		SELINT 2
	Note: **<delay>** is only applied to first command executed after **#ATDELAY**	
AT#ATDELAY=?	Test command returns the supported range of values for parameter **<delay>**	
Example	Delay "at#gpio=1,1,1" execution of 5 seconds: at#gpio=1,0,1;#atdelay=50;#gpio=1,1,1 OK	

5.1.6.6 Multisocket AT Commands

5.1.6.6.1 Socket Status - #SS

#SS - Socket Status		SELINT 2

AT#SS[=<connId>]	Execution command reports the current status of the socket:
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	
	The response format is:
	
	#SS: <connId>,<state>,<locIP>,<locPort>,<remIP>,<remPort>
	
	where:
	<connId> - socket connection identifier, as before
	<state> - actual state of the socket:
	  0 - Socket Closed.
	  1 - Socket with an active data transfer connection.
	  2 - Socket suspended.
	  3 - Socket suspended with pending data.
	  4 - Socket listening.
	  5 - Socket with an incoming connection. Waiting for the user accept or shutdown command.
	  6 - Socket resolving DNS.
	  7 - Socket connecting.
	
	<locIP> - IP address associated by the context activation to the socket.
	<locPort> - two meanings:
	  - the listening port if we put the socket in listen mode.
	  - the local port for the connection if we use the socket to connect to a remote machine.
	<remIP> - when we are connected to a remote machine this is the remote IP address.
	<remPort> - it is the port we are connected to on the remote machine.
	
	Note: issuing **#SS<CR>** causes getting information about status of all the sockets; the response format is:
	
	#SS: <connId1>,<state1>,<locIP1>,<locPort1>,<remIP1>,<remPort1> <CR><LF>
	
	…
	#SS: <connId6>,<state6>,<locIP6>,<locPort6>,<remIP6>,<remPort6>	

AT#SS=?	**Test command reports the range for parameter <connId>.**	

#SS - Socket Status		SELINT 2
Example	AT#SS #SS: 1,3,91.80.90.162,61119,88.37.127.146,10510 #SS: 2,4,91.80.90.162,1000 #SS: 3,0 #SS: 4,0 #SS: 5,3,91.80.73.70,61120,88.37.127.146,10509 #SS: 6,0 OK Socket 1: opened from local IP 91.80.90.162/local port 61119 to remote IP 88.37.127.146/remote port 10510 is suspended with pending data Socket 2: listening on local IP 91.80.90.162/local port 1000 Socket 5: opened from local IP 91.80.73.70/local port 61120 to remote IP 88.37.127.146/remote port 10509 is suspended with pending data AT#SS=2 #SS: 2,4,91.80.90.162,1000 OK We have information only about socket number 2	

#SI - Socket Info		SELINT 2
AT#SI[=<connId>]	Execution command is used to get information about socket data traffic. Parameters: **<connId>** - socket connection identifier 1..6 The response format is: **#SI: <connId>,<sent>,<received>,<buff_in>,<ack_waiting>** where: **<connId>** - socket connection identifier, as before **<sent>** - total amount (in bytes) of sent data since the last time the socket connection identified by **<connId>** has been opened **<received>** - total amount (in bytes) of received data since the last time the socket connection identified by **<connId>** has been opened **<buff_in>** - total amount (in bytes) of data just arrived through the socket connection identified by **<connId>** and currently buffered, not yet read **<ack_waiting>** - total amount (in bytes) of sent and not yet acknowledged data since the last time the socket connection identified by **<connId>** has been opened Note: not yet acknowledged data are available only for TCP connections; the value **<ack_waiting>** is always 0 for UDP connections. Note: issuing **#SI<CR>** causes getting information about data traffic of all the sockets; the response format is: **#SI: <connId1>,<sent1>,<received1>,<buff_in1>,<ack_waiting1> <CR><LF>** … **#SI: <connId6>,<sent6>,<received6>,<buff_in6>,<ack_waiting6>**	
AT#SI=?	Test command reports the range for parameter **<connId>**.	
Example	AT#SI #SI: 1,123,400,10,50 #SI: 2,0,100,0,0 #SI: 3,589,100,10,100 #SI: 4,0,0,0,0 #SI: 5,0,0,0,0 #SI: 6,0,98,60,0 OK *Sockets 1,2,3,6 are opened with some data traffic.* *For example socket 1 has 123 bytes sent, 400 bytes received, 10 byte waiting to be read and 50 bytes waiting to be acknowledged from the remote side.* AT#SI=1 #SI: 1,123,400,10,50 OK	

	We have information only about socket number 1

5.1.6.6.3   Socket Type - #ST

#ST – Socket Type		SELINT 2
AT#ST [=<ConnId>]	Set command reports the current type of the socket (TCP/UDP) and its direction (Dialer / Listener) Parameter: **< ConnId >** - socket connection identifier 1..6 The response format is: **#ST: <connId>,<type>,<direction>** where **< connId >** - socket connection identifier 1..6 **< type >** - socket type 0 – No socket 1 – TCP socket 2 – UDP socket **< direction >** - direction of the socket 0 – No 1 – Dialer 2 – Listener Note: issuing **#ST<CR>** causes getting information about type of all the sockets; the response format is: **#ST: <connId1>,<type1>,<direction1>** **<CR><LF>** … **#ST: <connId6>,< type 6>,< direction 6>**	
AT#ST=?	Test command reports the range for parameter <connId>.	
Example	single socket: AT#ST=3 #ST: 3,2,1 Socket 3 is an UDP dialer. All sockets: AT#ST #ST: 1,0,0 #ST: 2,0,0 #ST: 3,2,1 #ST: 4,2,2 #ST: 5,1,1 #ST: 6,1,2 Socket 1 is closed. Socket 2 is closed. Socket 3 is an UDP dialer Socket 4 is an UDP listener	

#ST – Socket Type	SELINT 2
	Socket 5 is a TCP dialer Socket 6 is a TCP listener

5.1.6.6.4 Context Activation - #SGACT

#SGACT - Context Activation		SELINT 2

AT#SGACT=<cid>, <stat>[,<userId>, <pwd>]	Execution command is used to activate or deactivate either the GSM context or the specified PDP context.
	Moreover it binds or unbinds Easy IP application to the specified PDP context (or GSM context).
	
	Parameters:
	<cid> - PDP context identifier
	  0 - specifies the GSM context (not yet available)
	  1..*max* - numeric parameter which specifies a particular PDP context definition. The value of *max* is returned by the Test command
	<stat>
	  0 - deactivate the context
	  1 - activate the context
	<userId> - string type, used only if the context requires it
	<pwd> - string type, used only if the context requires it
	
	Note: context activation/deactivation returns **ERROR** if there is not any socket associated to it (see **AT#SCFG**).
	Note: In LTE network, default PDP context(cid 1) is activated by piggybacking on LTE attach procedure and maintained until detached from NW. This command with cid 1 is just binding or unbinding application to the default PDP context.	

AT#SGACT?	Returns the state of all the contexts that have been defined
	
	#SGACT: <cid1>,<Stat1><CR><LF>
	…
	#SGACT: <cid*max*>,<Stat*max*>
	
	where:
	<cid*n*> - as **<cid>** before
	<stat*n*> - context status
	  0 - context deactivated
	
	  1 - context activated and bound to Easy IP application	

AT#SGACT=?	Test command reports the range for the parameters **<cid>** and **<stat>**	
Note	It is strongly recommended to use the same command (e.g. **#SGACT**) to activate the context, deactivate it and interrogate about its status.	

5.1.6.6.5 Socket Shutdown - #SH

#SH - Socket Shutdown		SELINT 2
AT#SH=<connId>	This command is used to close a socket. Parameter: **<connId>** - socket connection identifier 1..6 Note: socket cannot be closed in states "resolving DNS" and "connecting" (see AT#SS command)	
AT#SH=?	Test command reports the range for parameter **<connId>**.	

#SCFG - Socket Configuration		SELINT 2

AT#SCFG=
<connId>,<cid>,
<pktSz>,<maxTo>,
<connTo>,<txTo>
	Set command sets the socket configuration parameters.
	
	Parameters:
	<connId> - socket connection identifier
	  1..10
	<cid> - PDP context identifier
	  0 - specifies the GSM context
	  1.. *max* - numeric parameter which specifies a particular PDP context definition. The value of *max* is returned by the Test command
	<pktSz> - packet size to be used by the TCP/UDP/IP stack for data sending.
	  0 - select automatically default value(300).
	  1..1500 - packet size in bytes.
	<maxTo> - **exchange timeout (or socket inactivity timeout); if there's no data exchange within this timeout period the connection is closed.**
	  0 - no timeout
	  1..65535 - timeout value in seconds (default 90 s.)
	<connTo> - connection timeout; if we can't establish a connection to the remote within this timeout period, an error is raised.
	  10..1200 - timeout value in hundreds of milliseconds (default 600)
	<txTo> - data sending timeout; after this period data are sent also if they're less than max packet size.
	  0 - no timeout
	  1..255 - timeout value in hundreds of milliseconds (default 50)
	  256 – set timeout value in 10 milliseconds
	  257 – set timeout value in 20 milliseconds
	  258 – set timeout value in 30 milliseconds
	  259 – set timeout value in 40 milliseconds
	  260 – set timeout value in 50 milliseconds
	  261 – set timeout value in 60 milliseconds
	  262 – set timeout value in 70 milliseconds
	  263 – set timeout value in 80 milliseconds
	  264 – set timeout value in 90 milliseconds
	
	Note: these values are automatically saved in NVM.
	
	Note: if DNS resolution is required, max DNS resolution time(20 sec) has to be considered in addition to **<connTo>**

AT#SCFG?	Read command returns the current socket configuration parameters values for all the six sockets, in the format: **#SCFG: <connId1>,<cid1>,<pktsz1>,<maxTo1>,<connTo1>,<txTo1>** **<CR><LF>** . . . **#SCFG: <connId6>,<cid6>,<pktsz6>,<maxTo6>,<connTo6>,<txTo6>** **<CR><LF>**
AT#SCFG=?	Test command returns the range of supported values for all the subparameters.
Example	at#scfg? #SCFG: 1,1,300,90,600,50 #SCFG: 2,2,300,90,600,50 #SCFG: 3,2,250,90,600,50 #SCFG: 4,1,300,90,600,50 #SCFG: 5,1,300,90,600,50 #SCFG: 6,1,300,90,600,50 #SCFG: 7,1,300,90,600,50 #SCFG: 8,1,300,90,600,50

#SCFG - Socket Configuration	SELINT 2
#SCFG: 9,2,300,90,600,50 #SCFG: 10,2,300,90,600,50 OK	

5.1.6.6.7 Socket Configuration Extended - #SCFGEXT

#SCFGEXT - Socket Configuration Extended		SELINT 2

AT#SCFGEXT=
<conned>,<srMode>,
<recvDataMode>,
<keepalive>,
[,<ListenAutoRsp>
[,<sendDataMode>]
]
	Set command sets the socket configuration extended parameters.
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	
	<srMode> - SRing unsolicited mode
	0 - Normal (default):
	  SRING : <connId> where <connId> is the socket connection identifier
	1 – Data amount:
	  SRING : <connId>,<recData> where <recData> is the amount of data received on the socket connection number <connId>
	2 - Data view:
	  SRING : <connId>,<recData>,<data> same as before and <data> is data received displayed following <dataMode> value
	3 – Data view with UDP datagram informations:
	  SRING : <sourceIP>,<sourcePort><connId>,<recData>,<dataLeft>,<data> same as before with <sourceIP>,<sourcePort> and <dataLeft> that means the number of bytes left in the UDP datagram
	
	<recvDataMode> - data view mode for received data
	in command mode(AT#SRECV or <srMode> = 2)
	0- text mode (default)
	1- hexadecimal mode
	
	<keepalive> - Set the TCP Keepalive value in minutes
	 0 – Deactivated (default)
	 1 – 240 – Keepalive time in minutes
	
	<ListenAutoRsp> - Set the listen auto-response mode, that affects the commands AT#SL and AT#SLUDP
	0 - Deactivated (default)
	1 – Activated
	
	<sendDataMode> - data mode for sending data
	in command mode(AT#SSEND)
	
	0 - data represented as text (default)
	1 - data represented as sequence of hexadecimal numbers (from 00 to FF)
	Each octet of the data is given as two IRA character long hexadecimal number
	
	Note: these values are automatically saved in NVM.
	Note: Keepalive is available only on TCP connections.
	
	Note: for the behaviour of AT#SL and AT#SLUDP in case of auto-response mode or in case of no auto-response mode, see the description of the two commands.	

AT#SCFGEXT?	Read command returns the current socket extended configuration parameters values for all the six sockets, in the format: **#SCFGEXT:\<connId1\>, \<srMode1\>,\<dataMode1\>,*\<keepalive1\>,* *\<ListenAutoRsp1\>,0*\<CR\>\<LF\>** . . . **#SCFGEXT:\<connId6\>, \<srMode6\>,\<dataMode6\>,*\<keepalive6\>,* *\<ListenAutoRsp6\>,0*\<CR\>\<LF\>**
AT#SCFGEXT=?	Test command returns the range of supported values for all the subparameters.
Example	Socket 1 set with data view sring, text data mode, a keepalive time of 30 minutes and listen auto-response set. Socket 3 set with data amount sring, hex recv data mode, no keepalive and listen auto-response not set. Socket 4 set with hex recv and send data mode at#scfgext? #SCFGEXT: 1,2,0,30,1,0 #SCFGEXT: 2,0,0,0,0,0 #SCFGEXT: 3,1,1,0,0,0 #SCFGEXT: 4,0,1,0,0,1 #SCFGEXT: 5,0,0,0,0,0 #SCFGEXT: 6,0,0,0,0,0 OK

#SCFGEXT2 - Socket Configuration Extended	

AT#SCFGEXT2=
<connId>,<bufferStart>,
[,<abortConnAttempt>
[,<unused_B >
[,<unused_C >[,<noCarrierMode>]]]]
	Set command sets the socket configuration extended parameters for features not included in #SCFGEXT command.
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	
	<bufferStart> - Set the sending timeout method based on new data received from the serial port.
	(**<txTo>** timeout value is set by #SCFG command)
	Restart of transmission timer will be done when new data are received from the serial port.
	
	0 - old behaviour for transmission timer
	(#SCFG command 6th parameter old behaviour,
	start only first time if new data are received from the serial port)
	1 - new behaviour for transmission timer:
	restart when new data received from serial port
	
	Note: is necessary to avoid overlapping of the two methods. Enabling new method, the old method for transmission timer(#SCFG) is automatically disabled to avoid overlapping.
	
	Note: check if new data have been received from serial port is done with a granularity that is directly related to #SCFG **<txTo>** setting with a maximum period of 1 sec.
	
	<abortConnAttempt> - Enable connection attempt(#SD/#SKTD) abort before CONNECT(online mode) or OK(command mode)
	
	0 – Not possible to interrupt connection attempt
	1 – It is possible to interrupt the connection attempt
	(**<connTo>** set by #SCFG or
	  DNS resolution running if required)
	
	and give back control to AT interface by reception of a character.
	As soon as the control has been given to the AT interface the ERROR message will be received on the interface itself.
	
	Note: values are automatically saved in NVM.
	
	<noCarrierMode> - permits to choose **NO CARRIER** indication format when the socket is closed as follows
	
	0 – **NO CARRIER**
	(default)
	Indication is sent as usual, without additional information
	
	1 – **NO CARRIER:<connId>**
	Indication of current **<connId>** socket connection identifier is added
	
	2 – **NO CARRIER:<connId>,<cause>**
	Indication of current **<connId>** socket connection identifier and closure **<cause>** are added

	For possible **<cause>** values, see also **#SLASTCLOSURE** Note: like **#SLASTCLOSURE**, in case of subsequent consecutive closure causes are received, the original disconnection cause is indicated. Note: in the case of command mode connection and remote closure with subsequent inactivity timeout closure without retrieval of all available data(#SRECV or SRING mode 2), it is indicated cause 1 for both possible FIN and RST from remote.
AT#SCFGEXT2?	Read command returns the current socket extended configuration parameters values for all the six sockets, in the format: **#SCFGEXT2:<connId1>,<bufferStart1>,0,0,0,0<CR><LF>** **. . .** **#SCFGEXT2:<connId6>,<bufferStart6>,0,0,0,0<CR><LF>**
AT#SCFGEXT2=?	Test command returns the range of supported values for all the subparameters.
Example	AT#SCFGEXT2=1,1 OK AT#SCFGEXT2=2,1 OK AT#SCFGEXT2? #SCFGEXT2: 1,1,0,0,0,0 #SCFGEXT2: 2,1,0,0,0,0 #SCFGEXT2: 3,0,0,0,0,0 #SCFGEXT2: 4,0,0,0,0,0 #SCFGEXT2: 5,0,0,0,0,0 #SCFGEXT2: 6,0,0,0,0,0 OK AT#SCFG? #SCFG: 1,1,300,90,600,50 #SCFG: 2,1,300,90,600,50 #SCFG: 3,1,300,90,600,50 #SCFG: 4,2,300,90,600,50 #SCFG: 5,2,300,90,600,50 #SCFG: 6,2,300,90,600,50 OK AT#SCFG=1,1,300,90,600,30 OK Current configuration: socket with connId 1 and 2 are configured with new transmission timer behaviour. <txTo> corresponding value has been changed(#SCFG) for connId 1, for connId 2 has been left to default value.

5.1.6.6.9 Socket configuration Extended 3 - #SCFGEXT3

#SCFGEXT3 - Socket Configuration Extended 3		SELINT 2
AT#SCFGEXT3= <connId >,<immRsp>[, <closureTypeCmdMo deEnabling> [,<fastsring>[,<unuse d_C>[,<unused_D>]]]]	Set command sets the socket configuration extended parameters for features not included in #SCFGEXT command nor in #SCFGEXT2 command Parameters: **<connId> -** socket connection identifier 1..6 **<immRsp> -** Enables AT#SD command mode immediate response 0 – factory default, means that AT#SD in command mode (see **AT#SD**) returns after the socket is connected 1 – means that AT#SD in command mode returns immediately. Then the state of the connection can be read by the AT command **AT#SS** **<closureTypeCmdModeEnabling> -** Setting this parameter, successive #SD or #SL with **<closureType>** parameter 255 setting takes effect in command mode. It has been introduced due to retrocompatibility reason regarding **<closureType>** behaviour in command mode. 0 – factory default, #SD or #SL **<closureType>** 255 in command mode has no effect 1 – #SD or SL **<closureType>** 255 in command mode takes effect **<fastsring> -** Enables the fast SRING (active only when **AT#SCFGEXT** parameter **<srmode>**=2) in TCP and UDP sockets 0 – factory default, means that SRING unsolicited is received periodically if data are available every 200ms. 1 – means that if data are available SRING unsolicited is received asynchronous as fast as possible. Note: parameters are saved in NVM	
AT#SCFGEXT3?	Read command returns the current socket extended configuration parameters values for all the six sockets, in the format: **#SCFGEXT3:<connId1>,<immRsp1>, <closureTypeCmdModeEnabling>,< fastsring >,0,0<CR><LF>** **. . .** **#SCFGEXT3:<connId6>,<immRsp6>, <closureTypeCmdModeEnabling>, < fastsring >,0,0<CR><LF>**	
AT#SCFGEXT3=?	Test command returns the range of supported values for all the parameters.	

#SD - Socket Dial		SELINT 2

AT#SD=<connId>, <txProt>,<rPort>, <IPaddr> [,<closureType> [,<lPort> [,<connMode>]]]	Execution command opens a remote connection via socket.
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	<txProt> - transmission protocol
	  0 - TCP
	  1 - UDP
	<rPort> - remote host port to contact
	  1..65535
	<IPaddr> - address of the remote host, string type. This parameter can be either:
	  - any valid IP address in the format: "xxx.xxx.xxx.xxx"
	  - any host name to be solved with a DNS query
	<closureType> - socket closure behaviour for TCP when remote host has closed
	  0 - local host closes immediately (default)
	  255 - local host closes after an AT#SH or immediately in case of an abortive disconnect from remote.
	<lPort> - UDP connections local port
	  1..65535
	<connMode> - Connection mode
	  0 - online mode connection (default)
	  1 - command mode connection
	
	Note: **<closureType>** parameter is valid for TCP connections only and has no effect (if used) for UDP connections.
	
	Note: **<lPort>** parameter is valid for UDP connections only and has no effect (if used) for TCP connections.
	
	Note: if we set **<connMode>** to **online mode connection** and the command is successful we enter in **online data mode** and we see the intermediate result code **CONNECT**. After the **CONNECT** we can suspend the direct interface to the socket connection (nb the socket stays open) using the escape sequence (**+++**): the module moves back to **command mode** and we receive the final result code **OK** after the suspension. After such a suspension, it's possible to resume it in every moment (unless the socket inactivity timer timeouts, see **#SCFG**) by using the **#SO** command with the corresponding **<connId>**.
	
	Note: if we set **<connMode>** to **command mode connection** and the command is successful, the socket is opened and we remain in **command mode** and we see the result code **OK**.
	
	Note: if there are input data arrived through a connected socket and not yet read because the module entered **command mode** before reading them (after an escape sequence or after **#SD** has been issued with **<connMode>** set to **command mode connection)**, these data are buffered and we receive the **SRING** URC (**SRING** presentation format depends on the last **#SCFGEXT** setting); it's possible to read these data afterwards issuing **#SRECV**. Under the same hypotheses it's possible to send data while in **command mode** issuing **#SSEND**
	
	Note: resume of the socket(#SO) after suspension or closure(#SH) has to be done on the same instance on which the socket was opened through #SD. In fact, suspension has been done on the instance itself.
	
	Note: **<closureType>** 255 takes effect on a command mode connection(**<connMode>** set to 1 or online mode connection suspended

#SD - Socket Dial	
	SELINT 2
	with +++) only if **#SCFGEXT3 <closureTypeCmdModeEnabling>** parameter has been previously enabled. Note: if PDN connection has not properly opened then +CME ERROR: 556 (context not opened) will be given.
AT#SD=?	Test command reports the range of values for all the parameters.
Example	*Open socket 1 in online mode* AT#SD=1,0,80,"www.google.com",0,0,0 CONNECT … *Open socket 1 in command mode* AT#SD=1,0,80,"www.google.com",0,0,1 OK

5.1.6.6.11   Socket Restore - #SO

#SO - Socket Restore	
	SELINT 2
AT#SO=<connId>	Execution command resumes the direct interface to a socket connection which has been suspended by the escape sequence. Parameter: **<connId>** - socket connection identifier 1..6
AT#SO=?	Test command reports the range of values for **<connId>** parameter.

5.1.6.6.12   Socket Listen - #SL

#SL - Socket Listen	
	SELINT 2

**AT#SL=<connId>,
<listenState>,
<listenPort>
>[,<closure type>]**
	This command opens/closes a socket listening for an incoming TCP connection on a specified port.
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	<listenState> -
	  0 - closes socket listening
	  1 - starts socket listening
	<listenPort> - local listening port
	  1..65535
	<closure type> - socket closure behaviour for TCP when remote host has closed
	  0 - local host closes immediately (default)
	  255 - local host closes after an AT#SH or immediately in case of an abortive disconnect from remote.
	
	Note: if successful, the command returns a final result code **OK**.
	If the ListenAutoRsp flag has not been set through the command AT#SCFGEXT (for the specific connId), then, when a TCP connection request comes on the input port, if the sender is not filtered by internal firewall (see **#FRWL**), an URC is received:
	
	SRING : <connId>
	
	Afterwards we can use **#SA** to accept the connection or **#SH** to refuse it.

#SL - Socket Listen		SELINT 2
	If the ListenAutoRsp flag has been set, then, when a TCP connection request comes on the input port, if the sender is not filtered by the internal firewall (see command **#FRWL**), the connection is automatically accepted: the **CONNECT** indication is given and the modem goes into **online data mode**. If the socket is closed by the network the following URC is received: **#SL: ABORTED** Note: when closing the listening socket <listenPort> is a don't care Parameter Note: **<closureType>** 255 takes effect on a command mode connection (connection accepted through AT#SA=<connId>,1 or online mode connection suspended with +++) only if **#SCFGEXT3 <closureTypeCmdModeEnabling>** parameter has been previously enabled.	
AT#SL?	Read command returns all the actual listening TCP sockets.	
AT#SL=?	Test command returns the range of supported values for all the subparameters.	
Example	*Next command opens a socket listening for TCP on port 3500 without.* AT#SL=1,1,3500 OK	

5.1.6.6.13 Socket Listen UDP - #SLUDP

#SLUDP - Socket Listen UDP		SELINT 2

AT#SLUDP=<connId>, <listenState>, <listenPort>	This command opens/closes a socket listening for an incoming UDP connection on a specified port.
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	<listenState> -
	  0 - closes socket listening
	  1 - starts socket listening
	<listenPort> - local listening port
	  1..65535
	
	Note: if successful, the command returns a final result code **OK**.
	If the ListenAutoRsp flag has not been set through the command AT#SCFGEXT (for the specific connId), then, when an UDP connection request comes on the input port, if the sender is not filtered by internal firewall (see **#FRWL**), an URC is received:
	
	+SRING : <connId>
	
	Afterwards we can use **#SA** to accept the connection or **#SH** to refuse it.
	
	If the ListenAutoRsp flag has been set, then, when an UDP connection request comes on the input port, if the sender is not filtered by the internal firewall (see command **#FRWL**), the connection is automatically accepted: the **CONNECT** indication is given and the modem goes into **online data mode**.
	If the socket is closed by the network the following URC is received:
	
	#SLUDP: ABORTED	

#SLUDP - Socket Listen UDP	SELINT 2
	Note: when closing the listening socket <listenPort> is a don't care parameter
AT#SLUDP?	Read command returns all the actual listening UDP sockets.
AT#SLUDP=?	Test command returns the range of supported values for all the subparameters.
Example	*Next command opens a socket listening for UDP on port 3500.* AT#SLUDP=1,1,3500 OK

5.1.6.6.14   Socket Accept - #SA

#SA - Socket Accept	SELINT 2

AT#SA=<connId> [,<connMode>]	Execution command accepts an incoming socket connection after an URC **SRING: <connId>**
	
	Parameter:
	<connId> - socket connection identifier
	  1..6
	<connMode> - Connection mode, as for command **#SD**.
	  0 - online mode connection (default)
	  1 - command mode connection
	
	Note: the **SRING** URC has to be a consequence of a **#SL** issue.
	
	Note: setting the command before to having received a SRING will result in an ERROR indication, giving the information that a connection request has not yet been received

AT#SA=?	Test command reports the range of values for all the parameters.

5.1.6.6.15   Socket Info Extended - #SIEXT

#SIEXT – Socket Info Extended	SELINT 2
AT#SIEXT[=<connId>]	Execution command is used to get information about socket data traffic. Parameters: **<connId>** - socket connection identifier 1..6 The response format is: **#SIEXT: <connId>,<retx>,<oos>,<rsrvd1>,<rsrvd2>** where: **<connId>** - socket connection identifier, as before **<retx>** - total amount of retransmissions of outgoing packets since the last time the socket connection identified by **<connId>** has been opened **<oos>** - total amount of ingoing out of sequence packets (packets which sequence number is greater than the next expected one) since the last time the socket connection identified by **<connId>** has been opened **<rsrvd1/2>** - reserved fields for future development of new statistics. Currently they're always equal to 0 Note: parameters associated with a socket identified by <connId> are cleared when the socket itself is connected again (#SD or #SA after #SL). Until then, if previous connection has been established and closed, old values are yet available.

	Note: both **<retx>** and **<oos>** parameters are available only for TCP connections; their value is always 0 for UDP connections. Note: issuing **#SIEXT<CR>** causes getting information about data traffic of all the sockets; the response format is: **#SI: <connld1>,<retx1>,<oos1>,<rsrvd1_1>,< rsrvd2_1> <CR><LF>** **…** **#SI: <connld6>,<retx6>,<oos6>,< rsrvd1_6>,< rsrvd2_6>**
AT#SIEXT=?	Test command reports the range for parameter **<connld>**.

5.1.6.6.16   Detect the cause of a Socket disconnection - #SLASTCLOSURE

#SLASTCLOSURE – Detect the cause of a socket disconnection		SELINT 2
AT#SLASTCLOSURE= [<connld>]	Execution command reports socket disconnection cause Parameters: **<connld> -** socket connection identifier 1..6 The response format is: **#SLASTCLOSURE: <connld>,<cause>** where: **<connld>** - socket connection identifier, as before **<cause>** - socket disconnection cause: 0 – not available(socket has not yet been closed) 1.- remote host TCP connection close due to FIN/END: normal remote disconnection decided by the remote application 2 -.remote host TCP connection close due to RST, all others cases in which the socket is aborted without indication from peer (for instance because peer doesn't send ack after maximum number of retransmissions/peer is no more alive). All these cases include all the "FATAL" errors after recv or send on the TCP socket(named as different from EWOULDBLOCK) 3.- socket inactivity timeout 4.- network deactivation(PDN connection deactivation from network) Note: any time socket is re-opened, last disconnection cause is reset. Command report 0(not available). Note: user closure cause(**#SH**) is not considered and if a user closure is performed after remote disconnection, remote disconnection cause remains saved and is not overwritten. Note: if more consecutive closure causes are received, the original disconnection cause is saved. (For instance: if a TCP FIN is received from remote and later a TCP RST because we continue to send data, FIN cause is saved and not overwritten) Note: also in case of **<closureType>**(**#SD**) set to 255, if the socket has not yet been closed by user after the escape	

	sequence, **#SLASTCLOSURE** indicates remote disconnection cause if it has been received. Note: in case of UDP, cause 2 indicates abnormal(local) disconnection. Cause 3 and 4 are still possible. (Cause 1 is obviously never possible) Note: in case of command mode connection and remote closure with subsequent inactivity timeout closure without retrieval of all available data(#SRECV or SRING mode 2), it is indicated cause 1 for both possible FIN and RST from remote.
AT#SLASTCLOSURE=?	Test command reports the supported range for parameter **<connId>**

#SRECV - Receive Data In Command Mode		SELINT 2

AT#SRECV=
<connId>,
<maxByte>,[<UDPInfo>]
	Execution command permits the user to read data arrived through a connected socket, but buffered and not yet read because the module entered **command mode** before reading them; the module is notified of these data by a **SRING** URC, whose presentation format depends on the last **#SCFGEXT** setting.
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	<maxByte> - max number of bytes to read
	  1..1500
	<UDPInfo>
	  0 – UDP information disabled (default)
	  1 – UDP information enabled: data are read just until the end of the UDP datagram and the response carries information about the remote IP address and port and about the remaining bytes in the datagram.
	AT#SRECV=<connId>,<maxBytes>,1
	#SRECV: <sourceIP>,<sourcePort><connId>,<recData>, <dataLeft>
	data
	
	Note: issuing **#SRECV** when there's no buffered data raises an error.	

AT#SRECV=?	Test command returns the range of supported values for parameters < connId > < maxByte > and <UDPInfo>	
Example	**SRING URC (<srMode> be 0, <dataMode> be 0)** *telling data have just come through connected socket identified by <connId>=1 and are now buffered* SRING: 1 *Read in text format the buffered data* AT#SRECV=1,15 #SRECV: 1,15 stringa di test OK *Or:* *if the received datagram, received from <IPaddr and <IPport> is of 60 bytes* AT#SRECV=1,15,1 #SRECV: <IPaddr>,<IPport>,1,15,45 stringa di test OK **SRING URC (<srMode> be 1, <dataMode> be 1)** *telling 15 bytes data have just come through connected socket identified by <connId>=2 and are now buffered* SRING: 2,15 *Read in hexadecimal format the buffered data* AT#SRECV=2,15 #SRECV: 2,15 737472696e67612064692074657374 OK *Or:* *if the received datagram, received from <IPaddr and <IPport> is of 60 bytes*	

#SRECV - Receive Data In Command Mode	SELINT 2
	AT#SRECV=2,15 #SRECV: \<IPaddr>,\<IPport>,2,15,45 737472696e67612064692074657374 OK **SRING URC (\<srMode> be 2, \<dataMode> be 0)** *displaying (in text format) 15 bytes data that have just come through connected socket identified by \<connId>=3; it's no necessary to issue #SRECV to read the data; no data remain in the buffer after this URC* SRING: 3,15, stringa di test

5.1.6.6.18   Send Data In Command Mode - #SSEND

#SSEND - Send Data In Command Mode		SELINT 2
AT#SSEND= \<connId>	Execution command permits, while the module is in **command mode,** to send data through a connected socket. Parameters: **\<connId>** - socket connection identifier 1..6 The device responds to the command with the prompt \<greater_than>\<space> and waits for the data to send. To complete the operation send **Ctrl-Z** char (**0x1A** hex); to exit without writing the message send **ESC** char (**0x1B** hex). If data are successfully sent, then the response is **OK**. If data sending fails for some reason, an error code is reported Note: the maximum number of bytes to send is 1500 bytes ; trying to send more data will cause the surplus to be discarded and lost. Note: it's possible to use **#SSEND** only if the connection was opened by **#SD**, else the ME is raising an error. Note: a byte corresponding to BS char(0x08) is treated with its corresponding meaning; therefore previous byte will be cancelled(and BS char itself will not be sent)	
AT#SSEND=?	Test command returns the range of supported values for parameter \< connId >	
Example	*Send data through socket number 2* *AT#SSEND=2* *>Test\<CTRL-Z>* *OK*	

#SSENDUDP – send UDP data to a specific remote host		SELINT 2
AT#SSENDUDP=<connId> ,<remoteIP>,<remotePort>	This command permits, while the module is in command mode, to send data over UDP to a specific remote host. UDP connection has to be previously completed with a first remote host through **#SLUDP** / **#SA**. Then, if we receive data from this or another host, we are able to send data to it. Like command **#SSEND**, the device responds with '> ' and waits for the data to send. Parameters: **<connId>** - socket connection identifier 1..6 **<remoteIP>** - IP address of the remote host in dotted decimal notation, string type: "xxx.xxx.xxx.xxx" **<remotePort>** - remote host port 1..65535 Note: after SRING that indicates incoming UDP data and issuing **#SRECV** to receive data itself, through **#SS** is possible to check last remote host (IP/Port). Note: if successive resume of the socket to online mode Is performed(**#SO**), connection with first remote host is restored as it was before.	
AT#SSENDUDP=?	Test command reports the supported range of values for parameters **<connId>**,**<remoteIP>** and **<remotePort>**	
Example	*Starts listening on <LocPort>(previous setting of firewall through #FRWL has to be done)* AT#SLUDP=1,1,<LocPort> OK SRING: 1 *// UDP data from a remote host available* AT#SA=1,1 OK SRING: 1 AT#SI=1 #SI: 1,0,0,23,0 *// 23 bytes to read* OK AT#SRECV=1,23 #SRECV:1,23 message from first host OK AT#SS=1 #SS: 1,2,<LocIP>,<LocPort>,<RemIP1>,<RemPort1>	

	OK
	AT#SSENDUDP=1,<RemIP1>,<RemPort1> >response to first host OK SRING: 1 // *UDP data from a remote host available* AT#SI=1 #SI: 1,22,23,24,0 // *24 bytes to read* OK AT#SRECV=1,24 #SRECV:1,24 message from second host OK AT#SS=1 #SS: 1,2,<LocIP>,<LocPort>,<RemIP2>,<RemPort2> OK *Remote host has changed, we want to send* *a reponse:* **AT#SSENDUDP=1,<RemIP2>,<RemPort2>** **>response to second host** **OK**

5.1.6.6.20   Send UDP data to a specific remote host extended #SSENDUDPEXT

#SSENDUDPEXT – send UDP data to a specific remote host extended		SELINT 2
AT#SSENDUDPEXT =<connId>,<bytestosend>, ,<remoteIP>,<remotePort>	This command permits, while the module is in command mode, to send data over UDP to a specific remote host including all possible octets(from 0x00 to 0xFF) As indicated about **#SSENDUDP**: UDP socket has to be previously opened through **#SLUDP** / **#SA**, then we are able to send data to different remote hosts Like **#SSENDEXT**, the device responds with the prompt '> ' and waits for the data to send, operation is automatically completed when **<bytestosend>** have been sent. Parameters: **<connId>** - socket connection identifier 1..6 **<bytestosend> -** number of bytes to be sent 1-1500 **<remoteIP>** - IP address of the remote host in dotted decimal notation, string type: "xxx.xxx.xxx.xxx" **<remotePort>** - remote host port 1..65535	
AT#SSENDUDPEXT=?	Test command reports the supported range of values for parameters **<connId>**,**<bytestosend>**,**<remoteIP>** and **<remotePort>**	

5.1.6.6.21 Send data in Command Mode extended - #SSENDEXT

#SSENDEXT - Send Data In Command Mode extended		SELINT 2

AT#SSENDEXT=
<connId>,
<bytestosend>
	Execution command permits, while the module is in **command mode,** to send data through a connected socket including all possible octets (from 0x00 to 0xFF).
	
	Parameters:
	<connId> - socket connection identifier
	  1..6
	< bytestosend > - number of bytes to be sent
	  Please refer to test command for range
	
	The device responds to the command with the prompt <greater_than><space> and waits for the data to send.
	When <bytestosend> bytes have been sent, operation is automatically completed.
	If data are successfully sent, then the response is **OK**.
	If data sending fails for some reason, an error code is reported.
	
	Note: it's possible to use **#SSENDEXT** only if the connection was opened by **#SD**, else the ME is raising an error.
	
