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M5313 AT Command Interface Specification

NB-IoT Series

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Document Revision History

Revision	Date	Notes
1.0	2018-08-29	Initial release
1.1	2019-09-12	Add : +CMDMP, +CFGDUALMODE,+CFGRATPRIO Changed : Onenet , +CGREG,+CEREG



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Definitions and Abbreviations

3GPP	3 rd Generation Partnership Project
AID	Application Identifier
AT	Attention; this two-character abbreviation is always used to start a command line to be sent from TE to TA
ATCI	AT Command Interface
BCD	Binary Coded Decimal
BER-TLV	Basic Encoding Rule - TLV
DF	Dedicated File
DO	Data Object
EF	Elementary File
FCP	File Control Parameters
GSM	Global System for Mobile communications
IMSI	International Mobile Subscriber Identity
MCC	Mobile Country Code
ME	Mobile Equipment
MMI	Man Machine Interface
MNC	Mobile Network Code
MT	Mobile Termination
PIN	Personal Identification Number
PS_DO	PIN Status Data Object
RFU	Reserved for Future Use
SIM	Subscriber Identity Module
SFI	Short EF Identifier
STK	SIM Toolkit
TA	Terminal Adaptor (e.g. a GSM data card equal to DCE Data Circuit terminating Equipment)
TE	Terminal Equipment, e.g. a computer (equal to DTE; Data Terminal Equipment)
TLV	Tag Length Value
UE	User Equipment
UICC	Universal Integrated Circuit Card
USIM	Universal Subscriber Identity Module
B-TID	Bootstrapping Transaction Identifier
GBA	Generic Bootstrapping Architecture
GBA_ME	ME-based GBA
GBA_U	GBA with UICC-based enhancements
TMGI	Temporary Mobile Group Identity

1. Introduction

1.1. AT Command Syntax

- The AT, at, aT or At prefix must be set at the beginning of each command line. To terminate a command line enter <CR>.
- A/ is a special case. When A/ is received, the previous command line will be handled immediately. Neither AT prefix nor <CR> are needed.
- +++ is another special case. Strictly speaking, it is not an AT command. Rather, it is escape input sequence to indicate
- DCE switch from data mode or PPP online mode to command mode.
- AT commands can be split into three categories syntactically: basic, S parameter and extended.

Basic Syntax

- These AT commands have the format of AT<x><n>, or AT&<x><n>, where <x> is the Command, and <n> is the argument for that Command. An example of this is ATE<n>, which tells the DCE whether received characters should be echoed back to the DTE according to the value of <n>. <n> is optional and a default will be used if missing.

S Parameter Syntax

- These AT commands have the format of ATS<n>=<m>, where <n> is the index of the S register to set, and <m> is the value to assign to it. <m> is optional; if it is missing, then a default value is assigned.

Extended Syntax

These commands can operate in several modes, as follows:

AT+<x>=?	This is test mode, which will cause a response of the command and valid argument ranges. A typical response might be of the form "+TFG=(0,2), (1-10)", to indicate that command +TFG takes 2 arguments, which can be values 0 or 2, 1 to 10 and 3 only respectively.
AT+<x>?	This is read mode. The command will respond with the present values of its arguments.
AT+<x>=<n>	This is write mode. Here the command will take the arguments supplied and use them in the way specified. If the argument is missing, a default will be used.

-

1.2. AT Command Line

- Several AT commands can be combined into one command line. AT command line if started with AT prefix, and terminated with <CR>. Extended commands should be separated by semicolon (;). And semicolon can't be inserted between basic commands or S parameter commands.
- Empty AT command line (AT<CR>) is valid. DCE will return OK.
- Before <CR> is encountered, AT command line is buffered, and no AT commands will be processed. The maximum size of AT command line buffer can be configured in SDK. When the maximum size is exceeded, buffered data will be dropped silently, and AT prefix will be searched again.

- When all commands can be handled successfully, OK will be responded. When any command in the command line is failed, ERROR will be responded, and following commands in the command line will be dropped.
- When a series of AT commands will be send to DCE in separated lines, DTE MUST wait final response of the previous command line before send next command line.



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2. AT Command Interface

This section details all standard and proprietary AT commands that are supported by AT interface. The interface supports the following specifications:

- ITU V.250
- 3GPP TS 27.007 Release 14
- 3GPP TS 27.005 Release 14

In the following AT command tables, each AT command has a scope for the 27.010 MUX of either Channel Specific (one 27.010 MUX channel) or Generic (all 27.010 MUX channels). When the serial interface or USB interface is used in 27.010 multiplexer mode, there are multiple AT command channels which are available to use.

Those commands with Channel Specific scope apply only to the channel on which they are received. If the command relates to the setting of profile data, the effect of the profile data change will only apply to that channel.

Those commands with Generic scope apply to the MS as a whole. If the command relates to the setting of profile data, the effect of the profile data change will apply to all channels.

Where applicable, if an AT command parameter has a default value, that value is underlined in the parameter list for that AT Command.

2.1. Guidance on AT Command Syntax Definitions

For some AT commands, some parameters are optional. When this is the case, they are specified as shown in the example below:

```
AT+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]
```

In this case, all parameters are optional. If an optional parameter is missed out, then the comma must still be inserted if other optional parameters after are entered. For example:

```
AT+CRLP=61,61,,1,3
```

If, however, no further optional parameters are entered, then no commas are required. For example:

```
AT+CRLP=61,61
```

Note that this command is given as an example only and is not supported by the M5313 NB-IOT software.

2.2. Supported AT Commands According to V.250

2.2.1. Overview

The V.250 commands correspond to the commands of AT Hayes-compatible modems applicable for 3GPP TS 27.007.

Command	Description
+++	Escape from data mode
ATE	Set command echo mode
ATH	Disconnect existing connection
ATI	Display product identification information
ATO	Switch from command mode to data mode
ATQ	Set Result code presentation mode
ATS0	Set number of rings before automatically answering the call
ATS3	Set command line termination character
ATS4	Set response formatting character
ATS5	Set command line editing character
ATV	Set result code format mode
ATX	Set connect result code format and call monitoring
ATZ	Set all current parameters to user defined profile
AT&D	Set DTR function mode
AT&F	Set all current parameters to manufacturer defaults
AT&V	Display current configuration
AT&W	Store current parameter to user defined profile
AT+GMI	Request manufacturer identification
AT+GMM	Request TA model identification
AT+GMR	Request TA revision identification
AT+GSN	Request TA serial number identification (IMEI)
AT+IFC	Set TE-TA local data flow control
AT+IPR	Set fixed local rate
ATD*99#	Call control command

2.2.2. Detailed Description of Commands

2.2.2.1. +++

+++	Escape from data mode
Execute command	+++

	<p>Response</p> <p>The escape sequence is used to transfer from in-call data mode to in-call command mode without disconnecting from the remote modem. After a pause, responds with OK. Register S2 can be used to alter the escape character from '+', the default, to any decimal value in the range 0 to 255.</p>
Parameter	None
Scope	Channel Specific
Reference V.250	<p>Note</p> <p>This command is not preceded by AT and does not require a line terminator.</p>

2.2.2.2. ATE

ATE Set command echo mode	
Set command	ATE[<value>]
	<p>Response</p> <ul style="list-style-type: none"> This setting determines whether the TA echoes characters received from TE during command state. OK
Parameter	<value> 0 Echo mode off 1 Echo mode on
Scope	Channel Specific
Reference V.250	Note

2.2.2.3. ATH

ATH Disconnect existing connection	
Execute command	ATH[n]
	<p>Response</p> <ul style="list-style-type: none"> Disconnect existing call by local TE from command line and terminate call OK, or, if there is an outstanding request for mobile-terminate PDP context activation and AT+CGAUTO is set accordingly, the request is rejected. <p>Note: OK is issued after circuit 109(DCD) is turned off, if it was previously on.</p>
Parameter	<n> 0 disconnect from line and terminate call 1 ask for outgoing call disconnection
Scope	Channel Specific
Reference V.250, 27.007	<p>Note</p> <ul style="list-style-type: none"> Note that an outgoing data call can be aborted using any input character.

2.2.2.4. ATI

ATI Display product identification information	
--	--

Execute command	ATI
	Response TA issues product information text Example: <ul style="list-style-type: none"> CMCC M5313 < Software_Version > OK
Parameter	None
Scope	Channel Specific
Reference V.250	Note

2.2.2.5. ATO

ATO Switch from command mode to data mode	
Execute command	ATO[n]
	Response <ul style="list-style-type: none"> TA resumes the connection and switches back from command mode to data mode. If connection is not successfully resumed <ul style="list-style-type: none"> NO CARRIER else <ul style="list-style-type: none"> TA returns to data mode from command mode CONNECT <text> Note: <text> only if parameter setting X>0
Parameter	<ul style="list-style-type: none"> <n> 0 switch from command mode to data mode
Scope	Channel Specific
Reference V.250	Note

2.2.2.6. ATQ

ATQ		Set result code presentation mode	
Set command		ATQ[<n>]	
		Response This parameter setting determines whether the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting. If <n>=0: OK If <n>=1: (none)	
Parameter	<n>	0	TA transmits result code
		1	Result codes are suppressed and not transmitted

Scope	Channel Specific
Reference V.250	Note <ul style="list-style-type: none"> This command only affects V.250 AT commands and not all other AT commands in this specification.

2.2.2.7. ATS0

ATS0 Set number of rings before automatically answering the call	
Read command	ATS0?
	Response <ul style="list-style-type: none"> <n> OK
Set command	ATS0=[<n>]
	Response <ul style="list-style-type: none"> This parameter setting determines the number of rings before auto-answer. OK
Parameter	<n> 0 automatic answering is disabled 1-255 enable automatic answering on the ring number specified
Scope	Channel Specific
Reference V.250	Note

2.2.2.8. ATS3

ATS3 Set command line termination character	
Read command	ATS3?
	Response <ul style="list-style-type: none"> <n> OK
Set command	ATS3=[<n>]
	Response <p>This parameter setting determines the character recognized by the TA to terminate an incoming command line. The TA also returns this character in output.</p> <ul style="list-style-type: none"> OK
Parameter	<ul style="list-style-type: none"> <n> 0-13-127 command line termination character <ul style="list-style-type: none"> Note: default 13 = CR
Scope	Channel Specific
Reference V.250	Note

2.2.2.9. ATS4

ATS4 Set response formatting character	
Read command	ATS4?
	Response <ul style="list-style-type: none"> • <n> • OK
Set command	ATS4=[<n>]
	Response <ul style="list-style-type: none"> • This parameter setting determines the character generated by the TA for result code and information text. • OK
Parameter	<ul style="list-style-type: none"> • <n> <ul style="list-style-type: none"> ○ 0-10-127 response formatting character ○ Note: default 10 = LF
Scope	Channel Specific
Reference V.250	Note

2.2.2.10. ATS5

ATS5 Set command line editing character	
Read command	ATS5?
	Response <ul style="list-style-type: none"> • <n> • OK
Set command	ATS5=[<n>]
	Response <ul style="list-style-type: none"> • This parameter setting determines the character recognized by TA as a request to delete from the command line the immediately preceding character. • OK
Parameter	<ul style="list-style-type: none"> • <n> <ul style="list-style-type: none"> ○ 0-8-127 command line editing character ○ Note: default 8 = Backspace
Scope	Channel Specific
Reference V.250	Note

2.2.2.11. ATV

ATV Set result code format mode	
Set command	ATV[<value>]
	Response This parameter setting determines the contents of the header and trailer transmitted with result codes and information responses. When <value>=0 0 When <value>=1 OK
Parameter	<value> 0 Information response: <text><CR><LF> Short result code format: <numeric code><CR> 1 Information response: <CR><LF><text><CR><LF> Long result code format: <CR><LF><verbose code><CR><LF>
Scope	Channel Specific
Reference V.250	Note

2.2.2.12. ATX

ATX Set CONNECT result code format and call monitoring	
Set command	ATX[<value>]
	Response <ul style="list-style-type: none"> This parameter setting determines whether or not the TA detected the presence of dial tone and busy signal and whether or not TA transmits particular result codes OK
Parameter	<value> 0 CONNECT result code only returned, dial tone and busy detection are both disabled 1 CONNECT<text> result code only returned, dial tone and busy detection are both disabled 2 CONNECT<text> result code returned, dial tone detection is enabled, busy detection is disabled 3 CONNECT<text> result code returned, dial tone detection is disabled, busy detection is enabled 4 CONNECT<text> result code returned, dial tone and busy detection are both enabled
Scope	Channel Specific
Reference V.250	Note

2.2.2.13. ATZ

ATZ Set all current parameters to user defined profile	
Execute command	ATZ[<value>]

	Response <ul style="list-style-type: none"> TA sets all current parameters to the user defined profile. <ul style="list-style-type: none"> Note1: The user-defined profile is stored in non-volatile memory. Note2: If the user profile is not valid, it will default to the factory default profile. Note3: Any additional commands on the same command line are ignored. OK
Parameter	<value> 0 Reset to profile number 0
Scope	<ul style="list-style-type: none"> Channel Specific and Generic: each parameter may be Channel Specific or Generic (see command for individual parameter)
Reference V.250	Note