	Note: all special characters are sent like a generic byte.
	(For instance: 0x08 is simply sent through the socket and don't behave like a BS, i.e. previous character is not deleted)	

AT#SSENDEXT=?	Test command returns the range of supported values for parameters < connId > and **<bytestosend>**	

Example	Open the socket in command mode:
	at#sd=1,0,<port>,"IP address",0,0,1
	OK
	
	Give the command specifying total number of bytes as second parameter:
	
	at#ssendext=1,256
	> .... ; // Terminal echo of bytes sent is displayed here
	OK
	
	All possible bytes(from 0x00 to 0xFF) are sent on the socket as generic bytes.	

5.1.6.6.22 IP Easy Authentication Type - #SGACTAUTH

#SGACTAUTH – Easy GRPS Authentication Type		SELINT 2

AT#SGACTAUTH=
<type>
	Set command sets the authentication type for IP Easy
	This command has effect on the authentication mode used on AT#SGACT
	
	Parameter
	<type>
	  0 - no authentication
	  1 - PAP authentication (factory default)
	  2 - CHAP authentication
	
	Note: the parameter is not saved in NWM	

AT#SGACTAUTH?	Read command reports the current IP Easy authentication type, in the format: **#SGACTAUTH: <type>**	
AT#SGACTAUTH =?	Test command returns the range of supported values for parameter **<type>**.	

#SGACTCFG - Context Activation and Configuration		SELINT 2
AT#SGACTCFG= **<cid>,** **<retry>,** **[,<delay >** **[,<urcmode >]]**	Execution command is used to enable or disable the automatic activation/reactivation of the context for the specified PDP context, to set the maximum number of attempts and to set the delay between an attempt and the next one. The context is activated automatically after every GPRS Attach or after a NW PDP CONTEXT deactivation if at least one IPEasy socket is configured to this context (see AT#SCFG). Parameters: **<cid>** - PDP context identifier (see **+CGDCONT** command) 1.. *max* - numeric parameter which specifies a particular PDP context definition. The value of *max* is returned by the Test command **<retry>** - numeric parameter which specifies the maximum number of context activation attempts in case of activation failure. The value belongs to the following range: 0 - 15 0 - disable the automatic activation/reactivation of the context (default) **<delay>** - numeric parameter which specifies the delay in seconds between an attempt and the next one. The value belongs to the following range: 180 - 3600 **< urcmode >** - URC presentation mode 0 - disable unsolicited result code (default) 1 - enable unsolicited result code, after an automatic activation/reactivation, of the local IP address obtained from the network. It has meaning only if **<auto>**=1. The unsolicited message is in the format: **#SGACT: <ip_address>** reporting the local IP address obtained from the network. Note: the URC presentation mode **<urcmode>** is related to the current AT instance only. Last **<urcmode>** setting is saved for every instance as extended profile parameter, thus it is possible to restore it even if the multiplexer control channel is released and set up, back and forth. Note: **< retry >** and **<delay>** setting are global parameter saved in NVM Note: if the automatic activation is enabled on a context, then it is not allowed to modify by the command AT#SCFG the association between the context itself and the socket connection identifier; all the other parameters of command AT#SCFG are modifiable while the socket is not connected		
AT#SGACTCFG?	Read command reports the state of all the contexts, in the format: **#SGACTCFG: <cid1>,<retry1>,<delay1>, < urcmode >CR><LF>** **…** **#SGACTCFG: <cid*max*>,<retry*max*>,<delay*max*>,< urcmode >** where: **<cid*n*>** - as **<cid>** before **<retry*n*>** - as **<retry>** before **<delay*n*>** - as **<delay>** before **< urcmode >** - as **< urcmode >** before		
AT#SGACTCFG=?	Test command reports supported range of values for parameters **<cid>**,**<retry>**,**<delay>**and **< urcmode >**		

5.1.6.6.24 Context activation and configuration extended - #SGACTCFGEXT

#SGACTCFGEXT - context activation configuration extended		SELINT 2
AT#SGACTCFGEXT= <cid>, <abortAttemptEnable> [,<unused> [,<unused> [,<unused>]]]	Execution command is used to enable new features related to context activation. Parameters: **<cid>** - PDP context identifier (see **+CGDCONT** command) 1.. *max* - numeric parameter which specifies a particular PDP context definition. The value of *max* is returned by the Test command **< abortAttemptEnable >** 0 – old behaviour: no abort possible while attempting context activation 1 – abort during context activation attempt is possible by sending a byte on the serial port. It takes effect on successive GPRS context activation attempt through #SGACT command in the following manner. While waiting for AT#SGACT=<cid>,1 response(up to 150 s) is possible to abort attempt by sending a byte and get back AT interface control(NO CARRIER indication). Note: If we receive delayed CTXT ACTIVATION ACCEPT after abort, network will be automatically informed of our aborted attempt through relative protocol messages(SM STATUS) and will also close on its side. Otherwise, if no ACCEPT is received after abort, network will be informed later of our PDP state through other protocol messages (routing area update for instance).	
AT#SGACTCFGEXT?	Read command reports the state of all the defined contexts, in the format: **#SGACTCFGEXT: <cid1>,< abortAttemptEnable1 >,0,0,0<CR><LF>** … **#SGACTCFGEXT:<cid*max*>,<abortAttemptEnable*max*>,0,0,0<CR><LF>** where: **<cid*n*>** - as **<cid>** before **< abortAttemptEnable *n*>** - as **< abortAttemptEnable >** before Note: values are automatically saved in NVM.	
AT#SGACTCFGEXT=?	Test command reports supported range of values for all parameters	

5.1.6.6.25 PAD command features - #PADCMD

#PADCMD – PAD command features		SELINT 2
AT#PADCMD=<mode>	This command sets features of the pending data flush to socket, opened with AT#SD command. Parameters: **<mode>:** Bit 1: 1 - enable forwarding; 0 – disable forwarding; Other bits reserved; Note: forwarding depends on character defined by AT#PADFWD	

#PADCMD – PAD command features		SELINT 2
AT#PADCMD?	Read command reports the state of all the five contexts, in the format: **#SGACTCFGEXT: <cid1>,< abortAttemptEnable1 >,0,0,0<CR><LF>** **…** **#SGACTCFGEXT: <cid5>,< abortAttemptEnable5 >,0,0,0<CR><LF>** where: **<cid*n*>** - as **<cid>** before **< abortAttemptEnable *n*>** - as **< abortAttemptEnable >** before Note: values are automatically saved in NVM.	
AT#PADCMD=?	Test command reports supported range of values for all parameters	

5.1.6.6.26   PAD forward character - #PADFWD

#PADCMD – PAD command features		SELINT 2
AT#PADFWD=<char> [,<mode>]	This command sets the char that immediately flushes pending data to socket, opened with AT#SD command. Parameters: **<char>:** a number, from 0 to 255, that specifies the asci code of the char used to flush data **<mode>:** flush mode, 0 – normal mode (default); 1 – reserved; Note: use AT#PADCMD to enable the socket char-flush activity.	
AT#PADFWD?	Read command reports the currently selected **<char>** and **<mode>** in the format: **#PADFWD: <char>,mode**	
AT#PADFWD=?	Test command reports the supported range of values for parameters **<char>** and **<mode>**.	

5.1.6.6.27   Base64 encoding/decoding of socket sent/received data - #BASE64

#BASE64 – Base64 encoding/decoding of socket sent/received data		SELINT 2
AT#BASE64= <connId>,<enc>,<dec> [,<unused_B > [,<unused_C >]]	Set command enables base64 encoding and/or decoding of data sent/received to/from the socket in online or in command mode. Parameters: <connId> - socket connection identifier 1..6 **<enc>** 0 – no encoding of data received from serial port. 1 - MIME RFC2045 base64 encoding of data received from serial port that have to be sent to <connId> socket. Note: as indicated from RFC2045 the encoded output stream is represented in lines of no more than 76 characters each. Lines are defined as sequences of octets separated by a CRLF sequence. 2 - RFC 3548 base64 encoding of data received from serial port that have to be sent to <connId> socket. Note: as indicated from RFC3548 CRLF have not to be added.	

	<dec> 0 – no decoding of data received from socket <connId>. 1 - MIME RFC2045 base64 decoding of data received from socket <connId> and sent to serial port. (Same rule as for <enc> regarding line feeds in the received file that has to be decoded) 2 - RFC3548 base64 decoding of data received from socket <connId> and sent to serial port. (Same rule as for <enc> regarding line feeds in the received file that has to be decoded) Note: it is possible to use command to change current <enc>/<dec> settings for a socket already opened in command mode or in online mode after suspending it. (In this last case obviously it is necessary to set AT#SKIPESC=1). Note: to use #BASE64 in command mode, if data to send exceed maximum value for #SSENDEXT command, they have to be divided in multiple parts. These parts have to be a multiple of 57 bytes, except for the last one, to distinguish EOF condition. (Base64 encoding rules) For the same reason if #SRECV command is used by the application to receive data, a multiple of 78 bytes has to be considered. Note: to use #SRECV to receive data with <dec> enabled, it is necessary to consider that: reading <maxByte> bytes from socket, user will get less due to decoding that is performed. Note: values are automatically saved in NVM.
AT#BASE64?	Read command returns the current <enc>/<dec> settings for all the six sockets, in the format: **#BASE64:<connId1><enc1>,<dec1>,0,0<CR><LF>** **. . .** **#BASE64:<connId6>,<enc6>,<dec6>,0,0<CR><LF>**
AT#BASE64=?	Test command returns the range of supported values for all the subparameters.

Example	AT#SKIPESC=1
	OK
	
	AT#SD=<connId>,<txProt>,<rPort>,<IPaddr>
	CONNECT
	//Data sent without modifications(default)
	………
	+++ (suspension)
	OK
	
	at#base64=<connId>,1,0
	OK
	
	AT#SO=<connId>
	CONNECT
	// Data received from serial port are encoded
	// base64 before to be sent on the socket
	………………

#BASE64 – Base64 encoding/decoding of socket sent/received data	SELINT 2

+++ (suspension)
OK
 	
at#base64=<connId>,0,1
OK
 	
AT#SO=<connId>
CONNECT
// Data received from socket are decoded
// base64 before to be sent on the serial port
+++ (suspension)
…………………	

5.1.6.7 SSL Commands

5.1.6.7.1 Open a socket SSL to a remote server - #SSLD

#SSLD – Opens a socket SSL to a remote server		SELINT 2
AT#SSLD=<SSId>, <rPort>,<IPAddress>, <ClosureType>[, <connMode>[, <Timeout>]]	Execution command opens a remote connection via socket secured through SSL. Both command and online modes can be used. In the first case 'OK' is printed on success, and data exchange can be performed by means of #SSLSEND and #SSLRECV commands. In online mode 'CONNECT' message is printed, and data can be sent/received directly to/by the serial port. Communication can be suspended by issuing the escape sequence (by default +++) and restored with #SSLO command.	
	Parameters: **<SSId>** - Secure Socket Identifier 1 - Until now SSL block manage only one socket	
	<rPort> - Remote TCP port to contact 1..65535	
	<IPAddress> - address of the remote host, string type. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" any host name to be solved with a DNS query	
	<ClosureType> - 0 – only value 0 supported	
	<connMode> - connection mode 0 – online mode connection. 1 – command mode connection (factory default).	
	<Timeout> - time-out in 100 ms units. It represents the maximum allowed TCP inter-packet delay. It means that, when more data is expected during the handshake, the module awaits <Timeout> * 100 msecs for the next packet. If no more data can be read, the module gives up the handshake and raises an ERROR response.	
	Note: IT'S NOT the total handshake timeout or, in other words, it's not the absolute maximum time between the #SSLD issue and the CONNECT/OK/ERROR response. Though by changing this parameter you can limit the handshake duration (for example in case of congested network or busy server), there's no way to be sure to get the command response within a certain amount of time, because it depends on the TCP connection time, the handshake time and the computation time (which depends on the authentication mode and on the size of keys and certificates). 10..5000 - hundreds of ms (factory default is 100)	
	Note: if secure socket is not enabled using AT#SSLEN only test requests can be made.	
	Note: if timeout is not set for SSL connection the default timeout value, set by AT#SSLCFG, is used.	
	Note: in online mode the socket is closed after an inactivity period (configurable with #SSLCFG, with a default value of 90 seconds), and the 'NO CARRIER' message is printed.	

#SSLD – Opens a socket SSL to a remote server		SELINT 2
	Note: in online mode data are transmitted as soon as the data packet size is reached or as after a transmission timeout. Both these parameters are configurable by using #SSLCFG. Note: if there are input data arrived through a connected socket and not yet read because the module entered command mode before reading them (after an escape sequence or after #SSLD has been issued with <connMode> set to command mode connection), these data are buffered and we receive the SSLSRING URC (if any of its presentation formats have been enabled by means the #SSLCFG command); it's possible to read these data afterwards issuing #SSLRECV. Under the same hypotheses it's possible to send data while in command mode issuing #SSLSEND. Note: Before opening a SSL connection the GPRS context must have been activated by AT#SGACT=x,1. Note: Before opening a SSL connection, make sure to have stored the needed secure data (CA certificate), using AT#SSLSECDATA. Note: in case of CA Certificate already stored(for instance: SUPL), it could be possible to avoid #SSLSECDATA command. .	
AT#SSLD=?	Test command returns the range of supported values for all the parameters: **#SSLD: (1),(1-65535),,(0),(0,1),(10-5000)** .	

5.1.6.7.2　　Enable a SSL socket - #SSLEN

#SSLEN – Enable a SSL socket		SELINT 2
AT#SSLEN=<SSId>, <Enable>	This command enables a socket secured by SSL Parameters: **<SSId>** - Secure Socket Identifier 1 – Until now SSL block manages only one socket **<Enable>** 0 – deactivate secure socket [default] 1 – activate secure socket Note: if secure socket is not enabled only test requests can be made for every SSL command except #SSLS (SSL status) which can be issued also if the socket is disabled. Read commands can be issued if at least a <SSId> is enabled. Note: these values are automatically saved in NVM. Note: a SSL socket cannot be disabled by issuing #SSLEN=1,0 if it is connected.	
AT#SSLEN?	Read command reports the currently enable status of secure socket in the format: **#SSLEN: <SSId>,<Enable><CR><LF>** **<CR><LF>**	

	OK
AT#SSLEN=?	Test command returns the range of supported values for all the parameters: **#SSLEN: (1),(0,1)**

5.1.6.7.3 Close a SSL socket - #SSLH

#SSLH – Close a SSL socket	SELINT 2

AT#SSLH=<SSId>[, <ClosureType>]	This command allows closing the SSL connection. Parameters: **<SSId>** - Secure Socket Identifier 1 - Until now SSL block manage only one socket. **< ClosureType >:** 0 – only value 0 is supported Note: if secure socket is not enabled using **AT#SSLEN** only test requests can be made.
AT#SSLH=?	Test command returns the range of supported values for all the parameters: **#SSLH: (1),(0)**

5.1.6.7.4 Restore a SSL socket after a +++ - #SSLO

#SSLO – Restore a SSL socket after a +++	SELINT 2

AT#SSLO=<SSId>	This command allows to restore a SSL connection (online mode) suspended by an escape sequence (+++). After the connection restore, the **CONNECT** message is printed. Please note that this is possible even if the connection has been started in command mode (#SSLD with <connMode> parameter set to 1). Parameters: **<SSId>** - Secure Socket Identifier 1 - Until now SSL block manage only one socket. Note: if secure socket is not enabled using **AT#SSLEN** only test requests can be made. - Note: Before opening a SSL connection the GPRS context must have been activated by **AT#SGACT=X,1**. - - Note: if an error occur during reconnection the socket can not be reconnected then a new connection has to be done.
AT#SSLO=?	Test command returns the range of supported values for all the parameters: **#SSLO: (1)**

5.1.6.7.5   Read Data from a SSL socket - #SSLRECV

#SSLRECV – Read data from a SSL socket		SELINT 2

AT#SSLRECV=<SSId>, <MaxNumByte> [,<TimeOut>]	This command allows receiving data arrived through a connected secure socket, but buffered and not yet read because the module entered command mode before reading them. The module can be notified of these data by a SSLSRING URC, which enabling and presentation format depends on last #SSLCFG setting.
	
	Parameters:
	<SSId> - Secure Socket Identifier
	  1 - Until now SSL block manage only one socket.
	
	<MaxNumByte> - max number of bytes to read
	  1..1000
	
	< Timeout > - time-out in 100 ms units
	  1..5000 - hundreds of ms (factory default is 100)
	
	If no data are received the device respondes:
	#SSLRECV: 0<CR><LF>
	TIMEOUT<CR><LF>
	<CR><LF>
	OK
	
	If the remote host closes the connection the device respondes:
	#SSLRECV: 0<CR><LF>
	DISCONNECTED<CR><LF>
	<CR><LF>
	OK
	
	If data are received the device respondes:
	#SSLRECV: NumByteRead<CR><LF>
	...(Data read)... <CR><LF>
	<CR><LF>
	OK
	
	Note: if secure socket is not enabled using AT#SSLEN only test requests can be made.
	
	Note: if timeout is not set for SSL connection the default timeout value, set through AT#SSLCFG, is used.
	
	Note: before receiving data from the SSL connection it has to be established using AT#SSLD	

AT#SSLRECV=?	Test command returns the range of supported values for all the parameters: **#SSLRECV: (1),(1-1000),(10-5000)**	

5.1.6.7.6   Report the status of a SSL socket - #SSLS

#SSLS – Report the status of a SSL socket		SELINT 2
AT#SSLS=<SSId>	This command reports the status of secure sockets. Parameters: **<SSId>** - Secure Socket Identifier 1 - Until now SSL block manages only one socket	

#SSLS – Report the status of a SSL socket		SELINT 2

	If secure socket is connected the device responds to the command:
	
	#SSLS: <SSId>,2,<CipherSuite>
	
	otherwise:
	#SSLS: <SSId>,<ConnectionStatus>
	
	Where **<CipherSuite>** can be as follows:
	
	0 - unknown
	1 - TLS_RSA_WITH_RC4_128_MD5
	2 - TLS_RSA_WITH_RC4_128_SHA
	3 - TLS_RSA_WITH_AES_128_CBC_SHA
	4 - TLS_RSA_WITH_NULL_MD5
	5 - TLS_RSA_WITH_AES_256_CBC_SHA
	N - RFC value + 100
	
	Note: for all other(i.e.: N) possible values,
	<CipherSuite> is RFC value + 100
	
	otherwise:
	
	#SSLS: <SSId>,<ConnectionStatus>
	
	<ConnectionStatus> available values are:
	  0 – Socket Disabled
	  1 – Connection closed
	  2 – Connection open
	
	Note: this command can be issued even if the <SSId> is not enabled.	

AT#SSLS=?	Test command returns the range of supported values for all the parameters. **#SSLS: (1)**	

5.1.6.7.7   Manage the security data - #SSLSECDATA

#SSLSECDATA – Manage the security data		SELINT 2

AT#SSLSECDATA
=<SSId>,<Action>,
<DataType>[,<Size>]
	This command allows to store, delete and read security data (Certificate, CAcertificate, private key) into NVM.
	
	Parameters:
	<SSId> - Secure Socket Identifier
	  1 - Until now SSL block manages only one socket.
	
	<Action> - Action to do.
	  0 – Delete data from NVM.
	  1 – Store data into NVM.
	  2 – Read data from NVM .
	
	<DataType>
	   0 – Certificate
	  1 – CA certificate
	  2 - RSA Private key	

#SSLSECDATA – Manage the security data	SELINT 2

<table>
<tr><td></td><td>

<Size> - Size of security data to be stored
  1..4000

   - If the **<Action> parameter** is 1 (store data into NVM) the device responds to the command with the prompt '>' and waits for the data to store.
   -

Note: secured data have to be in PEM or in DER format, depending on **< cert_format >** chosen with **#SSLSECCFG**.
If no **< cert_format>** has been specified with **#SSLSECCFG**, PEM format is assumed.

PEM format(see **#SSLSECCFG** command):To complete the operation send Ctrl-Z char (0x1A hex); to exit without writing the message send ESC char (0x1B hex).
DER format(see **#SSLSECCFG** command)::
When <size> bytes are entered, the certificate is automatically stored. ESC or Ctrl-Z don't take effect, because they are considered as possible octets contained in the certificate.

If data are successfully stored, then the response is OK; if it fails for some reason, an error code is reported.

If the **<Action>** parameter is 2 (read data from NVM), data specified by **<DataType>** parameter is shown in the following format:
#SSLSECDATA: <connId>,<DataType>
<DATA>

OK

If **<DataType>** data has not been stored (or it has been deleted) the response has the following format:
#SSLSECDATA: <connId>,<DataType>
No data stored

OK

Note: **<size>** parameter is mandatory if the <write> action is issued, but it has to be omitted for <delete> or <read> actions are issued.

Note: if secure socket is not enabled using **AT#SSLEN** only test requests can be made.

Note: If socket is connected an error code is reported.

Note: in case of CA Certificate already stored(for instance: SUPL), it could be possible to avoid **#SSLSECDATA** command.

</td></tr>
<tr><td>

AT#SSLSECDATA?

</td><td>

Read command reports what security data are stored in the format:

#SSLSECDATA: <SSId 1>,<CertIsSet>,<CAcertIsSet>,<PrivKeyIsSet>

<CertIsSet>, <CAcertIsSet>, <PrivKeyIsset> are 1 if related data are stored into NVM otherwise 0.

</td></tr>
<tr><td>

AT#SSLSECDATA=?

</td><td>

Test command returns the range of supported values for all the parameters:

#SSLSECDATA: (1),(0-2), ,(0-2),(1-4000)

</td></tr>
</table>

#SSLSECDATA – Manage the security data		SELINT 2

5.1.6.7.8   Send data through a SSL socket - #SSLSEND

#SSLSEND – Send data through a SSL socket		SELINT 2

AT#SSLSEND=<SSId>[,< Timeout >]	This command allows sending data through a secure socket.
	
	Parameters:
	<SSId> - Secure Socket Identifier
	  1 - Until now SSL block manage only one socket.
	
	< Timeout > - socket send timeout, in 100 ms units.
	  1..5000 - hundreds of ms (factory default is 100)
	
	The device responds to the command with the prompt '>' and waits for the data to send.
	To complete the operation send Ctrl-Z char (0x1A hex); to exit without writing the message send ESC char (0x1B hex).
	
	If data are successfully sent, then the response is OK.
	If data sending fails for some reason, an error code is reported
	
	Note: the maximum number of bytes to send is 1023; trying to send more data will cause the surplus to be discarded and lost.
	
	Note: if secure socket is not enabled using **AT#SSLEN** only test requests can be made.
	
	Note: if timeout is not set for SSL connection the default timeout value, set by **AT#SSLCFG,** is used.
	
	Note: Before sending data through the SSL connection it has to be established using **AT#SSLD**.

AT#SSLSEND=?	Test command returns the range of supported values for all the parameters: **#SSLSEND: (1),(1-5000)**

5.1.6.7.9   Send data through a secure sockect in Command Mode - #SSLSENDEXT

#SSLSENDEXT – Send data through a secure socket in Command Mode extended		SELINT 2

AT#SSLSENDEXT= <SSId>,<bytestosend>[, <Timeout>]	This command allows sending data through a secure socket.
	
	Parameters:
	<SSId> - Secure Socket Identifier
	  1 - Until now SSL block manage only one socket.
	
	<bytestosend> - number of bytes to be sent
	Please refer to test command for range
	
	<Timeout> - time-out in 100 ms units
	  1..5000 - hundreds of ms (factory default is 100)
	
	The device responds to the command with the prompt '>' <greater_than><space> and waits for the data to send.
	When **<bytestosend>** bytes have been sent, operation is automatically completed.
	If data are successfully sent, then the response is **OK**.

#SSLSENDEXT – Send data through a secure socket in Command Mode extended		SELINT 2
	If data sending fails for some reason, an error code is reported. Note: if secure socket is not enabled using **AT#SSLEN** only test requests can be made. Note: if timeout is not set for SSL connection the default timeout value, set by **AT#SSLCFG,** is used. - Note: Before sending data through the SSL connection it has to be established using **AT#SSLD.** - - Note: all special characters are sent like a generic byte. (For instance: 0x08 is simply sent through the socket and don't behave like a BS, i.e. previous character is not deleted).	
AT#SSLSENDEXT=?	Test command returns the range of supported values for parameters **<SSId>** , **<bytestosend>** and **<Timeout>**. **#SSLSENDEXT: (1),(1-1500),(1-5000)**	
Example	Open the socket in command mode: at#ssld=1,443,<port>,"IP address",0,1 OK Give the command specifying total number of bytes as second parameter: at#sslsendext=1,256,100	

5.1.6.7.10   Configure security parameters of a SSL socket - #SSLSECCFG

#SSLSECCFG – Configure security parameters of a SSL socket		SELINT 2

AT#SSLSECCFG=
 <SSId>,
 <CipherSuite>,
 <auth_mode>
 [,<cert_format>]
	This command allows configuring SSL connection parameters.
	
	 Parameters:
	 <SSId> - Secure Socket Identifier
	   1 - Until now SSL block manage only one socket
	
	 <CipherSuite>
	   0 - Chiper Suite is chosen by remote Server [default]
	   1 - TLS_RSA_WITH_RC4_128_MD5
	   2 - TLS_RSA_WITH_RC4_128_SHA
	   3 - TLS_RSA_WITH_AES_128_CBC_SHA
	   4 - TLS_RSA_WITH_NULL_SHA
	   5 - TLS_RSA_WITH_AES_256_CBC_SHA
	
	 Note: when o value is chosen, cipher suites supported are indicated to the server within TLS handshake (i.e.: client hello) as follows:
	
	 TLS_RSA_WITH_AES_256_CBC_SHA
	 TLS_RSA_WITH_AES_128_CBC_SHA
	 TLS_RSA_WITH_RC4_128_SHA
	 TLS_RSA_WITH_RC4_128_MD5
	
	 Note: TLS_RSA_WITH_NULL_SHA is not included as default(0), but it is possible to set it(4) if required.
	
	 <auth_mode>
	 0 – SSL Verify None[default]
	 1 – Manage server authentication
	 2 – Manage server and client authentication if requested by the remote server	

#SSLSECCFG – Configure security parameters of a SSL socket		SELINT 2
	<cert_format> is an optional parameter. It selects the format of the certificate to be stored via **#SSLSECDATA** command 0 - DER format 1 - PEM format[default] Note - it is supposed that the module is just powered on and the **AT#SSLSECCFG** command is entered without **<cert_format>** parameter, the default format is PEM. In this case the **AT#SSLSECCFG?** read command doesn't return the setting of the format in order to meet retro compatibility with other families. Now, let's assume that **AT#SSLSECCFG** command is entered again, but using the **<cert_format>** parameter for the first time: if the read command is entered, it reports the parameter value just used. If subsequently the **<cert_format>** is omitted, the **AT#SSLSECCFG?** read command reports the parameter value entered the last time. Note: Server CAcertificate has to be stored through **AT#SSLSECDATA**. Note: if secure socket is not enabled using **#SSLEN** only test requests can be made. Read command can be issued if at least a **<SSId>** is enabled. Note: these values are automatically saved in NVM.	
AT#SSLSECCFG?	Read command reports the currently selected parameters in the format: **#SSLSECCFG:** **<SSId1>,<CipherSuite>,<auth_mode>[,<cert_format>]**	
AT#SSLSECCFG=?	Test command returns the range of supported values for all the parameters.	

5.1.6.7.11 Configure additional parameters of a SSL socket - #SSLSECCFG2

#SSLSECCFG2 – Configure additional parameters of a SSL socket		SELINT 2
AT#SSLSECCFG2= <SSId>, <version> [,<unused_A> [,<unused_B> [,<unused_C> [,<unused_D>]]]]	This command allows configuring additional SSL connection parameters. Parameters: **<SSId> -** Secure Socket Identifier 1 – Until now SSL block manage only one socket **<version> -** SSL/TLS protocol version (default is 1, i.e.: TLSv1.0) 0 – protocol version SSLv3 1 – protocol version TLSv1.0 2 – protocol version TLSv1.1 3 – protocol version TLSv1.2 Note: parameter is automatically saved in NVM	
AT#SSLSECCFG2?	Read command reports the currently selected parameters in the format: **#SSLSECCFG2: <SSId>,<version>,0,0,0,0**	
AT#SSLSECCFG2=?	Test command reports the range of supported values for all the parameters	

#SSLSECCFG2 – Configure additional parameters of a SSL socket	SELINT 2

5.1.6.7.12 Configure general parameters of a SSL socket - #SSLCFG

#SSLCFG – Configure general parameters of a SSL socket		SELINT 2

AT#SSLCFG=<SSId>, <cid>,<pktSz>, <maxTo>, <defTo>,<txTo>[, <sslSRingMode >[, <noCarrierMode >[, <UNUSED_1>[, <UNUSED_2>]]]]	This command allows configuring SSL connection parameters.
	
	Parameters:
	<SSId> - Secure Socket Identifier
	  1 - Until now SSL block manages only one socket
	
	<cid> - PDP Context Identifier. Dummy.
	  The PDP context used by SSL is specified in AT#PROTOCOLCFG (see)
	
	<pktSz> - packet size to be used by the SSL/TCP/IP stack for data sending.
	0 - select automatically default value (300).
	1..1500 - packet size in bytes.
	
	<maxTo> - exchange timeout (or socket inactivity timeout); in online mode, if there's no data exchange within this timeout period the connection is closed.
	0 - no timeout
	1..65535 - timeout value in seconds (default 90 s.)
	
	<defTo> - Timeout that will be used by default whenever the corresponding parameter of each command is not set.
	  10…5000 - Timeout in tenth of seconds (default 100).
	
	<txTo> - data sending timeout; in online mode after this period data are sent also if they're less than max packet size.
	0 - no timeout
	1..255 - timeout value in hundreds of milliseconds (default 50).
	
	<sslSRingMode> - sslSRing unsolicited mode.
	0 – SSLSRING disabled
	1 – SSLSRING enabled in the format
	  SSLSRING: <SSId>,<recData>
	where <SSId> is the secure socket identifier and <recData> is the amount of data received and decoded by the SSL socket.
	A new unsolicited is sent whenever the amount of data ready to be read changes. Only a record is decoded at once so, any further record is received and decoded only after the first have been read by the user by means of the **#SSLRECV** command.
	2 – SSLSRING enabled in the format
	  SSLSRING: <SSId>,<dataLen>,<data>
	where <SSId> is the secure socket identifier, <dataLen> is the length of the current chunk of data (the minimum value between the available bytes and 1300) and <data> is data received (<dataLen> bytes) displayed in ASCII format.
	
	<noCarrierMode> - this parameter permits to choose NO CARRIER indication format when the secure socket is closed as follows:
	
	0 – **NO CARRIER**
	(default)
	Indication is sent as usual, without additional information

#SSLCFG – Configure general parameters of a SSL socket		SELINT 2
	1 – **NO CARRIER:SSL,<SSId>** Indication of current **<SSId>** secure socket connection is added. The fixed "SSL" string allows the user to distinguish secure sockets from TCP sockets 2 – **NO CARRIER:SSL,<SSId>,<cause>** Indication of current **<SSId>** secure socket connection and closure **<cause>** are added. Following the possible **<cause>** values are listed: 0 – not available (secure socket has not yet been closed 1 – the remote TCP connection has been closed (RST, or any fatal error in send/recv are all included within this case) 2 – socket inactivity timeout 3 – network deactivation (PDP context deactivation from network) 4 – SSL "Close Notify Alert" message has been received 5 – the remote TCP connection has been closed(FIN) after all data have been retrieved from socket 6 – Closure due to any other SSL alert different from the previous ones. Note: if secure socket is not enabled using **#SSLEN** only test requests can be made. Read command can be issued if at least a <SSId> is enabled. Note: these parameters cannot be changed if the secure socket is connected. Note: these values are automatically saved in NVM	
AT#SSLCFG?	Read command reports the currently selected parameters in the format: **#SSLCFG: <SSId1>,<cid>,<pktSz>,<maxTo>,<defTo><txTo>,<sslSRingMode> ,<noCarrierMode>,0,0**	
AT#SSLCFG=?	Test command returns the range of supported values for all the parameters. **#SSLCFG: (1),(1),(0-1500),(0-65535),(10-5000),(0-255),(0),(0),(0),(0)**	

5.1.6.7.13   Configure application SSL parameters - #APPSSLCFG

#APPSSLCFG - Configure application SSL parameters		SELINT 2
AT#APPSSLCFG= <appName> [,<CipherSuite>, <SecLevel>, <TLSVer>]	This command allows the configuration of the security parameters of the applications supported by the module. It also allows the addition, the configuration and the deletion of the same set of SSL parameters used by custom applications from AppZone. Configuration of existing applications and addition of new ones are done by specifying all the parameters. Deletion of custom entries are performed by sending only **<appName>** parameter. **<appName>** - A string containing the name of the application which SSL parameters need to be configured. **Configuration:** if the string matches an entry already present in the applications list, and all the parameters of the command are defined, the corresponding	

#APPSSLCFG - Configure application SSL parameters	SELINT 2

	security parameters will be changed. The string comparison is case insensitive. **Addition:** if the string is not present in the current list of applications, a new entry is created. The application name can contain only alphanumeric parameters, stored in upper case, and the maximum allowed length is 8. All the parameters are mandatory. **Deletion:** if the string matches an entry already present in the applications list and only this parameter is set, the corresponding entry is deleted. Note: <u>five</u> slots are totally available for applications parameters. Any attempt to add further entries raises an error. Note: native applications cannot be deleted. Any attempt to delete them raises an error. **<CipherSuite>** - Cipher suite used in the secure connection (default may be different for any native application) 0 - Cipher Suite is chosen by remote Server 1 - TLS_RSA_WITH_RC4_128_MD5 2 - TLS_RSA_WITH_RC4_128_SHA 3 - TLS_RSA_WITH_AES_128_CBC_SHA 4 - TLS_RSA_WITH_NULL_SHA 5 - TLS_RSA_WITH_AES_256_CBC_SHA **<SecLevel>** - Security level (default may be different for any native application) 0 – SSL Verify None 1 – Manage server authentication **<TLSVer>** - SSL/TLS protocol version used by the current application (default may be different for any native application) 0 – protocol version SSLv3 1 – protocol version TLSv1.0 2 – protocol version TLSv1.1 3 – protocol version TLSv1.2
AT#APPSSLCFG?	Read command reports the currently selected parameters for each configured application in the format: **#APPSSLCFG: "app 1",<CipherSuite 1>,<SecLevel 1>,<TLSVer N>** … **#APPSSLCFG: "app N",<CipherSuite N>,<SecLevel N>,<TLSVer N>**
AT#APPSSLCFG=?	Test command returns the range of supported values for all the parameters. Depending on the number of applications defined, the **<appName>** parameter range has two different formats: it shows either the list of all defined application names, if the memory is full, or the maximum permitted length for any new application name (8), if the memory is not full.

#SSLI – Secure Socket Info		SELINT 2
AT#SSLI[=<SSId>]	Execution command is used to get information about secure socket data traffic. Parameters: **<SSId>** - Secure Socket Identifier 1 - Until now SSL block manages only one socket The response format is: **#SSLI:** **<SSId>,<DataSent>,<DataRecv>,<PendingData>,<TCPConnWaitingAck>** where: **<SSId>** - secure socket connection identifier, as before **<DataSent> -** total amount(in bytes) of data sent to the TLS/SSL connection since the beginning of the connection itself (obviously: not yet encoded into TLS/SSL record) **<DataRecv> -** total number of bytes received from the TLS/SSL connection since the beginning of the connection itself (obviously: already decoded from TLS/SSL record) **<PendingData> -** number of bytes available to be read from the TLS/SSL record that is currently being processed (obviously: already decoded from TLS/SSL record) **<TCPConnWaitingAck> -** indication of the underlying TCP socket condition, if there are TCP/IP packets sent but not yet acknowledged or not 0 – no TCP/IP packets sent waiting for ack 1 – yes TCP/IP packets sent waiting for ack	
AT#SSLI=?	Test command returns the range of supported values for all the parameters. **#SSLI: (1)**	

5.1.6.8 FTP AT Commands

5.1.6.8.1 FTP Time-Out - #FTPTO

#FTPTO - FTP Time-Out		SELINT 2
AT#FTPTO= [<tout>]	Set command sets the time-out used when opening either the FTP control channel or the FTP traffic channel. Parameter: **<tout>** - time-out in 100 ms units 100..5000 - hundreds of ms (factory default is 100) Note: The parameter is not saved in NVM.	
AT#FTPTO?	Read command returns the current FTP operations time-out, in the format: **#FTPTO: <tout>**	
AT#FTPTO=?	Test command returns the range of supported values for parameter **<tout>**	

5.1.6.8.2 FTP Open - #FTPOPEN

#FTPOPEN - FTP Open		SELINT 2

AT#FTPOPEN= [<server:port>, <username>, <password>[, <mode>]]	Execution command opens an FTP connection toward the FTP server.
	
	Parameters:
	<server:port> - string type, address and port of FTP server (factory default port 21).
	<username> - string type, authentication user identification string for FTP.
	<password> - string type, authentication password for FTP.
	<mode>
	  0 - active mode (factory default)
	  1 - passive mode
	
	Note: Before opening an FTP connection the PDP context (or GSM context) must have been activated by **AT#SGACT=x,1** command. The context 'x' is the one used by FTP, as specified in AT#PROTOCOLCFG (see).	

AT#FTPOPEN=?	Test command returns the **OK** result code.	

5.1.6.8.3 FTP Close - #FTPCLOSE

#FTPCLOSE - FTP Close		SELINT 2
AT#FTPCLOSE	Execution command closes an FTP connection.	
AT#FTPCLOSE=?	Test command returns the **OK** result code.	

#FTPCFG – description	SELINT 2
AT#FTPCFG=<tout>,<IPPignoring>[,<FTPSEn>]	<tout> - time-out in 100 ms units 100..5000 - hundreds of ms (factory default is 100) Set command sets the time-out used when opening either the FTP control channel or the FTP traffic channel. Note: The parameter is not saved in NVM. **<IPPignoring>** 0: No IP Private ignoring. During a FTP passive mode connection client uses the IP address received from server, even if it is a private IPV4 address. 1: IP Private ignoring enabled. During a FTP passive mode connection if the server sends a private IPV4 address the client doesn't consider this and connects with server using the IP address used in AT#FTPOPEN. **[,<FTPSEn>]** 0 – Disable FTPS security: all FTP commands will perform plain FTP connections. 1 – Enable FTPS security: from now on any FTP session opened through FTP commands will be compliant to FTPS protocol, providing authentication and encrypted communication. Note: in FTPS mode, FTP commands response time is generally bigger than in normal FTP mode. This latency is mainly due to the SSL handshake that has to be done at the opening of the FTP session (#FTPOPEN) and whenever a data exchange is required (#FTPPUT, #FTPGET etcetera). - Note: FTP security cannot be enabled if an SSL socket has been activated by means of #SSLD or #SSLFASTD. Moreover, trying to dial an SSL socket when **<enable>**=1 raises an error. - - Note: any **<enable>** change is forbidden during an open FTP connection (with or without security). Furthermore, SSL configuration settings are forbidden during FTPS connections
AT#FTPCFG?	Read command reports the currently selected parameters in the format: **#FTPCFG: <tout>,<IPPignoring>,<FTPSEn>**
AT+FTPCFG=?	Test command reports the supported range of values for parameter(s) **<tout>,<IPPignoring> and <FTPSEn>**

5.1.6.8.5　　　FTP Put - #FTPPUT

#FTPPUT - FTP Put		SELINT 2
AT#FTPPUT= [[<filename>], [<connMode>]]	Execution command, issued during an FTP connection, opens a data connection and starts sending **<filename>** file to the FTP server. If the data connection succeeds, a **CONNECT** indication is sent. afterward a NO CARRIER indication is sent when the socket is closed. Note: if we set **<connMode>** to 1, the data connection is openedand we remain in command mode and we see the result code **OK** (instead of **CONNECT**) Parameters: **<filename>** - string type, name of the file (maximum length 200 characters) **<connMode>** 0 - online mode 1 – command mode Note: use the escape sequence **+++** to close the data connection. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.	
AT#FTPPUT=?	Test command reports the maximum length of **<filename>** and the supported range of values of **<connMode>**. The format is: **#FTPPUT: <length>, (list of supported <connMode>s)** 　　where: 　　**<length>** - integer type value indicating the maximum length of **<filename>**	

5.1.6.8.6　　　FTP Get - #FTPGET

#FTPGET - FTP Get		SELINT 2
AT#FTPGET= [<filename>]	Execution command, issued during an FTP connection, opens a data connection and starts getting a file from the FTP server. If the data connection succeeds a **CONNECT** indication is sent. The file is received on the serial port. Parameter: **<filename>** - file name, string type. Note: The command causes an **ERROR** result code to be returned in case no FTP connection has been opened yet. Note: Command closure should always be handled by application. In order to avoid download stall situations a timeout should be implemented by the application.	
AT#FTPGET=?	Test command returns the OK result code.	

5.1.6.8.7   FTP GET in command mode - #FTPGETPKT

#FTPGETPKT - FTP Get in command mode		SELINT 2

AT#FTPGETPKT=
 <filename>
 [,<viewMode>]
	Execution command, issued during an FTP connection, opens a data connection and starts getting a file from the FTP server while remaining in **command mode**.
	
	 The data port is opened and we remain in **command mode** and we see the result code **OK**.
	 Retrieval from FTP server of "remotefile" is started, but data are only buffered in the module.
	 It's possible to read data afterwards issuing #FTPRECV command
	
	 Parameters:
	 <filename> - file name, string type. (maximum length: 200 characters).
	 <viewMode> - permit to choose view mode
	 (text format or Hexadecimal)
	    0 – text format (default)
	    1 – hexadecimal format
	
	 Note: The command causes an **ERROR** result code to be returned in case no FTP connection has been opened yet.
	
	 Note: Command closure should always be handled by application. In order to avoid download stall situations a timeout should be implemented by the application.	

AT#FTPGETPKT?	Read command reports current download state for <filename> with <viewMode> chosen, in the format: #FTPGETPKT: <remotefile>,<viewMode>,<eof> <eof> 0 = file currently being transferred 1 = complete file has been transferred to FTP client	
AT#FTPGETPKT=?	Test command returns the OK result code.	

5.1.6.8.8   FTP Type - #FTPTYPE

#FTPTYPE - FTP Type		SELINT 2

AT#FTPTYPE=
 [<type>]
	Set command, issued during an FTP connection, sets the file transfer type.
	
	 Parameter:
	 <type> - file transfer type:
	  0 - binary
	  1 - ascii
	
	 Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.	

#FTPTYPE?	Read command returns the current file transfer type, in the format: **#FTPTYPE: <type>**	
#FTPTYPE=?	Test command returns the range of available values for parameter **<type>**: **#FTPTYPE: (0,1)**	

5.1.6.8.9 FTP Read Message - #FTPMSG

#FTPMSG - FTP Read Message		SELINT 2
AT#FTPMSG	Execution command returns the last response from the server.	
AT#FTPMSG=?	Test command returns the **OK** result code.	

5.1.6.8.10 FTP Delete - #FTPDELE

#FTPDELE - FTP Delete		SELINT 2
AT#FTPDELE= [<filename>]	Execution command, issued during an FTP connection, deletes a file from the remote working directory. Parameter: **<filename>** - string type, it's the name of the file to delete. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet. Note: In case of delayed server response, it is necessary to check if ERROR indication is temporary due to timing out while waiting. In this case #FTPMSG response will result temporary empty. (Checking later #FTPMSG response will match with delayed server response)	
AT#FTPDELE=?	Test command returns the **OK** result code.	

5.1.6.8.11 FTP Print Working Directory - #FTPPWD

#FTPPWD - FTP Print Working Directory		SELINT 2
AT#FTPPWD	Execution command, issued during an FTP connection, shows the current working directory on FTP server. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.	
AT#FTPPWD=?	Test command returns the **OK** result code.	

5.1.6.8.12 FTP Change Working Directory - #FTPCWD

#FTPCWD - FTP Change Working Directory		SELINT 2
AT#FTPCWD= [<dirname>]	Execution command, issued during an FTP connection, changes the working directory on FTP server. Parameter: **<dirname>** - string type, it's the name of the new working directory. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.	
AT#FTPCWD=?	Test command returns the **OK** result code.	

5.1.6.8.13   FTP List - #FTPLIST

#FTPLIST - FTP List		SELINT 2
AT#FTPLIST[= [<name>]]	Execution command, issued during an FTP connection, opens a data connection and starts getting from the server the list of contents of the specified directory or the properties of the specified file. Parameter: <name> - string type, it's the name of the directory or file. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet. Note: issuing **AT#FTPLIST<CR>** opens a data connection and starts getting from the server the list of contents of the working directory.	
AT#FTPLIST=?	Test command returns the **OK** result code.	

5.1.6.8.14   Get file size - #FTPFSIZE

#FTPFSIZE – Get file size from FTP server		SELINT 2
AT#FTPFSIZE= <filename>	Execution command, issued during an FTP connection, permits to get file size of <filename> file. Note: FTPTYPE=0 command has to be issued before FTPFSIZE command, to set file transfer type to binary mode.	
AT# FTPFSIZE=?	Test command returns the OK result code.	

5.1.6.8.15   FTP Append - #FTPAPP

#FTPAPP - FTP Append		SELINT 2
AT#FTPAPP= [[<filename>], connMode>]	Execution command, issued during an FTP connection, opens a data connection and append data to existing <filename> file. If the data connection succeeds, a **CONNECT** indication is sent, afterward a NO CARRIER indication is sent when the socket is closed. Note: if we set **<connMode>** to 1, the data connection is openedand we remain in command mode and we see the result code **OK** (instead of **CONNECT**) Parameter: <filename> - string type, name of the file. **<connMode>** 0 - online mode 1 – command mode Note: use the escape sequence **+++** to close the data connection. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.	

AT#FTPAPP=?	Test command reports the maximum length of **<filename>** and the supported range of values of **<connMode>**. The format is:
	
	#FTPAPP: <length>, (list of supported <connMode>s)
	     where:
	       <length> - integer type value indicating the maximum length of **<filename>**	

5.1.6.8.16   Set restart position - # FTPREST

#FTPREST – Set restart position for FTP GET		SELINT 2
AT#FTPREST= <restartposition>	Set command sets the restart position for successive FTPGET (or FTPGETPKT) command. It permits to restart a previously interrupted FTP download from the selected position in byte. Parameter: <restartposition> position in byte of restarting for successive FTPGET (or FTPGETPKT) Note: It's necessary to issue FTPTYPE=0 before successive FTPGET (or FTPGETPKT command) to set binary file transfer type. Note: Setting <restartposition> has effect on successive FTP download. After successive successfully initiated FTPGET(or FTPGETPKT) command <restartposition> is automatically reset. Note: value set for <restartposition> has effect on next data transfer(data port opened by FTPGET or FTPGETPKT). Then <restartposition> value is automatically assigned to 0 for next download.	
AT#FTPREST?	Read command returns the current <restartposition> #FTPREST: <restartposition>	
AT#FTPREST=?	Test command returns the OK result code.	

5.1.6.8.17   Receive Data In Command Mode - #FTPRECV

#FTPRECV – Receive Data In Command Mode		SELINT 2
AT#FTPRECV= <blocksize>	Execution command permits the user to transfer at most <blocksize> bytes of remote file, provided that retrieving from the FTP server has been started with a previous #FTPGETPKT command, onto the serial port. This number is limited to the current number of bytes of the remote file which have been transferred from the FTP server. Parameters: < blocksize > - max number of bytes to read 1..3000 Note: it's necessary to have previously opened FTP data port and started download and buffering of remote file through #FTPGETPKT command Note: issuing **#FTPRECV** when there's no FTP data port opened raises an error. Note: data port will stay opened if socket is temporary waiting to receive data(FTPRECV returns 0 and FTPGETPKT gives a EOF 0 indication).	

#FTPRECV – Receive Data In Command Mode		SELINT 2
AT#FTPRECV?	Read command reports the number of bytes currently received from FTP server, in the format: #FTPRECV: <available>	
AT#FTPRECV=?	Test command returns the range of supported values for <blocksize> parameter.	
Example	AT#FTPRECV? #FTPRECV: 3000 OK Read required part of the buffered data: AT#FTPRECV=400 #FTPRECV: 400 Text row number 1 * 111111111111111111111111 * Text row number 2 * 222222222222222222222222 * Text row number 3 * 333333333333333333333333 * Text row number 4 * 444444444444444444444444 * Text row number 5 * 555555555555555555555555 * Text row number 6 * 666666666666666666666666 * Text row number 7 * 777777777777777777777777 * Text row number 8 * 88888888888888888888 OK AT#FTPRECV =200 #FTPRECV: 200 88888 * Text row number 9 * 999999999999999999999999 * Text row number 10 * AAAAAAAAAAAAAAAAAAAAAAAA * Text row number 12 * BBBBBBBBBBBBBBBBBBBBBBBB * Text row number 13 * CCCCCCCCCCCCCCCC OK Note: to check when you have received complete file it's possible to use AT#FTPGETPKT read command: AT#FTPGETPKT? #FTPGETPKT: sample.txt,0,1 OK (you will get <eof> set to 1)	

5.1.6.8.18   FTP Append

#FTPAPP - FTP Append		SELINT 2
AT#FTPAPP= [[<filename>], <connMode>]	Execution command, issued during an FTP connection, opens a data connection and append data to existing <filename> file. If the data connection succeeds, a **CONNECT** indication is sent, afterward a NO CARRIER indication is sent when the socket is closed. Note: if we set **<connMode>** to 1, the data connection is openedand we remain in command mode and we see the result code **OK** (instead of **CONNECT**) Parameter: **<filename>** - string type, name of the file. **<connMode>** 0 - online mode 1 – command mode Note: use the escape sequence **+++** to close the data connection. Note: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.	
AT#FTPAPP=?	Test command reports the supported range of values for parameters **<filename>** and **<connMode>**	

#FTPAPPEXT –	SELINT 2
AT#FTPAPPEXT= <bytestosend>[,< eof >]	This command permits to send data on a FTP data port while the module is in command mode. FTP data port has to be previously opened through **#FTPPUT** (or **#FTPAPP**) with **<connMode>** parameter set to command mode connection. Parameters: **< bytestosend >** - number of bytes to be sent 1..1500 **<eof>** - data port closure 0 – normal sending of data chunk 1 – close data port after sending data chunk The device responds to the command with the prompt <greater_than><space> and waits for the data to send. When **<bytestosend>** bytes have been sent, operation is automatically completed. If (all or part of the) data are successfully sent, then the response is: **#FTPAPPEXT: <sentbytes>** **OK** Where **<sentbytes>** are the number of sent bytes. Note: **<sentbytes>** could be less than **<bytestosend>** If data sending fails for some reason, an error code is reported.
AT#FTPAPPEXT=?	Test command reports the supported range of values for parameters **<bytestosend>** and **<eof>**
Example	*AT#FTPOPEN="IP",username,password* *OK* *AT#FTPPUT=<filename>,1 -> the new param 1 means that we open the connection in* *command mode* *OK* *// Here data socket will stay opened, but interface will be* *//available(command mode)* *AT#FTPAPPEXT=Size* *>… write here the binary data. As soon Size byte are written, data are sent and OK is returned* *#FTPAPPEXT: <SentBytes>* *OK* *………* *// Last #FTPAPPEXT will close the data socket, because* *// second(optional) parameter has this meaning:*

	AT#FTPAPPEXT=Size,1 *>…write here the binary data. As soon Size byte are written, data are sent and OK is returned* *#FTPAPPEXT: <SentBytes>* *OK* *// If the user has to reopen the data port to send another* *// (or append to the same) file, he can restart with the* *// FTPPUT(or FTPAPP.)* *//Then FTPAPPEXT,… to send the data chunks on the //reopened data port.* *// Note: if while sending the chunks the data port is closed* *// from remote, user will be aware of it because #FTPAPPEXT //* *will indicate ERROR and cause (available if previously //issued the command AT+CMEE=2) will indicate that* *//socket has been closed.* *// Also in this case obviously, data port will have to be //reopened with FTPPUT and so on…(same sequence)*

5.1.6.9 Enhanced IP Easy Extension AT Commands

5.1.6.9.1 Query DNS - #QDNS

#QDNS - Query DNS		SELINT 2
AT#QDNS= [<host name>]	Execution command executes a DNS query to solve the host name into an IP address. Parameter: **<host name>** - host name, string type. If the DNS query is successful then the IP address will be reported in the result code, as follows: **#QDNS: <host name>,<IP address>** where **<host name>** - string type **<IP address>** - string type, in the format **"xxx.xxx.xxx.xxx"** Note: the command has to activate the context if it was not previously activated. In this case the context is deactivated after the DNS query.	
AT#QDNS=?	Test command returns the **OK** result code.	
Note	This command requires that the authentication parameters are correctly set and that the network is present.	
Note	This command is available only on the first AT instance (see AT#PORTCFG) or on the first virtual port of CMUX and works on the PDN connection 1 and on the first ConnId (see AT#SCFG)	

5.1.6.9.2 DNS Response Caching - #CACHEDNS

#CACHEDNS – DNS Response Caching		SELINT 2
AT#CACHEDNS= [<mode>]	Set command enables caching a mapping of domain names to IP addresses, as does a resolver library. Parameter: **<mode>** 0 - caching disabled; it cleans the cache too 1 - caching enabled Note: the validity period of each cached entry (i.e. how long a DNS response remains valid) is determined by a value called the **Time To Live** (**TTL**), set by the administrator of the DNS server handing out the response. Note: If the cache is full (8 elements) and a new IP address is resolved, an element is deleted from the cache: the one that has not been used for the longest time. Note: it is recommended to clean the cache, if command **+CCLK** has been issued while the DNS Response Caching was enabled.	
AT#CACHEDNS?	Read command reports whether the DNS Response Caching is currently enabled or not, in the format: **#CACHEDNS: <mode>**	
AT#CACHEDNS=?	Test command returns the currently cached mapping along with the range of available values for parameter **<mode>**, in the format: **#CACHEDNS: [<hostn*1*>,<IPaddr*1*>,[…,[<hostn*n*>,<IPaddr*n*>,]]](0,1)**	

#CACHEDNS – DNS Response Caching	SELINT 2
	where: **<hostn*n*>** - hostname, string type **<IPaddr*n*>** - IP address, string type, in the format **"xxx.xxx.xxx.xxx"**

5.1.6.9.3 Manual DNS Selection - #DNS

#DNS – Manual DNS Selection	SELINT 2

AT#DNS=<cid>,
<primary>,
<secondary>
	Set command allows to manually set primary and secondary DNS servers either for a PDP context defined by **+CGDCONT** or for a GSM context defined by **#GSMCONT**
	
	Parameters:
	<cid> - context identifier
	  0 - specifies the GSM context
	  1.. *max* - numeric parameter which specifies a particular PDP context definition. The value of *max* is returned by the Test command
	
	<primary> - **manual primary DNS server**, string type, in the format **"xxx.xxx.xxx.xxx"** used for the specified cid; we're using this value instead of the **primary DNS server** come from the network (default is "0.0.0.0")
	<secondary> - **manual secondary DNS server**, string type, in the format **"xxx.xxx.xxx.xxx"** used for the specified cid; we're using this value instead of the **secondary DNS server** come from the network (default is "0.0.0.0").
	
	Note: if **<primary> is "0.0.0.0"** and **<secondary> is not "0.0.0.0"**, then issuing **AT#DNS=…** raises an error.
	
	Note: if **<primary> is "0.0.0.0"** we're using the **primary DNS server** come from the network as consequence of a context activation.
	
	Note: if **<primary> is not "0.0.0.0"** and **<secondary> is "0.0.0.0"**, then we're using only the **manual primary DNS server.**
	
	Note: the context identified by **<cid>** has to be previously defined, elsewhere issuing **AT#DNS=…** raises an error.
	
	Note: issuing **AT#DNS=…** raises an error if the context identified by **<cid>** has already been activated by AT commands.

AT#DNS?	Read command returns the manual DNS servers set either for every defined PDP context and for the single GSM context (only if defined), in the format: **[#DNS: <cid>,<primary>,<secondary>[<CR><LF>** **#DNS: <cid>,<primary>,<secondary>]]**
AT#DNS=?	Test command reports the supported range of values for the **<cid>** parameter.only, in the format: **#DNS: (0-15),,**

5.1.6.9.4 Socket Listen Ring Indicator - #E2SLRI

#E2SLRI - Socket Listen Ring Indicator	SELINT 2
AT#E2SLRI=[<n>]	Set command enables/disables the Ring Indicator pin response to a Socket Listen connect and, if enabled, the duration of the negative going pulse generated on receipt of connect.

#E2SLRI - Socket Listen Ring Indicator		SELINT 2

	Parameter:
	<n> - **RI** enabling
	  0 - **RI** disabled for Socket Listen connect (factory default)
	  50..1150 - **RI** enabled for Socket Listen connect; a negative going pulse is generated on receipt of connect and **<n>** is the duration in ms of this pulse.	

AT#E2SLRI?	Read command reports whether the Ring Indicator pin response to a Socket Listen connect is currently enabled or not, in the format: **#E2SLRI: <n>**	
AT#E2SLRI=?	Test command returns the allowed values for parameter **<status>**.	

5.1.6.9.5   Firewall Setup - #FRWL

#FRWL - Firewall Setup		SELINT 2

AT#FRWL=
[<action>,
<ip_address>,
<net mask>]
	Execution command controls the internal firewall settings.
	
	Parameters:
	<action> - command action
	  0 - remove selected chain
	  1 - add an **ACCEPT** chain
	  2 - remove all chains (**DROP** everything); **<ip_addr>** and **<net_mask>** has no meaning in this case.
	  3 – enable firewall and save this setting in NVM
	  4 – disable firewall and save this setting in NVM (default)
	
	<ip_addr> - remote address to be added into the **ACCEPT** chain; string type, it can be any valid IP address in the format: xxx.xxx.xxx.xxx
	<net_mask> - mask to be applied on the **<ip_addr>**; string type, it can be any valid IP address mask in the format: xxx.xxx.xxx.xxx
	
	Command returns **OK** result code if successful.
	
	Note: the firewall applies for incoming (listening) connections only.
	
	When enabled, firewall general policy is **DROP**, therefore all packets that are not included into an **ACCEPT** chain rule will be silently discarded.
	
	When a packet comes from the IP address **incoming_IP**, the firewall chain rules will be scanned for matching with the following criteria:
	
	incoming_IP & <net_mask> = <ip_addr> & <net_mask>
	
	If criteria is matched, then the packet is accepted and the rule scan is finished; if criteria is not matched for any chain the packet is silently dropped.	

AT#FRWL?	Read command reports the list of all **ACCEPT** chain rules registered in the Firewall settings in the format:
	
	#FRWL: <ip_addr>,<net_mask>,<status>
	#FRWL: <ip_addr>,<net_mask>,<status>
	….
	OK
	
	   where:
	<status> - firewall status
	  0 – not enabled (default)
	  1 - enabled	

AT#FRWL=?	Test command returns the allowed values for parameter **<action>**.	

5.1.6.9.6   Firewall Setup for IPV6 addresses - #FRWLIPV6

#FRWLIPV6 - Firewall Setup for IPV6 addresses		SELINT 2

AT#FRWLIPV6=
[<action>,
<ip_address>,
<net mask>]
	Execution command controls the internal firewall settings for IPV6 addresses.
	
	Parameters:
	<action> - command action
	  0 - remove selected chain
	  1 - add an **ACCEPT** chain
	  2 - remove all chains (**DROP** everything); **<ip_addr>** and **<net_mask>** has no meaning in this case.
	  3 – enable firewall and save this setting in NVM
	  4 –disable firewall and save this setting in NVM (default)
	
	<ip_addr> - remote address to be added into the **ACCEPT** chain; string type, it can be any valid IP address in the format xxx.xxx.xxx.xxx. xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx
	        or in the format yyyy:yyyy:yyyy:yyyy:yyyy: yyyy:yyyy:yyyy
	<net_mask> - mask to be applied on the **<ip_addr>**; string type, it can be any valid IP address mask in the format xxx.xxx.xxx.xxx. xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx
	        or in the format yyyy:yyyy:yyyy:yyyy:yyyy: yyyy:yyyy:yyyy
	
	Command returns **OK** result code if successful.
	
	Note: the firewall applies for incoming (listening) connections only.
	
	When enabled, firewall general policy is **DROP**, therefore all packets that are not included into an **ACCEPT** chain rule will be silently discarded.
	
	When a packet comes from the IP address **incoming_IP**, the firewall chain rules will be scanned for matching with the following criteria:
	
	incoming_IP & <net_mask> = <ip_addr> & <net_mask>
	
	If criteria is matched, then the packet is accepted and the rule scan is finished; if criteria is not matched for any chain the packet is silently dropped.	

AT#FRWLIPV6?	Read command reports the list of all **ACCEPT** chain rules registered in the Firewall settings in the format:
	
	#FRWLIPV6: <ip_addr>,<net_mask>,<status>
	#FRWLIPV6: <ip_addr>,<net_mask>,<status>
	….
	OK
	
	  where:
	<status> - firewall status
	  0 – not enabled (default)
	  1 - enabled	

AT#FRWLIPV6=?	Test command returns the allowed values for parameter **<action>.**	

5.1.6.9.7   Configure cid and IID parameters - #IIDIPV6

#IIDIPV6 – Configure cid and IID parameters		SELINT 2
AT#IIDIPV6=<cid>,<IID>	This command permits to have a fixed IID in IPV6 address associated to a certain cid Parameters: **<cid>** - Numeric parameter indicating the cid of the fixed IID.	

	<IID> - String parameter indicating the IID (IPv6 Interface Identifier). String type can be any valid IP address in the format xxx.xxx.xxx.xxx.xxx.xxx.xxx.xxx or in the format yyyy:yyyy:yyyy:yyyy. If the **<IID>** is set 0.0.0.0.0.0.0.0 for a certain **<cid>**, all the IPv6 address for that <cid> is set by the network. Note: values are automatically saved in NVM.
AT#IIDIPV6?	Read command returns the current settings for each defined in the format: **#IIDIPV6: <cid>,<IID>**
AT#IIDIPV6=?	Test command returns the supported range of parameter **<cid>** and the maximum length of **<IID>.**

Example	Suppose to use the IID "1.2.3.4.5.6.7.8" on the cid 3
	
	1) at#iidipv6=3,1.2.3.4.5.6.7.8
	
	OK
	
	2) set a socket to use the cid 3
	  at#scfg=2,3
	
	OK
	
	3) at#sgact=3,1
	
	#SGACT: 254.128.0.0.0.0.0.0.0.0.0.0.106.53.29.248.1
	
	OK
	
	4) open a socket listen or a dial with socket 2
	  at#sl=2,1,5555
	
	5) verify the IID set by at#iidipv6 with at#ss
	
	at#ss
	#SS: 1,0
	#SS: 2,4,"38.0.16.4.176.28.38.82.1.2.3.4.5.6.7.8",5555
	#SS: 3,0
	#SS: 4,0
	#SS: 5,0
	#SS: 6,0

	OK Known limitation: After the at#sgact it is necessary to wait few seconds, in order to permit the IPv6 Stateless Auto Configuration, before open a socket dial or listen.

5.1.6.9.8   GPRS Data Volume - #GDATAVOL

#GDATAVOL - GPRS Data Volume		SELINT 2

AT#GDATAVOL=
[<mode>]
	Execution command reports, for every active PDP context, the amount of data the last GPRS session (and the last GSM session, if GSM context is active) received and transmitted, or it will report the total amount of data received and transmitted during all past GPRS (and GSM) sessions, since last reset.
	
	Parameter:
	<mode>
	  0 - it resets the GPRS data counter for the all the available PDP contexts (1-15) and GSM data counter for GSM context 0
	  1 - it reports the last GPRS session data counter for the all the set PDP contexts (i.e. all the PDP contexts with APN parameter set using **+CGDCONT**) (and the last GSM session data counter for the GSM context, if set through **#GSMCONT**), in the format:
	
	#GDATAVOL: <cid*n*>,<tot*n*>,<sent*n*>,<received*n*>[<CR><LF>
	#GDATAVOL: <cid*m*>,<tot*m*>,<sent*m*>,<received*m*>[…]]
	
	where:
	<cid*n*> - PDP context identifier
	  0 - specifies the GSM context
	  1..15 - numeric parameter which specifies a particular PDP context definition
	<tot*n*> - number of bytes either received or transmitted in the last GPRS (or GSM) session for **<cid*n*>** PDP context;
	<sent*n*> - number of bytes transmitted in the last GPRS (or GSM) session for **<cid*n*>** PDP context;
	<received*n*> - number of bytes received in the last GPRS (or GSM) session for **<cid*n*>** PDP context;
	  2 - it reports the total GPRS data counter, since last reset, for the all the set PDP contexts (i.e. all the PDP context with APN parameter set using **+CGDCONT**) and the total GSM data counter for the GSM context, if set through **#GSMCONT**, in the format:
	
	#GDATAVOL: <cid*n*>,<tot*n*>,<sent*n*>,<received*n*>[<CR><LF>
	#GDATAVOL: <cid*m*>,<tot*m*>,<sent*m*>,<received*m*>[…]]
	
	where:
	<cid*n*> - PDP context identifier
	  0 - specifies the GSM context
	  1..15 - numeric parameter which specifies a particular PDP context definition
	<tot*n*> - number of bytes either received or transmitted, in every GPRS (or GSM) session since last reset, for **<cid*n*>** PDP context;
	<sent*n*> - number of bytes transmitted, in every GPRS (or GSM) session since last reset, for **<cid*n*>** PDP context;
	<received*n*> - number of bytes received, in every GPRS (or GSM) session since last reset, for **<cid*n*>** PDP context;

#GDATAVOL - GPRS Data Volume		SELINT 2
	Note: last GPRS and GSM session counters are not saved in NVM so they are loosen at power off. Note: total GPRS and GSM session counters are saved on NVM.	
AT#GDATAVOL=?	Test command returns the range of supported values for parameter **<mode>.**	

5.1.6.9.9 ICMP Ping Support - #ICMP

#ICMP - ICMP Ping Support		SELINT 2
AT#ICMP=<mode>	Set command enables/disables the ICMP Ping support. Parameter: **<mode>** 0 - disable ICMP Ping support (default) 1 - enable firewalled ICMP Ping support: the module is sending a proper ECHO_REPLY only to a subset of IP Addresses pinging it; this subset of IP Addresses has been previously specified through #FRWL (see) 2 - enable free ICMP Ping support; the module is sending a proper ECHO_REPLY to every IP Address pinging it. **NOTE**: the default value for NA products is 2.	
AT#ICMP?	Read command returns whether the ICMP Ping support is currently enabled or not, in the format: **#ICMP: <mode>**	
AT#ICMP=?	Test command returns the supported range of values of parameters **< mode>.**	

5.1.6.9.10 PING request - #PING

#PING – Send PING request		SELINT 2
AT#PING= <IPaddr>[,<retryNum >[,<len>[,<timeout>[,< ttl>]]]]	This command is used to send Ping Echo Request messages and to receive the corresponding Echo Reply. Parameters: **<IPaddr>** - address of the remote host, string type. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any host name to be solved with a DNS query **<retryNum>** - the number of Ping Echo Request to send 1-64 (default 4) **<len>** - the lenght of Ping Echo Request message 32-1460 (default 32) **<timeout>** - the timeout, in 100 ms units, waiting a single Echo Reply 1-600 (default 50) **<ttl>** - time to live 1-255 (default 128) Once the single Echo Reply message is receive a string like that is displayed: **#PING: <replyId>,<lp Address>,<replyTime>,<ttl>** Where: **<replyId>** - Echo Reply number **<lp Address>** - IP address of the remote host **<replyTime>** - time, in 100 ms units, required to receive the response **<ttl>** - time to live of the Echo Reply message	

#PING – Send PING request		SELINT 2
	Note1: when the Echo Request timeout expires (no reply received on time) the response will contain **<replyTime>** set to 600 and **<ttl>** set to 255 Note2: To receive the corresponding Echo Reply is not required to enable separately AT#ICMP Note3: Before send PING Request the GPRS context must have been activated by AT#SGACT=x,1 command. The context 'x' is the one used by PING, as specified in AT#PROTOCOLCFG (see).	
AT#PING=?	Test command reports the supported range of values for the **#PING** command parameters.	
Example	AT#PING="www.telit.com" #PING: 01,"81.201.117.177",6,50 #PING: 02,"81.201.117.177",5,50 #PING: 03,"81.201.117.177",6,50 #PING: 04,"81.201.117.177",5,50 OK	

5.1.6.9.11   DNS from Network - #NWDNS

#NWDNS – DNS from Network		SELINT 2

AT#NWDNS=
[<cid>[,<cid>
[,…]]]
	Execution command returns either the primary and secondary DNS addresses for the GSM context (if specified) and/or a list of primary and secondary DNS addresses for the specified PDP context identifiers
	
	Parameters:
	<cid> - context identifier
	  0 - specifies the GSM context (see **+GSMCONT**).
	  1..15 - numeric parameter which specifies a particular PDP context definition (see **+CGDCONT** command).
	
	Note: if no **<cid>** is specified, the DNS addresses for all **defined** contexts are returned.
	
	Note: issuing the command with more than 6 parameters raises an error.
	
	Note: the command returns only one row of information for every specified **<cid>**, even if the same **<cid>** is present more than once.
	
	The command returns a row of information for every specified **<cid>** whose context has been already defined. No row is returned for a **<cid>** whose context has not been defined yet. Response format is:
	
	#NWDNS: <cid>,<PDNSaddress>,<SDNSaddress>[<CR><LF>
	#NWDNS: <cid>,<PDNSaddress>,<SDNSaddress> […]]
	
	where:
	<cid> - context identifier, as before
	<PDNSaddress>,<SDNSaddress> - primary and secondary DNS addresses set through AT#DNS command. If not set, they are the primary and secondary DNS addresses assigned during the PDP(or GSM) context activation.	

AT#NWDNS=?	Test command returns a list of defined **<cid>**s.	

5.1.6.9.12 Configure protocol parameters - #PROTOCOLCFG

#PROTOCOLCFG – configure protocol parameters		SELINT 2
AT#PROTOCOLCFG=< protocol>,<cid>[,<UNU SED_1>[,<UNUSED_2>[,<UNUSED_3>]]]]	This command sets the configuration parameters needed to specific protocols Parameters: **<protocol> -** string that represents the protocol **<cid> -** cid of the PDP context to be used for the specified protocol Note: values are automatically saved in NVM.	
AT#PROTOCOLCFG?	Read command returns the current settings in the format: **#PROTOCOLCFG: "FTP",1,0,0,0<CR><LF>** **#PROTOCOLCFG: "SMTP",1,0,0,0<CR><LF>** **#PROTOCOLCFG: "PING",1,0,0,0<CR><LF>** **#PROTOCOLCFG: "SSL",1,0,0,0<CR><LF>** **#PROTOCOLCFG: "NTP",2,0,0,0<CR><LF>** Note: the list could be different between a product and the other.	
Nido delloAT#PROTOCOLCF G=?	Test command returns the range of supported values for all the parameters.	

5.1.6.10 SMS AT Commands

5.1.6.10.1 Move Short Message to other memory - #SMSMOVE

#SMSMOVE – Move Short Message to other memory		SELINT 2
AT#SMSMOVE= <index>	Execution command moves selected Short Message from current memory to destination memory. Parameter: <index> - message index in the memory selected by **+CPMS** command. It can have values form 1 to N, where N depends on the available space (see **+CPMS**) Note: if the destination memory is full, an error is returned.	
AT#SMSMOVE?	Read command reports the message storage status of the current memory and the destination memory in the format: **#SMSMOVE:** **<curr_mem>,<used_curr_mem>,<total_curr_mem>,<dest_mem>,<used_dest_mem>,<total_dest_mem>** Where: - **<curr_mem>** is the current memory, selected by **+CPMS** command. It can assume the values **"SM"** or **"ME"** - **<used_curr_mem>** is the number of SMs stored in the current memory - **<total_curr_mem>** is the max number of SMs that the current memory can contain - **<dest_mem>** is the destination memory. It can assume the values **"SM"** or **"ME"** - **<used_dest_mem>** is the number of SMs stored in the destination memory - **<total_dest_mem>** is the max number of SMs that the destination memory can contain	
AT#SMSMOVE=?	Test command reports the supported values for parameter **<index>**	

Example	AT#SMSMOVE?
	#SMSMOVE: "ME",3,100,"SM",0,50
	
	OK
	//the current memory is ME where 3 SMs are stored; the destination memory is SIM that is empty
	
	AT+CMGL=ALL
	+CMGL: 1,"STO UNSENT","32XXXXXXXX","",
	test 1
	+CMGL: 2,"STO UNSENT","32XXXXXXXX","",
	test 2
	+CMGL: 3,"STO UNSENT","32XXXXXXXX","",
	test 3
	
	OK
	//list the SMs to discover the memory index
	
	AT#SMSMOVE=1
	OK
	//move the SM in the first position of ME to SIM
	
	AT#SMSMOVE?
	#SMSMOVE: "ME",2,100,"SM",1,50
	
	OK	

#SMSMOVE – Move Short Message to other memory	SELINT 2
	//now we have 2 SMs in ME and 1 in SIM

5.1.6.10.2 SMS Commands Operation Mode - #SMSMODE

#SMSMODE - SMS Commands Operation Mode		SELINT 2

AT#SMSMODE=
<mode>
	Set command enables/disables the check for presence of SMS Service Centre Address in the FDN phonebook
	
	Parameter:
	<mode>
	  1 - disables the check for presence of SMS SCA in FDN
	  2 – enables the check for presence of SMS SCA in the FDN phonebook when FDN are enabled; if the SMS SCA is not present, then a SMS cannot be sent (default)	

AT#SMSMODE?	Read command reports whether the check of SMS SCA in FDN is enabled or not, in the format: **#SMSMODE: <mode>** (**<mode>** described above)	
AT#SMSMODE=?	Test command reports the supported range of values for parameter **<mode>**	

5.1.6.10.3   Domain configuration for Outgoing SMS - #ISMSCFG

#ISMSCFG – Domain configuration for Outgoing SMS		SELINT 2
AT#ISMSCFG=<mode>	Set command changes the configuration parameter for outgoing SMS, which will be used to route the outgoing SMS either over CPS or over IMS (IP Multimedia Core Network Subsystem). Parameter: **<mode>** 0 - the SMS service is not to be invoked over the IP networks; 1 - the SMS service is preferred to be invoked over the IP networks (default) NOTE: the setting is saved in NVM.	
AT#ISMSCFG?	Read command returns the current domain selected to route the outgoing SMS in the format: **#ISMSCFG: <mode>**	
AT#ISMSCFG=?	Test command returns the supported range of values for parameter **<mode>**, in the format: **#ISMSCFG:** (list of supported **<mode>**s)	

5.1.6.11 E-mail Management AT Commands

5.1.6.11.1 E-mail SMTP Server - #ESMTP

#ESMTP - E-mail SMTP Server		SELINT 2

AT#ESMTP=
[<smtp>]
	Set command sets the SMTP server address, used for E-mail sending. SMTP server can be specified as IP address or as nick name.
	