2.2.2.14. AT&D

AT&D Set circuit Data Terminal Ready (DTR) function mode	
	AT&D[<value>]
Set command	Response <ul style="list-style-type: none"> This parameter determines how the TA responds when circuit 108/2(DTR) is changed from the ON to the OFF condition during data mode. OK
Parameter	<value> 0 TA ignores status on DTR 1 ON->OFF on DTR: Change to command mode with call remaining connected 2 ON->OFF on DTR: Disconnect call, change to command mode. During state DTR=OFF is auto-answer off.
Scope	Channel Specific
Reference V.250	Note

2.2.2.15. AT&F

AT&F Set all current parameters to manufacturer defaults	
	AT&F[value]
Execute command	Response <ul style="list-style-type: none"> TA sets all current parameters to the manufacturer defined profile. OK
Parameter	<value> 0 set all TA parameters to manufacturer defaults
Scope	Channel Specific and Generic: each parameter may be Channel Specific or Generic (see command for individual parameter)
Reference V.250	Note

2.2.2.16. AT&V

AT&V Display current configuration	
Execute command	AT&V[<n>]
	Response <ul style="list-style-type: none"> TA returns the current parameter setting. <current configurations text> OK
Parameter	<n> 0 profile number
Scope	Channel Specific and Generic: each parameter may be Channel Specific or Generic (see command for individual parameter)
Reference	Note

2.2.2.17. AT&W

AT&W Store current parameter to user defined profile	
Execute command	AT&W[<n>]
	Response <ul style="list-style-type: none"> TA stores the current parameter setting in the user-defined profile. <ul style="list-style-type: none"> Note1: The user-defined profile is stored in non-volatile memory. OK
Parameter	<n> 0 profile number to store to
Scope	<ul style="list-style-type: none"> Channel Specific Only one user profile is stored in NVRAM. This command will store the current Generic parameters values and the Channel Specific values for the channel on which the command is received.
Reference	Note

2.2.2.18. AT+GMI

AT+GMI Request manufacturer identification	
Execute command	AT+GMI
	Response <ul style="list-style-type: none"> TA returns manufacturer identification text. <manufacturer> OK
Parameters	<manufacturer>

Scope	Channel specific (response output only on channel which entered the command)
Reference V.250	Note

2.2.2.19. AT+GMM

AT+GMM Request TA model identification	
Execute command	AT+GMM
	Response <ul style="list-style-type: none"> TA returns product model identification text. <model> OK
Parameters	<model>
Scope	Channel specific (response output only on channel which entered the command)
Reference V.250	Note

2.2.2.20. AT+GMR

AT+GMR Request TA revision identification	
Execute command	AT+GMR
	Response <ul style="list-style-type: none"> TA reports one or more lines of information text that permit the user to identify the version, revision level or data or other information of the device. <Revision> OK
Scope	Channel specific (response output only on channel which entered the command)
Reference V.250	Note

2.2.2.21. AT+GSN

AT+GSN Request TA serial number identification (IMEI)	
Set command	AT+GSN=<n>
	Response <ul style="list-style-type: none"> TA reports the IMEI (International Mobile Equipment Identifier) number in information text that permits the user to identify the individual ME device. OK
Parameter	<n> 1 IMEI of the telephone (International Mobile station Equipment Identity)
Scope	Channel specific (response output only on channel which entered the command)
Reference V.250	Note <ul style="list-style-type: none"> The serial number (IMEI) is varied by individual ME device.

2.2.2.22. AT+IFC

AT+IFC This comand is used to control DTE_DCE local flow													
Test command	AT+IFC=?												
	Response <ul style="list-style-type: none"> +IFC: <rxfc>, <txfc> OK 												
Read command	AT+ICF?												
	Response <ul style="list-style-type: none"> +IFC: <rxfc>, <txfc> OK <ul style="list-style-type: none"> Note: This framing is applied for command state 												
Set command	AT+IFC=[<forma t>,<parity>]]												
	Response <ul style="list-style-type: none"> OK 												
Parameter	Note: The parity field is ignored if the format field specifies no parity. <table border="0"> <tr> <td><rxfc></td><td></td></tr> <tr> <td>0</td><td>disable rx flow control</td></tr> <tr> <td>2</td><td>enable rx flow control</td></tr> <tr> <td><txfc></td><td></td></tr> <tr> <td>0</td><td>disable tx flow control</td></tr> <tr> <td>2</td><td>enable tx flow control</td></tr> </table>	<rxfc>		0	disable rx flow control	2	enable rx flow control	<txfc>		0	disable tx flow control	2	enable tx flow control
<rxfc>													
0	disable rx flow control												
2	enable rx flow control												
<txfc>													
0	disable tx flow control												
2	enable tx flow control												
Scope	Channel Specific												
Reference V.250	Note <ul style="list-style-type: none"> Depend on hardware support 												

2.2.2.23. AT+IPR

AT+IPR Set fixed local rate	
Test command	AT+IPR=?
	Response <ul style="list-style-type: none"> +IPR: (list of supported auto detectable <rate>s),(list of supported fixed-only<rate>s) OK
Read command	AT+IPR?

	Response <ul style="list-style-type: none"> • +IPR: <rate> • OK
Set command	AT+IPR=<rate> Response <ul style="list-style-type: none"> • This parameter setting determines the data rate of the TA on the serial interface. The rate of command takes effect following the issuance of any result code associated with the current command line. • OK
Parameter	<rate> Baud-rate per second 1200 2400 4800 9600 19200 28800 33600 38400 57600
Scope	Channel Specific
Reference V.250	Note <ul style="list-style-type: none"> • The setting will apply to all channels routed through one connection level for UART. • Not applicable for USB interface.

2.2.2.24. ATD*99#

This command is used by the PC to make a packet domain connection using the standard AT dial command.

Note that it is possible for ATD*99# to re-use an already active context as long as the context was activated with no data connection on the same channel (i.e. activated with AT+CGACT).

ATD	Request Packet Domain Service
Execute command	ATD*<GPRS_SC>[*[<called_address>] [*[<L2P>][*[<cid>[,<cid>[,...]]]]]]#

	<p>Response</p> <ul style="list-style-type: none"> UE attempts to set up a mobile originated PDP context. <p><u>Note:</u> This command may be aborted generally by receiving a character during execution. The aborting is not possible during some states of PDP context activation.</p> <ul style="list-style-type: none"> If no dial tone and (parameter setting X=2 or X=4) NO DIALTONE If busy and (parameter setting X=3 or X=4) BUSY If a PDP context cannot be established NO CARRIER If connection successful CONNECT <p>UE switches to packet switched data state.</p> <ul style="list-style-type: none"> When UE returns to command mode after PDP MO context deactivation OK 	
Parameter	<p><GPRS_SC> GPRS Service code. Digit string value 99 identifies a request to use PSD.</p> <p><called_address> String identifying called party in address space applicable to PDP. This parameter is not supported.</p> <p><L2P> Layer 2 protocol to be used.</p> <p>90001: Raw TCP/IP (No L2P required). Note that username and password must be set for the <cid> using the appropriate proprietary AT command (AT+CGAUTH).</p> <p><cid> Digit string specifying a particular PDP context definition (see AT+GCDCONT, AT+GCDSCONT).</p>	
Scope	Channel Specific	
Reference 3GPP TS 27.007	<p>Note</p> <p><L2P> value 90001 is used only for communication to a peer which supports raw TCP/IP routing to the modem and the additional AT commands required to support setup of IP configuration information.</p> <p>Note that if the <cid> value is omitted (i.e. just ATD*99# is entered) then the following takes place:</p> <ul style="list-style-type: none"> If the entity has a defined cid or a cid is defined but has an invalid entity, we will use that cid if the cid is not provided If the above condition is not met, we will use the next free cid In addition, we also check the cid is not reserved for a Mobile Terminated (MT) PDP context (by using AT*MMTPDPCID command). If it is reserved, we will skip it and continue to find a cid according to the rules above When a Mobile Terminated PDP context is incoming, we firstly check whether a cid has been reserved for MT PDP or not (using the AT*MMTPDPCID command). If not, we will get a free cid according to the rules above <p>Note that it is better to enter the <cid> value as the behavior of the dialup will be more predictable.</p> <p>When a new cid is used, the PDP context information associated with the cid (APN, etc) is copied from the default PDP context information stored in the background layer using AT command AT*MCGDEFCONT.</p>	

2.3. Supported AT Commands According to 3GPP TS 27.007

2.3.1. Overview

The 3GPP TS 27.007 commands are for remote control of NB-IoT functionality.

Command	Description
AT+CCLK	Clock
AT+CEER	Extended error report
AT+CFUN	Set phone functionality
AT+CGACT	Context activation
AT+CGATT	GPRS/Packet Domain attach or detach
AT+CGDATA	Enter Data State
AT+CGDCONT	Define PDP context
AT+CGMI	Request manufacturer identification
AT+CGMM	Request model identification
AT+CGMR	Request revision identification
AT+CGPADDR	Show PDP address
AT+CGREG	Network registration status
AT+CEREG	EPS network registration status
AT+CGCONTRDP	PDP context read dynamic parameters
AT+CIMI	Request international mobile subscriber identity
AT+CLCK	Facility lock
AT+CMEE	Report mobile equipment error
AT+COPN	Read operator names
AT+COPS	Operator selection
AT+CSQ	Signal Quality
AT+CPIN	Enter pin
AT+CPOL	Preferred operator list
AT+CPWD	Change password
AT+CREG	Network registration
AT+CSCS	Select TE character set
AT+CTZR	Time Zone Reporting
AT+CTZU	Automatic Time Zone Update
AT+CPLS	Selection of preferred PLMN List
AT+CPSMS	Power saving mode selection
AT+CCIOTOPT	CloT optimization configuration
AT+CEDRXS	eDRX setting
AT+CEDRXRDP	eDRX read dynamic parameters
AT+CGAPNRC	Report APN uplink rate control information

AT+CSCON	Query and generate URC for signaling connection station (CONNECTED or IDLE)
AT+CGEREP	Packet Domain Event Reporting
AT+NVSETRRCRLSTIMER10	set RRC connection release waiting time
AT+NVSETPM	set PM1/3
AT+CSCLK	set low clock mode
AT+CFGEDRX	Configure and query ED RX parameters

2.3.2. Detailed Descriptions of Commands

2.3.2.1. AT+CCLK

AT+CCLK Clock	
Read command	AT+CCLK?
	Response <ul style="list-style-type: none"> +CCLK: <time> OK +CME ERROR: <err>
Set command	AT+CCLK=<time>
	Response <ul style="list-style-type: none"> OK +CME ERROR: <err>
Parameters	<p><time> string type value; format is "yy/MM/dd, hh:mm:ss±zz"; where characters indicate year (two last digits), month, day, hour, minutes and seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -47...+48). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"</p> <p>Note: If MT does not support time zone information then the three last characters of <time> are not returned by +CCLK?.</p>
Scope	<ul style="list-style-type: none"> Channel specific for read command Generic for set command
Reference 3GPP TS 27.007	Note

2.3.2.2. AT+CEER

AT+CEER Extended error report	
Execute command	AT+CEER

	Response <ul style="list-style-type: none"> TA returns an extended report of the reason for the last call release. +CEER: <report> OK
Scope	Channel Specific
Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> Note that the cause display mode is set using the AT command AT*MCEERMODE. The response can be in either textual format (default) or numeric (according to 3GPP cause values). For more details see the AT*MCEERMODE command description.

2.3.2.3. AT+CFUN

AT+CFUN	Set phone functionality
	AT+CFUN=?
Test command	Response <ul style="list-style-type: none"> +CFUN: (list of supported <fun>s), (list of supported <rst>s) OK +CME ERROR: <err>
Read command	AT+CFUN? Response <ul style="list-style-type: none"> +CFUN: <fun> OK +CME ERROR: <err>
Set command	AT+CFUN=<fun>[,<rst>] Response <ul style="list-style-type: none"> OK +CME ERROR: <err>
Parameters	<fun> <ul style="list-style-type: none"> 0 minimum functionality 1 full functionality (Default) 4 disable phone both transmit and receive RF circuits <rst> <ul style="list-style-type: none"> 0 Do not reset the MT before setting it to <fun> power level. 1 Reset the MT before setting it to <fun> power level
Scope	<ul style="list-style-type: none"> Channel Specific for test and read command Generic for set command

Reference 3GPP TS 27.007	<p>Note</p> <p>Current, only Parameter 0 and 1 is support. When <fun> equals to 0 and 1, the second parameter <rst> is ignored. For CSW only do the de-registering when switch off, when parameter is set by 0 or 1, CSW will operate the network job independent. If AT modem can't register the network when parameter is set to 5, please check pin1 status</p>
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2.3.2.4. AT+CGACT

The execution command is used to activate or deactivate the specified PDP context (s). After the command has completed, the UE remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged.

If the UE is not PS attached when the activation form of the command is executed, the UE first performs a PS attach and then attempts to activate the specified contexts.

Note that in the 27.007 specification there is the following statement:

- For EPS, if an attempt is made to disconnect the last PDN connection, then the UE responds with **ERROR** or, if extended error responses are enabled, a **+CME ERROR**.

This applies when use of CID0 is enabled for the PDN connection activated during attach. In fact, entering AT+CGACT=<0 or 1>,0 will generate **ERROR** response.