	Parameter:
	<smtp> - SMTP server address, string type. This parameter can be either:
	    - any valid IP address in the format: xxx.xxx.xxx.xxx
	    - any host name to be solved with a DNS query in the format:
	        <host name>
	(factory default is the empty string "")
	
	Note: the max length for **<smtp>** is the output of Test command.	

AT#ESMTP?	Read Command reports the current SMTP server address, in the format: **#ESMTP: <smtp>**	
AT#ESMTP=?	Test command returns the max length for the parameter **<smtp>.**	
Example	AT#ESMTP="smtp.mydomain.com" OK	
Note	The SMTP server used shall be inside the APN space (the smtp server provided by the network operator) or it must allow the Relay, otherwise it will refuse to send the e-mail.	

5.1.6.11.2 E-mail Sender Address - #EADDR

#EADDR - E-mail Sender Address		SELINT 2

AT#EADDR=
[<e-add>]
	Set command sets the sender address string to be used for sending the e-mail.
	
	Parameter:
	<e-addr> - sender address, string type.
	    - any string value up to max length reported in the Test command.
	      (factory default is the empty string "")	

AT#EADDR?	Read command reports the current sender address, in the format: **#EADDR: <e-addr>**	
AT#EADDR=?	Test command returns the maximum allowed length of the string parameter **<e-addr>.**	
Example	AT#EADDR="me@email.box.com" OK AT#EADDR? #EADDR: "me@email.box.com" OK	

5.1.6.11.3 E-mail Authentication User Name - #EUSER

#EUSER - E-mail Authentication User Name		SELINT 2
AT#EUSER= [<e-user>]	Set command sets the user identification string to be used during the authentication step of the SMTP. Parameter: **<e-user>** - e-mail authentication User ID, string type. - any string value up to max length reported in the Test command. (factory default is the empty string "") Note: if no authentication is required then the **<e-user>** parameter shall be empty "".	
AT#EUSER?	Read command reports the current user identification string, in the format: **#EUSER: <e-user>**	
AT#EUSER=?	Test command returns the maximum allowed length of the string parameter **<e-user>**.	
Example	AT#EUSER="myE-Name" OK AT#EUSER? #EUSER: "myE-Name" OK	

5.1.6.11.4 E-mail Authentication Password - #EPASSW

#EPASSW - E-mail Authentication Password		SELINT 2
AT#EPASSW= [<e-pwd>]	Set command sets the password string to be used during the authentication step of the SMTP. Parameter: **<e-pwd>** - e-mail authentication password, string type. - any string value up to max length reported in the Test command. (factory default is the empty string "") Note: if no authentication is required then the **<e-pwd>** parameter shall be empty "".	
AT#EPASSW=?	Test command returns the maximum allowed length of the string parameter **<e-pwd>**.	
Example	AT#EPASSW="myPassword" OK	

5.1.6.11.5   E-mail Sending - #EMAILD

#EMAILD - E-mail Sending		SELINT 2
AT#EMAILD=[<da>, <subj>]	Execution command sends an e-mail message if GPRS context has already been activated by **AT#SGACT=x,1**or The context 'x' is the one used by SMTP, as specified in AT#PROTOCOLCFG (see). It is also possible to send an e-mail on the GSM context, if it has already been activated by **AT#SGACT=0,1**. Parameters: **<da>** - destination address, string type. (maximum length 100 characters) **<subj>** - subject of the message, string type. (maximum length 100 characters) The device responds to the command with the prompt '**>**' and awaits for the message body text. To complete the operation send **Ctrl-Z** char (**0x1A** hex); to exit without writing the message send **ESC** char (**0x1B** hex). If e-mail message is successfully sent, then the response is **OK**. If message sending fails for some reason, an error code is reported. Note: if the length of one of the string type parameters exceeds the maximum length, then the string is truncated. Note: Care must be taken to ensure that during the command execution, no other commands are issued. To avoid malfunctions is suggested to wait for the **OK** or **ERROR / +CMS ERROR:<err>** response before issuing further commands. Note: maximum length for message body is 1500 trying to send more data will cause the surplus to be discarded and lost.	
AT#EMAILD=?	Test command returns the **OK** result code.	
Example	AT#EMAILD="me@myaddress.com","subject of the mail" >message body… this is the text of the mail message… CTRL-Z *..wait..* OK *Message has been sent.*	

5.1.6.11.6   E-mail Parameters Save - #ESAV

#ESAV - E-mail Parameters Save		SELINT 2
AT#ESAV	Execution command stores the e-mail parameters in the NVM of the device. The e-mail parameters to store are: - E-mail User Name - E-mail Password - E-mail Sender Address - E-mail SMTP server	
AT#ESAV=?	Test command returns the **OK** result code.	
Note	If some parameters have not been previously specified then a default value will be taken.	

5.1.6.11.7   E-mail Parameters Reset - #ERST

#ERST - E-mail Parameters Reset		SELINT 2
AT#ERST	Execution command resets the e-mail parameters to the "factory default" configuration and stores them in the NVM of the device. The e-mail parameters to reset are: - E-mail User Name - E-mail Password - E-mail Sender Address - E-mail SMTP server	
AT#ERST=?	Test command returns the **OK** result code.	

5.1.6.11.8   SMTP Read Message - #EMAILMSG

#EMAILMSG - SMTP Read Message		SELINT 2
AT#EMAILMSG	Execution command returns the last response from SMTP server.	
AT#EMAILMSG=?	Test command returns the **OK** result code.	

5.1.6.11.9   Send mail with attachment - #SMTPCL

#SMTPCL – send mail with attachment		SELINT 2
AT#SMTPCL= <da>,<subj>,<att> [,<filename>,<encod>]	This command permits to send an email with different types of attachments if GPRS context has already been activated (#SGACT). After sending message body text (as with #EMAILD), the command switch to online mode if attachment has to be sent. While in online mode data received on the serial port are transmitted on the SMTP socket as MIME attachment. The escape sequence has to be sent to close the SMTP connection. Encoding of data received on the serial port is performed if required (binary data), before transmission on the SMTP socket. Parameters: **<da>** - destination address, string type. (maximum length 100 characters) **<subj>** - subject of the message, string type. (maximum length 100 characters) **<att>** - attached file flag 0 – no attachment 1 – attach a txt file 2 – attach a binary file(jpg,bin,pdf,...) **<filename>** - attached file name (maximum length 50 characters)	

	<encod> -Content-Transfer-Encoding used for attachment 0 – "7bit" means data all represented as short lines of US-ASCII data 1 – "base64" designed to represent arbitrary sequences of octets in a form that need not be humanly readable Note: if no attachment (**<att>** 0) has to be sent, the behavior is the same as with #EMAILD. OK after CTRL-Z is returned(if connection was successful), the switch to online mode is not performed. Note: If a txt file (**<att>**=1) is attached, only **<encod>**0("7bit") is possible. If a binary file (**<att>**=2) is attached, only **<encod>**1("base64") is possible. Note: if **<att>**=0 and **<filename>** is present and not empty, the attachment won't be considered Note: if **<att>** 1 or 2 and **<filename>** is not present, command will return an ERROR Note: default SMTP port (25) is used
AT#SMTPCL=?	Test command reports the supported range of values for parameters **<da>,<subj>,<att>[,<filename>,<encod>]**
Examples	at#smtpcl="me@myaddress.com","test1",1,"sample.txt",0 >message body...this is the text of the mail message… *Send CTRL-Z* CONNECT *…data received on the serial port are sent as attachment….* *Send escape sequence to close the SMTP connection* +++ NO CARRIER at#smtpcl="me@myaddress.com","test2",2,"image.jpg",1 >message body...this is the text of the mail message… *Send CTRL-Z* CONNECT *…data received on the serial port are base64-encoded and sent as attachment….* *Send escape sequence to close the SMTP connection* +++ NO CARRIER

5.1.6.11.10   E-mail SMTP Port - #ESMTPPORT

#ESMTPPORT – E-mail SMTP Port		SELINT 2
AT#ESMTPPORT=<Port>	This command permits to set SMTP port Parameters: **<Port> -** SMTP port to contact (default 25) 25..465,587 Note: SMTP protocol is used on the selected port Note: the value set by command is directly stored in NVM	
AT#ESMTPPORT?	Read command reports the currently selected **<Port>** in the format: **#ESMTPPORT: <Port >**	
AT#ESMTPPORT=?	Test command reports the supported range of values for parameter **< Port >**	

5.1.6.11.11   Configure SMTP parameters - #SMTPCFG

#SMTPCFG - Configure SMTP parameters		SELINT 2

AT#SMTPCFG=<ssl_enable d>[,<port>[,<mode>[,<UNU SED_1>[,<pkt_size>[,<UNU SED_2>]]]]]	This command sets the parameters needed to the SMTP connection
	
	Parameters:
	
	<ssl_enabled> - Numeric parameter indicating if the SSL encryption is enabled.
	  0 – SSL encryption disabled (default)
	  1 – SSL encryption enabled
	
	<port>: SMTP port to contact (default 25)
	25..465,587
	
	<mode> - SMTP start session command
	  0 – SMTP start session command HELO (default)
	1 – SMTP start session command EHLO
	
	<pkt_size> - send size for attachment sending
	(see **#SMTPCL** command)
	0 – select automatically default value(1024).
	1..1500 – send size in bytes.
	
	Note: the SSL encryption can be enabled only if <Enable> parameter of #SSLEN is set to 0, <FTPSEn> parameter of #FTPCFG is set to 0 and <ssl_enabled> parameter of #HTTPCFG is set to 0.
	
	Note: values are automatically saved in NVM.	

AT#SMTPCFG?	Read command returns the current settings in the format: **#SMTPCFG:<ssl_enabled>,<port>,<mode>,0,<pkt_size>,0 <CR><LF>**	
AT#SMTPCFG=?	Test command returns the supported range of parameters **<ssl_enabled>, <port>, <mode>** and **<pkt_size>** in the format: **#SMTPCFG: (list of supported <ssl_enabled>s),(list of supported <port>s),(list of supported <mode>s),(0),(list of supported <pkt_size>s) ,(0)**	

5.1.6.12   HTTP Client AT Commands

5.1.6.12.1   Configure HTTP Parameters - #HTTPCFG

#HTTPCFG – configure HTTP parameters		SELINT 2
AT#HTTPCFG=<prof_id>[,<server_address>[,<server_port>[,<auth_type>[,<username>[,<password>[,<ssl_enabled>[,<timeout>[,<cid>[,<pkt_size>][, <UNUSED_1>[, <UNUSED_2>]]]]]]]]]]	This command sets the parameters needed to the HTTP connection Parameters: <prof_id> - Numeric parameter indicating the profile identifier. Range: 0-2 <server_address> - String parameter indicating the IP address of the HTTP server. This parameter can be either: - any valid IP address in the format: "xxx.xxx.xxx.xxx" - any host name to be solved with a DNS query Default: "" for first and second profile; "m2mlocate.telit.com" for third profile. <server_port> - Numeric parameter indicating the TCP remote port of the HTTP server to connect to. Default: 80 for first and second profile; 9978 for third profile. Range 1...65535. <auth_type> - Numeric parameter indicating the HTTP authentication type. 0 – no authentication (default) 1 – basic authentication <username> - String parameter indicating authentication user identification string for HTTP. <password> - String parameter indicating authentication password for HTTP. <ssl_enabled> - Numeric parameter indicating if the SSL encryption is enabled. 0 – SSL encryption disabled (default) 1 – SSL encryption enabled <timeout>: Numeric parameter indicating the time interval in seconds to wait for receiving data from HTTP server. Range: (1- 65535). Default: 120. <cid> - Numeric parameter indicating the PDP Context Identifier. Range: (0- max, where the value of max is returned by the Test command Default: 3 (for LE910-SV V2 and LE910-SV1) Default: 1 (for ALL products except LE910-SV V2 and LE910-SV1) <pkt_size> - send(#HTTPSND) or recv(#HTTPRCV) size for data sending or receiving. 0 – select automatically default value(300). 1..1500 – send or recv size in bytes. Note: an ERROR is issued if <UNUSED_1> and <UNUSED_2> parameters are set with a value different from 0. Note: a special form of the Set command, #HTTPCFG=<prof_id>, causes the values for profile number <prof_id> to reset to default values. Note: only one profile can use the SSL encryption.

#HTTPCFG – configure HTTP parameters		SELINT 2
	Note: the SSL encryption can be enabled only if <Enable> parameter of #SSLEN is set to 0 and <FTPSEn> parameter of #FTPCFG is set to 0. Note: if it's needed to configure security parameters, it is possible to use #SSLSECCFG/#SSLSECDATA commands as usual for #SSLD Note: values are automatically saved in NVM.	
AT#HTTPCFG?	Read command returns the current settings for each defined profile in the format: **#HTTPCFG: <prof_id>,<server_address>,<server_port>,<auth_type>,<userna me>,<password>,<ssl_enabled>,<timeout>,<cid>,<pkt_size>,0,0 <CR><LF>[<CR><LF>#HTTPCFG: <prof_id>,<server_address>,<server_port>,<auth_type>,<usern ame>,<password>,<ssl_enabled>,<timeout>,<cid>,<pkt_size>,0 ,0]<CR><LF>[…]]**	
AT#HTTPCFG=?	Test command returns the supported range of parameters **<prof_id>, <server_port>, <auth_type>, <ssl_enabled>, <timeout>, <cid>** and **<pkt_size>** and the maximum length of **<server_address>, <username>** and **<password>** parameters in the format: # **HTTPCFG: (list of supported <prof_id>s),<s_length>,(list of supported <server_port>s), (list of supported <auth_type>s),<u_length>,<p_length>,(list of supported <ssl_enabled>s),(list of supported <timeout>s),(list of supported <cid>s) ,(list of supported <pkt_size>s)** where: **<s_length>** - integer type value indicating the maximum length of parameter **<server_address>**. **<u_length>** - integer type value indicating the maximum length of parameter **<username>**. **<p_length>** - integer type value indicating the maximum length of parameter **<password>**	

5.1.6.12.2   Send HTTP GET, HEAD or DELETE request - #HTTPQRY

#HTTPQRY – send HTTP GET, HEAD or DELETE request		SELINT 2
AT#HTTPQRY=<prof_id>,< command>,<resource>[,<e xtra_header_line>]	Execution command performs a GET, HEAD or DELETE request to HTTP server. Parameters: **<prof_id>** - Numeric parameter indicating the profile identifier. Range: 0-2 **<command>**: Numeric parameter indicating the command requested to HTTP server: 0 – GET 1 – HEAD 2 – DELETE **<resource>**: String parameter indicating the HTTP resource (uri), object of the request	

#HTTPQRY – send HTTP GET, HEAD or DELETE request	SELINT 2
	<extra_header_line>: String parameter indicating optional HTTP header line
	If sending ends successfully, the response is OK; otherwise an error code is reported.
	Note: the HTTP request header sent with #HTTPQRY always contains the "Connection: close" line, and it can not be removed.
	When the HTTP server answer is received, then the following URC is put on the serial port:
	#HTTPRING: **<prof_id>,<http_status_code>,<content_type>,<data_size>**
	Where: **<prof_id>** is defined as above **<http_status_code>** is the numeric status code, as received from the server (see RFC 2616) **<content_type>** is a string reporting the "Content-Type" header line, as received from the server (see RFC 2616) **<data_size>** is the byte amount of data received from the server. If the server doesn't report the "Content-Length:" header line, the parameter value is 0.
	Note: if there are no data from server or the server doesn't answer within the time interval specified in **<timeout>** parameter of **#HTTPCFG** command, then the URC **#HTTPRING** **<http_status_code>** parameter has value 0.
AT#HTTPQRY=?	Test command reports the supported range of values for the parameters **<prof_id>** and **<command>** and the maximum length of **<resource>** parameter in the format: **#HTTPQRY: (list of supported <prof_id>s),(list of supported <command>s),<r_length>,<m_length>** where: **<r_length>** - integer type value indicating the maximum length of parameter **<resource>**. **<m_length>** - integer type value indicating the maximum length of parameter **<extra_header_line>**.

5.1.6.12.3   Send HTTP POST or PUT request - #HTTPSND

#HTTPSND – send HTTP POST or PUT request	SELINT 2
AT#HTTPSND=<prof_id>,<command>,<resource>,<data_len>[,<post_param>[,<extra_header_line>]]	Execution command performs a POST or PUT request to HTTP server and starts sending data to the server. The device shall prompt a three character sequence **<greater_than><greater_than><greater_than>** **(IRA 62, 62, 62)** after command line is terminated with <CR>; after that the data can be entered from TE, sized **<data_len>** bytes. Parameters: **<prof_id>** - Numeric parameter indicating the profile identifier. Range: 0-2

	<command>: Numeric parameter indicating the command requested to HTTP server: 0 – POST 1 – PUT **<resource>**: String parameter indicating the HTTP resource (uri), object of the request **<data_len>**: Numeric parameter indicating the data length to input in bytes **<post_param>**: Numeric/string parameter indicating the HTTP Content-type identifier, used only for POST command, optionally followed by colon character (:) and a string that extends with sub-types the identifier: "0[:extension]" – "application/x-www-form-urlencoded" with optional extension "1[:extension]" – "text/plain" with optional extension "2[:extension]" – "application/octet-stream" with optional extension "3[:extension]" – "multipart/form-data" with optional extension other content – free string corresponding to other content type and possible sub-types **<extra_header_line>**: String parameter indicating optional HTTP header line If sending ends successfully, the response is OK; otherwise an error code is reported. Note: the HTTP request header sent with #HTTPSND always contains the "Connection: close" line, and it can not be removed. When the HTTP server answer is received, then the following URC is put on the serial port: **#HTTPRING:** **<prof_id>,<http_status_code>,<content_type>,<data_size>** Where: **<prof_id>** is defined as above **<http_status_code>** is the numeric status code, as received from the server (see RFC 2616) **<content_type>** is a string reporting the "Content-Type" header line, as received from the server (see RFC 2616) **<data_size>** is the byte amount of data received from the server. If the server doesn't report the "Content-Length:" header line, the parameter value is 0. Note: if there are no data from server or the server doesn't answer within the time interval specified in **<timeout>** parameter of **#HTTPCFG** command, then the URC **#HTTPRING** **<http_status_code>** parameter has value 0.
AT#HTTPSND=?	Test command returns the supported range of parameters **<prof_id>, <command>** and **<data_len>** and the maximum length of **<resource>, <post_param>** and **<extra_header_line>** parameters in the format: **# HTTPSND: (list of supported <prof_id>s),(list of supported <command>s), <r_length>, (list of supported <data_len>s),<p_length>,<m_length>**

#HTTPSND – send HTTP POST or PUT request		SELINT 2
	where: **<r_length>** - integer type value indicating the maximum length of parameter **<resource>**. **<p_length>** - integer type value indicating the maximum length of parameter **<post_param>**. **<m_length>** - integer type value indicating the maximum length of parameter **<extra_header_line>**	
Example	*Post 100 byte without "Content-type" header* **AT#HTTPSND=0,0,"/",100** **>>>** *Post 100 byte with "application/x-www-form-urlencoded"* **AT#HTTPSND=0,0,"/",100,0** **>>>** *Post 100 byte with "multipart/form-data" and extension* **AT#HTTPSND=0,0,"/",100,"3:boundary=----FormBoundary"** **>>>**	

5.1.6.12.4   Receive HTTP server data - #HTTPRCV

#HTTPRCV – receive HTTP server data		SELINT 2
AT#HTTPRCV=<prof_id>[,<maxByte>]	Execution command permits the user to read data from HTTP server in response to a previous HTTP module request. The module is notified of these data by the **#HTTPRING** URC. The device shall prompt a three character sequence **<less_than><less_than><less_than>** **(IRA 60, 60, 60)** followed by the data. If reading ends successfully, the response is OK; otherwise an error code is reported. Parameters: **<prof_id>** - Numeric parameter indicating the profile identifier. Range: 0-2 **< maxByte >** - Max number of bytes to read at a time Range: 0,64-1500 (default is 0 which means infinite size) Note: if <maxByte> is unspecified, server data will be transferred all in once. Note: If the data are not present or the **#HTTPRING** <http_status_code> parameter has value 0, an error code is reported.	
AT#HTTPRCV=?	Test command reports the supported range of values for **<prof_id>** parameter in the format: **# HTTPRCV: (list of supported <prof_id>s)**	

5.1.6.13 Script Management Commands

5.1.6.13.1 Write Script - #WSCRIPT

#WSCRIPT - Write Script		SELINT 2

AT#WSCRIPT=
[<script_name>,
<size>,
[,<hidden>]]
	Execution command causes the MODULE to store a file in the Easy Script® related NVM, naming it **<script_name>**
	
	The file should be sent using RAW ASCII file transfer.
	It is important to set properly the port settings. In particular:
	Flow control: hardware.
	Baud rate: 115200 bps
	
	Parameters:
	<script_name> - name of the file in NVM, string type (max 16 chars, case sensitive).
	<size> - file size in bytes
	<hidden> - file hidden attribute
	  0 - file content is readable with **#RSCRIPT** (default).
	  1 - file content is readable with **#RSCRIPT** (no effect).
	
	The device shall prompt a five character sequence
	<CR><LF><greater_than><greater_than><greater_than>
	(IRA 13, 10, 62, 62, 62)
	after command line is terminated with **<CR>**; after that a file can be entered from TE, sized **<size>** bytes.
	
	The operations completes when all the bytes are received.
	
	If writing ends successfully, the response is **OK**; otherwise an error code is reported.
	
	Note: the file name should be passed between quotes; every textual script file must have **.py** extension, whilst every pre-compiled executable script file must have **.pyo** extension; file names are case sensitive.
	
	Note: when sending the script be sure that the line terminator is **<CR><LF>** and that your terminal program does not change it.	

AT#WSCRIPT=?	Test command returns **OK** result code.	
Example	AT#WSCRIPT="First.py ",54,0 >>> *here receive the prompt; then type or send the textual script, sized 54 bytes* OK *Textual script has been stored*	
Note	It's recommended to use the extension **.py** only for textual script files and the extension **.pyo** only for pre-compiled executable script files.	

5.1.6.13.2 Read Script - #RSCRIPT

#RSCRIPT - Read Script		SELINT 2
AT#RSCRIPT= [<script_name>]	Execution command reports the content of file **<script_name>**. Parameter: **<script_name>** - file name, string type (max 16 chars, case sensitive). The device shall prompt a five character sequence **<CR><LF><less_than><less_than><less_than>** **(IRA 13, 10, 60, 60, 60)**	

	followed by the file content.
	Note: If the file **<script_name>** is not present an error code is reported.
AT#RSCRIPT=?	Test command returns **OK** result code.
Example	AT#RSCRIPT="First.py " *hereafter receive the prompt; then the script is displayed, immediately after the prompt* <<<import MDM MDM.send('AT\r',10) Ans=MDM.receive(20) OK

5.1.6.13.3   List Script Names - #LCSCRIPT

AT#LCSCRIPT	Execution command reports either the list of file names for the files currently stored in the Easy Script® related NVM, adding CRC16 information, and the available free NVM memory in the format: **[#LCSCRIPT: <script_name1>,<size1>[,<crc1>]…** **[<CR><LF>#LCSCRIPT: <script_name*n*>,<size*n*>[,<crc*n*>]]]** **<CR><LF>#LCSCRIPT: free bytes: <free_NVM>** where: **<script-name*n*>** - file name, quoted string type (max 16 chars, case sensitive) **<size*n*>** - size of script in bytes **<crc*n*>** - CRC16 poly (x^16+x^12+x^5+1) of script in hex format **<free_NVM>** - size of available NVM memory in bytes Note: CRC16 is calculated using the standard reversed CRC16-CCITT x^16+x^12+x^5+1 polynomial (0x1021 representation, reversed) with initial value FFFF. Note: if one file currently stored in NVM is in use than CRC16 cannot be calculated and execution command does not report **<crc*n*>** for that file.
AT#LCSCRIPT= <script_name>	Execution command reports size and CRC16 information of file **<script_name>** in the format: **[#LCSCRIPT: <script_name>,<size>[,<crc>]]** where: **<script-name>** - file name, quoted string type (max 16 chars, case sensitive) **<size>** - size of script in bytes **<crc>** - CRC16 poly (x^16+x^12+x^5+1) of script in hex format Parameter: **<script_name>** - file name, string type (max 16 chars, case sensitive). Note: CRC16 is calculated using the standard reversed CRC16-CCITT x^16+x^12+x^5+1 polynomial (0x1021 representation, reversed) with initial value FFFF.

#LCSCRIPT - List Script Names		SELINT 2
	Note: if file **<script_name>** is in use than CRC16 cannot be calculated and execution command does not report **<crc>**. Note: if file **<script_name>** is not in the list of files stored in NVM execution command exits with error message.	
AT#LCSCRIPT=?	Test command returns **OK** result code.	
Example	AT#LCSCRIPT #LCSCRIPT: "First.py",51,8FD6 #LCSCRIPT: "Second.py",178,A034 #LCSCRIPT: "Third.py",120,7C48 #LCSCRIPT: free bytes: 20000 OK AT#LCSCRIPT="Second.py" #LCSCRIPT: "Second.py",178,A034 OK If file Third.py is already in use. AT#LCSCRIPT #LCSCRIPT: "First.py",51,8FD6 #LCSCRIPT: "Second.py",178,A034 #LCSCRIPT: "Third.py",120 #LCSCRIPT: free bytes: 20000 OK	

5.1.6.13.4 Delete Script - #DSCRIPT

#DSCRIPT - Delete Script		SELINT 2
AT#DSCRIPT= [<script_name>]	Execution command deletes a file from Easy Script® related NVM memory. Parameter: **<script_name>** - name of the file to delete, string type (max 16 chars, case sensitive) Note: if the file **<script_name>** is not present an error code is reported.	
AT#DSCRIPT=?	Test command returns **OK** result code.	
Example	AT#DSCRIPT="Third.py" OK	

5.1.6.13.5 Delete All Scripts - #DASCRIPTS

#DASCRIPT – Delete All Scripts		SELINT 2
AT#DSCRIPT= [<script_name>]	Execution command deletes all files from Easy Script® related NVM memory. Note: if product supports directories execution command deletes all files from current working directory, it does not delete directories.	

#DASCRIPT – Delete All Scripts		SELINT 2
AT#DSCRIPT=?	Test command returns **OK** result code.	

5.1.6.13.6　File System Change Current Drive - #CHDRIVE

#CHDRIVE – File System Change Current Drive		SELINT 2
AT#CHDRIVE=<drive>	Set command sets the current drive in the file system. Parameter: **<drive>** - integer type, current drive integer value Note: at the the only available drive value in the file system is 0 and may be extended in future. Note: if the current drive value in the file system is not 0 then AT commands related to SCRIPT family and MMS family that make use of the file system will have ERROR response.	
AT#CHDRIVE?	Read command reports the current drive in the file system in the format: **#CHDRIVE: <drive>**	
AT#CHDRIVE=?	Test command returns the allowed values for parameter **<drive>.**	
Example	AT#CHDRIVE? #CHDRIVE: 0 OK	

5.1.6.14   SIM Toolkit Commands

5.1.6.14.1   SIM Tookit Interface Activation - #STIA

#STIA - SIM Toolkit Interface Activation		SELINT 2

AT#STIA=
[<mode>
[,<timeout>]]
	Set command is used to activate the SAT sending of unsolicited indications when a **proactive command** is received from SIM.
	
	Parameters:
	<mode>
	  0 - disable SAT
	  1 - enable SAT without unsolicited indication **#STN** (default)
	  2 - enable SAT and extended unsolicited indication **#STN** (see **#STGI**)
	  3 - enable SAT and reduced unsolicited indication **#STN** (see **#STGI**)
	17 - enable SAT without unsolicited indication #STN and 3GPP TS 23.038 alphabet used
	18 - enable SAT and extended unsolicited indication #STN (see #STGI) and 3GPP TS 23.038 alphabet used
	19 - enable SAT and reduced unsolicited indication #STN (see #STGI)and 3GPP TS 23.038 alphabet used
	
	33 - enable SAT without unsolicited indication #STN and UCS2 alphabet used
	34 - enable SAT and extended unsolicited indication #STN (see #STGI)and UCS2 alphabet used
	35 - enable SAT and reduced unsolicited indication #STN (see #STGI)and UCS2 alphabet used
	
	<timeout> - time-out for user responses
	  1.. 2 - time-out in minutes (default 2). Any ongoing (but unanswered) **proactive command** will be aborted automatically after **<timeout>** minutes. In this case, the terminal response is either "ME currently unable to process command", or if applicable, "No response from user". In addition an unsolicited indication will be sent to the external application:
	
	#STN: <cmdTerminateValue>
	
	where:
	  <cmdTerminateValue> is defined as **<cmdType> + terminate offset**; the terminate offset equals 100.
	
	Note: every time the SIM application issues a **proactive command** that requires user interaction an unsolicited code will be sent, if enabled with **#STIA** command, as follows:
	
	• if **<mode>** parameter of **#STIA** command has been set to 3 (reduced unsolicited indication) an unsolicited indication will be sent, indicating the type of **proactive command** issued by the SIM:
	
	#STN: <cmdType>
	
	• if **<mode>** parameter of **#STIA** command has been set to 2 (extended unsolicited indication) the format of the unsolicited indication depends on the specific command:
	
	if <cmdType>=1 (REFRESH)
	
	an unsolicited notification will be sent to the user:
	
	#STN: <cmdType>,<refresh type>
	
	where:

#STIA - SIM Toolkit Interface Activation	

<refresh type>
  0 - SIM Initialization and Full File Change Notification;
  1 - File Change Notification;
  2 - SIM Initialization and File Change Notification;
  3 - SIM Initialization;
  4 - SIM Reset

In this case neither **#STGI** nor **#STSR** commands are required:
- **AT#STGI** is accepted anyway.
- **AT#STSR=<cmdType>,0** will answer **OK** but do nothing.

if **<cmdType>=17** (SEND SS)
if **<cmdType>=19** (SEND SHORT MESSAGE)
if **<cmdType>=20** (SEND DTMF)
if **<cmdType>=32** (PLAY TONE)

an unsolicited notification will be sent if allowed by SIM (see GSM 11.14):

#STN: <cmdType>[,<text>]

where:
<text> - (optional) text to be displayed to user

In these cases neither **#STGI** nor **#STSR** commands are required:
- **AT#STGI** is accepted anyway.
- **AT#STSR=<cmdType>,0** will answer **OK** but do nothing.

In case of SEND SHORT MESSAGE (**<cmdType>**=19) command if sending to network fails an unsolicited notification will be sent

#STN: 119

if **<cmdType>=33** (DISPLAY TEXT)

an unsolicited notification will be sent if allowed by SIM (see GSM 11.14):

#STN: <cmdType>[,<cmdDetails>[,<text>]

where:
<cmdDetails> - unsigned Integer used as a bit field.
 0..255 - used as a bit field:
bit 1:
 0 - normal priority
 1 - high priority
bits 2 to 7: reserved for future use
bit 8:
 0 - clear message after a delay
 1 - wait for user to clear message
<text> - (optional) text to be displayed to user

In this case:
  1. if **<cmdDetails>/bit8** is **0** neither **#STGI** nor **#STSR** commands are required:
-   **AT#STGI** is accepted anyway.
-   **AT#STSR=<cmdType>,0** will answer **OK** but do nothing.
  2. If **<cmdDetails>/bit8** is 1 **#STSR** command is required

if **<cmdType>=40** (SET UP IDLE MODE TEXT)

an unsolicited notification will be sent:

#STN: <cmdType>[,<text>]

where:
<text> - (optional)text to be displayed to user

In these cases neither **#STGI** nor **#STSR** commands are required:
- **AT#STGI** is accepted anyway.
- **AT#STSR=<cmdType>,0** will answer **OK** but do nothing.

if **<cmdType>=18** *(SEND USSD)*

an unsolicited notification will be sent to the user:

#STN: <cmdType>[,<text>]

where:
<text> - optional text string sent by SIM

In this case:
- **AT#STSR=18,20** can be sent to end USSD transaction.
- **AT#STGI** is accepted anyway.
- **AT#STSR=<cmdType>,0** will answer **OK** but do nothing.

if **<cmdType>=5** *(SET UP EVENT LIST)*

an unsolicited notification will be sent:

#STN: <cmdType>[,<event list mask>]

where:
<event list mask> - (optional)hexadecimal number representing the list of events to monitor (see GSM 11.14)
- '00' = MT call
- '01' = Call connected
- '02' = Call disconnected
- '03' = Location status
- '04' = User activity
- '05' = Idle screen available
- '06' = Card reader status (if class "a" is supported)
- '07' = Language selection
- '08' = Browser Termination (if class "c" is supported)
- '09' = Data available (if class "e" is supported)
- '0A' = Channel status (if class "e" is supported)

The hexadecimal number is actually a bit mask, where each bit, when set, indicates that the corresponding event has to be monitored (e.g., if <event list mask> is 0x0001, it means that MT call has to be monitored).

In these cases neither **#STGI** nor **#STSR** commands are required:
- **AT#STGI** is accepted anyway.
- **AT#STSR=<cmdType>,0** will answer **OK** but do nothing.

if **<cmdType>=64** *(OPEN CHANNEL)*

an unsolicited notification will be sent to the user:

#STN: <cmdType>[,<text>]

where:
<text> - optional text string sent by SIM

In this case:
- **AT#STSR=64,34** can be sent to reject request.
- **AT#STGI** is accepted anyway.
- **AT#STSR=<cmdType>,0** will start connection.

All other commands:

the unsolicited indication will report just the proactive command type:

#STN: <cmdType>

Note: if the **call control** or **SMS control facility in the SIM** is activated, when the customer application makes an outgoing call, or sends an SS or USSD, or an SMS, the following **#STN** unsolicited indication could be sent, according to GSM 11.14, to indicate whether the outgoing call has been accepted, rejected or modified by the SIM, or if the SMS service centre address or destination has been changed:

#STN: <cmdTerminateValue>,<Result>[,<TextInfo>[,<Number>[,<MODestAddr>]]]

where
<cmdTerminateValue>
  150 - SMS control response
  160 - call/SS/USSD response
<Result>
  0 - Call/SMS not allowed
  1 - Call/SMS allowed
  2 - Call/SMS allowed with modification
<Number> - Called number, Service Center Address or SS String in ASCII format.
<MODestAddr> - MO destination address in ASCII format.
<TextInfo> - alpha identifier provided by the SIM in ASCII format.

Note: an unsolicited result code

#STN: 254

is sent if the user has indicated the need to end the proactive SIM application session (**AT#STSR=<cmdType>,**16 i.e. "proactive SIM application session terminated by the user" according to GSM 11.14).

The TA does not need to respond directly, i.e. **AT#STSR** is not required.
It is possible to restart the SAT session from the main menu again with the command **AT#STGI=37**.

Note: The settings are saved on user profile and available on following reboot. SIM Toolkit activation/deactivation is only performed at power on.

Note: if **#ENS=1** then the **<mode>** parameter is set to 2

#STIA - SIM Toolkit Interface Activation		SELINT 2

AT#STIA?	Read command can be used to get information about the SAT interface in the format:
	
	#STIA: <state>,<mode>,<timeout>,<SatProfile>
	
	where:
	<state> - the device is in one of the following state:
	  0 - SIM has not started its application yet
	  1 - SIM has started its application (SAT main menu ready)
	<mode> - SAT and unsolicited indications enabling status (see above)
	<timeout> - time-out for user responses (see above)
	<SatProfile> - SAT Terminal Profile according to GSM 11.14, i. e. the list of SIM Application Toolkit facilities that are supported by the ME. The profile cannot be changed by the TA.
	
	Note: In SAT applications usually an SMS message is sent to the network provider containing service requests, e.g. to send the latest news. The provider returns a message with the requested information.
	Before activating SAT it is recommended to set the SMS text mode with command **AT+CMGF=1** and to enable unsolicited indications for incoming SMS messages with command **+CNMI**.	

AT#STIA=?	Test command returns the range of available values for the parameters **<mode>** and **<timeout>**.	
Note	Just one instance at a time, the one which first issued **AT#STIA=n** (with **n** different from zero), is allowed to issue SAT commands, and this is valid till the same instance issues **AT#STIA=0**. After power cycle another instance can enable SAT.	
Note	A typical SAT session on AT interface starts after an **#STN: 37** unsolicited code is received, if enabled(see above). At that point usually an **AT#STGI=37** command is issued (see **#STGI**), and after the SAT main menu has been displayed on TE an **AT#STSR=37,0,x** command is issued to select an item in the menu (see **#STSR**).	

5.1.6.14.2 SIM Tookit Get Information - #STGI

#STGI - SIM Tookit Get Information		SELINT 2

AT#STGI=
[<cmdType>]
	#STGI set command is used to request the parameters of a **proactive command** from the ME.
	
	Parameter:
	<cmdType> - **proactive command** ID according to GSM 11.14 (decimal); these are only those command types that use the AT interface; SAT commands which are not using the AT interface (not MMI related SAT commands, e.g. PROVIDE LOCAL INFORMATION) are executed without sending any indication to the user
	  1 - REFRESH
	  5 – SET UP EVENT LIST
	  16 - SET UP CALL
	  17 - SEND SS
	  18 - SEND USSD
	  19 - SEND SHORT MESSAGE
	  20 - SEND DTMF
	  32 - PLAY TONE
	  33 - DISPLAY TEXT
	  34 - GET INKEY
	  35 - GET INPUT
	  36 - SELECT ITEM
	  37 - SET UP MENU
	  40 – SET UP IDLE MODE TEXT	

64 – OPEN CHANNEL

Requested command parameters are sent using an **#STGI** indication:

#STGI: <parameters>

where **<parameters>** depends upon the ongoing **proactive command** as follows:

*if **<cmdType>=1** (REFRESH)*

#STGI: <cmdType>,<refresh type>
where:
<refresh type>
  0 - SIM Initialization and Full File Change Notification;
  1 - File Change Notification;
  2 - SIM Initialization and File Change Notification;
  3 - SIM Initialization;
  4 - SIM Reset

*if **<cmdType>=5** (SET UP EVENT LIST)*
#STGI: <cmdType>,<event list mask>
where:
<event list mask> - hexadecimal number representing the list of events to monitor (see GSM 11.14):

- '00' = MT call
- '01' = Call connected
- '02' = Call disconnected
- '03' = Location status
- '04' = User activity
- '05' = Idle screen available
- '06' = Card reader status (if class "a" is supported)
- '07' = Language selection
- '08' = Browser Termination (if class "c" is supported)
- '09' = Data available (if class "e" is supported)
- '0A' = Channel status (if class "e" is supported)

The hexadecimal number is actually a bit mask, where each bit, when set, indicates that the corresponding event has to be monitored (e.g., if <event list mask> is 0x0001, it means that MT call has to be monitored).

*if **<cmdType>=16** (SET UP CALL)*
#STGI: <cmdType>,<commandDetails>,[<confirmationText>], <calledNumber>where:
<commandDetails> - unsigned integer, used as an enumeration
  0 Set up call, but only if not currently busy on another call
  1 Set up call, but only if not currently busy on another call, with redial
  2 Set up call, putting all other calls (if any) on hold
  3 Set up call, putting all other calls (if any) on hold, with redial
  4 Set up call, disconnecting all other calls (if any)
  5 Set up call, disconnecting all other calls (if any), with redial
<confirmationText> - string for user confirmation stage
<calledNumber> - string containing called number
*if **<cmdType>=17** (SEND SS)*
*if **<cmdType>=18** (SEND USSD)*
*if **<cmdType>=19** (SEND SHORT MESSAGE)*
*if **<cmdType>=20** (SEND DTMF)*
*if **<cmdType>=32** (PLAY TONE)*
*if **<cmdType>=40** (SET UP IDLE MODE TEXT)*
*if **<cmdType>=64** (OPEN CHANNEL)*

#STGI - SIM Tookit Get Information	SELINT 2

#STGI: <cmdType>[,<text>]

where:
<text> - text to be displayed to user

*if **<cmdType>=33** (DISPLAY TEXT)*

#STGI: <cmdType>,<cmdDetails>[,<text>]

where:
<cmdDetails> - unsigned Integer used as a bit field.
 0..255 - used as a bit field:
bit 1:
 0 - normal priority
 1 - high priority
bits 2 to 7: reserved for future use
bit 8:
 0 - clear message after a delay
 1 - wait for user to clear message
<text> - text to be displayed to user

*if **<cmdType>=34** (GET INKEY)*

#STGI: <cmdType>,<commandDetails>,<text>

where:
<commandDetails> - unsigned Integer used as a bit field.
 0..255 - used as a bit field:
bit 1:
 0 - Digits only (0-9, *, # and +)
 1 - Alphabet set;
bit 2:
 0 - SMS default alphabet (GSM character set)
 1 - UCS2 alphabet
bit 3:
 0 - Character sets defined by bit 1 and bit 2 are enabled
 1 - Character sets defined by bit 1 and bit 2 are disabled and the "Yes/No" response is requested
bits 4 to 7:
 0
bit 8:
 0 - No help information available
 1 - Help information available
<text> - String as prompt for text.

*if **<cmdType>=35** (GET INPUT)*

#STGI: <cmdType>,<commandDetails>,<text>,<responseMin>, <responseMax>[,<defaultText>]

where:
<commandDetails> - unsigned Integer used as a bit field.
 0..255 - used as a bit field:
bit 1:
 0 - Digits only (0-9, *, #, and +)
 1 - Alphabet set

bit 2:
  0 - SMS default alphabet (GSM character set)
  1 - UCS2 alphabet
bit 3:
  0 - ME may echo user input on the display
  1 - User input shall not be revealed in any way. Hidden entry mode (see GSM 11.14) is only available when using digit input. In hidden entry mode only characters ('0'-'9', '*' and '#') are allowed.
bit 4:
  0 - User input to be in unpacked format
  1 - User input to be in SMS packed format
bits 5 to 7:
  0
bit 8:
  0 - No help information available
  1 - Help information available
<text> - string as prompt for text
<responseMin> - minimum length of user input
  0..255
<responseMax> - maximum length of user input
  0..255
<defaultText> - string supplied as default response text

if **<cmdType>=36** (SELECT ITEM)

The first line of output is:

#STGI: <cmdType>,<commandDetails>,<numOfItems>[,<titleText>]
<CR><LF>

One line follows for every item, repeated for **<numOfItems>**:

#STGI: <cmdType>,<itemId>,<itemText>[,<nextActionId>]

where:
<commandDetails> - unsigned Integer used as a bitfield
  0..255 - used as a bit field:
bit 1:
  0 - Presentation type is not specified
  1 - Presentation type is specified in bit 2
bit 2:
  0 - Presentation as a choice of data values if bit 1 = '1'
  1 - Presentation as a choice of navigation options if bit 1 is '1'
bit 3:
  0 - No selection preference
  1 - Selection using soft key preferred
bits 4 to 7:
  0
bit 8:
  0 - No help information available
  1 - Help information available
<numOfItems> - number of items in the list
<titleText> - string giving menu title
<itemId> - item identifier
  1..**<numOfItems>**
<itemText> - title of item
<nextActionId> - the next proactive command type to be issued upon execution of the menu item.
  0 - no next action information available.

#STGI - SIM Tookit Get Information	SELINT 2

	if **<cmdType>=37** *(SET UP MENU)*
	The first line of output is:
	#STGI: <cmdType>,<commandDetails>,<numOfItems>,<titleText> <CR><LF>
	One line follows for every item, repeated for **<numOfItems>**:
	#STGI: <cmdType>,<itemId>,<itemText>[,<nextActionId>]

	where:
	<commandDetails> - unsigned Integer used as a bitfield
	  0..255 - used as a bit field:
	bit 1:
	  0 - no selection preference
	  1 - selection using soft key preferred
	bit 2 to 7:
	  0
	bit 8:
	  0 - no help information available
	  1 - help information available
	<numOfItems> - number of items in the list
	<titleText> - string giving menu title
	<itemId> - item identifier
	  1..**<numOfItems>**
	<itemText> - title of item
	<nextActionId> - the next proactive command type to be issued upon execution of the menu item.
	  0 - no next action information available.

	Note: upon receiving the **#STGI** response, the TA must send **#STSR** command (see below) to confirm the execution of the proactive command and provide any required user response, e.g. selected menu item.
AT#STGI?	The read command can be used to request the currently ongoing **proactive command** and the SAT state in the format **#STGI: <state>,cmdType>** where: **<state>** - SAT interface state (see **#STIA**) **<cmdType>** - ongoing proactive command An error message will be returned if there is no pending command.
AT#STGI=?	Test command returns the range for the parameters **<state>** and **<cmdType>**.
Note	The unsolicited notification sent to the user: **#STN: 37** is an indication that the main menu of the SIM Application has been sent to the TA. It will be stored by the TA so that it can be displayed later at any time by issuing an **AT#STGI=37** command. A typical SAT session on AT interface starts after an **#STN: 37** unsolicited code is received, if enabled. At that point usually an **AT#STGI=37** command is issued, and after the SAT main menu has been displayed on TE an **AT#STSR=37,0,x** command is issued to select an item in the menu (see below). The session usually ends with a SIM action like sending an SMS, or

starting a call. After this, to restart the session from the beginning going back to SAT main menu it is usually required an **AT#STSR=37,16** command.

The unsolicited notification sent to the user:

#STN:237

is an indication that the main menu of the SIM Application has been removed from the TA, and it is no longer available. In this case **AT#STGI=37** command response will be always **ERROR**.

5.1.6.14.3   SIM Tookit Send Response - #STSR

#STSR - SIM Tookit Send Response		SELINT 2

AT#STSR=
[<cmdType>,
<userResponse>
[,<data>]]
	The write command is used to provide to SIM user response to a command and any required user information, e.g. a selected menu item.
	
	Parameters:
	<cmdType> - integer type; **proactive command** ID according to GSM 11.14 (see **#STGI**)
	<userResponse> - action performed by the user
	  0 - command performed successfully (call accepted in case of call setup, start connection in case of open channel request)
	  16 - proactive SIM session terminated by user
	  17 - backward move in the proactive SIM session requested by the user
	  18 - no response from user
	  19 - help information required by the user
	  20 - USSD/SS Transaction terminated by user
	  32 - TA currently unable to process command
	  34 - user has denied SIM call setup request
	  35 - user cleared down SIM call before connection or network release
	<data> - data entered by user, depending on **<cmdType>**, only required if **<Result>** is 0:
	Get Inkey
	<data> contains the key pressed by the user; used character set should be the one selected with **+CSCS**.
	Note: if, as a user response, a binary choice (Yes/No) is requested by the SIM application using bit 3 of the **<commandDetails>** parameter the valid content of the **<inputString>** is:
	a) "IRA", "8859-1", "PCCP437" charsets: "Y" or "y" (positive answer) and "N" or "n" (negative answer)
	b) UCS2 alphabet "0079" or "0059" (positive answer) and "006E" or "004E" (negative answer)
	
	Get Input
	<data> - contains the string of characters entered by the user (see above)
	
	Select Item
	<data> - contains the item identifier selected by the user
	
	Note:
	Use of icons is not supported. All icon related actions will respond with no icon available.	

AT#STSR?	The read command can be used to request the currently ongoing **proactive command** and the SAT state in the format **#STSRI: <state>,<cmdType>** where:	

#STSR - SIM Tookit Send Response		SELINT 2
	<state> - SAT interface state (see **#STIA**) **<cmdType>** - ongoing proactive command An error message will be returned if there is no pending command.	
AT#STSR=?	Test command returns the range for the parameters **<state>** and **<cmdType>**.	

5.1.6.14.4 SIM Tookit terminal Attach - #STTA

#STTA – SIM Toolkit Terminal Attach		SELINT 2
AT#STTA=<state>	This command attaches/detaches the SIM Toolkit application to the AT instance reserved for this use (see #STACFG). Parameters: **<state>:** attached state 0 – SIM Toolkit detaches 1 – SIM Toolkit attaches If SIM Toolkit application has been already attached/detached the command does nothing and returns OK.	
AT#STTA?	Read command reports the current **<state>** in the format: **#STTA: <state>**	
AT#STTA=?	Test command reports the supported range of values for parameter **<state>**	
Note	The AT instance reserved for the SIM Toolkit application is setted by the command #STACFG (default is #3).	

5.1.6.14.5 Configure SIM Toolkit Application parameters - #STACFG

#STACFG – Configure SIM Toolkit Application parameters		SELINT 2
AT#STACFG=<instance> [, <UNUSED_1>[, <UNUSED_2>]	Set command configures the SIM Toolkit Application. Parameters: **<instance>:** AT instance that will be used by the SIM Toolkit Application (see **#STTA**). Range 1 - 5, default 3. **<UNUSED_1>**: reserved for future use **<UNUSED_2>**: reserved for future use Note: <instance> parameter can be setted only if <state> parameter of **#STTA** is set to 0, otherwise the set command returns ERROR. Note: an ERROR is issued if <UNUSED_1> and <UNUSED_2> parameters are set with a value different from 0.	
AT#STACFG?	Read command returns the current settings of parameters in the format: **# STACFG:<instance>,0,0**	
AT#STACFG=?	Test command returns the supported values for the #STACFG parameters	

5.1.6.15　Phonebook AT Commands

5.1.6.15.1　Read Group Entries - #CPBGR

#CPBGR- Read Group Entries		SELINT 2
AT#CPBGR= <index1> [,<index2>]	Execution command returns Grouping information Alpha String (GAS) USIM file entries in location number range **<index1>**...**<index2>**. If **<index2>** is omitted, only location **<index1>** is returned. These strings are the names used for groups an ADN entry could belong to. Parameters: **<index1>** - integer type, value in the range of location numbers of GAS. **<index2>** - integer type, value in the range of location numbers of GAS. The response format is: **[#CPBGR: <index1>,<text>[<CR><LF>** **#CPBGR: <index2>,<text>[…]]]** where: **<index*n*>** - the location number of the GAS entry **<text>** - the alphanumeric text associated to the entry	
AT#CPBGR=?	Test command returns the supported range of values for parameters **<index*n*>** and the maximum length of **<text>** field, in the format: **#CPBGR: (<minIndex> - <maxIndex>),<tlength>** where: **<minIndex>** - the minimum **<index>** number, integer type **<maxIndex>**- the maximum **<index>** number, integer type **<tlength>** - maximum **<text>** field length, integer type	

5.1.6.15.2　Write Group Entries - #CPBGW

#CPBGW - Write Group Entry		SELINT 2
AT#CPBGW= <index>,<text>	Execution command writes Grouping information Alpha String (GAS) USIM file entry in location number **<index>**. Parameters: **<index>** - integer type, value in the range of location numbers of the GAS file. **<text>** - the text associated to the entry, string type Note: If record number **<index>** already exists, it will be overwritten.	
AT#CPBGW=?	Test command returns location range supported by the current storage as a compound value, and maximum length of **<text>** field. The format is: **+CPBGW: (list of supported <index>s),<tlength>** where: **<tlength>** - integer type value indicating the maximum length of field **<text>** in bytes; actual maximum number of characters that can be stored depends upon **<text>** coding (see +CSCS)	

5.1.6.16　GNSS AT Commands

5.1.6.16.1　GNSS Receiver Configuration

5.1.6.16.1.1　GNSS Device Type Set – AT$GPSD

$GPSD - GNSS Device Type Set		SELINT 2
AT$GPSD= <device_type> [,<sub_device_type>]	Set command defines which GNSS receiver is connected to the module. It reserves the Serial port #1 of the module (TRACE) to receive the data stream coming from the attached GNSS module. Parameter: **<device type>** 0 - none; the serial port is not connected to the GNSS device and available for standard use 　1 - currently has no meaning, maintained for backward compatibility 　2 - serial port connected to the GNSS serial port: controlled mode. This configuration is for SiRF StarIV-based GNSS modules support only (JF2-FLASH, JF2-ROM and JF2-ROM+EEPROM) 3 - serial port connected to the GNSS serial port: controlled mode. This configuration is for SiRF StarIV-based GNSS modules support only (JN3-FLASH, JN3-ROM and JN3-ROM+EEPROM). 4 - serial port connected to the GNSS serial port: controlled mode. This configuration is for ST TeseoII-based GNSS modules support only (SL869) 　5 - serial port connected to the GNSS serial port: controlled mode. This configuration is for SiRF StarV-based GNSS modules support only (SE868-V2) 　6 - serial port connected to the GNSS serial port: controlled mode. This configuration is for MediaTek MT3333-based GNSS modules support only (e.g. SL871) **<sub_device type>** 0 - Flash device: Flash based module (default). 1 - ROM device: ROM based module. 2 - ROM + EEPROM (or SPI Flash) device: EEPROM (or SPI Flash) based module. Note: The **<sub_device type>** can be used with SiRF Star-based GNSS modules (JF2/JN3/SE868-V2) only, i.e. when **AT$GPSD=2, AT$GPSD=3 or AT$GPSD=5.**	
AT$GPSD?	Read command reports the current value of **<device_type>** and **<sub_device_type>**　parameters, in the format: **$GPSD: <device_type>,<sub_device_type>**	
AT$GPSD=?	Test command reports the range of supported values for parameter **<device_type>,<sub_device_type>**	
Example	AT$GPSD=0 OK AT$GPSD=2,1 OK AT$GPSD=4,2 ERROR	
Note	The current setting is stored through **AT$GPSSAV**	

5.1.6.16.1.2　GPIO Configuration for GNSS Control – AT$GPSGPIO

$GPSGPIO – GPIO Configuration for GNSS Control		SELINT 2
AT$GPSGPIO= <on_off>, <system_on>, <boot>, <reset>	Execution command sets the GPIO pins to be used to drive JF2 (SE868), JN3 (SL868), SL869, SE868-V2 and SL871 GNSS modules. Parameters: **<on_off>** -　　GPIO pin number to be used to drive the JF2/JN3/SL869/SE868-V2's ON-OFF signal (default = 1) **<system_on>** -GPIO pin number to be used to drive the JF2/SE868-V2's SYSTEM-ON signal (default = 2) **<boot>** - GPIO pin number to be used to drive the JF2-Flash/JN3-Flash/SL869's BOOT signal (default = 3) **<reset>** - GPIO pin number to be used to drive the JF2-Flash/JN3-Flash's RESET signal (default = 4)	
AT$GPSGPIO?	Read command reports the currently selected configuration in the format: **$GPSGPIO: <on_off>,<system_on>,<boot>,<reset**	
AT$GPSGPIO=?	Test command reports supported range of values for parameters **<on_off>, <system_on>, <boot>** and **<reset>** Note**:** the extended GPIO range is reported along with the available customer GPIO range.	
Example	- For a JF2-Flash (AT$GPSD=2,0): AT$GPSGPIO=4,5,6,7 OK AT$GPSGPIO? $GPSGPIO: 4,5,6,7 OK - For a JF2-ROM (AT$GPSD=2,1): AT$GPSGPIO=4,5,0,0 OK OR AT$GPSGPIO=4,5,6,7 OK AT$GPSGPIO? $GPSGPIO: 4,5,0,0 OK - For a JF3-ROM (AT$GPSD=3,1): AT$GPSGPIO=4,0,0,0 OK OR AT$GPSGPIO=4,5,6,7 OK AT$GPSGPIO? $GPSGPIO: 4,0,0,0	

$GPSGPIO – GPIO Configuration for GNSS Control	SELINT 2
	OK - Set Command to configure GPIOs from extended GPIO range: AT$GPSGPIO=131,132,130,128 OK - Test Command showing extended GPIO range: AT$GPSGPIO=? $GPSGPIO: (1-8,128-131),(1-8,132-133),(1-8,128-131),(1-8,128-131) OK
Note	The GPIO configuration specified through this command must be coherent with the specific GNSS module that has to be used, i.e. the configuration specified through the AT$GPSD command. Therefore the GPIOs corresponding to unnecessary signals (e.g. \<system_on>, \<boot> and \<reset> for a JN3-ROM) should be set to zero: this allows to reserve and use the minimum number of GPIOs. See the Hardware User Guide to check the number of available GPIO pins. The GPIO configuration correctness and functionality (i.e. possible conflicts with the GPIO configuration applied through **AT#GPIO**) are under the customer's sole responsibility. If any of the V24 signals has been previously configured as GPIO through **AT#V24CFG**, it can be set by the extended GPIO range (GPIO # from 128 to 133) to drive the external GNSS receiver. Extended GPIOs and V24 signals correspondence is shown below: GPIO #128 → DCD GPIO #129 → CTS GPIO #130 → RING GPIO #131 → DSR GPIO #132 → DTR GPIO #133 → RTS See the Example section above for an example on how to set such GPIOs. An ERROR is returned whenever trying to set a GPIO, from the extended GPIO range, its corresponding V24 signal has not been previously configured as GPIO through **AT#V24CFG.** The current GPIO configuration can be stored through **AT$GPSSAV.** The Command is available in "Controlled Mode" only

5.1.6.16.1.3   Set the GNSS Serial Port Speed – AT$GPSSERSPEED

$GPSSERSPEED – Set the GNSS Serial Port Speed	SELINT 2
AT$GPSSERSPEED= <speed>	Execution command sets the GNSS serial port communication speed. Parameters: **\<speed>** - 4800(default) 9600

$GPSSERSPEED – Set the GNSS Serial Port Speed		SELINT 2
AT$GPSSERSPEED?	Read command returns the selected serial speed in the format **$GPSSERSPEED: <speed>**	
AT$GPSSERSPEED=?	Test command returns the available range for **<speed>**	
Example	AT$GPSSERSPEED = 4800 OK	
Note	This command can be used with SiRF-based GNSS modules, such as JF2, JN3 and SE868-V2 (**AT$GPSD=2, AT$GPSD=2,1, AT$GPSD=2,2, AT$GPSD=3, AT$GPSD=3,1, AT$GPSD=3,2 or AT$GPSD=5,2**), and MT3333-based GNSS modules such as SL871 (AT$GPSD=6). The current setting is stored through **$GPSSAV**. The module must be restarted to use the new configuration.	

5.1.6.16.1.4   GNSS Controller Power Management – AT$GPSP

$GPSP – GNSS Controller Power Management		SELINT 2
AT$GPSP=<status>	Set command allows to manage power-up or down of the GNSS controller Parameter: **<status>** 0 - GNSS controller is powered down 1 - GNSS controller is powered up	
\AT$GPSP?	Read command reports the current value of the **<status>** parameter, in the format: **$GPSP: <status>** The <status> parameter does not report the real power status of the GNSS module but only the value set through the set command above. The <status> parameter, once stored through the AT$GPSSAV command, specifies the power status of the GNSS module (ON or OFF) at system start-up.	
AT$GPSP=?	Test command reports the range of supported values for parameter **<status>**	
Example	AT$GPSP=0 OK	
Note	The command is available in "controlled mode" only. The current setting is stored through **$GPSSAV**	

5.1.6.16.1.5   GNSS Antenna LNA Control – AT$GPSAT

$GPSAT – GNSS Antenna LNA Control		SELINT 2
AT$GPSAT= <type>	Set command selects the GNSS antenna used. Parameter: **<type>** 0 - Disable External GNSS Antenna LNA (default):	

$GPSAT – GNSS Antenna LNA Control		SELINT 2
	GNSS chip Internal LNA Gain Mode is High and **GPS_EXT_LNA_EN** signal is Low 1 - Enable External GNSS Antenna LNA: GNSS chip Internal LNA Gain Mode is Low and **GPS_EXT_LNA_EN** signal is High	
AT$GPSAT?	Read command returns the current value of **<type>** in the format: **$GPSAT: <type>**	
AT$GPSAT=?	Test command reports the range of supported values for parameter **<type>**	
Example	AT$GPSAT=1 OK	
Note	The command is available in "controlled mode" only This command is currently available for SiRFIV-based GNSS modules (JF2 and JN3) only, i.e. whenever is AT$GPSD=2 or AT$GPSD=3. This command must be issued only when the GNSS receiver is operating in Full Power Mode (see **$GPSPS),** otherwise it might have no effect Since the **AT$GPSAT** command performs a hardware reconfiguration of the GNSS receiver, issuing two consecutive **AT$GPSAT** commands should be avoided, otherwise the reconfiguration might fail: an **ERROR** is returned in the latter case If the **<type>** parameter has been set to 1, the External GNSS Antenna LNA is directly driven by the GNSS receiver according to its current power mode (i.e. the External GNSS Antenna LNA is turned off whenever the GNSS receiver is in power saving mode) Please refer to the HW User Guide for the compatible GNSS antennas and their usage Note: the current setting is stored through **$GPSSAV**	

5.1.6.16.1.6   Save GNSS Parameters Configuration – AT$GPSSAV

$GPSSAV - Save GNSS Parameters Configuration		SELINT 2
AT$GPSSAV	Execution command stores the current GNSS parameters in the NVM of the GSM module.	
AT$GPSSAV=?	Test command returns the **OK** result code	
Example	AT$GPSSAV OK	
Note	The module must be restarted to use the new configuration	

5.1.6.16.1.7   Restore GNSS Parameters to Default – AT$GPSRST

$GPSRST - Restore GNSS Parameters To Default		SELINT 2
AT$GPSRST	Execution command resets the GNSS parameters to "Factory Default" configuration and stores them in the NVM of the GSM module.	
AT$GPSRST=?	Test command returns the **OK** result code	

$GPSRST - Restore GNSS Parameters To Default		SELINT 2
Example	AT$GPSRST OK	
Note	The module must be restarted to use the new configuration	

5.1.6.16.1.8   Set CPU Clock for ST TESEOII – AT$GPSSTCPUCLK

$GPSSTCPUCLK – Set CPU Clock for ST TESEOII		SELINT 2
AT$GPSSTCPUCLK= <cpu_clock>	Set command allows changing the CPU Clock Frequency for ST TESEOII-based GNSS modules (e.g. SL869, GE910-GNSS). Parameter: **<cpu_clock>:** 0 – 52 MHz 1 – 104 MHz 2 – 156 MHz 3 – 208 MHz Note: The **<cpu_clock>** setting is saved into TESEOII NVM and retained until a NVM erase or a next firmware upgrade of the GNSS receiver is performed.	
AT$GPSSTCPUCLK?	Read command reports the current setting for the CPU Clock Frequency in the format: **$GPSSTCPUCLK: <cpu_clock>** Note: An **ERROR** is returned if the CPU Clock Frequency has never been changed.	
AT$GPSSTCPUCLK=?	Test command reports the supported range of values for the parameter **<cpu_clock>**	
Note	Note: This command can be used with ST TESEOII-based GNSS modules only (**AT$GPSD=4**). *Please refer to the Software Application Note of the GNSS receiver used for further information on the CPU Clock Frequency used by default.*	

5.1.6.16.1.9   GNSS 5Hz Navigation Mode – AT$GNSS5HZ

$GNSS5HZ – GNSS 5Hz Navigation Mode		SELINT 2
AT$GNSS5HZ= <mode>	Set command allows enabling the 5Hz Navigation Mode on a SiRFStar V Flash-based GNSS receiver (e.g. SE868-V3). Parameter: **<mode>** 0 – Disable 5Hz Navigation Mode (default) 1 – Enable 5Hz Navigation Mode	
AT$GNSS5HZ?	Read command reports the current value of the **<mode>** parameter, in the format: **$GNSS5HZ: <mode>**	
AT$GNSS5HZ=?	Test command reports the range of supported values for parameter **<mode>**	

$GNSS5HZ – GNSS 5Hz Navigation Mode	SELINT 2
Note	The command is available in "Controlled Mode" only.

5.1.6.16.2 GNSS Power Saving Modes Management

5.1.6.16.2.1 Set the GNSS Module in Power Saving Mode – AT$GPSPS

$GPSPS - Set The GNSS Module In Power Saving Mode	SELINT 2

AT$GPSPS=
<mode>
[,<PTF_Period>]
	Set command allows setting the GNSS module in Power saving mode.
	
	Parameters:
	<mode> - the GNSS receiver can operate in four power modes:
	  0 – Full Power Mode, power saving disabled (default). Full-power mode is also known as Continuous Navigation mode. This is the most accurate navigation mode and supports the most dynamic motion scenarios.
	  1 – TricklePower Mode. TricklePower mode is a duty cycled mode in which the system selects a minimum rate of navigation solution updates and minimizes average current.
	  2 – Push-To-Fix Mode. Push-to-Fix mode (PTF) is designed for applications that require infrequent position reporting. The SiRF Star receiver generally stays in the Hibernate system power state but wakes up periodically to refresh position, time, ephemeris data and RTC calibration. A pulse on the external ON_OFF line to the receiver acts as a position update request.
	  3 – Micro Power Mode. Micro Power mode (MPM) is a very low power maintenance mode that delivers continuous availability of the navigation solution. It is intended for low dynamics applications. It continuously maintains ephemeris data as well as a low level of uncertainty in the estimates of position, time, and receiver clock error. It achieves this by keeping the SiRF Star receiver in the Hibernate power state and leaving Hibernate only as needed to maintain these conditions.
	  4 – SmartGNSS I Mode. SmartGNSS I autonomously manages GNSS system usage based on signal conditions to save power. The adaptive mechanism uses fewer system resources during strong signal conditions and uses more resources during weak signal conditions in order to maintain navigation performance.
	  5 – SmartGNSS II Mode. SmartGNSS II includes the benefits of SmartGNSS I and achieves further power reduction by minimizing the usage of the secondary GNSS constellation
	
	<PTF_Period> - Push-To-Fix update period, numeric value in seconds; when mode is Push-To-Fix, the receiver turns on periodically according to this parameter (default value is 1800 sec). This parameter does have meaning only when **<mode>**=2.

AT$GPSPS?	Read command returns the current power saving mode and push-to-fix period, in the format: **$GPSPS: <mode>,<PTF_Period>**
AT$GPSPS=?	Test command returns the available range for **<mode>** and **<PTF_Period>**
Note	Available in "controlled mode" only Push-To-Fix and Micro Power modes support is not available for JN3 because it does not have an ON_OFF input. Therefore, when AT$GPSD=3, only Full Power and TricklePower modes are supported.

$GPSPS - Set The GNSS Module In Power Saving Mode		SELINT 2
	In addition, in this case, the **<PTF_Period>** parameter is accepted but not used. Micro Power Mode support is not currently available for SE868-V2. SmartGNSS I and SmartGNSS II Modes are available on SiRF Star V Flash-based GNSS receivers only (e.g. SE868-V3) This command is currently available for SiRF-based GNSS modules (JF2, JN3, SE868-V2 and SE868-V3) only, i.e. whenever is AT$GPSD=2, AT$GPSD=3 or AT$GPSD=5.	

5.1.6.16.2.2 Wake Up GNSS from Power Saving Mode – AT$GPSWK

$GPSWK - Wake Up GNSS From Power Saving Mode		SELINT 2
AT$GPSWK	Execution command allows waking the GNSS module up when a power saving or standby mode has been previously enabled.	
AT$GPSWK=?	Test command returns the **OK** result code	
Note	Available in "controlled mode" only. This command is currently available for Sirf-based and MediaTek MT3333-based GNSS modules (e.g. JF2, JN3, SE868-V2 and SL871), i.e. whenever is AT$GPSD=2, AT$GPSD=3, AT$GPSD=5 or AT$GPSD=6. Notes for SiRF-based GNSS modules only: If the GNSS module has been configured to work in TricklePower Mode, it will start up, get a fix and then continue to work in power saving mode. If the GNSS module has been configured to work in Push-To-Fix Mode, issuing **AT$GPSWK** allows to wake it up before the Push-To-Fix update period; once a new fix will be got, the GNSS module will return to Push-To-Fix mode. If the GNSS module has been configured to work in Micro Power Mode, it will be set to Full Power Mode (same as issuing AT$GPSPS=0 command). Notes for MediaTek MT3333-based GNSS modules only: If the GNSS module has been configured to work in any of the supported Standby modes, the current Standby mode will be disabled.	

5.1.6.16.2.3 Set the Periodic Power Saving Mode for MTK – AT$GPSMTKPPS

$GPSMTKPPS - Set the Periodic Power Saving Mode for MTK		SELINT 2
AT$GPSMTKPPS= <mode>[, <runtime>, <sleeptime>, <second_runtime>, <second_sleeptime>]	Set command allows setting the MediaTek MT3333-based GNSS modules' Periodic Power Saving Mode settings. Parameters: **<mode>** - the GNSS receiver can operate in five different Periodic Power Saving modes: 0 – Normal mode (Periodic Power Saving mode disabled) 1 – Periodic Backup mode 2 – Periodic Standby mode 8 – AlwaysLocate™ standby mode	

$GPSMTKPPS - Set the Periodic Power Saving Mode for MTK		SELINT 2
	9 – AlwaysLocate™ backup mode **<runtime> -** Full Power (or Normal) Period in milliseconds 1000...518400000 **<sleeptime>** - Low Power Period (backup/standby) in milliseconds 1000... 518400000 **<second_runtime>** - Full Power (or Normal) Period in milliseconds for extended acquisition if GNSS acquisition fails during **<runtime>** 0 – Disable 1000...518400000 – Enable (should be larger than the set **<runtime>** value) **<second_sleeptime>** - Low Power Period (backup/standby) in milliseconds for extended sleep if GNSS acquisition fails during **<runtime>** 0 – Disable 1000...518400000 Note: The **<runtime>, <sleeptime>, <second_runtime>, <second_sleeptime>** parameters must be set if **<mode>** is 1 or 2 otherwise **ERROR** is returned Note: The **<runtime>, <sleeptime>, <second_runtime>, <second_sleeptime>** parameters must be omitted if **<mode>** is 0, 8 or 9 otherwise **ERROR** is returned Note: **<mode>** values different from 0 can be set only when the GNSS module is powered ON and operating in Full (or Normal) Power mode. Note: the **<mode>** value 0 can be set only when the GNSS module is operating in any of the Periodic Power Saving modes. Issuing **AT$GPSMTKPPS=0** the GNSS module switches back to Full (or Normal) Power mode as soon as it wakes up according to the **<sleeptime>** and **<second_sleeptime>** values set.	
AT$GPSMTKPPS?	Read command returns the current Periodic Power Saving mode in the format: **$GPSMTKPPS: <mode>[,<runtime>,<sleeptime>,<second_runtime>,<second_sleepti me>]**	
AT$GPSMTKPPS=?	Test command reports the supported range of values for parameters **<mode>,<runtime>,<sleeptime>,<second_runtime>,<second_sleeptim e>**	
Note	Available in "controlled mode" only. This command is currently available for MediaTek MT3333-based GNSS modules (e.g. SL871) only, i.e. whenever is AT$GPSD=6.	

5.1.6.16.2.4   Set Standby Mode for MTK – AT$GPSMTKSTDBY

$GPSMTKSTDBY - Set Standby Mode for MTK		SELINT 2
AT$GPSMTKSTDBY= <mode>	Set command allows setting the MediaTek MT3333-based GNSS modules in Standby mode. Parameters: **<mode>** - the GNSS receiver can operate in three Standby modes: 0 – Standby Mode disabled (default). This value cannot be set and may be reported by the read command only. 1 – Stop Mode 2 – Sleep Mode	
AT$GPSMTKSTDBY?	Read command returns the current Standby mode in the format:	

$GPSMTKSTDBY - Set Standby Mode for MTK		SELINT 2
	$GPSMTKSTDBY: <mode>	
AT$GPSMTKSTDBY=?	Test command returns the available range for **<mode>**	
Note	This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is AT$GPSD=6. Stop or Sleep Standby modes can be set only when the GNSS module is powered ON and operating in full power mode. The GNSS module can be forced to exit from the standby modes through the **AT$GPSWK** command.	

5.1.6.16.3 GNSS General Management

5.1.6.16.3.1 GNSS Software Version – AT$GPSSW

$GPSSW - GNSS Software Version		SELINT 2
AT$GPSSW	Execution command returns the GNSS module software version in the format: **$GPSSW: <sw version>**	
AT$GPSSW?	Read command has the same meaning as the Execution command	
AT$GPSSW=?	Test command returns the **OK** result code	
Example	For SiRF IV-based modules (e.g. JF2, JN3 and GE864-GPS): AT$GPSSW $GPSSW: GSD4e_4.0.2-P1 05/26/2010 146 OK For STM TeseoII-based modules (e.g. SL869 and GE910-GNSS): AT$GPSSW $GPSSW: SL869 v3.0.0.1 -STD -N96 OK For SiRF V-based modules (e.g. SE868-V2): AT$GPSSW $GPSSW: 5xp__5.5.2-R32+5xpt_5.5.2-R32 OK For MT3333-based modules (e.g. SL871): AT$GPSSW $GPSSW: AXN_3.60_3333_14080800,C012,MT33-1.,1.106 OK	
Note	The command is available in "controlled mode" only. The GNSS Module software version is available in few seconds at first GPS module startup	

5.1.6.16.3.2 GNSS Reset – AT$GPSR

$GPSR - GNSS Reset		SELINT 2
AT$GPSR= <reset_type>	Execution command allows to reset the GNSS controller.	

$GPSR - GNSS Reset	SELINT 2

	Parameter:
	 <reset_type>
	   0 – Factory reset: this option clears all the GNSS memory including Clock Drift, Extended Ephemeris files stored into flash memory and applied software patch in case a ROM-based receiver is being used.
	   1 – Coldstart (No Almanac, No Ephemeris): this option clears all data that is currently stored in the internal memory of the GNSS receiver including Last Position, Almanac, Ephemeris and Time. However, the stored Clock Drift and Extended Ephemeris are retained.
	   2 – Warmstart (No ephemeris): this option clears Ephemeris and Last Position only. Almanac and Extended Ephemeris are retained.
	   3 – Hotstart (with stored Almanac and Ephemeris): the GNSS receiver restarts by using all data that is currently stored in the internal memory of the GNSS receiver: valid Almanac, Ephemeris and Extended Ephemeris are therefore retained and used.