If CID0 mode is not enabled then it is possible to enter the AT+CGACT command to deactivate the last PDN connection from the point of view of the middleware. When the user uses AT+CGACT to disconnect the last PDN connection the following occurs:

- The PDN connection is preserved in the protocol stack
- The PDN connection is disconnected at the middleware, so the <cid> for the PDN connection is marked as deactivated
- OK response is returned rather than **ERROR**

For EPS, the activation request for an EPS bearer resource will be answered by the network by either an EPS dedicated bearer activation or EPS bearer modification request. The request must be accepted by the UE before the PDP context can be set in to established state.

- If no <cid>s are specified the activation form of the command activates all defined contexts.
- If no <cid>s are specified the deactivation form of the command deactivates all active contexts.

The read command returns the current activation states for all the defined PDP contexts.

The test command is used for requesting information on the supported PDP context activation states.

AT+CGACT	PDP Context activate or deactivate
Test command	AT+CGACT=?
	Response <ul style="list-style-type: none"> +CGACT: (list of supported <state>s) OK
Read command	AT+CGACT?

	Response <ul style="list-style-type: none"> • +CGACT:<cid>,<state>[<CR><LF>+CGACT: <cid>,<state>[...]] • OK 										
Set command	AT+CGACT=[<state>[,<cid> [,<cid>[,...]]]] Response <ul style="list-style-type: none"> • OK • NO CARRIER • ERROR 										
Parameter	<table border="0"> <tr> <td><state></td><td>indicates the state of PDP context activation</td></tr> <tr> <td>0</td><td>deactivated</td></tr> <tr> <td>1</td><td>activated</td></tr> <tr> <td>Other</td><td>reserved and will result in an ERROR response to the execution command.</td></tr> <tr> <td><cid></td><td>a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command)</td></tr> </table>	<state>	indicates the state of PDP context activation	0	deactivated	1	activated	Other	reserved and will result in an ERROR response to the execution command.	<cid>	a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command)
<state>	indicates the state of PDP context activation										
0	deactivated										
1	activated										
Other	reserved and will result in an ERROR response to the execution command.										
<cid>	a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command)										
Scope	<ul style="list-style-type: none"> ○ Channel Specific for test and read command ○ Generic for set command 										
Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> • If context is deactivated successfully, NO CARRIER is returned • If CID0 for PDN activated during attach is enabled, then AT+CGACT=<0 or 1>,0 will cause ERROR response. 										

2.3.2.5. AT+CGATT

AT+CGATT	GPRS/Packet Domain attach or detach
Test command	AT+CGATT=? Response <ul style="list-style-type: none"> • +CGATT: (list of supported <state>s) • OK
Read command	AT+CGATT? Response <ul style="list-style-type: none"> • +CGATT: <state> • OK
Set command	AT+CGATT=[<state>] Response <ul style="list-style-type: none"> • OK • ERROR

Parameter	<p><state> indicates the state of GPRS/Packet Domain attachment</p> <p>0 detached</p> <p>1 attached</p> <p>Other reserved and will result in an ERROR response to the execution command.</p>
Scope	<ul style="list-style-type: none"> Channel Specific for test and read command Generic for set command
Reference 3GPP TS 27.007	Note

2.3.2.6. AT+CGDATA

This command is used activate a PDP context / EPS bearer rather than using the ATD*99# method. It will be used by the Packet Transport mechanism for activating a PDP context / EPS bearer.

Note that it is possible for AT+CGDATA to re-use an already active context as long as the context was activated with no data connection on the same channel (i.e. activated with AT+CGACT).

AT+CGDATA	Enter Data State
Test command	<p>AT+CGDATA=?</p> <p>Response</p> <ul style="list-style-type: none"> +CGDATA: (list of supported <L2P>s) OK
Set command	<p>AT+CGDATA=<L2P>[, <cid>[,]]</p> <p>Response</p> <ul style="list-style-type: none"> OK ERROR
Parameter	<ul style="list-style-type: none"> <L2P> a string parameter that indicates the layer 2 protocol to be used between the TE and MT: <ul style="list-style-type: none"> M-PT – Packet Transport Mechanism protocol for a PDP such as IP Other values are not supported and will result in an ERROR response to the execution command. <cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command)
Scope	Channel Specific
Reference 3GPP TS 27.007	<p>Note</p> <ul style="list-style-type: none"> The command will enter data state once the PDP context has been activated<L2P> value M-PT represents no <l2p> but raw IP packet transfer. +++ escape from data mode.

2.3.2.7. AT+CGDCONT

The set command specifies PDP context parameter values for a PDP context identified by the (local) context

identification parameter, <cid>. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

For EPS the PDN connection and its associated EPS default bearer is identified herewith. For EPS the <PDP_addr> shall be omitted.

A special form of the set command, `+CGDCONT= <cid>` causes the values for context number `<cid>` to become undefined.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the UE supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line.

The feature "initial PDP context" may be supported and is a manufacturer specific option. For this option, the context with <cid>=0 (context number 0) is defined upon startup and does not need to be created with the +CGDCONT command. The initial PDP context has particular manufacturer specific default settings disassociated with any other default settings of +CGDCONT. When in E-UTRAN, the initial PDP context is automatically activated by the MT following a successful registration to the network depending on the setting of AT+CIPCA command. If all active contexts are deactivated, the initial PDP context can be (re)established. This is manufacturer specific and depends on the current RAT as well as how the active contexts are deactivated.

AT+CGDCONT	Define the PDP context
Test command	<p>AT+CGDCONT=?</p> <p>Response +CGDCONT: (range of supported <cid>s),<PDP_type>,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),(list of supported<Non-IPMTUdiscovery>s)</p> <p>[<CR><LF>+CGDCONT: (range of supported <cid>s),<PDP_type>,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported<IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s),(list of supported <Local_Addr_Ind>s),,(list of supported <Non-IP_MTU_discovery>s)[...]]</p>
Read command	<p>AT+CGDCONT?</p> <p>Response [+CGDCONT:<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc> [,<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>]]]]]]]]] [<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<request_t ype>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO>[, <IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non- IP_MTU_discovery>]]]]]]]] [...]]</p>
Set command	<p>AT+CGDCONT=[<cid>,[<PDP_type>,[<APN>],[<PDP_addr>,[<d_comp>,[<h_comp>[,<IPv4AddrAlloc>],<request_type>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<securePCO> [,<IPv4_MTU_discovery>[,<Local_Addr_Ind>[,<Non-IP_MTU_discovery>]]]]]]]]]]]</p> <p>Response</p>

	<ul style="list-style-type: none"> • OK • ERROR
Parameter	<ul style="list-style-type: none"> • <cid> (PDP Context Identifier) a numeric parameter that specifies a particular PDP context definition. <ul style="list-style-type: none"> ○ The parameter is local to the UE-TE interface and is used in other PDP context-related commands. ○ The range of permitted values (minimum value = 1 or if the initial PDP context is supported minimum value = 0) is returned by the test form of the command. • <PDP_type> (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol : <ul style="list-style-type: none"> ○ IP Internet Protocol (IETF STD 5) ○ IPV6 Internet Protocol, version 6 (IETF RFC 2460) ○ IPV4V6 Virtual <PDP_type> introduced to handle dual IP stack UE capability (see 3GPP Technical Specifications 24.301). ○ Non-IP Transfer of Non-IP data to external packet data Network (see 3GPP Technical Specifications 24.301). • <APN> (Access Point Name) a string parameter, a logical name to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. • <PDP_addr> a string parameter that identifies the UE in the address space applicable to the PDP. If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read form of the command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the +CGPADDR command. <ul style="list-style-type: none"> ○ NOTE: For EPS, this field is omitted. • <d_comp>: a numeric parameter that controls PDP data compression (applicable for SND CP only) (refer 3GPP TS 04.65) <ul style="list-style-type: none"> ○ 0 - off (default if value is omitted) ○ 1 - on (manufacturer preferred compression) ○ 2 - V.42bis ○ Other values are reserved. • <h_comp>: a numeric parameter that controls PDP header compression (refer 3GPP TS 04.65) <ul style="list-style-type: none"> ○ 0 - off (default if value is omitted) ○ 1 - on (manufacturer preferred compression) ○ 2 - RFC1144 (applicable for SND CP only) ○ 3 - RFC 2507 ○ 4 - RFC 3095 (ROHC) (applicable for PDCP only) ○ Other values are reserved. • <IPv4_MTU_discovery>: integer type; influences how the MT/TA requests to get the IPv4 MTU size, see 3GPP TS 24.008 sub-clause 10.5.6.3. <ul style="list-style-type: none"> ○ 0 Preference of IPv4 MTU size discovery not influenced by +CGDCONT ○ 1 Preference of IPv4 MTU size discovery through NAS signaling • <Non-IP_MTU_discovery>: integer type; influences how the MT/TA requests to get the Non-IP MTU size, see 3GPP TS 24.008 sub-clause 10.5.6.3. <ul style="list-style-type: none"> ○ 0 Preference of Non-IP MTU size discovery not influenced by +CGDCONT ○ 1 Preference of Non-IP MTU size discovery through NAS signaling supported
Scope	<ul style="list-style-type: none"> ○ Channel Specific for test and read command ○ Generic for set command

Reference 3GPP TS 27.007	<ul style="list-style-type: none"> Note <ul style="list-style-type: none"> If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup. As all other contexts, the parameters for <cid>=0 can be modified with +CGDCONT. If the initial PDP context is supported, +CGDCONT=0 resets context number 0 to its particular default settings. Parameters: <IPv4AddrAlloc>,<request_type>,<P-CSCF_discovery>,<IM_CN_Signalling_Flag_Ind>,<NSLPI>,<securePCO>,<Local_Addr_Ind>,<IPv4_MTU_discovery> and <Non-IP_MTU_discovery> are not supported in M5313 modem.
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2.3.2.8. AT+CGMI

AT+CGMI	Request manufacturer identification
Execute command	AT+CGMI Response <ul style="list-style-type: none"> TA returns manufacturer identification text. <manufacturer> OK
Parameters	<ul style="list-style-type: none"> <manufacturer>
Scope	Channel Specific
Reference 3GPP TS 27.007	Note

2.3.2.9. AT+CGMM

AT+CGMM	Request model identification
Execute command	AT+CGMM Response <ul style="list-style-type: none"> TA returns product model identification text
Parameters	<model>
Scope	Channel Specific
Reference 3GPP TS 27.007	Note

2.3.2.10. AT+CGMR

AT+CGMR	Request revision identification
Execute command	AT+CGMR Response <ul style="list-style-type: none"> TA returns product software version identification text <revision> OK

Parameters	<revision>
Scope	Channel Specific
Reference 3GPP TS 27.007	Note

2.3.2.11. AT+CGPADDR

AT+CGPADDR Show PDP address	
Test command	AT+CGPADDR=?
	Response <ul style="list-style-type: none"> +CGPADDR: (list of defined <cid>s) OK
Set command	AT+CGPADDR=[<cid>[,<cid>[,...]]]
	Response <ul style="list-style-type: none"> +CGPADDR:<cid>,<PDP_addr>[<CR><LF>+CGPADDR:<cid>,<PDP_addr>[...]] OK
Parameter	<ul style="list-style-type: none"> <cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command). If no <cid> is specified, the addresses for all defined contexts are returned. <PDP_addr> a string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. <ul style="list-style-type: none"> For a static address, it will be the one set by the +CGDCONT command when the context was defined. For a dynamic address, it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available.
Scope	Channel specific for test command
Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> This command dictates the behavior of PPP in the ME but not that of any other GPRS/Packet Domain-enabled foreground layer, e.g. browser.

2.3.2.12. AT+CGREG

This command is used to display the packet switched network registration status.

AT+CGREG Network registration status	
Test command	AT+CGREG=?

	Response <ul style="list-style-type: none"> +CGREG: (list of supported <n>s) OK
Read command	AT+CGREG?
	Response <ul style="list-style-type: none"> +CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]] +CME ERROR: <err> OK
Set command	AT+CGREG=[<n>]
	Response <ul style="list-style-type: none"> OK
Parameter	<div> <div><n></div> <div> <div>0</div> <div>disable network registration unsolicited result code</div> </div> <div> <div>1</div> <div>enable network registration unsolicited result code +CGREG: <stat></div> </div> <div> <div>2</div> <div>enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>[,<AcT>,<rac>]]</div> </div> </div> <div> <div><stat></div> <div> <div>0</div> <div>not registered, ME is not currently searching a new operator to register to</div> </div> <div> <div>1</div> <div>registered, home network</div> </div> <div> <div>2</div> <div>not registered, but ME is currently searching for a new operator to register to</div> </div> <div> <div>3</div> <div>registration denied</div> </div> <div> <div>4</div> <div>unknown</div> </div> <div> <div>5</div> <div>registered, roaming</div> </div> <div> <div>6</div> <div>registered for "SMS only", home network (applicable only when <AcT> indicates E-UTRAN</div> </div> <div> <div>7</div> <div>registered for "SMS only", roaming (applicable only when <AcT> indicates E-UTRAN</div> </div> </div> <div> <div><lac></div> <div>string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)</div> </div> <div> <div><ci></div> <div>string type; four byte UTRAN/GERAN/E-UTRAN cell ID in hexadecimal format</div> </div> <div> <div><AcT></div> <div>access technology of the registered network</div> <div> <div>0</div> <div>GSM</div> </div> <div> <div>1</div> <div>GSM Compact</div> </div> <div> <div>2</div> <div>UTRAN (not applicable)</div> </div> <div> <div>3</div> <div>GSM w/EGPRS (not applicable)</div> </div> <div> <div>4</div> <div>UTRAN w/HSDPA (not applicable)</div> </div> <div> <div>5</div> <div>UTRAN w/HSUPA (not applicable)</div> </div> <div> <div>6</div> <div>UTRAN w/HSDPA and HSUPA (not applicable)</div> </div> <div> <div>7</div> <div>E-UTRAN</div> </div> </div> <div> <div><rac></div> <div>string type; one byte routing area code in hexadecimal format</div> </div>

Scope	Channel Specific
Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> The set command controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the UE's GPRS network registration status, or code +CGREG: <stat>[,<lac>,<ci>[,<AcT>,<rac>]] when <n>=2 and there is a change of the network cell. For NB-IoT product, only <AcT> value of 9 is valid.

2.3.2.13. AT+CEREG

The set command controls the presentation of an unsolicited result code +CEREG: <stat> when <n>=1 and there is a change in the UE's EPS network registration status, or result code +CEREG: <stat>[,<tac>,<ci>[,<AcT>]] when <n>=2 and there is a change of the network cell.

NOTE: If the EPS UE 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.

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

AT+CEREG	EPS Network Registration Status
Test Command	AT+CEREG=?
	Response <ul style="list-style-type: none"> +CEREG: (list of supported <n>s) OK
Read command	AT+CEREG?
	Response <ul style="list-style-type: none"> when <n>=0, 1, 2 or 3 and command successful: <ul style="list-style-type: none"> +CEREG: <n>,<stat>[,<tac>],<ci>[,<AcT>,<cause_type>,<reject_cause>]]] when <n>=4 or 5 and command successful: <ul style="list-style-type: none"> +CEREG: <n>,<stat>[,<lac>],<ci>[,<AcT>,<rac>],<cause_type>,<reject_cause>],<Active-Time>,<Periodic-TAU>]]] If error is related to wrong AT syntax or operation not allowed: <ul style="list-style-type: none"> +CME ERROR: <err>
Execution command	AT+CEREG=[<n>]
	Response <ul style="list-style-type: none"> OK If error is related to wrong AT syntax: <ul style="list-style-type: none"> +CME ERROR: <err>
Unsolicited result code	See Parameters below

Parameters	<n>	<p>0 disable network registration unsolicited result code</p> <p>1 enable network registration unsolicited result code +CEREG: <stat></p> <p>2 enable network registration and location information unsolicited result code +CEREG: <stat>[,<[lac>],[<ci>],[<AcT>],[<rac>]]</p> <p>3 enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,<[lac>],[<ci>],[<AcT>],[<rac>]][,<cause_type>,<reject_cause>]]</p> <p>4 For a UE that wants to apply PSM, enable network registration and location information unsolicited result code +CEREG: <stat>[,<[lac>],[<ci>],[<AcT>],[<rac>]][,<[<Active-Time>],[<Periodic-RAU>],[<GPRS-READY-timer>]]]]</p> <p>5 For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,<[lac>],[<ci>],[<AcT>],[<rac>]][,<[<cause_type>],[<reject_cause>]][,<[<Active-Time>],[<Periodic-RAU>],[<GPRS-READY-timer>]]]]]</p>
	<stat>	<p>EPS registration status</p> <p>0 not registered, ME is not currently searching a new operator to register to</p> <p>1 registered, home network</p> <p>2 not registered, but ME is currently searching for a new operator to register to</p> <p>3 registration denied</p> <p>4 unknown</p> <p>5 registered, roaming</p> <p>6 registered for "SMS only", home network (applicable only when <AcT> indicates NB-IOT</p> <p>7 registered for "SMS only", roaming (applicable only when <AcT> indicates NB-IOT</p>
	<tac>	string type; two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).
	<ci>	string type; four byte GERAN/UTRAN/E-UTRAN cell ID in hexadecimal format
	<AcT>	access technology of the registered network
	0	GSM
	1	GSM Compact
	2	UTRAN (not applicable)
	3	GSM w/EGPRS (not applicable)
	4	UTRAN w/HSDPA (not applicable)
	5	UTRAN w/HSUPA (not applicable)
	6	UTRAN w/HSDPA and HSUPA (not applicable)
	7	E-UTRAN
	<cause_type>	integer type; indicates the type of <reject_cause>
	0	Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 Annex A.
	1	Indicates that <reject_cause> contains a manufacturer-specific cause.

	<p><reject_cause> integer type; contains the cause of the failed registration. The value is of type as defined by <cause_type>.</p> <p><Active-Time> string type; one byte in an 8-bit format. Indicates the Active Time value (T3324) allocated to the UE in E-UTRAN. The Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682 and 3GPP TS 23.401.</p> <p><Periodic-TAU> string type; one byte in an 8-bit format. Indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008, Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 and 3GPP TS 23.401.</p>
Scope	Channel Specific
Reference	<p>Note</p> <ul style="list-style-type: none"> For NB-IoT product, only <AcT> value of 9 is valid.

2.3.2.14. AT+CGCONTRDP

The execution command returns the relevant information for a primary PDP Context established by the network with the primary context identifier <cid>. If the context cannot be found an ERROR response is returned.

If the UE 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.

If the parameter <cid> is omitted, the relevant information for all established PDP contexts are returned.

NOTE: The dynamic part of the PDP context will only exist if established by the network.

The test command returns a list of <cid>s associated with active contexts.

AT+CGCONTRDP PDP Context Read Dynamic Parameters	
Test Command	AT+CGCONTRDP=?
	<p>Response</p> <ul style="list-style-type: none"> +CGCONTRDP: (list of <cid>s associated with active contexts) OK
Read command	AT+CGCONTRDP?
	<p>Response</p> <ul style="list-style-type: none"> +CME ERROR: <err>
Execution command	AT+CGCONTRDP=[<cid>]
	<p>Response</p> <p>+CGCONTRDP: <cid>, <bearer_id>, <apn>[, <local address and subnet mask>[, <gw_addr>[, <DNS_prim_addr>[, <DNS_sec_addr>[, <P-CSCF_prim_addr>[, <P-CSCF_sec_addr>[, <IM_CN_Signalling_Flag>[, <LIPA_indication>[, <IPv4_MTU>[, <WLAN_Offload>[, <Local_Addr_Ind>[, <Non-IP_MTU>[, <Serving_PLMN_rate_control_value>]]]]]]]]]]</p> <p>[<CR><LF></p> <p>+CGCONTRDP: <cid>,<bearer_id>,<apn>[,<local address and subnet mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-</p>

	<p>CSCF_prim_addr>[, <P-CSCF_sec_addr>[, <IM_CN_Signalling_Flag>[, <LIPA_indication>[, <IPv4_MTU>[, <WLAN_Offload>[, <Local_Addr_Ind>[, <Non-IP_MTU>[, <Serving_PLMN_rate_control_value>]]]]]]]]][...]]</p> <p>OK</p> <p>If error is related to wrong AT syntax:</p> <p>+CME ERROR: <err></p>
Parameters	<p><cid> a numeric parameter which specifies a particular primary PDP context definition. The parameter is local to the TE-UE interface and is used in other PDP context-related commands.</p> <p><bearer_id> a numeric parameter which identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.</p> <p><APN> a string parameter which is a logical name that was used to select the GGSN or the external packet data network.</p> <p><local address and subnet mask> a string parameter which shows the IP Address and subnet mask of the UE. 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.</p> <p><gw_addr> a string parameter which shows the Gateway Address of the UE. The string is given as dot-separated numeric (0-255) parameters.</p> <p><DNS_prim_addr> a string parameter which shows the IP Address of the primary DNS Server.</p> <p><DNS_sec_addr> a string parameter which shows the IP address of the secondary DNS Server.</p> <p><IPv4_MTU> integer type; shows the IPv4 MTU size in octets.</p> <p><Non-IP_MTU> integer type; shows the Non-IP MTU size in octets.</p> <p><Serving_PLMN_rate_control_value>; integer type; indicates the maximum number of uplink messages the UE is allowed to send in a 6-minute interval. This refers to octet 3 to 4 of the Serving PLMN rate control IE as specified in 3GPP TS 24.301 sub-clause 9.9.4.28.</p>
Scope	Generic information displayed
Reference	<p>Note</p> <ul style="list-style-type: none"> Parameters <P_CSCF_prim_addr>, <P_CSCF_sec_addr>, <IM_CN_Signalling_Flag>, <LIPA_indication>, <WLAN_Offload>, <Local_Addr_Ind>, IPv4_MTU> and <Non-IP_MTU> are not displayed for NB-IoT solution.

2.3.2.15. AT+CIMI

AT+CIMI	Request international mobile subscriber identity
Execute command	AT+CIMI

	Response <ul style="list-style-type: none"> TA returns <IMSI> for identifying the individual SIM which is attached to ME. <ul style="list-style-type: none"> +CIMI: <IMSI> OK If error is related to ME functionality: <ul style="list-style-type: none"> +CME ERROR: <err>
Parameter	<ul style="list-style-type: none"> <IMSI> International Mobile Subscriber Identity (string without double quotes)
Scope	Channel Specific
Reference 3GPP TS 27.007	Note

2.3.2.16. AT+CLCK

This command is used to lock, unlock or interrogate a ME or a network facility <fac>. Password is normally needed to do such actions. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>.

AT+CLCK	Facility lock
	AT+CLCK=?
Test command	Response <ul style="list-style-type: none"> +CLCK: (list of supported <fac>s) OK
	AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]
Execute command	Response This command is used to lock, unlock or interrogate a ME or a network facility <fac>. Password is normally needed to do such actions. When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>. <ul style="list-style-type: none"> If <mode><>2 and command is successful <ul style="list-style-type: none"> OK If <mode>=2 and command is successful <ul style="list-style-type: none"> +CLCK: <status>[,<class1>[<CR><LF> +CLCK: <status>, class2....]] OK If error is related to ME functionality: <ul style="list-style-type: none"> +CME ERROR: <err>

Parameters	<p><fac> "SC" SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued)</p> <p><mode> 0 unlock 1 lock 2 query status</p> <p><passwd> password</p> <p><class> Field not required for NB-IOT, so will be ignored</p> <p><status> 0 off 1 on</p>
Scope	Generic
Reference 3GPP TS 27.007	Note

2.3.2.17. AT+CMEE

AT+CMEE Report mobile equipment error	
Test command	AT+CMEE=?
	Response <ul style="list-style-type: none"> +CMEE: (list of supported <n>s) OK
Read command	AT+CMEE?
	Response <ul style="list-style-type: none"> +CMEE: <n> OK
Set command	AT+CMEE=<n>
	Response <ul style="list-style-type: none"> TA disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the ME. OK
Parameters	<p><n> 0 disable result code 1 enable result code and use numeric values 2 enable result code and use verbose values</p>
Scope	Channel Specific

Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> • <n> value 0 is set as default in production (non-development) builds. • <n> value 2 is set as default in development builds.
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2.3.2.18. AT+COPS

AT+COPS		Operator selection	
Test command	AT+COPS=?		
	<p>Response</p> <p>UE returns a list of quadruplets, each representing an operator present in the network. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in order: home network, networks referenced in SIM, and other networks.</p> <ul style="list-style-type: none">• +COPS: list of supported (<stat>, long alphanumeric <oper>, short alphanumeric <oper>, numeric <oper>[,<Act>])s [, (list of supported <mode>s), (list of supported <format>s)] OK• If error is related to ME functionality:<ul style="list-style-type: none">○ +CME ERROR: <err>		
Read command	AT+COPS?		
	<p>Response</p> <p>UE returns the current mode and the currently selected operator. If no operator is selected, <format> and <oper> are omitted.</p> <ul style="list-style-type: none">• +COPS: <mode>[, <format>[, <oper>[,<Act>]]]• OK• If error is related to ME functionality:<ul style="list-style-type: none">○ +CME ERROR: <err>		
Set command	AT+COPS=<mode>[,<format>[,<oper>[,<Act>]]]		
	<p>Response</p> <p>UE forces an attempt to select and register the GSM (or UMTS for 3G only) network operator. If the selected operator is not available, no other operator shall be selected (except <mode>=4). The selected operator name format shall apply to further read commands (+COPS?).</p> <ul style="list-style-type: none">• OK• If error is related to ME functionality:<ul style="list-style-type: none">○ +CME ERROR: <err>		
Parameters	<stat>	0	unknown
		1	operator available
		2	operator current
		3	operator forbidden
	<oper>	operator in format as per <mode>	
	<mode>	0	automatic mode; <oper> field is ignored
		1	manual operator selection; <oper> field shall be present
		2	manual deregister from network
		3	set only <format> (for read command +COPS?) – not shown in Read command response
		4	manual/automatic selected; if manual selection fails, automatic mode (<mode>=0) is entered
<format>	0	long format alphanumeric <oper>; can be up to 16 characters long	

	1 short format alphanumeric <oper> 2 numeric <oper>; GSM Location Area Identification number <AcT> 9 NB-IoT
Scope	<ul style="list-style-type: none"> Channel specific for test and read command Generic for set command
Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> AT+COPS=?, It will take some time to return quadruplets. during this time, other At Command input will not responded until the quadruplets return. The response time does not exceed 200s. AT+COPS=1,..., It will take some time to return ok or error, during this time, other At Command input will not responded. The response time does not exceed 200s. <AcT> field is fixed at 9 for NB-IoT product <format> 0 and 1 (long format alphanumeric and short format alphanumeric) are not supported

2.3.2.19. AT+CSQ

Execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the MT.