AT$GPSR=?	Test command reports the range of supported values for parameter **<reset_type>**
Example	AT$GPSR=0 OK
Note	The command is available in "controlled mode" only This command must be issued only when the GNSS receiver is operating in Full Power Mode (see $GPSPS), otherwise it might have no effect. Since the Factory Reset (**<reset_type>=0**) performs a hardware reconfiguration of the GNSS receiver, issuing two consecutive **AT$GPSR** commands should be avoided, otherwise the reconfiguration might fail: an **ERROR** is returned in the latter case.

5.1.6.16.3.3   Direct Access to GNSS Module – AT$GPSCON

$GPSCON - Direct Access to GNSS Module	SELINT 2
AT$GPSCON	Execution command allows setting the cellular module in transparent mode in order to have a direct access to the serial port of the GNSS module. The cellular module will directly transfer the received data to the GNSS module (and vice-versa), without checking or elaborating it.
AT$GPSCON=?	Test command returns the **OK** result code
Note	The command can be used in "controlled mode" only. In case of an incoming call from cellular module, this will be visible on the RING pin of serial port. The escape sequence is "+++". The suggested Serial Port Speed for SirfIV-based modules (e.g. JF2 and JN3) is 57600. The suggested Serial Port Speed for SirfV-based modules (e.g. SE868-V2) is 115200.

5.1.6.16.4   GNSS Positioning Information

5.1.6.16.4.1   Unsolicited NMEA Data Configuration – AT$GPSNMUN

$GPSNMUN - Unsolicited NMEA Data Configuration	SELINT 2

AT$GPSNMUN=
<enable>
[,<GGA>,<GLL>,
<GSA>,<GSV>,
<RMC>,<VTG >]
	Set command allows to activate an Unsolicited stream of GNSS data (in NMEA format) through the standard cellular module serial port and defines which NMEA sentences will be relayed
	
	Parameters:
	<enable>
	 0 - NMEA data stream de-activated (default)
	 1 - NMEA data stream activated with the following unsolicited response syntax:
	   $GPSNMUN: <NMEA SENTENCE><CR>
	 2 - NMEA data stream activated with the following unsolicited response syntax:
	   <NMEA SENTENCE><CR>
	 3 - dedicated NMEA data stream; it is not possible to send AT commands; with the escape sequence '+++' the user can return to command mode
	<GGA> - Global Positioning System Fix Data
	 0 - disable (default)
	 1 - enable
	<GLL> - Geographic Position - Latitude/Longitude
	 0 - disable (default)
	 1 - enable
	<GSA> - GNSS DOP and Active Satellites
	 0 - disable (default)
	 1 - enable
	<GSV> - GNSS Satellites in View
	 0 - disable (default)
	 1 - enable
	<RMC> - Recommended Minimum Specific GNSS Data
	 0 - disable (default)
	 1 - enable
	<VTG> - GNSS Course Over Ground and Ground Speed
	 0 - disable (default)
	 1 – enable

AT$GPSNMUN?	Read command returns whether the unsolicited GNSS NMEA data stream is currently enabled or not, along with the current NMEA mask configuration, in the format: **$GPSNMUN:<enable>,<GGA>,<GLL>,<GSA>,<GSV>,<RMC>,< VTG >**
AT$GPSNMUN=?	Test command returns the supported range of values for parameters **<enable>, <GGA>, <GLL>, <GSA>, <GSV>, <RMC>, <VTG>**
Example	Set the GSA as available sentence in the unsolicited message: AT$GPSNMUN=2,0,0,1,0,0,0 OK Turn-off the unsolicited mode: AT$GPSNMUN=0 OK Read the current NMEA mask configuration:

$GPSNMUN - Unsolicited NMEA Data Configuration		SELINT 2
	AT$GPSNMUN? $GPSNMUN: 2,0,0,1,0,0,0 OK The unsolicited message will be: $GPGSA,A,3,23,20,24,07,13,04,02,,,,,,2.4,1.6,1.8*3C	
Reference	NMEA 0183 Specifications	
Note	The command is available in "Controlled Mode" only The available NMEA sentences and their talker (GN, GP and GL) depend on the GNSS receiver used and its firmware configuration. Please refer to the Software Application Note of the GNSS receiver used for further information on the available NMEA data set. SirfIV-based GNSS modules (e.g. JF2, JN3): The fields PDOP and VDOP are not available	

5.1.6.16.4.2 Get Acquired Position Information – AT$GPSACP

$GPSACP – Get Acquired Position Information		SELINT 2

AT$GPSACP	Execution command returns information about the latest GNSS position in the format:
	
	$GPSACP: \<UTC>,\<latitude>,\<longitude>,\<hdop>,\<altitude>, \<fix>,\<cog>,\<spkm>,\<spkn>,\<date>,\<nsat>
	
	where:
	\<UTC> - UTC time (hhmmss.sss) referred to GGA sentence
	\<latitude> - format is ddmm.mmmm N/S (referred to GGA sentence)
	 where:
	 dd - degrees
	  00..90
	 mm.mmmm - minutes
	  00.0000..59.9999
	 N/S: North / South
	\<longitude> - format is dddmm.mmmm E/W (referred to GGA sentence)
	 where:
	 ddd - degrees
	  000..180
	 mm.mmmm - minutes
	  00.0000..59.9999
	 E/W: East / West
	\<hdop> - x.x - Horizontal Diluition of Precision (referred to GGA sentence)
	\<altitude> - x.x Altitude - mean-sea-level (geoid) in meters (referred to GGA sentence)
	\<fix> -
	 0 or 1 - Invalid Fix
	 2 - 2D fix
	 3 - 3D fix
	\<cog> - ddd.mm - Course over Ground (degrees, True) (referred to VTG sentence)
	 where:	

$GPSACP – Get Acquired Position Information	

	ddd - degrees
	  000..360
	mm - minutes
	  00..59
	<spkm> - x.x Speed over ground (Km/hr) (referred to VTG sentence)
	<spkn> - x.x- Speed over ground (knots) (referred to VTG sentence)
	<date> - ddmmyy Date of Fix (referred to RMC sentence)
	 where:
	dd - day
	  01..31
	mm - month
	  01..12
	yy - year
	  00..99 - 2000 to 2099
	<nsat> - nn - Total number of satellites in use (referred to GGA sentence)
	00..12

AT$GPSACP?	Read command has the same meaning as the Execution command
AT$GPSACP=?	Test command returns the **OK** result code
Example	AT$GPSACP $GPSACP: 122330.000,4542.8106N,01344.2720E,2.25,338.0,3,0.0,0.02,0.01,2406 13,04 OK
Note	If the GNSS receiver is turned off or its serial line is not physically connected to the cellular module, the answer might be empty as shown below. AT$GPSACP $GPSACP: OK

5.1.6.16.4.3   GNSS Estimated Position Errors – AT$GNSSEPE

$GNSSEPE – GNSS Estimated Position Errors		SELINT 2
AT$GNSSEPE?	Read command reports the Estimated Horizontal and Vertical Position Errors for the last GNSS position fix, for SiRF StarIV and SiRF StarV based GNSS receivers, in the format: **$GNSSEPE: <ehpe>,<evpe>** Where: **<ehpe>** - Estimated Horizontal Position Error in meters **<evpe>** - Estimated Vertical Position Error in meters	
AT$GNSSEPE=?	Test command returns the **OK** result code	
Note	The command is available in "Controlled Mode" only. If a GNSS position fix has not been got yet, the answer will be as follows: **AT$GNSSEPE?** **$GNSSEPE: 0.00,0.00** **OK**	

5.1.6.16.5   GNSS SiRFInstantFix™

5.1.6.16.5.1   GPS SiRFInstantFix™ – AT$GPSIFIX

$GPSIFIX – GPS SiRFInstantFix™		SELINT 2
AT$GPSIFIX= <enable>[, <cgee>, <sgee>[, <update>]]	Set command enables/disables SiRFInstantFix™ feature available on SiRF StarIV based modules. Parameters: **<enable>** - SiRFInstantFix Usage 0 – Disable (default) 1 – Enable **<cgee>** - Client Generated Extended Ephemeris (CGEE) 0 – Disable 1 – Enable (default) **<sgee>** - Server Generated Extended Ephemeris (SGEE) 0 – Disable (default) 1 – Enable **<update>** - SGEE File Update Mode 0 – Upon Aiding Data Requests coming from GPS chip 1..168 – Update rate in hours (168 is the max update rate in case of 7-days SGEE files usage) Note: If **<enable>=0,** the rest of parameters must be omitted otherwise **ERROR** is returned Note: If **<enable>=1** and the rest of parameters is omitted, the default configuration, or a previous stored one, is used Note: If **<sgee>=1**, the **<update>** parameter must be set otherwise **ERROR** is returned Note: If **<sgee>=1** the following URC is used to warn, according to the **<update>** value, that the SGEE file has to be updated: *$SIFIXEV: SGEE File Update Requested*	

$GPSIFIX – GPS SiRFInstantFix™		SELINT 2
	Note: If **<sgee>=0,** the **<update>** parameter must be omitted otherwise **ERROR** is returned	
AT$GPSIFIX?	Read command reports the currently selected SiRFInstantFix configuration in the format: **$GPSIFIX: <enable>[,<cgee>,<sgee>[,<update>]]**	
AT$GPSIFIX=?	Test command reports the supported range of values for parameters **<enable>, <cgee>, <sgee>,<update>**	
Example	AT$GPSIFIX=0 OK AT$GPSIFIX=1,1,0 OK	
Note	SiRFInstantFix parameters are stored in NVM, along with all current GPS parameters, if **OK** is returned (same as AT$GPSSAV). SiRFInstantFix default configuration may be restored by issuing the AT$GPSRST command. The Command is available in "Controlled Mode" only.	

5.1.6.16.5.2   GNSS SiRFInstantFix™ – AT$GNSSIFIX

$GNSSIFIX – GNSS SiRFInstantFix™		SELINT 2
AT$GNSSIFIX= <navsystem>, <cgee>, <sgee>	Set command enables/disables the SiRFInstantFix™ feature available on SiRF StarV-based GNSS modules. Parameters: **<navsystem>** - Constellation for which the SiRFInstantFix™ feature has to be enabled 0 – GPS 1 – GLONASS **<cgee>** - Client Generated Extended Ephemeris (CGEE) 0 – Disable 1 – Enable **<sgee>** - Server Generated Extended Ephemeris (SGEE) 0 – Disable 1 – Enable Note: SE868-V2 firmware comes with CGEE and SGEE enabled by default for both GPS and GLONASS constellations. Note: if **<sgee>=1** the following URC is used to warn, according to the **<navsystem>** value, that the SGEE file has to be updated: - For GPS *$SIFIXEV: GPS SGEE File Update Requested* - For GLONASS *$SIFIXEV: GLONASS SGEE File Update Requested*	
AT$GNSSIFIX?	Read command reports the current SiRFInstantFix™ configuration, for both GPS and GLONASS, in the format: **$GNSSIFIX: 0,<cgee>,<sgee>**	

$GNSSIFIX – GNSS SiRFInstantFix™		SELINT 2
	$GNSSIFIX: 1,<cgee>,<sgee>	
AT$GNSSIFIX=?	Test command reports the supported range of values for parameters **<navsystem>, <cgee>, <sgee>**	
Example	AT$GNSSIFIX=0,1,0 OK AT$GNSSIFIX=1,1,1 OK	
Note	The Command is available in "Controlled Mode" only.	

5.1.6.16.5.3   Get SGEE File for SiRFInstantFix™ – AT$FTPGETIFIX

$FTPGETIFIX – Get SGEE File for SiRFInstantFix™		SELINT 2
AT$FTPGETIFIX= <filename>, <filesize> [,<navsystem>]	Execution command, issued during a FTP connection, opens a data connection, downloads a SGEE file from the FTP server and injects it into SiRF StarIV or StarV GNSS receiver. Parameters: **<filename>** - file name, string type **<filesize>** - SGEE file size in bytes **<navsystem>** - Constellation for which the SGEE file has to be downloaded and injected 0 – GPS (default) 1 – GLONASS Note: the **<navsystem>** parameter has a meaning for Sirf StarV-based receivers (e.g. SE868-V2) only; if omitted, the default value will be used (GPS). Therefore, when a Sirf StarIV-based receiver is used, the **<navsystem>** parameter is accepted but it does not have any effect.	
AT$FTPGETIFIX=?	Test command returns the **OK** result code	
Example	AT$FTPGETIFIX="packedDifference.f2p3enc.ee",30970 OK AT$FTPGETIFIX="packedDifference.f2p1enc.ee",10742 +CME ERROR: SGEE file is not newer than the last stored one	
Note	Whenever a FTP connection has not been opened yet, an **ERROR** result code is returned. Whenever an error happens during the SGEE file injection stage, an **ERROR** result code is returned In this case the possible *<err>* values reported by *+CME ERROR* (numeric format followed by verbose format) may be: 920 SGEE update initialization stage failed 921 SGEE file is not newer than the last stored one 922 SGEE update generic error 923 SGEE file open error The command closure should always be handled by the customer application. In order to avoid download stall situations a timeout should be implemented by the application. The Command is available in "Controlled Mode" only.	

5.1.6.16.5.4   Get SGEE File for SiRFInstantFix™ – AT$HTTPGETIFIX

$HTTPGETIFIX – Get SGEE File for SiRFInstantFix™		SELINT 2
AT$HTTPGETIFIX= < prof_id >, <filesize> [,<navsystem>]	Execution command, issued during a HTTP connection, downloads a SGEE file from the HTTP server and injects it into the SiRF StarIV or StarV GNSS receiver, after a HTTP query using a specific Profile Id, GET option, SGEE file name has been sent. Parameters: **<prof_id>** - Numeric parameter indicating the profile identifier. Range: 0-2 **<filesize>** - SGEE file size in bytes **<navsystem>** - Constellation for which the SGEE file has to be downloaded and injected 0 – GPS (default) 1 – GLONASS Note: the **<navsystem>** parameter has a meaning for Sirf StarV-based receivers (e.g. SE868-V2) only; if omitted, the default value will be used (GPS). Therefore, when a Sirf StarIV-based receiver is used, the **<navsystem>** parameter is accepted but it does not have any effect.	
AT$HTTPGETIFIX=?	Test command returns the **OK** result code	
Example	AT$HTTPGETIFIX=0,30970 OK AT$HTTPGETIFIX=0,10742 +CME ERROR: SGEE file is not newer than the last stored one	
Note	Whenever a HTTP configuration has not been done yet, an **ERROR** result code is returned. Whenever an error happens during the SGEE file injection stage, an **ERROR** result code is returned In this case the possible *<err>* values reported by *+CME ERROR* (numeric format followed by verbose format) may be: 920 SGEE update initialization stage failed 921 SGEE file is not newer than the last stored one 922 SGEE update generic error 923 SGEE file open error The Command is available in "Controlled Mode" only.	

5.1.6.16.6   GNSS Patch Management

5.1.6.16.6.1   Write Patch on Flash – AT$WPATCH

$WPATCH – Write Patch on Flash		SELINT 2
AT$WPATCH= <patch_file_name>, <size>	Execution command allows storing a SiRF software patch onto the module's flash memory. Parameters: **<patch_file_name>** - name of the file in NVM, string type (max 16 chars, case sensitive). **<size>** - file size in bytes The file should be sent using RAW ASCII file transfer. It is important to set properly the port settings. In particular: Flow control: hardware. Baud rate: 115200 bps	

$WPATCH – Write Patch on Flash		SELINT 2
	The device shall prompt a three character sequence: <greater_than><greater_than><greater_than> (IRA 62, 62, 62) then the command line is terminated with a <CR>; after that a file can be sent from TE, sized <size> bytes. The operations completes when all the bytes are received. If writing ends successfully, the response is OK; otherwise an error code is reported.	
AT$WPATCH=?	Test command returns the **OK** result code	
Example	AT$WPATCH = "GSD4E_4.1.2.pd2",5472 >>> here the prompt is received: depending on your editor settings it's possible that the prompt overrides the above line; then type or send the patch, sized 54 bytes OK Patch has been stored.	
Note	Note: This command can be used with SIRF ROM-based GPS modules only (**AT$GPSD=2,1**, **AT$GPSD=2,2, AT$GPSD=3,1, AT$GPSD=3,2 or AT$GPSD=5,2**). Note: The patch file must have a "**.pd2**" or "**.pd3**" (AT$GPSD=5,2) extension.	

5.1.6.16.6.2   Enable Patch – AT$EPATCH

$EPATCH – Enable Patch		SELINT 2
AT$EPATCH= [<patch_file_name>]	Execution command allows enabling the usage of a SiRF software patch saved onto the module's flash memory. Parameters: <patch_file_name> - name of the file in NVM, string type (**max 16 chars, case sensitive**). The execution command returns OK but the patching is confirmed by the following unsolicited: - *"Patch Manager: Patched"* Other unsolicited messages can be due to errors occurred during the patching procedure or patch storage errors: -*"Patch Manager: Error opening Patch File"* -*"Patch Manager: Error processing Patch File"* -*"Patch Manager: Error on Start Request"* -*"Patch Manager: Error on Load Request"* -*"Patch Manager: Error on Exit Request"*	
AT$EPATCH?	Read command displays the patch currently in use in the format: **$EPATCH: <patch_file_name>**	
AT$EPATCH=?	Test command returns the **OK** result code	
Example	AT$EPATCH = "GSD4E_4.1.2.pd2" OK Patch Manager: Patched.	

$EPATCH – Enable Patch	SELINT 2

	- The SiRF GNSS module has been patched
Note	This command can be used with SIRF ROM-based GNSS modules only (**AT$GPSD=2,1**, **AT$GPSD=2,2**, **AT$GPSD=3,1**, **AT$GPSD=3,2** or **AT$GPSD=5,2**). The patch file must have a **".pd2"** or ".**pd3**" (AT$GPSD=5,2) extension. A previously applied patch can be removed from the GNSS Patch RAM by issuing a Factory Reset or by powering the GNSS module down and removing the VBatt. However, if automatic patch application hasn't been disabled, the patch will be automatically reapplied. If the **<patch_file_name>** is omitted, the automatic patch application, at the next startup of the cellular module, is disabled. However, the current patch remains applied until it will be not removed as explained above. The configuration specified through AT$EPATCH can be saved by means of the **AT$GPSSAV** command. The "**AT$EPATCH**" command returns **ERROR**.

5.1.6.16.6.3   List Available Patch – AT$LPATCH

$LPATCH – List Available Patch	SELINT 2

AT$LPATCH	Execution command displays the available SiRF software patch saved onto the module's flash memory.
AT$LPATCH=?	Test command returns the **OK** result code
Example	AT$LPATCH $LPATCH: "GSD4E_4.1.2.pd2",5472 OK
Note	This command can be used with SIRF ROM-based GPS modules only (**AT$GPSD=2,1**, **AT$GPSD=2,2**, **AT$GPSD=3,1**, **AT$GPSD=3,2** or **AT$GPSD=5,2**). The patch file must have a "**.pd2**" or "**.pd3**" (AT$GPSD=5,2) extension.

5.1.6.16.6.4   Delete Patch from NVM – AT$DPATCH

$DPATCH – Delete Patch from NVM	SELINT 2

AT$DPATCH= <patch_file_name>	Execution command deletes a SiRF software patch stored onto the module's flash memory. Parameters: **<patch_file_name>** - name of the file in NVM, string type (max 16 chars, case sensitive). The execution command returns OK.
AT$DPATCH=?	Test command returns the **OK** result code
Example	AT$DPATCH = "GSD4E_4.1.2.pd2" OK

$DPATCH – Delete Patch from NVM	SELINT 2
Note	This command can be used with SIRF ROM-based GNSS modules only (**AT$GPSD=2,1, AT$GPSD=2,2, AT$GPSD=3,1 AT$GPSD=3,2 or AT$GPSD=5,2**).

5.1.6.16.7   GNSS ST-AGPS™

5.1.6.16.7.1   Enable ST-AGPS™ Usage – AT$GPSSTAGPS

$GPSSTAGPS – Enable ST-AGPS™ Usage	SELINT 2
AT$GPSSTAGPS= <enable>	Set command enables/disables the STAGPS™ feature available on ST TESEOII-based GNSS modules. Parameters: **<enable>:** 0 – Disable 1 – Enable
AT$GPSSTAGPS?	Read command reports the currently selected STAGPS™ configuration in the format: **$GPSSTAGPS: <enable>**
AT$GPSSTAGPS=?	Test command reports the supported range of values for parameter **<enable>**
Note	This command can be used with ST TESEOII-based GNSS modules only (AT$GPSD=4). Since the current STAGPS™ configuration is not saved in NVM this command has to be issued at every power-cycle of both the GNSS receiver and the GSM module.

5.1.6.16.7.2   Get ST-AGPS Seed File for ST-AGPS™ – AT$HTTPGETSTSEED

$HTTPGETSTSEED – Get ST-AGPS Seed File for ST-AGPS™	SELINT 2
AT$HTTPGETSTSEED= <prof_id>, <filesize>	Execution command, issued during a HTTP connection, downloads a ST-AGPS seed file from the HTTP server and creates a decoded version of the file itself. The decoded seed file is stored onto the module's NVM and can be injected later on by means of the AT$INJECTSTSEED command. The ST-AGPS seed file size must be retrieved, before issuing the AT$HTTPGETSTSEED command, by sending a HTTP query using a specific Profile Id, GET option and the ST-AGPS seed file name. Parameters: **<prof_id>** - Numeric parameter indicating the profile identifier. Range: 0-2 **<filesize>** - ST-AGPS seed file size in bytes
AT$HTTPGETSTSEED=?	Test command returns the **OK** result code
Example	AT$HTTPGETSTSEED=0,2199 OK
Note	The Command is available in "Controlled Mode" only. Whenever a HTTP configuration has not been done yet, an **ERROR** result code is returned.

5.1.6.16.7.3　Inject Decoded ST-AGPS Seed File – AT$INJECTSTSEED

$INJECTSTSEED – Inject Decoded ST-AGPS Seed File		SELINT 2
AT$INJECTSTSEED	Execution command injects a decoded ST-AGPS seed, previously downloaded and stored onto the module's NVM, into TESEOII-based GNSS receivers. Note: whenever an error happens during the decoded ST-AGPS seed file injection stage, an **ERROR** result code is returned In this case the possible <err> values reported by **+CME ERROR** (numeric format followed by verbose format) may be: 970　　STAGPS Seed file open error 971　　STAGPS Seed file exceeds the maximum allowed one 972　　STAGPS pre-configuration error 973　　STAGPS seed injection error 974　　STAGPS re-configuration error Note: a decoded ST-AGPS seed can be injected only if the GNSS receiver has a valid UTC time from a previous fix, i.e. it is in a warm start condition.	
AT$INJECTSTSEED=?	Test command returns the **OK** result code	
Note	The command is available in "Controlled Mode" only.	

5.1.6.16.8　GNSS MTK EPO

5.1.6.16.8.1　Get EPO File for MT EPO Aiding – AT$HTTPGETEPO

$HTTPGETEPO – Get EPO File for MT EPO Aiding		SELINT 2
AT$HTTPGETEPO= <prof_id>, <filesize>	Execution command, issued during a HTTP connection, downloads an EPO file from the HTTP server and stores it on the cellular module's NVM for future use. The EPO file can be injected later on by means of the AT$INJECTEPO command. The EPO file size must be retrieved, before issuing the AT$HTTPGETEPO command, by sending a HTTP query using a specific Profile Id, GET option and the EPO file name. Parameters: **<prof_id>** - Numeric parameter indicating the profile identifier. Range: 0-2 **<filesize>** - EPO file size in bytes Note: whenever a HTTP configuration has not been done yet, an **ERROR** result code is returned	
AT$HTTPGETEPO=?	Test command returns the **OK** result code	
Example	AT$HTTPGETEPO=0,129024 OK	
Note	This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is AT$GPSD=6.	

5.1.6.16.8.2   Inject EPO Aiding File – AT$INJECTEPO

$INJECTEPO – Inject EPO Aiding File		SELINT 2
AT$INJECTEPO	Execution command injects an EPO file, previously downloaded and stored onto the cellular module's NVM, into MT3333-based GNSS receivers (e.g. SL871). Note: whenever an error happens during the EPO file injection stage, an **ERROR** result code is returned. In this case the possible <err> values reported by **+CME ERROR** (numeric format followed by verbose format) may be: 980 GNSS file open error 985 Invalid EPO file 986 EPO MTK binary configuration error 987 EPO injection error 988 EPO NMEA configuration error Note: only EPO files up to 14-days validity are currently supported. Therefore, if a 30-days EPO file is used, only data for the first 14 days will be injected.	
AT$INJECTEPO=?	Test command returns the **OK** result code	
Note	This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is AT$GPSD=6.	

5.1.6.16.8.3   Query EPO Data Status – AT$QUERYEPO

$QUERYEPO – Query EPO Data Status		SELINT 2
AT$QUERYEPO	Execution command queries the EPO data status, in MT3333-based GNSS receivers (e.g. SL871), whose answer will be in the form: **$QUERYEPO: <SET>,<FWN>,<FTOW>,<LWN>,<LTOW>, <FCWN>,<FCTOW>,<LCWN>,<LCTOW>** Where: **<SET>** - Total number of EPO data set stored into the GNSS receiver. The EPO prediction for one day is made up of 4 EPO data sets. **<FWN>** - GPS week number of the first set of EPO data stored into the GNSS receiver. **<FTOW>** - GPS TOW of the first set of EPO data stored into the GNSS receiver. **<LWN>** - GPS week number of the last set of EPO data stored into the GNSS receiver. **<LTOW>** - GPS TOW of the last set of EPO data stored into the GNSS receiver. **<FCWN>** - GPS week number of the first set of EPO data currently used. **<FCTOW>** - GPS TOW of the first set of EPO data currently used. **<LCWN>** - GPS week number of the last set of EPO data currently used. **<LCTOW>** - GPS TOW of the last set of EPO data currently used.	
AT$QUERYEPO=?	Test command returns the **OK** result code	
Example	AT$QUERYEPO $QUERYEPO: 56,1832,259200,1834,237600,1832,367200,1832,367200 OK	
Note	This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is AT$GPSD=6.	

5.1.6.16.8.4   Delete EPO Data – AT$CLEAREPO

$CLEAREPO – Delete EPO Data		SELINT 2
AT$CLEAREPO	Execution command deletes all the EPO data from MT3333-based GNSS receivers (e.g. SL871).	
AT$CLEAREPO=?	Test command returns the **OK** result code	
Note	This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is AT$GPSD=6.	

5.1.6.16.8.5   Enable EASY – AT$EASY

$EASY – Enable EASY		SELINT 2
AT$EASY=<enable>	Set command allows enabling or disabling the EASY feature on MT3333-based GNSS receivers (e.g. SL871). Parameters: **<enable>** - Enable/Disable the EASY feature 0 – Disable 1 – Enable	
AT$EASY?	Read command reports the current EASY status in the format: **$EASY: <enable>,<extension_day>** Where: **<extension_day>** - Number of days for which the prediction has been already done 0 – EASY enabled and prediction not finished yet or not available 1..3 – EASY enabled and prediction finished for 1, 2 and 3 days respectively	
AT$EASY=?	Test command reports the range of supported values for parameter **<enable>**	
Note	This command is available in "controlled mode" only, for MediaTek MT3333-based GNSS modules (e.g. SL871), i.e. whenever is AT$GPSD=6. The EASY feature is supported starting from SL871 firmware version AXN_3.60_3333_14080800,C012,MT33-1.,1.106 The default EASY configuration depends on the specific SL871 firmware version used.	

5.1.6.17 Audio Commands

5.1.6.17.1 Audio Basic Configuration

5.1.6.17.1.1 Select Ringer Sound - #SRS

#SRS - Select Ringer Sound		SELINT 2

AT#SRS=
[<n>,<tout>]
	Set command sets the ringer sound.
	
	Parameters:
	<n> - ringing tone
	  0 - current ringing tone
	  1..*max* - ringing tone number, where *max* can be read by issuing the Test command **AT#SRS=?**.
	<tout> - ringing tone playing timer in units of seconds.
	 0 - ringer is stopped (if present) and current ringer sound is set.
	 1..60 - ringer sound playing for **<tout>** seconds and, if **<n> > 0,** ringer sound **<n>** is set as default ringer sound.
	
	Note: when the command is issued with **<n> > 0** and **<tout> > 0**, the **<n>** ringing tone is played for **<tout>** seconds and stored as default ringing tone.
	
	Note: if command is issued with **<n> > 0** and **<tout> = 0**, the playing of the ringing is stopped (if present) and **<n>** ringing tone is set as current.
	
	Note: if command is issued with **<n> = 0** and **<tout> > 0** then the current ringing tone is played for **<tout>** seconds.
	
	Note: if both **<n>** and **<tout>** are **0** then the default ringing tone is set as current and ringing is stopped.
	
	Note: If all parameters are omitted then the behaviour of Set command is the same as Read command	

AT#SRS?	Read command reports current selected ringing and its status in the form: **#SRS: <n>,<status>** where: **<n>** - ringing tone number 1..*max* **<status>** - ringing status 0 - selected but not playing 1 - currently playing	
AT#SRS=?	Test command reports the supported values for the parameters **<n>** and **<tout>**	

5.1.6.17.1.2 Select Ringer Path - #SRP

#SRP - Select Ringer Path		SELINT 2
AT#SRP=[<n>]	It has no effect and is included only for backward compatibility. Parameter: **<n>**: (0-3)	
AT#SRP?	Read command reports the set value of the parameter **<n>** in the format: **#SRP: <n>**.	
AT#SRP=?	Test command reports the supported values for the parameter **<n>**.	
Example	AT#SRP=? #SRP: (0-3) OK	

#SRP - Select Ringer Path	SELINT 2
	AT#SRP=3 OK

5.1.6.17.1.3   Handsfree Microphone Gain - #HFMICG

#HFMICG - Handsfree Microphone Gain		SELINT 2
AT#HFMICG= [<level>]	It has no effect and is included only for backward compatibility. Parameter: **<level>**: 0..7 - (factory default = 4)	
AT#HFMICG?	Read command returns the current set value for parameter **<level>**, in the format: **#HFMICG: <level>**	
AT#HFMICG=?	Test command returns the supported range of values of parameter **<level>**.	

5.1.6.17.1.4   Handset Microphone Gain - #HSMICG

#HSMICG - Handset Microphone Gain		SELINT 2
AT#HSMICG= [<level>]	Set command sets the handset microphone input gain Parameter: **<level>**: handset microphone input gain 0..7 - handset microphone gain (+6dB/step)	
AT#HSMICG?	Read command returns the current set value for parameter **<level>**, in the format: **#HSMICG: <level>**	
AT#HSMICG=?	Test command returns the supported range of values of parameter **<level>**.	

5.1.6.17.1.5   Handsfree Receiver Gain - #HFRECG

#HFRECG - Handsfree Receiver Gain		SELINT 2
AT#HFRECG= <level>	It has no effect and is included only for backward compatibility. Parameter: **<level>**: 0..6 - (factory default = 0) *Note: This parameter is saved in NVM issuing AT&W command.*	
AT#HFRECG?	Read command returns the current value of parameter **<level>**, in the format: **#HFRECG: <level>**	
AT#HFRECG=?	Test command returns the supported range of values of parameter **<level>**.	

5.1.6.17.1.6   Handset Receiver Gain - #HSRECG

#HSRECG - Handset Receiver Gain		SELINT 2
AT#HSRECG= <level>	Set command sets the handset analogue output gain Parameter: **<level>**: handset analogue output gain 0..6 - handset analogue output (-3dB/step, default value = 0) *Note: This parameter is saved in NVM issuing AT&W command.*	

#HSRECG - Handset Receiver Gain		SELINT 2
AT#HSRECG?	Read command returns the current handset analog output gain, in the format: **#HSRECG: <level>**	
AT#HSRECG=?	Test command returns the supported range of values of parameter **<level>**.	

5.1.6.17.1.7   Set Handset Sidetone - #SHSSD

#SHSSD - Set Handset Sidetone		SELINT 2

AT#SHSSD=
<mode>
	Set command enables/disables the sidetone on handset audio output.
	
	Parameter:
	<mode>
	  0 - disables the handset sidetone (factory default)
	  1 - enables the handset sidetone
	
	Note: This parameter is saved in NVM issuing AT&W command.	

AT#SHSSD?	Read command reports whether the handset sidetone is currently enabled or not, in the format: **#SHSSD: <mode>**	
AT#SHSSD=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.1.8   Set Handset Sidetone - #SHFSD

#SHFSD - Set Handsfree Sidetone		SELINT 2

AT#SHFSD=
<mode>
	It has no effect and is included only for backward compatibility.
	
	Parameter:
	<mode>
	  0 - disables the handsfree sidetone (factory default)
	  1 - enables the handsfree sidetone
	
	Note: This parameter is saved in NVM issuing AT&W command.	

AT#SHFSD?	Read command reports whether the handsfree sidetone is currently enabled or not, in the format: **#SHFSD: <mode>**	
AT#SHFSD=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.1.9   Speaker Mute Control - #SPKMUT

#SPKMUT - Speaker Mute Control		SELINT 2

AT#SPKMUT=<n>	Set command enables/disables the global muting of the speaker audio line,
	for every audio output (ring, incoming sms, voice, Network coverage)
	
	Parameter:
	<n>
	  0 - mute off, speaker active (factory default)
	  1 - mute on, speaker muted.
	
	Note: this command mutes/activates both speaker audio paths, internal speaker and external speaker.	

AT#SPKMUT?	Read command reports whether the muting of the speaker audio line during a voice call is enabled or not, in the format:	

#SPKMUT - Speaker Mute Control		SELINT 2
	#SPKMUT: <n>	
AT#SPKMUT=?	Test command reports the supported values for **<n>** parameter.	

5.1.6.17.1.10 Digital Microphone Gain - #DIGMICG

#DIGMICG – Digital Microphone Gain		SELINT 2

AT#DIGMICG=<gain_level>	This command allows setting the microphone digital gain through 46 levels by 1 dB steps
	
	Parameters:
	  <gain_level>: digital microphone input gain
	   0..45 - digital microphone input gain (+1dB/step, factory default = 0)
	
	NOTE:
	This command substitutes the #HSMICG command and has the same default values.	

AT# DIGMICG?	Read command returns the current digital microphone gain level, in the format: **#DIGMICG: <gain_level>**	
AT# DIGMICG =?	Test command reports the supported range of values for parameters **<gain_level>**.	

5.1.6.17.1.11 Open Audio Path - #OAP

#OAP - Open Audio Loop		SELINT 2

AT#OAP=[<mode>]	Set command sets Open Audio Path.
	
	Parameter:
	  0 - disables Open Audio Path (default)
	  1 - enables Open Audio Path	

AT#OAP?	Read command reports whether the Open Audio Path is currently enabled or not, in the format: **#OAP: <mode>**	
AT#OAP=?	Test command returns the supported range of values of parameter **<mode>**.	
Note	The audio loop will be established between microphone and speaker using sidetone scaling value. **AT#OAP** command is intended for testing purposes only. Thus, care must be taken to ensure that during the command execution no other audio interacting commands are issued.	

5.1.6.17.1.12 TeleType Writer - #TTY

#TTY - TeleType Writer		SELINT 2

AT#TTY=<support>	Set command enables/disables the TTY functionality.
	
	Parameter:
	<support>
	  0 - disable TTY functionality (factory default)
	  1 - enable TTY functionality
	
	Note: the value set by command is directly stored in NVM and doesn't depend on the specific AT instance.	

AT#TTY?	Read command returns whether the TTY functionalityis currently enabled or not, in the format:	

#TTY - TeleType Writer	SELINT 2
	#TTY: <support>
AT#TTY=?	Test command reports the supported range of values for parameter **<support>**.

5.1.6.17.2 Tones Configuration

5.1.6.17.2.1 Signaling Tones Mode - #STM

#STM - Signaling Tones Mode		SELINT 2

AT#STM= [<mode>]	Set command enables/disables the signaling tones output on the audio path
	
	Parameter:
	<mode> - signaling tones status
	  0 - signaling tones disabled
	  1 - signaling tones enabled
	  2 - all tones disabled
	
	Note:
	AT#STM=0 has the same effect as **AT+CALM=2**;
	AT#STM=1 has the same effect as **AT+CALM=0**.	

AT#STM?	Read command reports whether the current signaling tones status is enabled or not, in the format: **#STM: <mode>**	
AT#STM=?	Test command reports supported range of values for parameter **<mode>**.	

5.1.6.17.2.2 Tone Playback - #TONE

#TONE - Tone Playback		SELINT 2

AT#TONE=<tone> [,<duration>]	Execution command allows the reproduction of DTMF tones, standard free tone, standard busy tone and a set of user defined tones for a certain time.
	
	Parameters:
	<tone> - ASCII characters, range is **((0-9),#,*,(A-D),(G-L),Y,Z)**;
	  - (0-9), #,*,(A-D): DTMF tone
	  - (G-L): User Defined Tones
	  - Y: free tone
	  - Z: busy tone
	<duration> - Duration of current tone in 1/10 of Sec.
	  1..300 - tenth of seconds (default is 30)
	
	Note: See AT#UDTSET command to set user defined tones	

AT#TONE=?	Test command returns the supported range of values for parameters **<tone>** and **<duration>**.	