Test command returns values supported as compound values.

AT+CSQ	Signal Quality																		
Test Command	AT+CSQ=? Response <ul style="list-style-type: none"> +CSQ: (list of supports <rssi>s), (list of supported <ber>s) OK 																		
Execution command	AT+CSQ Response <ul style="list-style-type: none"> +CSQ: <rssi>,<ber> OK If error is related to wrong AT syntax: <ul style="list-style-type: none"> +CME ERROR: <err> 																		
Parameters	<table> <tr> <td><rssi></td><td>integer type</td></tr> <tr> <td>0</td><td>-113 dBm or less</td></tr> <tr> <td>1</td><td>-111 dBm</td></tr> <tr> <td>2...30</td><td>-109... -53 dBm</td></tr> <tr> <td>31</td><td>-51 dBm or greater</td></tr> <tr> <td>99</td><td>not known or not detectable</td></tr> <tr> <td><ber></td><td>Integer type; channel bit error rate (in percent)</td></tr> <tr> <td>0...7</td><td>as RXQUAL values RXQUAL_0...RXQUAL_7 as defined in 45.008.</td></tr> <tr> <td>99</td><td>not known or not detectable</td></tr> </table>	<rssi>	integer type	0	-113 dBm or less	1	-111 dBm	2...30	-109... -53 dBm	31	-51 dBm or greater	99	not known or not detectable	<ber>	Integer type; channel bit error rate (in percent)	0...7	as RXQUAL values RXQUAL_0...RXQUAL_7 as defined in 45.008.	99	not known or not detectable
<rssi>	integer type																		
0	-113 dBm or less																		
1	-111 dBm																		
2...30	-109... -53 dBm																		
31	-51 dBm or greater																		
99	not known or not detectable																		
<ber>	Integer type; channel bit error rate (in percent)																		
0...7	as RXQUAL values RXQUAL_0...RXQUAL_7 as defined in 45.008.																		
99	not known or not detectable																		
Scope	Generic																		
Reference	Note																		

2.3.2.20. AT+CPIN

AT+CPIN		Enter PIN
Read command		AT+CPIN?
		<p>Response</p> <ul style="list-style-type: none"> TA returns an alphanumeric string indicating whether some password is required or not. +CPIN: <code> OK If error is related to ME functionality: <ul style="list-style-type: none"> +CME ERROR: <err>
Set command		AT+CPIN=<pin> [, <new pin>] [, <new pin>]]
		<p>Response</p> <p>TA stores a required password (SIM PIN, SIM PUK, PH-SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken and an error message, +CME ERROR, is returned to TE.</p> <p>If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the SIM.</p> <p>When a new password is set, a third optional parameter may also be specified. This extra parameter is compared to the new password to check they are equivalent as an additional security feature.</p> <ul style="list-style-type: none"> OK If error is related to ME functionality: <ul style="list-style-type: none"> +CME ERROR: <err>
Parameters		<p><pin> string type; password</p> <p><new pin> string type; If the PIN required is SIM PUK or SIM PUK2: new password</p> <p><code> READY no further entry needed</p> <p>SIM PIN ME is waiting for SIM PIN</p> <p>SIM PUK ME is waiting for SIM PUK</p> <p>SIM PIN2 PIN2, e.g. for editing the FDN book possible only if preceding command was acknowledged with +CME ERROR:17</p> <p>SIM PUK2 possible only if preceding command was acknowledged with error +CME ERROR:18.</p> <p>PH-SIM PIN ME is waiting for phone to SIM card (antitheft) PH-NET PIN Network personalization password is required. PH-NETSUB PIN Network subset is required.</p> <p>PH-SP PIN Service provider personalization password is required.</p> <p>PH-CORP PIN Corporate personalization password is required.</p>
		<ul style="list-style-type: none"> Channel specific for test and read command Generic for set command
Reference 3GPP TS 27.007		<p>Note</p> <ul style="list-style-type: none"> Note that syntax differs from B1 specification, as syntax matches 27.007 specification. Original implementation had incorrect syntax: PH_SIM now changed to PH-SIM. PH-SIM PUK is not in the code or in 27.007 so has been removed from this spec for AT+CPIN.

2.3.2.21. AT+CPOL

AT+CPOL Preferred operator list	
Test command	AT+CPOL=?
	Response <ul style="list-style-type: none"> +CPOL: (list of supported <index>s),(list of supported <format>s) OK
Read command	AT+CPOL?
	Response <ul style="list-style-type: none"> +CPOL: <ul style="list-style-type: none"> <index1>,<format>,<oper1>[,<GSM_AcT1>,<GSMcomp_AcT1>,<UTRAN_AcT1>,<E-UTRAN_AcT1>] [<CR><LF>+CPOL: <ul style="list-style-type: none"> <index2>,<format>,<oper2>[,<GSM_AcT2>,<GSMcomp_AcT2>,<UTRAN_AcT2>,<E-UTRAN_AcT2>] [...]] OK +CME ERROR: <err>
Set command	AT+CPOL=[<index>][,<format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>,<E-UTRAN_AcT>]]]
	Response <ul style="list-style-type: none"> OK +CME ERROR: <err>
Parameters	<index> integer type: order number of operator in USIM preferred operator list <format> 0 long format alphanumeric <oper> 1 short format alphanumeric <oper> 2 numeric <oper> <opern> string type: <format> indicates whether alphanumeric or numeric format used (see +COPS command) <GSM_AcTn> GSM Access technology; 0 access technology not selected 1 access technology selected <GSM_Comp_AcTn> GSM compact Access technology; 0 access technology not selected 1 access technology selected <UTRAN_AcTn> UTRA Access 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
Scope	<ul style="list-style-type: none"> Channel specific for test and read command Generic for set command
Reference 3GPP TS 27.007	Note <ul style="list-style-type: none"> Not all USIMs support the preferred operator list.

2.3.2.22. AT+CPWD

AT+CPWD Change password	
Test command	AT+CPWD=?
	Response TA returns a list of pairs that present the available facilities and the maximum length of their password. <ul style="list-style-type: none"> • +CPWD: list of supported (<fac>, <pwdlength>)s OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err>
Execute command	AT+CPWD=<fac>,<oldpwd>,<newpwd>
	Response TA sets a new password for the facility lock function. <ul style="list-style-type: none"> • OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err>
Parameters	<fac> "SC" SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command issued)
	<oldpwd> old password
	<newpwd> new password
	<pwdlength> integer maximum length of password
Scope	<ul style="list-style-type: none"> ○ Channel specific for test command ○ Generic for set command
Reference 3GPP TS 27.007	Note

2.3.2.23. AT+CREG

AT+CREG Network registration	
Test command	AT+CREG=?
	Response <ul style="list-style-type: none"> • +CREG: list of supported <n>s • OK
Read command	AT+CREG?

	<p>Response</p> <p>UE returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the ME. Location information elements <lac>, <ci> and <AcT> are returned only when <n>=2 and ME is registered in the network.</p> <ul style="list-style-type: none"> When <n> = 0 or 1: <ul style="list-style-type: none"> +CREG: <n>,<stat> OK When <n> = 2: <ul style="list-style-type: none"> +CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]] OK If error is related to ME functionality: <ul style="list-style-type: none"> +CME ERROR: <err>
Set command	<p>AT+CREG=[<n>]</p> <p>Response</p> <ul style="list-style-type: none"> UE controls the presentation of an unsolicited result code +CREG: <stat> when <n>=1 and there is a change in the ME network registration status. OK
Unsolicited result code	<ul style="list-style-type: none"> When <n>=1 and there is a change in the ME network registration status: +CREG: <stat> When <n>=2 and there is a change in the ME cell status: +CREG: <stat>[,<lac>,<ci>[,<AcT>]]

Parameters	<n>	0	disable network registration unsolicited result code
		1	enable network registration unsolicited result code +CREG: <stat>
		2	enable network registration and location information unsolicited result code +CREG:<stat>[,<lac>,<ci>[,<AcT>]]
	<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
		6	registered for "SMS only", home network (applicable only when <AcT> indicates NB-IOT
		7	registered for "SMS only", roaming (applicable only when <AcT> indicates NB-IOT
	<lac>		string type; two byte location area code or tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)
	<ci>		string type; four byte UTRAN/GERAN/E-UTRAN cell ID in hexadecimal format
	<AcT>		access technology of the registered network
Scope		0	GSM
		1	GSM Compact
		2	UTRAN (not applicable)
		3	GSM w/EGPRS (not applicable)
		4	UTRAN w/HSDPA (not applicable)
		5	UTRAN w/HSUPA (not applicable)
		6	UTRAN w/HSDPA and HSUPA (not applicable)
		7	E-UTRAN
Reference 3GPP TS 27.007	Note		

2.3.2.24. AT+CSCS

AT+CSCS	Select TE Character Set
Test command	AT+CSCS=?
	Response • +CSCS: (list of supported <chest>s)
Read command	AT+CSCS?
	Response • +CSCS: <chset> OK
Set command	AT+CSCS=[<chset>]
	Response • Sets which character set <chset> is used by the TE. The TA can then convert character strings correctly between the TE and ME character sets.

Parameter	<chset> "GSM" GSM default alphabet. "HEX" Hexadecimal numbers in character strings "IRA" International reference alphabet (ITU-T T.50) "PCCP" PC character set Code Page "PCDN" PC Danish/Norwegian character set "UCS2" UCS2 alphabet "8859-1" ISO 8859 Latin (1) character set
Scope	Channel specific
Reference 3GPP TS 27.007	Note

2.3.2.25. AT+CTZR

AT+CTZR	Time Zone Reporting
Test command	AT+CTZR=? Response <ul style="list-style-type: none"> • +CTZR: (list of supported <onoff>s) • OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err>
Read command	AT+CTZR? Response <ul style="list-style-type: none"> • +CTZR: <onoff> • OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err>
Set command	AT+CTZR=<onoff> Response <ul style="list-style-type: none"> • OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err> <p>This set 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.</p>
Parameter	<onoff> 0 Disable time zone change event reporting 1 Enable time zone change event reporting
Scope	Channel Specific
Reference 3GPP TS 27.007	Note

2.3.2.26. AT+CTZU

AT+CTZU	Automatic Time Zone Update
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Test command	AT+CTZU=?				
	Response <ul style="list-style-type: none"> • +CTZU: (list of supported <onoff>s) • OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err> 				
Read command	AT+CTZU?				
	Response <ul style="list-style-type: none"> • +CTZU: <onoff> OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err> 				
Read command	AT+CTZU?				
	Response <ul style="list-style-type: none"> • +CTZU: <onoff> OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err> 				
Set command	AT+CTZU=<onoff>				
	Response <ul style="list-style-type: none"> • OK • If error is related to ME functionality: <ul style="list-style-type: none"> ○ +CME ERROR: <err> Set command enables and disables automatic time zone update via NITZ				
Parameter	<ul style="list-style-type: none"> • <onoff> <table border="0"> <tr> <td>0</td><td>disable automatic time zone update via NITZ</td></tr> <tr> <td>1</td><td>automatic time zone update via NITZ</td></tr> </table> 	0	disable automatic time zone update via NITZ	1	automatic time zone update via NITZ
0	disable automatic time zone update via NITZ				
1	automatic time zone update via NITZ				
Scope	Generic				
Reference 3GPP TS 27.007	Note				

2.3.2.27. AT+CPSMS

The set command controls the setting of the UEs power saving mode (PSM) parameters. The command controls whether the UE wants to apply PSM or not, as well as the requested extended periodic TAU value in E-UTRAN and the requested Active Time value. See the unsolicited result codes provided by commands +CEREG for the Active Time value and the extended periodic TAU value that are allocated to the UE by the network in E-UTRAN.

A special form of the command can be given as +CPSMS=2. In this form the use of PSM will be disabled and data for all parameters in the command +CPSMS will be removed or, if available, set to the manufacturer specific default values.

The read command returns the current parameter values.

The test command returns the supported <mode>s and the value ranges for the requested extended periodic TAU value in E-UTRAN and the requested Active Time value as compound values.

AT+CPSMS	Power Saving Mode Setting
Test Command	AT+CPSMS=?
	Response <ul style="list-style-type: none"> • +CPSMS: (list of supported <mode>s),(list of supported <Requested_Periodic-

	RAU>s),(list of supported <Requested_GPRS-READY-timer>s),(list of supported <Requested_Periodic- TAU>s),(list of supported <Requested_Active-Time>s) <ul style="list-style-type: none"> • OK 						
Read command	AT+CPSMS=?						
	Response <ul style="list-style-type: none"> • +CPSMS:<mode>,[<Requested_Periodic-RAU>],[<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>] • If error is related to wrong AT syntax or operation not allowed: <ul style="list-style-type: none"> ○ +CME ERROR: <err> 						
Execution command	AT+CPSMS=[<mode>,[<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>]]]]]						
	Response <ul style="list-style-type: none"> • OK • If error is related to wrong AT syntax: <ul style="list-style-type: none"> ○ +CME ERROR: <err> 						
Parameters	<ul style="list-style-type: none"> • <mode>: integer type. Indication to disable or enable the use of PSM in the UE. <table border="0"> <tr> <td>0</td> <td>Disable the use of PSM</td> </tr> <tr> <td>1</td> <td>Enable the use of PSM</td> </tr> <tr> <td>2</td> <td>Disable the use of PSM and discard all parameters for PSM or, if available reset to the manufacturer specific default values.</td> </tr> </table> • <Requested_Periodic-RAU>: N/A for NB-IoT • <Requested_GPRS-READY-timer>: N/A for NB-IoT • <Requested_Periodic-TAU>: string type; one byte in an 8-bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. The requested extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 and 3GPP TS 23.401. The default value, if available, is manufacturer specific. • <Requested_Active-Time>: string type; one byte in an 8-bit format. Requested Active Time value (T3324) to be allocated to the UE. The requested Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682, 3GPP TS 23.060 and 3GPP TS 23.401. The default value, if available, is manufacturer specific. 	0	Disable the use of PSM	1	Enable the use of PSM	2	Disable the use of PSM and discard all parameters for PSM or, if available reset to the manufacturer specific default values.
0	Disable the use of PSM						
1	Enable the use of PSM						
2	Disable the use of PSM and discard all parameters for PSM or, if available reset to the manufacturer specific default values.						
Scope	Generic						
Reference	Note						

2.3.2.28. AT+CCIOTOPT

The set command controls which Clot EPS optimizations the UE indicates as supported and preferred in the ATTACH REQUEST and TRACKING AREA UPDATE REQUEST messages. The command also allows reporting of the Clot EPS optimizations that are supported by the network. A UE supporting Clot functionality may support control plane Clot EPS optimization or user plane Clot EPS optimization or both (see 3GPP TS 24.301, sub-clause 9.9.3.34). Based on the application characteristics the UE may prefer to be registered for control plane Clot EPS optimization or for user plane Clot EPS optimization (see 3GPP TS 24.301, sub-clause 9.9.3.0B).

Further the network may support control plane Clot EPS optimization or user plane Clot EPS optimization or both (see 3GPP TS 24.301, sub-clause 9.9.3.12A).

The set command is used also to control the unsolicited result code +CCIOTOPTI. An unsolicited result code

+CCIOTOPTI: <supported_Network_opt> is used to indicate the supported CloT EPS optimizations by the network.

The read command returns the current settings for supported and preferred CloT EPS optimizations and the current status of unsolicited result code +CCIOTOPTI.

AT+CCIOTOPT	CloT Optimization Configuration
Test Command	AT+CCIOTOPT=?
	Response <ul style="list-style-type: none"> +CCIOTOPT: (list of supported <n>s),(list of supported <supported_UE_opt>s),(list of supported <preferred_UE_opt>s) OK
Read command	AT+CCIOTOPT?
	Response <ul style="list-style-type: none"> +CCIOTOPT:<n>,<supported_UE_opt>,<preferred_UE_opt>
Execution command	AT+CCIOTOPT=[<n>,<supportedUE_opt>,<preferred_UE_opt>]]
	Response <ul style="list-style-type: none"> OK If error is related to wrong AT syntax: <ul style="list-style-type: none"> +CME ERROR: <err>
Unsolicited result code	+CCIOTOPTI: <supported_Network_opt> is used to indicate the supported CloT EPS optimizations by the network.
Parameters	<ul style="list-style-type: none"> <n>: integer type, enables or disables reporting of unsolicited result code +CCIOTOPTI. <ul style="list-style-type: none"> 0 Disable reporting. 1 Enable reporting. 3 Disable reporting and reset the parameters for CloT EPS optimization to the default values. <supported_UE_opt>: integer type; indicates the UE's support for CloT EPS optimizations. <ul style="list-style-type: none"> 0 No support 1 Support for control plane CloT EPS optimization. 2 Support for user plane CloT EPS optimization. 3 Support for both control plane CloT EPS optimization and user plane CloT EPS optimization. <preferred_UE_opt>: integer type; indicates the UE's preference for CloT EPS optimizations. <ul style="list-style-type: none"> 0 No preference 1 Preference for control plane CloT EPS optimization 2 Preference for user plane CloT EPS optimization <supported_Network_opt>: integer type; indicates the Network support for CloT EPS optimizations. <ul style="list-style-type: none"> 0 No support 1 Support for control plane CloT EPS optimization. 2 Support for user plane CloT EPS optimization. 3 Support for both control plane CloT EPS optimization and user plane CloT EPS optimization.

Scope	Channel Specific
Reference	Note

2.3.2.29. AT+CEDRXS

The set command controls the setting of the UEs eDRX parameters. The command controls whether the UE wants to apply eDRX or not, as well as the requested eDRX value for each specified type of access technology.

The set command also controls the presentation of an unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] when <n>=2 and there is a change in the eDRX parameters provided by the network.

A special form of the command can be given as +CEDRXS=3. In this form, eDRX will be disabled and data for all parameters in the command +CEDRXS will be removed or, if available, set to the manufacturer specific default values.

AT+CEDRXS	eDRX Setting								
Test Command	AT+CEDRXS=?								
	Response <ul style="list-style-type: none"> +CEDRXS: (list of supported <mode>s),(list of supported <AcT-type>s),(list of supported <Requested_eDRX_value>s) OK 								
Read command	AT+CEDRXS?								
	Response <ul style="list-style-type: none"> [+CEDRXS: <AcT-type>,<Requested_eDRX_value> [<CR><LF>+CEDRXS: <AcT-type>,<Requested_eDRX_value> [...]] OK 								
Execution command	AT+CEDRXS=[<mode>[,<AcT-type>[,<Requested_eDRX_value>]]]								
	Response <ul style="list-style-type: none"> OK If error is related to wrong AT syntax: <ul style="list-style-type: none"> +CME ERROR: <err> 								
Parameters	<ul style="list-style-type: none"> <mode>: integer type, indicates to disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <mode> will take effect for all specified values of <AcT>. <table border="0"> <tr> <td>0</td> <td>Disable the use of eDRX</td> </tr> <tr> <td>1</td> <td>Enable the use of eDRX</td> </tr> <tr> <td>2</td> <td>Enable the use of eDRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]</td> </tr> <tr> <td>3</td> <td>Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values.</td> </tr> </table> <AcT-type>: integer type, indicates the type of access technology. This AT-command is used to specify the relationship between 	0	Disable the use of eDRX	1	Enable the use of eDRX	2	Enable the use of eDRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]	3	Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values.
0	Disable the use of eDRX								
1	Enable the use of eDRX								
2	Enable the use of eDRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]								
3	Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values.								

	<p>the type of access technology and the requested eDRX value.</p> <ul style="list-style-type: none"> 1 EC-GSM-IoT (A/Gb mode) 2 GSM (A/Gb mode) 3 UTRAN (Iu mode) 4 E-UTRAN (WB-S1 mode) 5 E-UTRAN (NB-S1 mode) <ul style="list-style-type: none"> • <Requested_eDRX_value>: string type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. The default value, if available, is manufacturer specific. • <NW-provided_eDRX_value>: string type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. • <Paging_time_window>: string type; half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.
Scope	Generic
Reference	Note

2.3.2.30. AT+CEDRXRDP

The execution command returns <AcT-type> and <Requested_eDRX_value>, <NW-provided_eDRX_value> and <Paging_time_window> if eDRX is used for the cell that the MS is currently registered to.

If the cell that the MS is currently registered to is not using eDRX, AcT-type=0 is returned.

AT+CEDRXRDP eDRX Read Dynamic Parameters	
Execution command	AT+CEDRXRDP
	<p>Response</p> <ul style="list-style-type: none"> • +CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] • OK
Parameters	<ul style="list-style-type: none"> • <AcT-type>: integer type, indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value. <ul style="list-style-type: none"> 1 EC-GSM-IoT (A/Gb mode) 2 GSM (A/Gb mode) 3 UTRAN (Iu mode) 4 E-UTRAN (WB-S1 mode) 5 E-UTRAN (NB-S1 mode) • <Requested_eDRX_value>: string type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX

	<p>parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.</p> <ul style="list-style-type: none"> • <NW-provided_eDRX_value>: string type; half a byte in a 4-bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008. • <Paging_time_window>: string type; half a byte in a 4-bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see sub-clause 10.5.5.32 of 3GPP TS 24.008). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 Table 10.5.5.32/3GPP TS 24.008.
Scope	Generic
Reference	Note

2.3.2.31. AT+CGAPNRC

This execution command returns the APN rate control parameters (see 3GPP TS 24.008) associated to the provided context identifier <cid>.

If the parameter <cid> is omitted, the APN rate control parameters for all active PDP contexts are returned. The test command returns a list of <cid>s associated with secondary and non-secondary active PDP contexts.

AT+CGAPNRC	APN Rate Control
Test Command	AT+CGAPNRC=?
	Response <ul style="list-style-type: none"> • +CGAPNRC: (list of <cid>s associated with active contexts) • OK
Execution command	AT+CGAPNRC[=<cid>]
	Response <ul style="list-style-type: none"> • [+CGAPNRC: <cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[, <Maximum_uplink_rate>]]] • [<CR><LF>+CGAPNRC: <cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]] • [...]] • OK
Parameters	<ul style="list-style-type: none"> • <cid>: integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands). • <Additional_exception_reports>: integer type; indicates whether an additional exception reports are allowed to send when the maximum uplink rate is reached. This refers to bit 4 of octet 1 of the APN rate control parameters IE as specified in 3GPP TS 24.008 sub-clause 10.5.6.3.2. <ul style="list-style-type: none"> 0 Additional_exception_reports at maximum rate reached are not allowed to be sent. 1 Additional_exception_reports at maximum rate reached are allowed to send. • <Uplink_time_unit>: integer type; specifies the time unit to be used for the

	<p>maximum uplink rate. This refers to bits 1 to 3 of octet 1 of the APN rate control parameters IE as specified in 3GPP TS 24.008 sub-clause 10.5.6.3.2.</p> <p>0 unrestricted</p> <p>1 minute</p> <p>2 hour</p> <p>3 day</p> <p>4 week</p> <ul style="list-style-type: none"> • <Maximum_uplink_rate>: integer type; specifies the maximum number of messages the UE is restricted to send per uplink time unit. This refers to octet 2 to 4 of the APN rate control parameters IE as specified in 3GPP TS 24.008 sub-clause 10.5.6.3.2.
Scope	Generic
Reference	Note

2.3.2.32. AT+CSCON

The set command controls the presentation of an unsolicited result code +CSCON. If <n>=1, +CSCON: <mode> is sent from the MT when the connection mode of the MT is changed. If <n>=2 and there is a state within the current mode, +CSCON: <mode>[,<state>] is sent from the MT. If <n>=3, +CSCON:<mode>[,<state>[,<access>]] is sent from the MT. If setting fails, an MT error, +CME ERROR: <err> is returned. Refer subclause 9.2 for possible <err> values. When the MT is in UTRAN or E-UTRAN, the mode of the MT refers to idle when no PS signalling connection and to connected mode when a PS signalling connection between UE and network is setup. When the UE is in GERAN, the mode refers to idle when the MT is in either the IDLE state or the STANDBY state and to connected mode when the MT is in READY state. The <state> value indicates the state of the MT when the MT is in GERAN, UTRAN connected mode or E-UTRAN.

The read command returns the status of result code presentation and an integer <mode> which shows whether the MT is currently in idle mode or connected mode. State information <state> is returned only when <n>=2. Radio access type information <access> is returned only when <n>=3.

Test command returns supported values as a compound value.

AT+CSCON Signaling Connection Status	
Test Command	AT+CSCON=?
	Response <ul style="list-style-type: none"> • +CSCON: (list of <n>s) • OK
Read command	AT+CSCON?
	Response <ul style="list-style-type: none"> • +CSCON: <n>,<mode>[,<state>] • OK • If error is related to wrong AT syntax: <ul style="list-style-type: none"> ◦ +CME ERROR: <err>
Execution command	AT+CSCON=<n>
	Response <ul style="list-style-type: none"> • OK • If error is related to wrong AT syntax: <ul style="list-style-type: none"> ◦ +CME ERROR: <err>
Unsolicited result code	+CSCON: <mode>[,<state>[,<access>]]
Parameters	<ul style="list-style-type: none"> • <n>: integer type: <ul style="list-style-type: none"> 0 disable unsolicited result code

	1 enable unsolicited result code +CSCON: <mode> <ul style="list-style-type: none"> <mode>: integer type; indicates signaling connection status 0 idle 1 connected
Scope	Channel specific
Reference	Note <ul style="list-style-type: none"> <state> and <access> parameters not supported for NB-IoT

2.3.2.33. AT+CGEREP

Set command enables or disables sending of unsolicited result codes, +CGEV: XXX from UE to TE in the case of certain events occurring in the Packet Domain UE or the network. <mode> controls the processing of unsolicited result codes specified within this command. <bfr> controls the effect on buffered codes when <mode> 1 or 2 is entered.