5.1.6.17.2.3 Extended tone generation - #TONEEXT

#TONEEXT – Extended tone generation		SELINT 2

AT# TONEEXT= <toneId>,<act	Execution command allows the reproduction of DTMF tones, standard free tone, standard busy tone and a set of user defined tones for a infinite time, or stop the running tone
	
	Parameters:
	< toneId > - ASCII characters in the set **(0-9), #,*,(A-D),(G-L),Y,Z** ;
	  - (0-9), #,*,(A-D) : DTMF tone
	  - (G-L) : User Defined Tones9F9F[2].	

---

[2] See also AT#UDTSET, AT#UDTRST and AT#UDTSAV command description following in this document.

#TONEEXT – Extended tone generation	SELINT 2

	- y : free tone
	- z: busy tone
	< act > - Action to be performed.
	  - 0: Stop the <toneId> if running.
	  - 1: Start the <toneId>.

AT#TONEEXT=?	Test command returns the range of supported values for parameter **<toneId>,<act>.**

5.1.6.17.2.4   User Defined Tone SET - #UDTSET command

#STM - Signaling Tones Mode	SELINT 2
AT#UDTSET= <tone> ,<F1>,<A1> [,<F2>,<A2> [,<F3>,<A3>]]	Set command sets frequency and amplitude composition for a User Defined Tone. Parameters: **<tone>** - tone index (G,H,I,J,K,L) **<Fi>** - frequency in Hz; range is (300,3000) in step of 1 Hz **<Ai>** - amplitude in dB; range is (10,100) in step of 1 dB Note: Ai = 100 is equal to the max value of the single tone. Lower values attenuate output to the difference between 100 and the selected amplitude (ex: Ai = 80 is equal to 100-80 = -20dB). Note: issuing AT&F1 or AT&Z has the effect to set the parameters with the last saved in NVM values Note: Ai = 0 and Fi = 0 are only values for uninitialized parameters and can't be issued by AT command. Every time the set command is issued, the unspecified parameters are automatically reset to zero. (Ai,Fi) issuing needs also (Aj,Fj) with j<i.
AT# UDTSET?	Read command returns the current settings for the tones: **#UDTSET: G,<F1>,<A1>,<F2>,<A2>,<F3>,<A3>** **#UDTSET: H, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>** **#UDTSET: I, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>** **#UDTSET: J, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>** **#UDTSET: K, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>** **#UDTSET: L, <F1>,<A1>,<F2>,<A2>,<F3>,<A3>**
AT# UDTSET=?	Test command returns the supported range of values for **<tone>, <Fi>** and **<Ai>** parameters.

5.1.6.17.2.5   User Defined Tone SAVE - #UDTSAV command

#UDTSAV – User Defined Tone SAVe	SELINT 2

AT#UDTSAV	Execution command allows the reproduction of DTMF tones, standard free tone, standard busy tone and a set of user defined tones for a infinite time, or stop the running tone
	
	Parameters:
	< toneId > - ASCII characters in the set **(0-9), #,*,(A-D),(G-L),Y,Z** ;
	  - (0-9), #,*,(A-D) : DTMF tone
	  - (G-L) : User Defined Tones9F9F[3].
	  - y : free tone

---

[3] See also AT#UDTSET, AT#UDTRST and AT#UDTSAV command description following in this document.

#UDTSAV – User Defined Tone SAVe		SELINT 2
	- z: busy tone **< act >** - Action to be performed. - 0: Stop the <toneId> if running. - 1: Start the <toneId>.	
AT#UDTSAV=?	Test command returns the **OK** result code.	
Example	AT#UDTSAV OK Current tones are saved in NVM	

5.1.6.17.2.6   User Defined Tone Reset - #UDTRST command

# UDTRST – Extended tone generation		SELINT 2
AT#UDTRST	Execution command resets to the default set the actual values of frequency and amplitude parameters that can be set with the command **#UDTSET**.	
AT#UDTRST=?	Test command returns the **OK** result code.	
Example	AT#UDRST OK The default value tones are restored in NVM	

5.1.6.17.3   Audio Profiles

5.1.6.17.3.1   Audio Profile Selection - #PSEL

#PSEL – Audio Profile Selection		SELINT 2
AT#PSEL=<prof>	Set command selects the active audio profile Parameter: **<prof>**: current profile 0 - standard profile 1..3 - extended profile, modifiable. *Note: This parameter is saved in NVM issuing AT&W command.*	
AT#PSEL?	The read command returns the active profile in the format: **#PSEL:<prof>**	
AT#PSEL=?	Test command returns the supported range of values of parameter **<prof>**.	

5.1.6.17.3.2   Audio Profile Configuration Save - #PSAV

#PSAV - Audio Profile Configuration Save		SELINT 2
AT#PSAV	Execution command saves the actual audio parameters in the NVM of the device. It is not allowed if active audio profile is 0. The audio parameters to store are: - Uplink path biquad filters - Downlink path biquad filters	
AT#PSAV=?	Test command returns the **OK** result code.	
Example	AT#PSAV OK	

#PSAV - Audio Profile Configuration Save	SELINT 2
	Current audio profile is saved in NVM

5.1.6.17.3.3 Audio Profile Factory Configuration - #PRST

#PRST - Audio Profile Factory Configuration	SELINT 2
AT#PRST	Execution command resets the actual audio parameters in the NVM of the device to the default set. It is not allowed if active audio profile is 0. The audio parameters to reset are: - Uplink path biquad filters - Downlink path biquad filters
AT#PRST=?	Test command returns the **OK** result code.
Example	AT#PRST OK *Current audio profile is reset*

5.1.6.17.4 Audio Filters

5.1.6.17.4.1 Uplink Path Biquad Filters - #BIQUADIN

#BIQUADIN - Uplink Path Biquad Filters		SELINT 2
AT#BIQUADIN= **<a$_{F0}$>** **[,<a$_{F1}$>** **[,<a$_{F2}$>** **[,<b$_{F1}$>** **[,<b$_{F2}$>** **[,<a$_{S0}$>** **[,<a$_{S1}$>** **[,<a$_{S2}$>** **[,<b$_{S1}$>** **[,<b$_{S2}$>** **]]]]]]]]]**	Set command allows to configure the parameters of the two cascaded digital **biquad filters** $H_{First}(z) \cdot H_{Second}(z)$ in Uplink path (sending). It is not allowed if active audio profile is 0. Parameters: **<a$_{Fn}$>,<b$_{Fn}$>,<a$_{Sn}$>,<b$_{Sn}$>** - they all are specific parameters for the calculation of digital **biquad filters** as follows: $$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$ $$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$ -32768..32767 - each value has to be interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bit word (Q15) Note: in the above formulas pay attention to the multiplier (2) for parameters **<a$_{F1}$>**, **<a$_{S1}$>**, **<b$_{F1}$>** and **<b$_{S1}$>** Parameters can be saved in NVM using AT#PSAV command and are available for audio profiles 1,2,3. For audio profile 0 the values are fixed.
AT#BIQUADIN?	Read command returns the parameters for the active profile in the format: **#BIQUADIN:** **<a$_{F0}$>,<a$_{F1}$>,<a$_{F2}$>,<b$_{F1}$>,<b$_{F2}$>,<a$_{S0}$>,<a$_{S1}$>,<a$_{S2}$>,<b$_{S1}$>,<b$_{S2}$>** It is not allowed if active audio profile is 0.
AT#BIQUADIN=?	Test command returns the supported range of values for parameters **<a$_{F0}$>**, **<a$_{F1}$>**, **<a$_{F2}$>**, **<b$_{F1}$>**, **<b$_{F2}$>**, **<a$_{S0}$>**, **<a$_{S1}$>**, **<a$_{S2}$>**, **<b$_{S1}$>**, **<b$_{S2}$>**

5.1.6.17.4.2 Extended Uplink Path Biquad Filters - #BIQUADINEX

#BIQUADINEX - Uplink Path Biquad Filters		SELINT 2
AT#BIQUADINEX= **<a$_{F0}$>** **[,<a$_{F1}$>** **[,<a$_{F2}$>** **[,<b$_{F1}$>** **[,<b$_{F2}$>** **[,<a$_{S0}$>** **[,<a$_{S1}$>** **[,<a$_{S2}$>** **[,<b$_{S1}$>** **[,<b$_{S2}$>** **]]]]]]]]]**	Set command allows to configure the parameters of the two cascaded digital **biquad filters** $H_{First}(z) \cdot H_{Second}(z)$ in Uplink path (sending). It is not allowed if active audio profile is 0. Parameters: **<a$_{Fn}$>,<b$_{Fn}$>,<a$_{Sn}$>,<b$_{Sn}$>** - they all are specific parameters for the calculation of digital **biquad filters** as follows: $$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$ $$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$ -32768..32767 - each value has to be interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bit word (Q15)

#BIQUADINEX - Uplink Path Biquad Filters		SELINT 2
	Note: in the above formulas pay attention to the multiplier (2) for parameters **<a$_{F1}$>**, **<a$_{S1}$>**, **<b$_{F1}$>** and **<b$_{S1}$>** Parameters can be saved in NVM using AT#PSAV command and are available for audio profiles 1,2,3. For audio profile 0 the values are fixed.	
AT#BIQUADINEX?	Read command returns the parameters for the active profile in the format: **#BIQUADINEX:** **<a$_{F0}$>,<a$_{F1}$>,<a$_{F2}$>,<b$_{F1}$>,<b$_{F2}$>,<a$_{S0}$>,<a$_{S1}$>,<a$_{S2}$>,<b$_{S1}$>,<b$_{S2}$>** It is not allowed if active audio profile is 0.	
AT#BIQUADINEX=?	Test command returns the supported range of values for parameters **<a$_{F0}$>, <a$_{F1}$>, <a$_{F2}$>, <b$_{F1}$>, <b$_{F2}$>, <a$_{S0}$>, <a$_{S1}$>, <a$_{S2}$>, <b$_{S1}$>, <b$_{S2}$>**	

5.1.6.17.4.3 Uplink Path Biquad Filters - #BIQUADOUT

#BIQUADOUT - Downlink Path Biquad Filters		SELINT 2
AT#BIQUADOUT= **<a$_{F0}$>** **[,<a$_{F1}$>** **[,<a$_{F2}$>** **[,<b$_{F1}$>** **[,<b$_{F2}$>** **[,<a$_{S0}$>** **[,<a$_{S1}$>** **[,<a$_{S2}$>** **[,<b$_{S1}$>** **[,<b$_{S2}$>** **]]]]]]]]]**	Set command allows to configure the parameters of the two cascaded digital **biquad filters** $H_{First}(z) \cdot H_{Second}(z)$ in Downlink path (receiving). It is not allowed if active audio profile is 0. Parameters: **<a$_{Fn}$>,<b$_{Fn}$>,<a$_{Sn}$>,<b$_{Sn}$>** - they all are specific parameters for the calculation of digital **biquad filters** as follows: $$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$ $$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$ -32768..32767 - each value has to be interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bit word (Q15) Note: in the above formulas pay attention to the multiplier (2) for parameters **<a$_{F1}$>**, **<a$_{S1}$>**, **<b$_{F1}$>** and **<b$_{S1}$>** Parameters can be saved in NVM using AT#PSAV command and are available for audio profiles 1,2,3. For audio profile 0 the values are fixed.	
AT#BIQUADOUT?	Read command returns the parameters for the active profile in the format: **#BIQUADOUT:** **<a$_{F0}$>,<a$_{F1}$>,<a$_{F2}$>,<b$_{F1}$>,<b$_{F2}$>,<a$_{S0}$>,<a$_{S1}$>,<a$_{S2}$>,<b$_{S1}$>,<b$_{S2}$>** It is not allowed if active audio profile is 0.	
AT#BIQUADOUT=?	Test command returns the supported range of values for parameters **<a$_{F0}$>, <a$_{F1}$>, <a$_{F2}$>, <b$_{F1}$>, <b$_{F2}$>, <a$_{S0}$>, <a$_{S1}$>, <a$_{S2}$>, <b$_{S1}$>, <b$_{S2}$>**	

5.1.6.17.4.4 Extended Uplink Path Biquad Filters - #BIQUADOUTEX

#BIQUADOUTEX - Downlink Path Biquad Filters		SELINT 2
AT#BIQUADOUTEX= **<a$_{F0}$>** **[,<a$_{F1}$>** **[,<a$_{F2}$>** **[,<b$_{F1}$>** **[,<b$_{F2}$>** **[,<a$_{S0}$>** **[,<a$_{S1}$>** **[,<a$_{S2}$>** **[,<b$_{S1}$>** **[,<b$_{S2}$>** **]]]]]]]]]**	Set command allows to configure the parameters of the two cascaded digital **biquad filters** $H_{First}(z) \cdot H_{Second}(z)$ in Downlink path (receiving). It is not allowed if active audio profile is 0. Parameters: **<a$_{Fn}$>,<b$_{Fn}$>,<a$_{Sn}$>,<b$_{Sn}$>** - they all are specific parameters for the calculation of digital **biquad filters** as follows: $$H_F(z) = \frac{a_{F0} + 2 \cdot a_{F1} \cdot z^{-1} + a_{F2} \cdot z^{-2}}{1 + 2 \cdot b_{F1} \cdot z^{-1} + b_{F2} \cdot z^{-2}}$$ $$H_S(z) = \frac{a_{S0} + 2 \cdot a_{S1} \cdot z^{-1} + a_{S2} \cdot z^{-2}}{1 + 2 \cdot b_{S1} \cdot z^{-1} + b_{S2} \cdot z^{-2}}$$ -32768..32767 - each value has to be interpreted as signed fixed point number in two's complement format with 15 fractional bits in a 16 bit word (Q15) Note: in the above formulas pay attention to the multiplier (2) for parameters **<a$_{F1}$>, <a$_{S1}$>, <b$_{F1}$>** and **<b$_{S1}$>** Parameters can be saved in NVM using AT#PSAV command and are available for audio profiles 1,2,3. For audio profile 0 the values are fixed.	
AT#BIQUADOUTEX?	Read command returns the parameters for the active profile in the format: **#BIQUADOUTEX:** **<a$_{F0}$>,<a$_{F1}$>,<a$_{F2}$>,<b$_{F1}$>,<b$_{F2}$>,<a$_{S0}$>,<a$_{S1}$>,<a$_{S2}$>,<b$_{S1}$>,<b$_{S2}$>** It is not allowed if active audio profile is 0.	
AT#BIQUADOUTEX=?	Test command returns the supported range of values for parameters **<a$_{F0}$>, <a$_{F1}$>, <a$_{F2}$>, <b$_{F1}$>, <b$_{F2}$>, <a$_{S0}$>, <a$_{S1}$>, <a$_{S2}$>, <b$_{S1}$>, <b$_{S2}$>**	

5.1.6.17.5   Echo Canceller Configuration

5.1.6.17.5.1   Handsfree Echo Canceller - #SHFEC

#SHFEC - Handsfree Echo Canceller		SELINT 2
AT#SHFEC= [<mode>]	It has no effect and is included only for backward compatibility. Parameter: **<mode>** (0,1) - (0 is factory default) Note: This setting returns to default after power off.	
AT# SHFEC?	Read command reports the value of parameter **<mode>**, in the format: **#SHFEC: <mode>**	
AT# SHFEC=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.5.2   Handset Echo Canceller - #SHSEC

#SHSEC - Handset Echo Canceller		SELINT 2
AT#SHSEC= [<mode>]	It has no effect and is included only for backward compatibility. Parameter: **<mode>** (0,1) - (0 is factory default) Note: This setting returns to default after power off.	
AT# SHSEC?	Read command reports the value of parameter **<mode>**, in the format: **#SHSEC: <mode>**	
AT# SHSEC=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.5.3   Handsfree Echo Canceller - #SHFAGC

#SHFAGC - Handsfree Automatic Gain Control		SELINT 2
AT#SHFAGC= [<mode>]	It has no effect and is included only for backward compatibility. Parameter: **<mode>** (0,1) - (0 is factory default) Note: This setting returns to default after power off.	
AT# SHFAGC?	Read command reports the value of parameter **<mode>**, in the format: **#SHFAGC: <mode>**	
AT# SHFAGC=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.5.4   Handset Echo Canceller - #SHSAGC

#SHSAGC - Handset Automatic Gain Control		SELINT 2
AT#SHSAGC= [<mode>]	Set command enables/disables the automatic gain control function on audio handset input. Parameter: **<mode>** 0 - disables automatic gain control for handset mode (default) 1 - enables automatic gain control for handset mode *Note: This parameter is saved in NVM issuing AT&W command.*	
AT# SHSAGC?	Read command reports the value of parameter **<mode>**, in the format: **#SHSAGC: <mode>**	
AT# SHSAGC=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.5.5   Handsfree Echo Canceller - #SHFNR

#SHFEC - Handsfree Noise Reduction		SELINT 2
AT#SHFNR= [<mode>]	It has no effect and is included only for backward compatibility. Parameter: **<mode>** (0,1) - (0 is factory default) Note: This setting returns to default after power off.	
AT# SHFNR?	Read command reports the value of parameter **<mode>**, in the format: **#SHFNR: <mode>**	
AT# SHFNR=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.5.6   Handset Echo Canceller - #SHSNR

#SHSNR - Handset Noise Reduction		SELINT 2
AT#SHSNR= [<mode>]	Set command enables/disables the noise reduction function on audio handset input. Parameter: **<mode>** 0 - disables noise reduction for handset mode (default) 1 - enables noise reduction for handset mode *Note: This parameter is saved in NVM issuing AT&W command.*	
AT# SHSNR?	Read command reports the value of parameter **<mode>**, in the format: **#SHSNR: <mode>**	
AT# SHSNR=?	Test command returns the supported range of values of parameter **<mode>**.	

5.1.6.17.5.7 Echo Reducer Configuration - #ECHOCFG

#ECHOCFG – Echo Reducer Configuration		SELINT 2
AT#ECHOCFG=<par_1> [,<par_2>[,…,<par_N>]]	Set command writes values in echo reducer parameters. It is not allowed if active audio profile is 0. The module responds to the set command with the prompt '>' and waits for the data to send. Parameters: **<par_1>** 0 – configure all parameters, module awaits 39 values 1,2,..,39 – configure single parameters, module awaits 1 value **<par_i>** with i = {2;N} 1,2,..,39 – configure every parameter specified After '>' to complete the operation send Ctrl-Z char (0x1A hex); to exit without writing the message send ESC char (0x1B hex). Data shall be written in Hexadecimal Form with 4 digits for every **<par_i>** value provided by set command. If data are successfully sent, then the response is OK. If data sending fails for some reason, an error code is reported. Parameters can be saved in NVM using AT#PSAV command and are available for audio profiles 1,2,3. For audio profile 0 the values are fixed. Note: Configuring single parameters, it is allowed to enter a maximum of 32 parameters. Note: the default configuration is targeted for almost all common acoustic echo scenarios; if further tuning is needed the customer can change by oneself only the following parameters: **<par_14>** 0..32767 - factory default value is 18384 Additional gain: increasing this parameter average echoes are more attenuated **<par_15>** 0..16384 - factory default value is 2000 Total gain lower limit: increasing this parameter small echoes are more attenuated **<par_16>** 0..16384 - factory default value is 10000 Total gain upper limit: increasing this parameter load echoes are more attenuated **<par_32>** 0..32767 - factory default value is 6000 NR Attenuation factor: decreasing this parameter increases allowed attenuation **<par_33>** 0..32767 - factory default value is 8000 Overestimation factor 0: decreasing this parameter increases noise reduction and decreases speech quality below 500Hz **<par_34>**

#ECHOCFG – Echo Reducer Configuration		SELINT 2
	0..32767 - factory default value is 8000 Overestimation factor 1: decreasing this parameter increases noise reduction and decreases speech quality above 500Hz The remaining parameters could be changed but under the supervision of Telit Technical Support.	
AT#ECHOCFG?	Read command reports the currently set parameters in the format: **#ECHOCFG: <par_1><par2>…<parN>** **<par_i>:** Full set of registers values dumped in hexadecimal form, 39 words (156 characters). It is not allowed if active audio profile is 0.	
AT#ECHOCFG=?	Test command reports supported range of values for all parameters in the format: **#ECHOCFG: <i>, (<low_i>-<high_i>)** Where **<i>:** Parameter index **<low_i>:** Lower limit of **<par_i>** **<high_i>:** High limit of **<par_i>**	

5.1.6.17.6 Embedded DTMF Decoder

5.1.6.17.6.1 Embedded DTMF decoder enabling - #DTMF

#DTMF – Embedded DTMF decoder enabling		SELINT 2
AT#DTMF= [<mode>]	Set command enables/disables the embedded DTMF decoder. Parameters: **<mode>:** 0 – disable DTMF decoder (default) 1 – enables DTMF decoder 2 – enables DTMF decoder without URC notify Note: if **<mode>**=1, the receiving of a DTMF tone is pointed out with an unsolicited message through AT interface in the following format: 　#DTMFEV: x　　with x as the DTMF digit Note: the duration of a tone should be not less than 50ms. Note: the value set by command is not saved and a software or hardware reset restores the default value. The value can be stored in NVM using profiles. Note: When DTMF decoder is enabled, PCM playing and recording are automatically disabled (AT#SPCM will return error).	
AT# DTMF?	Read command reports the currently selected **<mode>** in the format:	

#DTMF – Embedded DTMF decoder enabling	SELINT 2
#DTMF: <mode>	
AT# DTMF=?	Test command returns the supported range of values of parameter **<mode>**.

5.1.6.17.6.2 Embedded DTMF decoder configuration - #DTMFCFG

#DTMFCFG – Embedded DTMF decoder configuration		SELINT 2
AT#DTMFCFG=<scaling>,<threshold_1>,<threshold_2>[,<std_twist>,<rev_twist>]	Set command allows configuration of the embedded DTMF decoder. Parameters: **<scaling>:** 3..11 – this is the scaling applied to the pcm samples in order to manage arithmetic operations. The default value is 7. **<threshold_1>:** 1000..20000 – this is the numeric threshold used to detect DTMF tones. The default value is 2500. **<threshold_2>:** 1000..20000 – this is the numeric threshold used to start DTMF decoding. The default value is 1500. **<std_twist>:** 0..20 – standard twist threshold. It is an optional parameter and the default value is 9. **<rev_twist >:** 0..20 – reverse twist threshold. It is an optional parameter and the default value is 5. **Note: The default values were chosen after a fine tuning, so every change should be done very carefully to avoid wrong decoding.** Note: the values set by command are not saved and a software or hardware reset restores the default value. Note: Default values are referred to standard DMTF decoder (AT#DTMF=1). Note: It is supposed that the module is just powered on and the AT#DTMFCFG command is entered without < std_twist> and <rev_twist> parameters. In this case the read command doesn't return the setting of the <std_twist> and <rev_twist> in order to meet retro compatibility with other families. Now, let's assume that AT#DTMFCFG command is entered again, but using the < std_twist> and <rev_twist> parameters for the first time: if the read command is entered, it reports the parameter value just used. If subsequently the <std_twist> and <rev_twist> are omitted, the read command reports the parameter value entered the last time.	
AT# DTMFCFG?	Read command reports the currently selected value in the format: **# DTMFCFG: <scaling>,<threshold_1>,<threshold_2>[,<std_twist>[,<rev_twist >]]**	
AT# DTMFCFG=?	Test command reports supported range of values for all parameters.	

#DTMFCFG – Embedded DTMF decoder configuration	SELINT 2

5.1.6.17.7   Digital Voice Interface

5.1.6.17.7.1   Digital Voiceband Interface - #DVI

#DVI - Digital Voiceband Interface		SELINT 2

AT#DVI=<mode> [,<dviport>, <clockmode>]	Set command enables/disables the Digital Voiceband Interface.
	
	Parameters:
	<mode> - enables/disables the DVI.
	  0 - disable DVI;
	  1 - enable DVI; audio is forwarded to the DVI block
	  2 - reserved
	
	<dviport>
	  2 - DVI port 2 will be used.
	
	<clockmode>
	  0 - DVI slave
	  1 - DVI master (factory default)	

AT# DVI?	Read command reports last setting, in the format: **#DVI: <mode>,<dviport>,<clockmode>**	
AT# DVI=?	Test command reports the range of supported values for parameters <mode>,<dviport> and <clockmode>	

5.1.6.17.7.2   Digital Voice Interface Extension - #DVIEXT

#DVIEXT – Digital Voiceband Interface Extension		SELINT 2
AT#DVIEXT=<config >,[<samplerate>,[< samplewidth>,[<audio mode>,>,[<edge>]]]]	Set command configures the Digital Voiceband Interface. Parameters: **<config>** 0 – Burst Mode 1 – Normal Mode (factory default) **<samplerate>** 0 – audio scheduler sample rate 8KHz (factory default) 1 - audio scheduler sample rate 16KHz **<samplewidth>** 0 – 16 bits per sample (factory default) 1 – 18 bits per sample 2 – 20 bits per sample 3 – 24 bits per sample 4 – 32 bits per sample **<audiomode>** 0 – Mono Mode 1 – Dual Mono (factory default) **<edge>** 0 – data bit is transmitted on falling edge of clock and sampled on rising edge of clock (factory default) 1 – data bit is transmitted on rising edge of clock and sampled on falling edge of clock Note: <edge> parameters is valid only in Burst Mode, in Normal Mode shall be 0.	

#DVIEXT – Digital Voiceband Interface Extension		SELINT 2
AT#DVIEXT?	Read command reports last setting, in the format: **#DVIEXT: <config>,<samplerate>,< samplewidth >,<audiomode>, <edge>**	
AT#DVIEXT=?	Test command reports the range of supported values for parameters: **<config>,<samplerate>,< samplewidth >,<audiomode>,<edge>**	

5.1.6.17.7.3   DVI Clock Activation - #DVICLK

#DVI - Digital Voiceband Interface		SELINT 2

AT#DVICLK=<clk>	Set command configures and activates the DVICLK clock signal.
	
	Parameters:
	<clk>
	  0 – Disable (factory default)
	  1 – DVI Clock activated at 256KHz
	  2 – DVI Clock activated at 384KHz
	  3 – DVI Clock activated at 512KHz
	
	Note: the commands #DVI, #DVIEXT, #OAP can turn off the DVICLK signal or change its frequency.
	Note: after setting the DVICLK frequency through #DVICLK command, a voice call does not modify the DVICLK setting.	

AT#DVICLK?	Read command reports last setting, in the format: **#DVICLK: <clk>**	
AT#DVICLK=?	Test command reports the range of parameter **<clk>**	

5.1.6.17.8   Audio file and stream management

5.1.6.17.8.1   PCM Play and Receive - #SPCM

#SPCM - PCM Play And Receive		SELINT 2

AT#SPCM=<mode>,<dir>[,<format>]	Set command allows user either to send speech sample coming from microphone or downlink audio channel to serial port in PCM format, or to play a PCM stream coming from serial port to speaker or uplink audio channel.
	As showed in the table below if **<mode>** = 3 and **<dir>** = 1 then the speech coming from serial port with selected PCM **<format>** is sent to uplink and, at the same time, the speech coming from downlink is sent to serial port with selected PCM **<format>.**
	An active speech call is needed when sending/receiving to/from audio channel.
	
	Parameters:
	<mode>: action to be execute;
	  1 - play PCM stream from serial to selected direction **<dir>**.
	  2 - send speech from selected direction **<dir>** to serial.
	  3 - send/receive speech to/from selected direction **<dir>**
	  -
	<dir>: Select the audio path.
	  0 - send/receive to/from audio front end
	  1 - send/receive to/from audio channel
	  2 - reserved
	
	< format >: PCM bits format
	  0 - 8 bit (factory default)
	  1 - 16 bit	

#SPCM - PCM Play And Receive		SELINT 2

	Note: Execution command switches module in online mode. Module moves back to command mode either after entering the escape sequence +++ or as a consequence of a **DTR transition**. **Note: Using 16 bit it is mandatory to set +IPR at least to 230400.** The following table summarizes the status of audio path during a speech call for different configurations and with sidetone disabled: |	mode = 1	mode = 2	mode = 3
---	---	---	---
dir = 0	Uplink off / Downlink on PCM stream on speaker	Uplink off / Downlink off PCM stream from microphone	Not supported
dir = 1	Uplink on / Downlink off PCM stream on Uplink	Uplink off / Downlink on PCM stream from Downlink	Uplink on / Downlink on PCM stream to/from Uplink/Downlink	 Sidetone is active for default. Note: When DTMF decoder is enabled, PCM playing and recording are automatically disabled (AT#SPCM will return error).
AT#SPCM=?	Test command returns the supported range of values for parameters **<mode>, <dir>** and **<format>**. **#SPCM: <mode>,<dir>,<format>**
Example	AT#SPCM=1,0,0 CONNECT +++ NO CARRIER Note: after the CONNECT, 8Khz 8bit PCM stream has to be sent to serial port AT#SPCM=2,0,0 CONNECT +++ NO CARRIER Note: after the CONNECT, 8Khz 8bit PCM stream can be read from serial port

5.1.6.18 Jammed Detection & Report AT Commands

5.1.6.18.1 Enhanced Jammed Detect & Report 2 - #JDRENH2

#JDRENH2 – Enhanced Jammed Detect & Report 2	SELINT 2

AT#JDRENH2=<mode>[,<SAT2G>, <SAT3G>, <CARRNUM>, <P_RxLev_T2G>, <P_EcN0_T3G>, <P_RSCP_T3G>[,<spare>[,<spare>[,<spare>[,<spare>]]]]]	Set command allows to control the Jammed Detect & Report feature.
	
	The MODULE can detect if a communication Jammer is active in its range and give indication to the user of this condition either on the serial line with an unsolicited code or on a dedicated GPIO by rising it.
	
	Parameters:
	<mode> - behaviour mode of the Jammed Detect & Report
	  0 - disables Jammed Detect & Report (factory default)
	  1 - enables the Jammed Detect; the Jammed condition is reported on pin GPIO2/JDR
	  GPIO2/JDR **Low** - Normal Operating Condition
	  GPIO2/JDR **High** - Jammed Condition.
	  2 - enables the Jammed Detect; the Jammed condition is reported with a single unsolicited result code on serial line, in the format:
	
	#JDR: <status>
	where:
	<status>
	  JAMMED - Jammed condition detected
	  OPERATIVE - Normal Operating condition restored. This code will be shown only after a jammed condition has occurred.
	  3 - enables the Jammed Detect; the MODULE will make both the actions as for **<mode>=1** and **<mode>=2**.
	  4 - enables the Jammed Detect; the Jammed condition is reported with an unsolicited code every 3s on serial line, in the format:
	
	#JDR: <status>
	where:
	<status>
	  JAMMED - Jammed condition detected
	  OPERATIVE - Normal Operating condition restored. This code will be shown only after a jammed condition has occurred.
	  5 - enables the Jammed Detect; the MODULE will make both the actions as for **<mode>=1** and **<mode>=4**.
	  6 - enables the Jammed Detect (this value is available only for 10.00.xxx release); the Jammed condition is reported in the format:
	
	#JDR: <status>
	where:
	<status>
	  JAMMED - Jammed condition detected
	    OPERATIVE - Normal Operating condition restored. This code will be shown only after a jammed condition has occurred
	    UNKNOWN – default state before first successful PLMN searching
	
	NOTICE: if you change the **<mode>** parameter of the **AT#JDRENH2** command, it will be automatically changed the **<mode>** parameter of the **AT#JDR** command, without notice.
	 - Set the starting absolute threshold of RxLevel 2G Network.
	After a frequency scan in 2G bands, if the power measured of a carrier is above of <SAT2G> that carrier is counted as possible jammed carrier.
	0...63 (Factory default is 45).
	
	<SAT3G> - Set the starting absolute threshold of RSSI 3G Network.
	After a frequency scan in 3G bands, if the power measured of a carrier is above of <SAT3G> that carrier is counted as possible jammed carrier.
	0...63 (Factory default is 35).

#JDRENH2 – Enhanced Jammed Detect & Report 2		SELINT 2
	<**CARRNUM**> - Set the minimum number of possible jammed carriers to consider that the module is under jamming condition. 0…200 (Factory default is 100). <**P_RxLev_T2G**> - Set the threshold of RxLev in 2G Network. The threshold (RxLev_Thr) is calculated as RxLev_Thr=RxLev_Av*(1+(<**P_RxLev_T2G**>/100)) where RxLev_Av is the average of the last 10 RxLev measures. 0…100 (Factory default is 15). <**P_EcN0_T3G**> - Set the threshold of EcN0 in 3G Network. The threshold (EcN0_Thr) is calculated as EcN0_Thr= EcN0_Av*(1-(<**P_EcN0_T3G**>/100)) where EcN0_Av is the average of the last 10 EcN0 measures. 0…100 (Factory default is 70). <**P_RSCP_T3G**> - Set the threshold of RSCP in 3G Network. The threshold (RSCP_Thr) is calculated as RSCP_Thr= RSCP_Av*(1-(<**P_RSCP_T3G**>/100)) where RSCP_Av is the average of the last 10 RSCP measures. 0…100 (Factory default is 20). All the parameter settings are saved in NVM memory.	
AT#JDRENH2?	Read command reports the current behaviour mode, in the format: **#JDRENH2:** **<mode>,<SAT2G>,<SAT3G>,<CARRNUM>,<P_RxLev_T2G>,<P_EcN0_T3G>,<P_RSCP_T3G>,0,0,0,0**	
AT#JDRENH2=?	Test command reports the supported range of values for the parameters **#JDRENH2:** **(<mode>),(<SAT2G>),(<SAT3G>),(<CARRNUM>),(<P_RxLev_T2G>),(<P_EcN0_T3G>),(<P_RSCP_T3G>),(0),(0),(0),(0)**	

5.1.6.18.2   LTE Jammed Detect & Report - #JDR4GCFG

#JDR4GCFG – LTE Jammed Detect & Report		SELINT 2
AT#JDR4GCFG=<P_RSRP_T4G>,<P_RSRQ_T4G>,<P_RSSNR_T4G>[,<spare>[,<spare>[,<spare>[,<spare>[,<spare>[,<spare>]]]]]]	Set command allows to configure the LTE Jammed Detect & Report feature. Parameters: <**P_RSRP_T4G**> - Set the threshold of RSRP. The threshold (RSRP_Thr) is calculated as RSRP_Thr= RSRP_Av*(1+(<**P_RSRP_T4G**>/100)) where RSRP_Av is the average of the last 8 RSRP measures. 0..100(Factory default is 30) <**P_RSRQ_T4G**> - Set the threshold of RSRQ. The threshold (RSRQ_Thr) is calculated as RSRQ_Thr= RSRQ_Av*(1-(<**P_RSRQ_T4G**>/100)) where RSRQ_Av is the average of the last 8 RSRQ measures. 0..100(Factory default is 90) <**P_RSSNR_T4G**> - Set the threshold of RSRP. The threshold (RSSNR_Thr) is calculated as RSSNR _Thr= RSSNR _Av*(1+(<**P_RSSNR_T4G**>/100)) where RSSNR _Av is the average of the last 8 RSRP measures.	

#JDR4GCFG – LTE Jammed Detect & Report		SELINT 2
	0..100(Factory default is 80) NB: See **AT#JDRENH2** to set the enable of the LTE Jammed Detect & Report feature.	
AT#JDR4GCFG?	Read command reports the current settings, in the format: **#JDR4GCFG:** **<P_RSRP_T4G>,<P_RSRQ_T4G>,<P_RSSNR_T4G>,0,0,0,0,0,0**	
AT#JDR4GCFG=?	Test command reports the supported range of values for the parameters **#JDR4GCFG:** **(<P_RSRP_T4G>),(<P_RSRQ_T4G>),(<P_RSSNR_T4G>),(0),(0),(0),(0),(0),(0)**	

5.1.6.19 m2mAIR Cloud Commands

The following AT commands regard the deviceWISE functionality.

Here is a basic interaction diagram:

5.1.6.19.1 Configure deviceWISE parameters - #DWCFG

#DWCFG – configure deviceWISE parameters		SELINT 2

AT#DWCFG=[<serverUrl>[,<deviceIDSelector>[,<appToken>[,<security>[,<heartBeat>[,<autoReconnect>[,<overflowHandling>[,<atrunInstanceId>[,<serviceTimeout>[,<contextID>[,<unused_1>[,<unused_2>]]]]]]]]]]]]	This command sets the parameters related to the deviceWISE functionality
	
	Parameters:
	<**serverUrl**> - String parameter indicating the URL of the M2M Service instance in address:port form.
	
	<**deviceIDSelector**> 0 – 1 (0=IMEI 1=CCID/ESN), basically 0 if not SIM card or CDMA ID installed
	
	<**appToken**> - The secure application token provided in the Management Portal, typically a string of 16 characters..
	
	<**security**> - Flag indicating if the SSL encryption is enabled.
	  0 – SSL encryption disabled (default)
	  1 – SSL encryption enabled
	
	If SSL encryption enabling is required, some initial settings have to be done as follows. For further details, refer to "SSL/TLS User Guide".
	
	SSL channel has to be enabled as follows:
	
	AT#SSLEN=1,1
	OK	

| | If server authentication is needed, **#SSLSECCFG** has to be set as follows:

AT#SSLSECCFG=1,0,1,0
OK

Then, CA Certificate(DER format) has to be stored as follows:

AT#SSLSECDATA=1,1,1,<size>
>
………………… // store CA Certificate
OK

Note: Only the configuration SSL commands listed above are admitted. DW connection in secure mode cannot be used contemporarily to any command starting an SSL connection (including SSL sockets, FTPS, secure SMTP and HTPS).