Read command returns the current mode and buffer settings.

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

AT+CGEREP		Packet Domain Event Reporting
Test Command	AT+CGEREP=?	
	Response	<ul style="list-style-type: none"> +CGEREP: (list of supported <mode>s), (list of supported <bfr>s) OK
Read Command	AT+CGEREP?	
	Response	<ul style="list-style-type: none"> +CGEREP: <mode>, <bfr> OK
Execution Command	AT+CGEREP=[<mode>]	
	Response	<ul style="list-style-type: none"> OK If error is related to wrong AT syntax: <ul style="list-style-type: none"> +CME ERROR: <err>
Parameters	<mode> <ul style="list-style-type: none"> 0 buffer unsolicited result codes in the UE; if UE result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE. 1 discard unsolicited result codes when UE-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 UE when UE-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when UE-TE link becomes available; otherwise forward them directly to the TE <bfr> <ul style="list-style-type: none"> 0 UE buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered 1 UE 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) 	<p>Unsolicited Result Codes supported:</p> <p>For network attachment, the following unsolicited result codes and the corresponding events are defined:</p>

+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 termination has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

For PDP context activation, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW PDN ACT <cid>

The network has activated a context. The context represents a Primary PDP context in GSM/UMTS. The <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.

NOTE 1: This event is not applicable for EPS.

+CGEV: ME PDN ACT <cid>[,<reason>[,<cid_other>]]

The mobile termination has activated a context. The context represents a PDN connection in NB-IOT. The <cid> for this context is provided to the TE. This event is sent either in result of explicit context activation request (+CGACT), or in result of implicit context activation request associated to attach request (+CGATT=1). The format of the parameter <cid> and <cid other> are found in command +CGDCONT.

For PDP context deactivation, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW PDN DEACT <cid>

The network has deactivated a context. The context represents a PDN connection in NB-IOT. The associated <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.

NOTE 2: Occurrence of this event replaces usage of the event

+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]

+CGEV: ME PDN DEACT <cid>

The mobile termination has deactivated a context. The context represents a PDN connection in NB-IOT. The <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.

NOTE 3: Occurrence of this event replaces usage of the event

+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]

For other PDP context handling, the following unsolicited result codes and the corresponding events are defined:

+CGEV: REJECT <PDP_type>, <PDP_addr>

A network request for context activation occurred when the UE was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected. The format of the parameters <PDP_type> and <PDP_addr> are found in command +CGDCONT.

NOTE 6: This event is not applicable for EPS.

+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]

The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to the UE. The format of the parameters <PDP_type>, <PDP_addr> and <cid> are found in command +CGDCONT.

NOTE 7: This event is not applicable for EPS.

Parameter:

<PDP_type>	Packet Data Protocol type (see +CGDCONT command)
<PDP_addr>	Packet Data Protocol address (see +CGDCONT command)
<cid>	Context Id (see +CGDCONT command) Note: <cid> only given if known

	<p><class> <event_type></p> <p>to the UE. GPRS mobile class (see +CGCLASS command)</p> <p>Integer type parameter indicates whether this is an informational Event of whether the TE as acknowledged it.</p> <p>0 Informational event 1 Information request: Acknowledgement required. The Acknowledgement can be accept or reject, see AT+CGANS.</p> <p><change_reason></p> <p>Integer type parameter indicates what kind of change occurred.</p> <p>1 TFT only changed 2 QoS only changed 3 Both TFT and QoS changed</p> <p><reason></p> <p>Integer type parameter indicates the reason why the context activation request for PDP type IPV4V6 was not granted. This parameter is only included if the requested PDP type associated with <cid> is IPV4V6, and the PDP type assign by the network for <cid> is either IPV4 or IPV6</p> <p>0 IPV4 only allowed 1 IPV6 only allowed 2 single address bearers only allowed 3 single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful</p> <p><cid_other></p> <p>Indicated the context identifier allocated by MT for an MT initiated context of a second address type. MT shall only include this parameter if <reason> parameter indicates single address bearers only allowed, and MT support MT initiated context activation of a second address type without additional commands from the TE, and MT has activated the PDN connection or PDP context associated with <cid_other>.</p>
Scope	Channel Specific
Reference	<p>Note</p> <ul style="list-style-type: none"> Parameter <mode> option 2 is not supported. Parameter <cid_other> is not supported by NB-IOT modem software.

2.3.2.34. AT+NVSETRRCRLSTIMER10

AT+NVSETRRCRLSTIMER10 set RRC connection release waiting time	
Test command	AT+NVSETRRCRLSTIMER10=?
	<p>Response</p> <ul style="list-style-type: none"> OK
Read command	AT+NVSETRRCRLSTIMER10?
	<p>Response</p> <ul style="list-style-type: none"> rrcRlsTimer10 is 0
Set command	AT+NVSETRRCRLSTIMER10=<value>
	<p>Response</p> <ul style="list-style-type: none"> OK
Parameter	<value>
	<p>0 set 1s</p> <p>1 set 10s</p>

Scope	Channel specific
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2.3.2.35. AT+NVSETPM

AT+NVSETPM The execution command is used to set PM1/3	
Test command	AT+NVSETPM=?
	Response • OK
Set command	AT+NVSETPM=<value>
	Response • OK
Parameter	<value>
	0 Close PM1 & PM3
	1 Open PM1
	2 Open PM1 & PM3
Scope	Channel specific

2.3.2.36. AT+CSCLK

AT+CSCLK set low clock mode	
Test command	AT+CSCLK=?
	Response • OK
Set command	AT+CSCLK=<value>
	Response • OK
Parameter	<value>
	0 Disable slow clock
	1 Enable slow clock mode
	2 Set slow clock mode automatically
Scope	Channel specific

2.3.2.37. AT+CFGEDRX

AT+CFGEDRX Configure and query EDRX parameters	
Test command	AT+CFGEDRX=?
	Response • AT+CFGEDRX=[0-1],[0-15],[0-15] • OK
Read command	AT+NVSETPM=?
	Response • +CFGEDRX: <enable>[,<ptw>[,<edrx_val>]]

	<ul style="list-style-type: none">OK
Set command	AT+NVSETRRCRLSTIMER10=<value>
	Response <ul style="list-style-type: none">OK
Parameter	<enable> <ul style="list-style-type: none">0 Edrx is not supported1 Support Edrx
	<ptw> integer, Value range [0-15], to configure the index value of the UE requested paging time Window length. See24.008
Scope	Channel specific



2.4. AT Commands According to 3GPP TS 27.005 for SMS

2.4.1. Overview

The 3GPP TS 27.005 commands are for performing SMS and CBS related operations for both Text and PDU modes.

Command	Description
AT+CMGD	Delete SMS Message
AT+CMGF	Select SMS Message Format
AT+CMGL	List SMS Messages From Preferred Store
AT+CMGR	Read SMS Message
AT+CMGS	Send SMS Message
AT+CMGW	Write SMS Message To Memory
AT+CMSS	Send SMS Message From Storage
AT+CNMI	New SMS Message Indications
AT+CPMS	Preferred SMS Message Storage
AT+CSCA	SMS Service Centre Address
AT+CSDH	Show SMS Text Mode Parameters
AT+CSMP	Set SMS Text Mode Parameters

2.4.2. Detailed Descriptions of Commands

2.4.2.1. AT+CMGD

AT+CMGD	Delete SMS message										
Test command	AT+CMGD=?										
	Response <ul style="list-style-type: none"> +CMGD: list of supported <index>s OK 										
Execute command	AT+CMGD=<index>[,<DelFlag>]										
	Response <ul style="list-style-type: none"> TA deletes one or several messages from preferred message storage <mem1> location <index> or message groups indicated by <DelFlag>. OK If error is related to ME functionality: <ul style="list-style-type: none"> +CMS ERROR <err> 										
Parameters	<ul style="list-style-type: none"> <index> integer type; value in the range of location numbers supported by the associated memory. This value is only used if <DelFlag> = 0 <DelFlag> message delete mode <table border="0"> <tr> <td>0</td><td>Delete message at location <index> (Default value)</td></tr> <tr> <td>1</td><td>Delete all read messages</td></tr> <tr> <td>2</td><td>Delete all READ and SENT messages</td></tr> <tr> <td>3</td><td>Delete all READ, SENT and UNSENT messages</td></tr> <tr> <td>4</td><td>Delete all messages</td></tr> </table> 	0	Delete message at location <index> (Default value)	1	Delete all read messages	2	Delete all READ and SENT messages	3	Delete all READ, SENT and UNSENT messages	4	Delete all messages
0	Delete message at location <index> (Default value)										
1	Delete all read messages										
2	Delete all READ and SENT messages										
3	Delete all READ, SENT and UNSENT messages										
4	Delete all messages										

Scope	<ul style="list-style-type: none"> Channel Specific for test command Generic for execute command
Reference 3GPP TS 27.005	<p>Note</p> <ul style="list-style-type: none"> When the M5313 software has concatenated SMS handling in modem enabled (see AT command AT*MFTRCFG) the user can delete a concatenated text SMS up to 1024 characters in length. A concatenated SMS is stored on the SIM as number of smaller SMSs. (This is not possible when MMI is present). When the M5313 software does not have concatenated SMS handling in the modem enabled, the maximum text SMS length is restricted depending on the data coding scheme (160 for 7-bit, 140 for 8-bit, 80 for 16-bit). An attempt to delete anything other than the first segment of a concatenated SMS, when concat SMS is enabled, will result in ERROR response. Deleting an empty entry will result in OK response rather than ERROR.

2.4.2.2. AT+CMGF

AT+CMGF Select SMS Message Format	
Test command	AT+CMGF=?
	Response <ul style="list-style-type: none"> +CMGF: list of supported <mode>s OK
Read command	AT+CMGF?
	Response <ul style="list-style-type: none"> +CMGF: <mode> OK
Set command	AT+CMGF=[<mode>]
	Response <ul style="list-style-type: none"> TA sets parameter to denote which input and output format of messages to use. OK
Parameters	<mode> 0 PDU mode 1 text mode
Scope	Channel Specific
Reference 3GPP TS 27.005	Note

2.4.2.3. AT+CMGL

AT+CMGL List SMS messages from preferred store	
Test command	AT+CMGL=?
	Response <ul style="list-style-type: none"> +CMGL: list of supported <stat>s OK

Execute command	<p>AT+CMGL[=<stat>]</p> <p>Response</p> <p>TA returns messages with status value <stat> from message storage <mem1> to the TE. . If status of the message is 'received unread', status in the storage changes to 'received read'.</p> <ul style="list-style-type: none"> If text mode (+CMGF=1) and command successful: for SMS-SUBMITs and/or SMS-DELIVERs: <ul style="list-style-type: none"> +CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>][,<tooa/toda>,<length>]<CR><LF><data>[...]] OK If SMS-STATUS-REPORT and text mode: <ul style="list-style-type: none"> +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>[...]] OK If PDU mode (+CMGF=0) and command successful: <ul style="list-style-type: none"> +CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu> [<CR><LF>+CMGL: <index>,<stat>,[alpha],<length><CR><LF><pdu> [...]] OK If error is related to ME functionality: <ul style="list-style-type: none"> +CMS ERROR: <err> <p>Parameters</p> <ul style="list-style-type: none"> <alpha> string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer specific <da> 3GPP 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <toda> <data> In the case of SMS: 3GPP 23.040 TP-User-Data in text mode responses; format: <ul style="list-style-type: none"> if <dc> indicates that 3GPP 23.038 default alphabet is used and <fo> indicates that 3GPP 23.040 TP-User-Data-Header-Indication is not set: ME/TA converts GSM alphabet into current TE character set according to rules of Annex A if <dc> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that 3GPP 23.040 TP-User-Data-Header-Indication is set: 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))
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	<p>In the case of CBS: 3GPP 23.041 CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> ○ if <dc> indicates that 3GPP 23.038 default alphabet is used: ME/TA converts GSM alphabet into current TE character set according to rules of Annex A ○ if <dc> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number <ul style="list-style-type: none"> • <length> integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) • <index> integer type; value in the range of location numbers supported by the associated memory • <oa> 3GPP 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters; type of address given by <toa> • <pdu> In the case of SMS: 3GPP 24.011 SC address followed by 3GPP 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit 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)). In the case of CBS: 3GPP 23.041 TPDU in hexadecimal format. • <scts> 3GPP 23.040 TP-Service-Center-Time-Stamp in time-string format (refer <dt>) • <toda> 3GPP 24.011 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) • <toa> 3GPP 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>) • <fo> First byte of SMS-DELIVER, SMS-SUBMIT or SMS-STATUS-REPORT in integer format. <ul style="list-style-type: none"> • <mr> Message reference. Integer format. • <ra> Recipient address. String type. • <tora> Type of address of <ra>. <ul style="list-style-type: none"> ○ 145: International number ○ 129: National number • <scts> Service centre time stamp. String format: "yy/MM/dd, hh:mm:ss+/-zz" (Year/Month/Dat, Hour:Seconds+/TimeZone) • <dt> Discharge time. String format: "yy/MM/dd, hh:mm:ss+/-zz" (Year/Month/Dat, Hour:Seconds+/TimeZone) • <st> Status of an SMS-STATUS-REPORT. Integer format.
Parameters	<ul style="list-style-type: none"> • If text mode: <ul style="list-style-type: none"> <stat> "REC UNREAD" Received unread messages (default) "REC READ" Received read messages "STO UNSENT" Stored unsent messages "STO SENT" Stored sent messages "ALL" All messages • If PDU mode: <ul style="list-style-type: none"> <stat> 0 Received unread messages (default) 1 Received read messages

	2 Stored unsent messages 3 Stored sent messages 4 All messages
Scope	Channel Specific (reads from generic SMS store)
Reference 3GPP TS 27.005	Note <ul style="list-style-type: none"> Read of SMS-SRs when <mem1> is set to "SR" can read SIM memory When the M5313 software has concatenated SMS handling in modem enabled (see AT command AT*MFTRCFG) the user can read a concatenated text SMS up to 1024 characters in length. A concatenated SMS is stored on the SIM as number of smaller SMSs. (This is not possible when MMI is present). When the M5313 software does not have concatenated SMS handling in the modem enabled, the maximum text SMS length is restricted depending on the data coding scheme (160 for 7-bit, 140 for 8-bit, 80 for 16-bit).