<heartBeat> - If no packets are received in the number of seconds specified in the heartbeat field, a heartbeat message will be sent to keep the connection alive.
  Default: 60
  Range: 10 - 86400

<autoReconnect> - Flag indicating if the connection manager should automatically reconnect to the service.
0 – auto-reconnect disabled
1 – auto-reconnect lazy - reconnect on next send and every 3600 seconds.
2 – auto-reconnect moderate (default) - reconnect 120 seconds, then every 3600 seconds after the first day.
3 – auto-reconnect aggressive - reconnect every 120 seconds.

<overflowHandling> - Flag indicating if the way to handle overflows in data management.
0 – FIFO (default)
1 – LIFO

<atrunInstanceId> - AT instance that will be used by the service to run the AT Command.
Default 4
Range 0 – 4

<serviceTimeout> - It defines in seconds the maximum time interval for a service request to the server.
Default 5
Range 1 – 120

<contextID> - the PDP context used for the network connection.
   -    For all products except LE910-SV_V2 and LE910-SV1:
Default 1
Range 1 – 5
   -    For LE910-SV_V2 and LE910-SV1 products:
Default 3
Range 3 – 5

 |
| **AT#DWCFG?** | Read command returns the current settings in the format: |

	#DWCFG: <serverUrl>,<deviceIDSelector>,<appToken>,<security>,<heartBeat>,<autoReconnect>,<overflowHandling>,<atrunInstanceId>,<serviceTimeout>,<contextID>,0,0
AT#DWCFG=?	Test command returns the supported range of parameters **<deviceIDSelector>, <security>, <heartBeat>, <AutoReconnect>,<overflowHandling>,<atrunInstanceId>** , **<serviceTimeout>**,**<contextID>, <unused_1>** and **<unused_2>**, and the maximum length of **<serverUrl> and <appToken>** parameters.

5.1.6.19.2   Connect to M2M Service - #DWCONN

#DWCONN – connect to M2M Service		SELINT 2

AT#DWCONN=<connect>	Set command connects/disconnects to the M2M Service.
	
	Parameters:
	<connect> - flag to connect/disconnect to the M2M Service
	  0 – disconnect (default)
	  1 – connect
	
	Note: **AT#DWCONN=1** performs the socket connection and the MQTT connection. **AT#DWCONN=0** performs the socket disconnection.
	
	Note: the PDN connectionused for the network connection is the first (**<cid>**=1 has to be previously defined with **AT+CGDCONT** command and activated with **AT#SGACT** command)
	
	Note: if the secure mode connection has been enabled, it cannot be used contemporarily to any command starting an SSL connection (including SSL sockets, FTPS, secure SMTP and HTTPS).	

AT#DWCONN?	Read command returns the current settings for all parameters in the format: **#DWCONN: <connect>>,<status>** Where: **<connect>** is defined as above **<status>** is the real connection status. Values: 0 = disconnected 1 = trying to connect 2 = connected 3 = waiting to connect	
AT#DWCONN=?	Test command reports the supported range of values for all parameters	

5.1.6.19.3   Query connection status - #DWSTATUS

#DWSTATUS – query connection status		SELINT 2
AT#DWSTATUS	Execution command returns the status of the connection, including some runtime statistics. Note, all statistics should be stored in RAM, not NVM. The Cloud will return a generic structure **#DWSTATUS:** **<connected><lastErrorCode>,<latency>,<pktsIn>,<pktsOut>,<bytesIn>,<bytesOut>**	

	<connected> : 3 = waiting to connect, 2 = connected, 1 = trying to connect, 0 = disconnected **<lastErrorCode>**: last error code encountered by the client **<latency> :** milliseconds measured between last request and reply. **<pktsIn> :** number of packets received, tracked by the server **<pktsOut> :** number of packets sent. **<bytesIn>** : number of bytes received, TCP/IP payload **<bytesOut>** : number of bytes sent.
AT#DWSTATUS=?	Test command reports **OK** result code

5.1.6.19.4 Send data to M2M Service - #DWSEND

#DWSEND – send data to M2M Service		SELINT 2
AT#DWSEND=<type>,<par am_>[,<param_2>[,…[<par am_n>]]]	Execution command permits to send formatted data to the M2M Service. Parameters: <type> - type code for the type of message to send. 0 - normal request 1 - method request 2 - method update 3 - method ack The meaning of the following parameters (<param_1> … <param_n>) changes depending on the value of the first parameter <type>: Type 0 message format (API execution request): <param_1> - command – the API command to execute. <param_2+> - string parameters required by the method, in the format <key_i>,<value_i>. They are key-value pairs indicating the i-th parameter, with i=0,…,12. If the current API does not require input variables, these parameters can be omitted. Type 1 message format (remote method execution request): <param_1> - "thingKey" – the key of a thing to execute. <param_2> - timeout – time to wait in milliseconds before returning an error for the request. <param_3> - method – the method key of a thing to execute. <param_4> - is singleton – 0 or 1. 1 if no more than one of these instances can exist. <param_5+> - string parameters required by the method, in the format <key_i>,<value_i>. They are key-value pairs indicating the i-th parameter, with i=0,…,10. If the current method does not require input variables, these parameters can be omitted. Type 2 message format (method update): <param_1> - id – the identification of the method instance. <param_2> - message – a message represents the current status of the method. Type 3 message format (method acknowledgement):	

	<param_1> - id – the identification of the method instance.
	  <param_2> - status – the integer result status for the execution.
	  0 is reserved for OK.
	  <param_3 when status is set to non-zero> - error message associated with the status.
	  <param_3+ when status is set to zero> - return parameters of the method. Key-value pairs should be used. param_i should be the name of the element and param_i+1 should be the value of the element. If the current method does not require output variables, these parameters can be omitted.
	
	  Note: there is no limit on the length of the single <param_i>, but there is a limit in the total length of the AT command string, that cannot exceed 400 characters. If this threshold is exceeded, then an ERROR is raised.
	  There is also a limit of 20 messages on the receive queue. If the queue is full, the consequent send will still succeed but the response for that particular request will be dropped until an item is removed from this queue (See command AT#DWRCV and AT#DWRCVR).
	
	  Note: the response to the AT#DWSEND command reports the <msgId> value that identifies the sending.
	
	  Note: if data are successfully sent, then the response is OK.
	  If data sending fails for some reason, an error code is reported.
	
	  Note: it's possible to use AT#DWSEND only if the connection has been opened with AT#DWCONN.

AT#DWSEND=?	Test command reports the maximum length of **<type>** parameter.

5.1.6.19.5   Send raw data to M2M Service - #DWSENDR

#DWSENDR – send raw data to M2M Service		SELINT 2

AT#DWSENDR=<dataLen>	Execution command permits to send raw data to the M2M Service. Content must be valid JSON.
	
	  Parameters:
	  <dataLen> - number of bytes to be sent
	  Range: 1 - 1500
	
	  The module responds to the command with the prompt <greater_than><space> and waits for the data to send.
	  When **<dataLen>** bytes have been sent, operation is automatically completed.
	  If data are successfully sent, then the response is OK.
	  If data sending fails for some reason, an error code is reported.
	
	  Note: the response to the **AT#DWSENDR** command reports the **<msgId>** value that identifies the sending.
	  There is also a limit of 20 messages on the receive queue. If the queue is full, the consequent send will still succeed but the response for that particular request will be dropped until an item is removed from this queue (See command AT#DWRCV and AT#DWRCVR).
	
	  Note: it's possible to use **AT#DWSENDR** only if the connection has been opened with **AT#DWCONN**	

AT#DWSENDR=?	Test command reports the supported range of values for **<dataLen>** parameter	

5.1.6.19.6 Receive data from M2M Service - #DWRCV

#DWRCV – Receive data from M2M Service		SELI NT 2
AT#DWRCV=<msgId>	Execution command permits the user to read formatted data arriving from M2M Service; the module is notified of these data by the URC **#DWRING**. Parameters: **<msgId>** - index of the data message to receive, as indicated in the URC **#DWRING** Range: >=1 If the received data are the consequence of a previous data sending issued by **AT#DWSEND**, then the **<msgId>** value is the same of the **<msgId>** value reported in the answer of **AT#DWSEND**. The incoming Server data are notified by the URC **#DWRING** with the following format: **#DWRING: <type>,<msgId>,<len>** where: **<type> -** type of message to receive **<msgId>** - index of the data message to receive **<len>** - length of data message to receive If the incoming data are accepted with **AT#DWRCV**, then the formatted data are received and showed with the following URC: **#DWDATA:** **<msgId>,<error>,<len>,<param_1>[,<param_2>[,…[,<param_n>]]]** where: **<msgId>** - defined as above <error> - error code of the message to receive, 0 if there is no error. **<len>** - defined as above **<param_i>** - string parameter indicating the i-th parameter associated to the type specified Note: it is possible to use **AT#DWRCV** only if the connection has been opened with **AT#DWCONN**, else the ME is raising an error. If the data received are the consequence of a previous data sending issued by **AT#DWSEND**, then they can be read only using **AT#DWRCV** command and not **AT#DWRCVR** command (i.e.: **AT#DWRCV** and **AT#DWRCVR** are not interchangeable).
AT#DWRCV=?	Test command reports the supported range of values for all parameters.

5.1.6.19.7 Receive raw data from M2M Service - #DWRCVR

#DWRCVR – Receive raw data from M2M Service		SELI NT 2
AT#DWRCVR=<msgId>	Execution command permits the user to read raw data arriving from M2M Service; the module is notified of these data by the URC **#DWRING**. Parameters:

#DWRCVR – Receive raw data from M2M Service		SELI NT 2
	<msgId> - index of the data message to receive, as indicated in the URC **#DWRING** Range: >=1 If the data received are the consequence of a previous data sending (issued by **AT#DWSENDR**), then the **<msgId>** value is the same of the **<msgId>** value reported in the answer of **AT#DWSENDR**. The incoming Server data are notified by the URC **#DWRING** with the following format: **#DWRING: <type>,<msgId>,<len>** where: **<type>** - type of the data message to receive **<msgId>** - index of the data message to receive **<len>** - length of data message to receive If the incoming data are accepted with **AT#DWRCVR**, then the data are received and showed with the following URC: **#DWRDATA: <msgId>,<error>,<len>,<data>** where: **<msgId>** - defined as above **<error>** - error code of the message to receive, 0 if there is no error. **<len>** - defined as above **<data>** - M2M Service data Note: it is possible to use **AT#DWRCVR** only if the connection has been opened with **AT#DWCONN**, else the ME is raising an error. If the data received are the consequence of a previous data sending issued by **AT#DWSENDR**, then they can be read only using **AT#DWRCVR** command and not **AT#DWRCV** command (i.e.: **AT#DWRCV** and **AT#DWRCVR** are not interchangeable).	
AT#DWRCVR=?	Test command reports the supported range of values for all parameters.	

5.1.6.19.8   List information on messages pending from M2M Service - #DWLRCV

#DWLRCV – List information on messages pending from M2M Service		SELI NT 2
AT#DWLRCV	Execution command permits the user to obtain information regarding the messages pending from M2M Service in the following format: **#DWLRCV:** **<msg_number>[,<msgId_1>,<msg_1_len>[,<msgId_2>,<msg_2_len>[,……< msgId_n>,<msg_n_len>]]]** where: **<msg_number>** - number of messages pending from M2M Service Range: >=0 **<msgId_i>** - index of the i-th data message to receive **<msg_i_len>** - length of the i-th data message to receive Note: it is possible to use **AT#DWLRCV** only if the connection has been opened with **AT#DWCONN**, else the ME is raising an error.	

#DWLRCV – List information on messages pending from M2M Service		SELI NT 2
AT#DWLRCV=?	Test command reports **OK** result code	

5.1.6.19.9   Enable Agent Features - #DWEN

#DWEN – enable agent features		SELINT 2
AT#DWEN=<feat>,<en>[,<option1>[,<option2>[,<option3>[,<option4>[,<option5>]]]]]	Set command permits to enable/disable up to 8 different deviceWISE features. Parameters: **<feat>** - feature to enable or disable; range (0-7) 0 – remote at commands 1 … 7 – reserved for future use. **<en>** - enable or disable the features 0 – disable the feature 1 – enable the feature **<optionX>** where X=1,..,5 - optional parameters depending on the feature (string) Note: feature 0 (Remote AT commands) has no option. Note: the **<en>** value is considered only at the very first connection to M2M Service (**AT#DWCONN=1**) after a device power on or reboot	
AT#DWEN?	Read command returns the current settings for each feature in the format: **#DWEN:** <feat>,<en>,<option1>,<option2>,<option3>,<option4>,<option5>	
AT#DWEN=?	Test command reports the supported range of values for parameters **<feat>** and **<en>** and the maximum length of **<optionX>** (where X=1,..,5) parameters	

5.1.6.20.1 SWM Client Enable / Disable - #SWMENA

#SWMENA – SWM Client Enable / Disable		SELINT 2
AT#SWMENA=<mode>	Execution command, used to enable/disable the SWM Client feature. Parameters: **<mode>** 0 – disable (default) 1 – enable Note: <mode> parameter is only intended for client initiated SWM sessions management. SWM NIA sessions could be executed independently.	
AT#SWMENA?	Read command reports the current setting of SWM Client **<mode>** and **<status>** in the format: **#SWMENA: <mode>,<status>** where: **<status>** - service status 0 – not connected 1 – connected Note: issuing #SWMENA=0 resets any pending update process by resetting the SWM OMADM client to its default values and also by deleting all the files needed by the SMW OMADM client currently present in the "/swm" folder in the file system. Note: SWM Client could also be enabled by an incoming SWM NIA SMS message, even in case it is not enabled already. The SMS reception should activate the client if any other OMADM campaign is not concurrently ongoing, and at the end of it, the SWM client is automatically disabled in order to restore the starting condition. Note: if SWM client was not user activated and a NIA SMS has been correctly received, the PDN connection is activated to manage the SWM campaign, and at the end of it the PDN connection is deactivated to restore the previous condition; if the SWM client was already user-activated, the NIA campaign should maintain the PDN connection active status.	
AT#SWMENA=?	Test command reports the supported range of values for the **<mode>** parameter.	

Example	// starting condition
	AT#SWMENA?
	#SWMENA: 0,0
	
	OK
	
	//after SWM NIA SMS reception and during SWM campaign management
	AT#SWMENA?
	AT#SWMENA: 0,1
	
	OK
	
	…
	
	//after SWM NIA SMS end-of-management
	AT#SWMENA?
	AT#SWMENA: 0,0	

#SWMENA – SWM Client Enable / Disable	SELINT 2
	OK … //SWM client user activation AT#SWMENA=1 OK AT#SWMENA? AT#SWMENA: 1,1 OK

5.1.6.20.2 Configure SWM Client Parameters - #SWMCFG

#SWMCFG – Configure SWM Client Parameters	SELINT 2

AT#SWMCFG=[<max_avail _size_ext_storage> [,<pdpId>[,<enableInRoami ng>[,<enableReleaseNoteU RL>[,<pollingIntervalInHou rs>[,<bootupPollingInterval >[,<recoveryPollingInterval >[,<secureConnection>]]]]]]]	Set command configures the parameters related to SWM Client.
	
	Parameters:
	<max_avail_size_ext_storage> - maximum available size in bytes of the external storage. For external application updates. Default: 0.
	
	<pdpId> - PDP context identifier the SWM client should use on the module. Range: 1-5; Default: 1
	
	<enableInRoaming> - Flag indicating if DM sessions are allowed in cellular roaming conditions.
	  0 – DM sessions not allowed in roaming (default)
	  1 – DM sessions allowed in roaming
	
	<enableReleaseNoteURL> - Flag indicating if unsolicited ring notifications for #SWMCHKUPD and #SWMRING will contain the release note strings even if they are present in the DM session.
	  0 – release note not present in URC (default)
	  1 – release note present in URC
	
	<pollingIntervalInHours> - Integer parameter indicating the span of time in hours between automatic DM session initiations by the SWM client. Valid value is >=0. A value of 0 means no polling. Default is stored parsed as part of the DM tree: 168.
	
	<bootupPollingInterval> - Integer parameter indicating the span of time in minutes between device boot and a one time DM session initiation by the SWM client. Valid value is >=0. A value of 0 means that the SWM Client launches a DM session immediately. Default is stored parsed as part of the DM tree: 60.
	
	<recoveryPollingInterval> - Integer parameter indicating the next polling clock time when the device initiated (polling) session has failed. The value should be smaller than **<pollingIntervalInHours>**. Valid value is >=0. A value of 0 means no polling. Default is stored parsed as part of the DM tree: 2.
	
	<secureConnection> - Flag indicating if the SSL encryption is enabled. Not yet implemented.

#SWMCFG – Configure SWM Client Parameters		SELINT 2
	0 – SSL encryption disabled (default) 1 – SSL encryption enabled (not yet implemented) Note: if SSL encryption is enabled, another secure socket will not be available for the application. Note: if the parameter **<max_avail_size_ext_storage>** has value 0, then the external application handling is not supported/required. Note: the configuration has to be done before enabling SWM. Issuing the **AT#SWMCFG** set command after **AT#SWMENA=1** will raise an error.	
AT#SWMCFG?	Read command reports the current values of parameters in the format: **#SWMCFG:** **<max_avail_size_ext_storage>,<pdpId>,<enableInRoaming>,<enableReleaseNoteURL>,<pollingIntervalInHours>,<bootupPollingInterval>,<recoveryPollingInterval>,<secureConnection>**	
AT#SWMCFG=?	Test command reports the supported range of values for all the parameters.	

5.1.6.20.3   Configure Bootstrap - # SWMBOOTSTRAP

#SWMBOOTSTRAP – Configure Bootstrap		SELINT 2
AT#SWMBOOTSTRAP=<serverId>,<name>,<serverURL>,<serverAuthType>,<serverAuthName>,<serverAuthSecret>,<serverAuthData>,<clientAuthType>,<clientAuthName>,<clientAuthSecret>,<clientAuthData>	Set command configures the DM parameters like server URL and access credentials, required for the DM sessions. Parameters: **<serverId> -** string parameter that identifies the server. Only alphanumeric characters are allowed. **<name>** - string parameter indicating the name of the bootstrap parameters set **<serverURL>** - string parameter indicating the URL of the SWM server in *address:port* form. The *address* substring shall start with "http://" or "https://", otherwise an error is raised. **<serverAuthType>** - integer parameter indicating the authentication type at the server side: 0 – BASIC 1 – DIGEST 2 – HMAC **<serverAuthName>** - string parameter indicating the username in the server authentication **<serverAuthSecret>** - string parameter indicating the password in the server authentication **<serverAuthData>** - string parameter indicating the nonce in the server authentication **<clientAuthType>** - integer parameter indicating the authentication type at the client side: 0 – BASIC	

Reproduction forbidden without Telit Communications PLC written authorization – All Rights Reserved

#SWMBOOTSTRAP – Configure Bootstrap		SELINT 2
	1 – DIGEST 2 – HMAC **\<clientAuthName\>** - string parameter indicating the username in the client authentication **\<clientAuthSecret\>** - string parameter indicating the password in the client authentication **\<clientAuthData\>** - string parameter indicating the nonce in the client authentication Note: the command is allowed only if SWM Client is enabled (i.e. **AT#SWMENA?** answers 1 for **\<mode\>** parameter) Note: if the user wants to omit **\<serverAuthName\>**, **\<serverAuthSecret\>**, **\<serverAuthData\>**, **\<clientAuthName\>**, **\<clientAuthSecret\>** or **\<clientAuthData\>** parameters, a void string such as "" should be inserted for each of them. Note: the client supports only 15 possible Bootstrap account changes. Every successive attempt to change it will result in an ERROR. To reset this condition, SWM client should be switched off (**#SWMENA**=0).	
AT#SWMBOOTSTRAP?	Read command reports the current values of parameters in the format: **#SWMBOOTSTRAP:** **\<serverId\>,\<name\>,\<serverURL\>,\<serverAuthType\>,\<serverAuthName\>,\<serverAuthSecret\>,\<serverAuthData\>,\<clientAuthType\>,\<clientAuthName\>,\<clientAuthSecret\>,\<clientAuthData\>** The showed values are those of the tree.	
AT#SWMBOOTSTRAP=?	Test command reports the supported range of values for all the parameters.	

5.1.6.20.4   Enable/Disable Self Registration - #SWMREG

#SWMREG –Enable/Disable Self Registration		SELINT 2
AT#SWMREG=\<mode\>[,\<domainName\>[,\<PIN\>]]	Set command enables/disables in the SWM Client the self-registration functionality to an SWM Center service domain. In case self-registration is enabled, the SWM client will use the domainName and PIN combination to register upon first OMA-DM session to the correct customer domain (account) in the SWM Center server. Parameters: **\<mode\>** 0 – disable (default) 1 – enable **\<domainName\>** - String parameter indicating the SWM Center domain name to register to. If absent, then a predefined default one is used from the DM tree configuration. **\<PIN\>** - String parameter indicating the PIN code for registration into the domain. If absent, then a predefined default one is used from the DM tree configuration.	

#SWMREG –Enable/Disable Self Registration		SELINT 2
	Note: after a successful self-registration, any later attempt are accepted but will not have any effect. Note: the self-registration failure is notified with the following URC: **#SWMRING: 1[, <notificationDescription>]** Note: the self-registration is possible only if SWM has previously been enabled by issuing **AT#SWMENA=1** command. Note: the self-registration <**mode**>, <**domainName**> and <**PIN**> parameters are not reset after the SWM Client disabling, as they refer to parameters that affect the server behaviour.	
AT#SWMREG?	Read command reports the current setting of <**mode**> parameter in the format: **#SWMREG: <mode>** The registration credentials are not reported for security reasons.	
AT#SWMREG=?	Test command reports the supported range of values for the <**mode**> parameter and the maximum length of <**domainName**> and <**PIN**> parameters in the format: **#SWMREG: (list of supported <mode>s),<domainLength>,<pinLength>** where: <**domainLength**> - integer type value indicating the maximum length of field <**domainName**> <**pinLength**> - integer type value indicating the maximum length of field <**PIN**>.	

5.1.6.20.5   Check updates - #SWMCHKUPD

#SWMCHKUPD – Check updates		SELINT 2
AT#SWMCHKUPD	Execution command, used to trigger a DM Session for querying the OMA-DM server for a pending update. Note: if successful, the command returns a final result code OK. Then, when an update checking is done, a URC is received: **#SWMCHKUPD**:<**isUpdateAvailable**>[, <**totalPackageSizeInBytes**>[,<**description**>[,<**releaseNoteURL**>]]] where: <**isUpdateAvailable**> 0 – No update is available. 1 – Update is available. <**totalPackageSizeInBytes**> - Size of update package in bytes. <**description**> - Description of the release package <**releaseNoteURL**> - OMA-DM Server URL where the package release note is located. Note: The <**totalPackageSizeInBytes**> parameter is optional and will be present in the response in case an update package is pending	

#SWMCHKUPD – Check updates	SELINT 2
	on the OMA-DM server side. The <releaseNoteURL> parameter is optionally available if there is a descriptive release note string associated with the update package and if <enableReleaseNoteURL>=1 in #SWMCFG. Note: the command raises an error if issued before **AT#SWMENA=1**.
AT#SWMCHKUPD=?	Test command returns the **OK** result code.
Example	*Update is available*) AT#SWMCHKUPD OK #SWMCHKUPD: 1,4096, Minor Bug Fixes and Added Functionality (*No Update is available*) AT#SWMCHKUPD OK #SWMCHKUPD: 0

5.1.6.20.6   Download update package from OMA-DM software management server - #SWMGETDP

#SWMGETDP – Download update package from OMA-DM software management server.	SELINT 2
AT#SWMGETDP= <status>	Execution command confirms SWM client to proceed and download an update package after receiving a URC **#SWMCHKUPD**: 1,<**totalPackageSizeInBytes**>[,<**description**>[,<**releaseNoteURL**>]] Parameters: <**status**> - User action for confirmation 0 – Reject 1 – Accept Note: if successful, commands returns a final result code OK. Then, a URC is received: **#SWMDLPRGRSS**: <**accumulativeReceivedBytes**>,<**totalDPSizeInBytes**> where: <**accumulativeReceivedBytes**>: current size in bytes of the downloaded portion of the package <**totalDPSizeInBytes**>: total size in bytes of the package Note: when download is done successful, the following URC is received: - **#SWMRING: 2[,<description>[,<releaseNoteURL>]]** Note: the command raises an error if issued before **AT#SWMENA=1**. Note: if **#SWMGETDP** issued when the delta package has already been downloaded, the command returns "OK" and no action is performed.

#SWMGETDP – Download update package from OMA-DM software management server.		SELINT 2
AT#SWMGETDP=?	Test command reports the supported range of values for the **<status>** parameter.	
Example	AT#SWMCHKUPD OK #SWMCHKUPD: 1,1024,"Description of update package","Release Note URL" AT#SWMGETDP=1 OK #SWMDLPRGRSS: 0,1024 #SWMDLPRGRSS: 1024,1024 #SWMRING: 2,"Description of update package","Release Note URL"	

5.1.6.20.7   Install software update package - #SWMDEPLOYDP

#SWMDEPLOYDP – Install software update package		SELINT 2
AT#SWMDEPLOYDP=<status>	Execution command confirms SWM client to install update package after a URC **#SWMRING: 2[,<description>[,<releaseNoteURL>]]** Parameters: **<status>** - User action for confirmation 0 – Reject 1 – Accept Note: if the update requires a device reboot, the device will be rebooted silently. Note: when a FUMO update is done, a URC is received **#SWMRING**: <notificationId>[<description>[,<releaseNoteURL>]] where: **<notificationId>** 4 – Firmware update successfully deployed 5 – Firmware update failed Note: the command raises an error if issued before **AT#SWMENA=1**. Note: if **#SWMDEPLOYDP** is issued before the delta package is downloaded with **#SWMGETDP**, the command returns "OK" and no action is performed.	
AT#SWMDEPLOYDP=?	Test command reports the supported range of values for the **<status>** parameter.	
Example	AT# SWMDEPLOYDP =1 OK (after device reboot) #SWMRING: 4,"description of update package","Release Note URL"	

5.1.6.21   *Device Management (OMA-DM) Commands*

5.1.6.21.1   **OMADM Configuration management - #OMACFG**

#OMACFG - OMA DM Configuration parameters management		SELINT 2
AT#OMACFG=< pdpId > [,<unused_1>[,<unused_2> [,<unused_3>]]]	The set command is intended to allow the end-user to handle the OMADM AT&T parameters configuration. Parameters: **< pdpId >** - PDP context identifier the AT&T OMADM client should use on the module. Range: 1-5; Default: 1 **<unused_1>** Default: 0 **<unused_2>** Default: 0 **<unused_3>** Default: 0	
AT#OMACFG?	The read command returns the parameters current value.	
AT#OMACFG=?	Test command returns the supported range for #OMACFG command parameters.	

Example	//get the current values
	AT#OMACFG?
	#OMACFG: 1,0,0,0
	
	OK
	
	//set a new PDP context identifier value
	AT#OMACFG=3
	
	OK
	
	//read the currently set value
	AT#OMACFG?
	#OMACFG: 3,0,0,0
	
	OK
	
	//test command
	AT#OMACFG=?
	#OMACFG: (1-5),(0), (0), (0)
	
	OK	

5.1.6.21.2   **Enable OMA DM - #ENAOMADM**

#ENAOMADM – Enable OMA DM		SELINT 2
AT#ENAOMADM=<enable> [,<unsolicited>[,<account type>]]	This command allows the user to control some features about Open Mobile Alliance (OMA) standards-based Device Management (DM) functionality. OMA DM is used to remotely provision new subscribers, configure applications and network settings, manage software, and retrieve device information over the air. Parameters: **<enable>** - is no more used to disable/enable OMA DM functionality. <enable> parameter is managed and saved in NvM to maintain the former AT&T client's behaviour. **<unsolicited>** type of notification 0 - disabled	

#ENAOMADM – Enable OMA DM	SELINT 2

1 - enabled (factory default); the ME informs about reception of DM events related to ongoing session through an unsolicited code

#OMADM: <event>

Where **<event>** is one of the strings
  "UIE_SESSION_DM_NI_STARTED" - A NIA session has started
  "UIE_BOOTSTRAP_GET_PIN" - Request PIN code
  "UIE_BOOTSTRAP_GET_NSS" - Request NSS data
  "UIE_UI_ALERT_INFO" - Shows the end-user a UI Alert information message
  "UIE_UI_ALERT_CONFIRM" - Shows the end-user an UI Alert confirmation message
  "UIE_UI_ALERT_INPUT" - Shows the end-user an UI Alert input message
  "UIE_UI_ALERT_CHOICE" - Shows the end-user an UI Alert choice list
  "UIE_FUMO_CONFIRM_UPDATE" - Prompts the end-user to confirm update installation

(Only for Verizon products)
"UIE_SESSION_STATE_NOTIFY_UI",<message>   could   be associated with the following <message>:

- "Started", when a NIA message is taken in charge by the OMADM client;
- "Complete", when the OMADM session has completed its scope.
- "Aborted", when the session started but the connection management resulted in a fatal error and the OMADM session fails. It is issued along with an internal code.

  "UIE_SESSION_NOTIFY_NIA_DROP",<code> – Alerts the user that a NIA message was received but discarded because of <code> reasons:

- '1' reports that the device is in Roaming;
- '2' reports that the device has no network coverage
- '3' reports a generic error

(Only for AT&T products)
<account type> - is used to change the server to connect to (if necessary)
0. AT&T Production
1. (reserved)
2. (reserved)
3. (reserved)
4. (reserved)
5. (reserved)

Note – valid only for AT&T -: the command only works for **#ENS=1** (see **#ENS** command). It is consequent that, once the OMADM client is active, #ENS could not be disabled.

Note: the values **<enable>** and **<account type>** set by command are directly stored in NVM and do not depend on the specific CMUX instance; the value **<unsolicited>** is stored in the profile extended section, and it depends on the specific AT instance

#ENAOMADM – Enable OMA DM	SELINT 2

	Note: it is in charge of the user to verify if a IP context must be defined before the enable command is issued; the context, if not already activated, is activated by the command

Note: OMA DM Client is enabled by an incoming AT&T NIA SMS message. The SMS reception should activate the client if any other OMADM campaign is not concurrently ongoing (i.e.: SWM client could be active but it is not managing any delta downloading/deploying), and at the end of it, the OMA DM client is automatically disabled in order to restore the starting condition. There is no real correlation between the OMA DM client status and the **<enable>** parameter. |
| AT#ENAOMADM? | Read command reports the currently selected parameters and DM engine status in the format:
#ENAOMADM: <enable>,<unsolicited>,<account type>,<engine status>

Where
 <engine status>
 0 – DM engine stopped
 1 – DM engine running

Note: in Verizon products, <account type> parameter is shown even if it is meaningless.
Note: <enable> parameter is shown even if uncorrelated to the effective client's status. |
| AT#ENAOMADM=? | Test command reports the supported range of values for parameters **<enable>, <unsolicited>** and **<account type>**. |
| Example | //starting condition
AT#ENAOMADM?
#ENAOMADM: 0,1,0,0

OK
AT#SGACT?
#SGACT: 1,0

OK

//after AT&T NIA SMS, and during AT&T campaign management
AT#ENAOMADM?
#ENAOMADM: 0,1,0,1

OK
AT#SGACT?
#SGACT: 1,1

OK

//after the AT&T NIA Campaign end
AT#ENAOMADM?
#ENAOMADM: 0,1,0,0

OK
AT#SGACT?
#SGACT: 1,0 |

#ENAOMADM – Enable OMA DM	SELINT 2
	OK

	//NIA received during an SWM campaign (in "idle" status)
	AT#SWMENA=1
	OK
	AT#SWMENA?
	AT#SWMENA: 1,1
	OK
	AT#SWMCHKUPD
	OK
	SWMCHKUPD: 0
	//a NIA message is received, client switch is managed
	AT#SWMENA?
	AT#SWMENA: 1,0
	OK
	AT#ENAOMADM?
	#ENAOMADM: 0,1,0,1
	OK
	// after the AT&T campaign's end, no unsolicited are shown
	AT#SWMENA?
	AT#SWMENA: 1,1
	OK
	AT#ENAOMADM?
	#ENAOMADM: 0,1,0,0
	OK

	//during an SWM campaign (not "idle")
	// now is still 'idle'…
	AT#SWMENA?
	AT#SWMENA: 1,1
	OK
	//… and now is no more idle (a delta is present. From now to end of deploy, SWM client is not idle)
	AT#SWMCHKUPD
	OK
	#SWMCHKUPD: 1, 22096,"Firmware,20.00.402.0-A012_bis,UpdPkg_LE910_EU_V2_1G_20.00.402.0-A012"
	// any incoming NIA messages are rejected unless the SWM client status is 'idle'
	AT#ENAOMADM?
	#ENAOMADM: 0,1,0,0
	OK

#ENAOMADM – Enable OMA DM		SELINT 2

	------ 	
	//Correctly managed Verizon session
	#OMADM: "UIE_SESSION_STATE_NOTIFY_UI","DM","Started","0"
	#OMADM:
	"UIE_SESSION_STATE_NOTIFY_UI","DM","Complete","0"
	
	//Aborted Verizon session
	#OMADM: "UIE_SESSION_STATE_NOTIFY_UI","DM","Started","0"
	#OMADM:
	"UIE_SESSION_STATE_NOTIFY_UI","DM","Aborted","24577"
	
	// dropped NIA message, due to roaming state
	#OMADM: "UIE_SESSION_NOTIFY_NIA_DROP","DM","NIA sms dropped","1"	

5.1.6.21.3 Host ODIS parameters management - #HOSTODIS

#HOSTODIS – Host Odis parameters management		SELINT 2
AT#HOSTODIS=<Param>,<Action>[,<Value>[,<Instance>]]	The set command is intended to allow the end-user to handle the Host Odis parameters for AT&T OMADM client. Parameters: <Param> - this parameter should be used to select the parameter to work on: 0 is for the Host Manufacturer; 1 is for the Host Model; 2 is for the Host Software application version; 3 is for the Host Device Unique ID. <Action> - this parameter should be used to select the action to be performed on the chosen parameter: 0 is to perform a "set"; 1 is to perform a "get" 2 is to perform a "reset"; <Value> - only valid in case of <Action> set to 0, it should contain a string with the proper value. <Instance> - instance of host details settings: 1 – instance '1' Note: Host Manufacturer, Host Model and Host Software application version do not change after an OTA firmware upgrade. Note: "GET" operation not allowed on Host Device Unique ID.	
AT#HOSTODIS=?	Test command returns the supported range of <Param>, <Action>, <Value> and <Instance> parameters.	
Example	//get the currently set values (i.e.: host Model) AT#HOSTODIS=1,1 #HOSTODIS:"HMOD1"	

#HOSTODIS – Host Odis parameters management	SELINT 2
	OK
	//set a new Host Model value
	AT#HOSTODIS=1,0,"Model #4 - 2nd version"
	OK
	//read the currently set value
	AT#HOSTODIS=1,1
	#HOSTODIS: 0,"Model #4 - 2nd version"
	OK
	//reset the Model value
	AT#HOSTODIS=1,2
	OK
	//read again the currently set value
	AT#HOSTODIS=1,1
	#HOSTODIS:"HMOD1"
	OK
	//test command
	AT#HOSTODIS=?
	#HOSTODIS: (0-3),(0-2),64,0
	OK

5.1.6.21.4 OMA DM Send PIN or NSS - #OMASENDPIN

#OMASENDPIN – OMA DM Send PIN or NSS	SELINT 2
AT#OMASENDPIN= <data>	This command sends a response to an **UIE_BOOTSTRAP_GET_PIN** or **UIE_BOOTSTRAP_GET_NSS** event (see **#ENAOMADM** command). Parameter: **<data>** - string corresponding to the requested PIN or NSS data
AT#OMASENDPIN=?	Test command tests for command existence.**.**

5.1.6.21.5 Device ID write - #UNIQUEDEVID

#UNIQUEDEVID – Device ID write	SELINT 2
AT#UNIQUEDEVID=<Devic eID>	Handling of Device ID parameter (developed for ODIS AT&T requirement). Set command writes the Device ID in persistent storage Parameters: **<DeviceID>** - Device ID: up to 16 alphanumeric digits ID assigned to the device. String type.
Example	AT#UNIQUEDEVID =abc1234567890123 OK // Read command not supported AT#UNIQUEDEVID? ERROR

6 DOCUMENT HISTORY

6.1 Revisions

Revision	Date	Changes
0	2015-11-03	Preliminary Version
1	2016-05-10	Document template and AT commands update Alignment to first mass production release 20.00.xx2 (AT$ commands to be added in rev.2)
2	2016-05-30	Adding GNSS AT commands, modified description of +CEMODE, #SWMBOOTSTRAP, #CODEC. #UNIQUEDEVID
3	2017-12-01	Applicability table update. Added LE910-JN1. Updated Storage Table. AT#FILEPWD typo correction, +CGCONTRD title syntax, #CESTHLCK description correction, +CFUN update Added +CGSMS, #APPSSLCFG, AT#FWSWITCH, #I2CCF, #CMAR, #TXCAL4G, +CMAR , +CMGL, +CMGR, +CMGW, #IIDIPV6, #MTUSIZE, #SEKEY, +CCHO, +CCHC, +CGLA Typo corrections.

Design Review — 120°

Process Validation — 180°

RF/EMC Pre-Certification — 240°

Module Selection — 60°

Approvals Support — 300°

360° — Value Added Services & Connectivity Enterprise Integration & Application Enablement

m2mair