2.4.2.4. AT+CMGR

AT+CMGR	Read SMS message
Test command	AT+CMGR=? Response <ul style="list-style-type: none"> OK
Execute command	AT+CMGR=<index> Response TA returns SMS message with location value <index> from message storage <mem1> to the TE. If status of the message is 'received unread', status in the storage changes to 'received read'. <ul style="list-style-type: none"> If text mode (+CMGF=1) and command successful: <ul style="list-style-type: none"> for SMS-DELIVER: +CMGR:<stat>,<oa>,[<alpha>],<scts> [,<tooa>,<fo>,<pid>,<dc>,<sca>,<tosca>,<length>]<CR><LF><data> OK for SMS-SUBMIT: +CMGR:<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dc>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data> OK If SMS-STATUS-REPORT and text mode: +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> OK If PDU mode (+CMGF=0) and command successful: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> OK If error is related to ME functionality: +CMS ERROR: <err>
Parameters	<ul style="list-style-type: none"> <index> integer type; value in the range of location numbers supported by the associated memory <alpha> string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; implementation of this feature is manufacturer specific. <da> 3GPP 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to

		characters of the currently selected TE character set (specified by +CSCS); type of address given by <toa>
•	<data>	<p>In the case of SMS: 3GPP 23.040 TP-User-Data in text mode responses; format:</p> <ul style="list-style-type: none"> ○ if <dc> indicates that 3GPP 23.038 default alphabet is used and <fo> indicates that 3GPP 23.040 TP-User-Data-Header-Indication is not set: <p>ME/TA converts GSM alphabet into current TE character set according to rules of Annex A</p> <ul style="list-style-type: none"> ○ if <dc> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that 3GPP 23.040 TP-User-Data-Header-Indication is set: 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)). <p>In the case of CBS: 3GPP 23.041 CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> ○ if <dc> indicates that 3GPP 23.038 default alphabet is used: <p>ME/TA converts GSM alphabet into current TE character set according to rules of Annex A</p> <ul style="list-style-type: none"> ○ if <dc> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number
•	<dc>	depending on the command or result code: 3GPP 23.038 SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format
•	<fo>	depending on the command or result code: first octet of 3GPP 23.040 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format
•	<length>	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
•	<mid>	3GPP 23.041 CBM Message Identifier in integer format
•	<oa>	3GPP 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted characters of the currently selected TE character set (specified by +CSCS); type of address given by <toa>
•	<pdu>	In the case of SMS: 3GPP 24.011 SC address followed by 3GPP 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit 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)). In the case of CBS: 3GPP 23.041 TPDU in hexadecimal format.
•	<sca>	3GPP 24.011 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS); type of address given by <tosca>
•	<scts>	3GPP 23.040 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
•	<stat>	
	0	"REC UNREAD" Received unread messages
	1	"REC READ" Received read messages

	2 "STO UNSENT" Stored unsent messages 3 "STO SENT" Stored sent messages 4 "ALL" All messages <ul style="list-style-type: none"> • <tda> 3GPP 24.011 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) • <toa> 3GPP 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer<tda>) • <tosca> 3GPP 24.011 RP SC address Type-of-Address octet in integer format (default refer <tda>) • <vp> depending on SMS-SUBMIT <fo> setting: 3GPP 23.040 TP-Validity-Period either in integer format (default 167) or in time-string format (refer <dt>) • <mr> Message reference. Integer format. • <ra> Recipient address. String type. • <tora> Type of address of <ra>. <ul style="list-style-type: none"> ○ 145: International number ○ 129: National number • <dt> Discharge time. String format: "yy/MM/dd, hh:mm:ss+/-zz" (Year/Month/Dat, Hour:Seconds+/TimeZone) • <st> Status of an SMS-STATUS-REPORT. Integer format.
Scope	Channel Specific (reads from generic SMS store)
Reference 3GPP TS 27.005	Note <ul style="list-style-type: none"> • Read of SMS-SRs when <mem1> is set to "SR" can read SIM memory • When the M5313 software has concatenated SMS handling in modem enabled (see AT command AT*MFTRCFG) the user can read a concatenated text SMS up to 1024 characters in length. A concatenated SMS is stored on the SIM as number of smaller SMSs. (This is not possible when MMI is present). • When the M5313 software does not have concatenated SMS handling in the modem enabled, the maximum text SMS length is restricted depending on the data coding scheme (160 for 7-bit, 140 for 8-bit, 80 for 16-bit).

2.4.2.5. AT+CMGS

AT+CMGS	Send SMS message
Test command	AT+CMGS=?
	Response <ul style="list-style-type: none"> • OK
Execute command	AT+CMGS=<da>[,<tda>]<CR> text is entered<ctrl-Z/ESC>
	Response TA transmits SMS message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Value can be used to identify message upon unsolicited delivery status report result code. <ul style="list-style-type: none"> • If text mode(+CMGF=1) and sending successful: <ul style="list-style-type: none"> ○ +CMGS: <mr> OK • If PDU mode(+CMGF=0) and sending successful: <ul style="list-style-type: none"> ○ +CMGS: <mr> OK • If error is related to ME functionality:

	<ul style="list-style-type: none"> ◦ +CMS ERROR: <err>
Parameters	<p>Parameters</p> <ul style="list-style-type: none"> • <da> 3GPP 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS); type of address given by <toa> • <toa> 3GPP 24.011 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) • <length> integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) • <mr> 3GPP 23.040 TP-Message-Reference in integer format
Scope	<ul style="list-style-type: none"> ◦ Channel Specific for test command ◦ Generic for execute command
Reference 3GPP TS 27.005	<p>Note</p> <ul style="list-style-type: none"> • If we set 8bit or 16bit encode of dcs, we can send 8bit or 16bit message with text mode. the entered text should be formatted as follows: - if <dcs> (set with +CSMP) indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set: - if TE character set other than “HEX” (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts the entered text into the GSM 7 bit default alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user); - if TE character set is “HEX”: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into the GSM 7 bit default alphabet characters. (e.g. 17 (IRA 49 and 55) will be converted to character ? (GSM 7 bit default alphabet 23)).

2.4.2.6. AT+CMGW

AT+CMGW Write SMS message to memory	
Test command	AT+CMGW=? Response <ul style="list-style-type: none"> • OK
Execute command	AT+CMGW [=<oa/da>[,<toa/oda>[,<stat>]]]<CR>text is entered <ctrl-Z/ESC> Response <ul style="list-style-type: none"> • OK
Parameters	<ul style="list-style-type: none"> • <oa> 3GPP 23.040 TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS); type of address given by <toa> • <da> 3GPP 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS); type of address given by <toa> • <toa> 3GPP 24.011 TP-Originating-Address Type-of-Address octet in integer format (default refer <toa>)

	<ul style="list-style-type: none"> • <tda> 3GPP 24.011 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) • <length> integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length) • <pdu> In the case of SMS: 3GPP 24.011 SC address followed by 3GPP 23.040 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit 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)). In the case of CBS: 3GPP 23.041 TPDU in hexadecimal format. • <index> Index of message in selected storage <mem2> • <stat> Status of message when stored in memory <ul style="list-style-type: none"> 0 "REC UNREAD" Received unread message 1 "REC READ" Received read message 2 "STO UNSENT" Stored unsent message (default) 3 "STO SENT" Stored sent message • <scts> 3GPP 23.040 TP-Service-Centre-Time-Stamp in time- string format String format: "yy/MM/dd,hh:mm:ss+/-zz" (Year/Month/Day,Hour:Seconds+TimeZone). Field only required when writing SMS-DELIVER.
Scope	<ul style="list-style-type: none"> ○ Channel Specific for test command ○ Generic for execute command
Reference 3GPP TS 27.005	<p>Note</p> <ul style="list-style-type: none"> • 1.not support long message. 2.<tda> have three values: 161, 145 and 129. 3. if pdu mode, each bit meaning of the • dcs byte are following: Dcs byte: bit7..bit0 • bit7..bit4 - encode group • bit7 - reserved bit6 - reserved bit5 - 0:text uncompress 1: GSM default compress bit4 - 0: bit0 and bit1 no use 1: bit0 • and bit1 useful • bit0: bit1: 0 0 class1 0 1 class2 1 0 class3 1 1 class4 • bit2: bit3: 0 0 GSM default 7 bit encode 0 1 8 bit encode 1 0 16bit(UCS2) encode 1 1 reserved • 4. At PDU mode ,if we want to write MT message at storage, we must specify the status of UNREAD or READ. And • at PDU mode , wen can' t write MT message which have status of UNSENT or SENT.

2.4.2.7. AT+CMSS

AT+CMSS Send SMS message from storage	
Test command	AT+CMSS=?
	Response <ul style="list-style-type: none"> • OK
Execute command	AT+CMSS=<index>[,<da>[,<tda>]]
	Response TA sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT). If new recipient address <da> is given, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on

	<p>successful message delivery. Values can be used to identify message upon unsolicited delivery status report result code.</p> <ul style="list-style-type: none"> If text mode(+CMGF=1) and sending successful: <ul style="list-style-type: none"> +CMSS: <mr> OK If PDU mode(+CMGF=0) and sending successful: <ul style="list-style-type: none"> +CMSS: <mr> OK If error is related to ME functionality: <ul style="list-style-type: none"> +CMS ERROR: <err>
Parameters	<ul style="list-style-type: none"> <index> integer type; value in the range of location numbers supported by the associated memory <da> 3GPP 23.040 TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS); type of address given by <tda> <tda> 3GPP 24.011 TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129) <mr> 3GPP 23.040 TP-Message-Reference in integer format
Scope	<ul style="list-style-type: none"> Channel Specific for test command Generic for execute command
Reference 3GPP TS 27.005	<p>Note</p> <ul style="list-style-type: none"> When the M5313 software has concatenated SMS handling in modem enabled (see AT command AT*MFTRCFG) this command will send the all stored messages which form part of a concatenated SMS. (This is not possible when the MMI is present).

2.4.2.8. AT+CNMI

AT+CNMI	New SMS message indications
	AT+CNMI=?
Test command	<p>Response</p> <ul style="list-style-type: none"> +CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s) OK
Read command	<p>AT+CNMI?</p> <p>Response</p> <ul style="list-style-type: none"> +CNMI: <mode>,<mt>,<bm>,<ds>,<bfr> OK
Set command	<p>AT+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]</p> <p>Response</p> <ul style="list-style-type: none"> TA selects the procedure for how the receiving of new messages from the network is indicated to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in 3GPP 23.038. OK If error is related to ME functionality:

	<ul style="list-style-type: none"> o +CMS ERROR: <err>
Parameters	<ul style="list-style-type: none"> • <mode> <ul style="list-style-type: none"> 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 (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 after reservation. Otherwise forward them directly to the TE. 3 Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode. • <mt> (the rules for storing received SMSs depend on its data coding scheme (refer 3GPP 23.038 [2]), preferred memory storage (+CPMS) setting and this value): <ul style="list-style-type: none"> 0 No SMS-DELIVER indications are routed to the TE. 1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> SMS-DELIVERS (except class 2) are routed directly to the TE using unsolicited result code: +CMT: [<alpha>], <length><CR><LF><pdu> (PDU mode enabled) or +CMT: <oa> , [<alpha>], <scts> [, <toa> , <fo> , <pid> , <dcs> , <sc> , <ca> , <tosca> , <length>] <CR><LF><data> (text mode enabled; about parameters in italics, refer command Show Text Mode Parameters +CSDH). Class 2 messages 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 classes result in indication as defined in <mt>=1. • <bm> (the rules for storing received CBMs depend on its data coding scheme (refer 3GPP 23.038 [2]), the setting of Select CBM Types (+CSCB) and this value): <ul style="list-style-type: none"> 0 No CBM indications are routed to the TE (default) • <ds> <ul style="list-style-type: none"> 0 No SMS-STATUS-REPORTs are routed to the TE. 1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled) or +CDS: <fo> , <mr> , [<ra>] , [<tora>] , <scts> , <dt> , <st> (text mode enabled) 2 SMS status reports are stored and indication of memory location routed to TE using unsolicited result +CDSI: "SR", <index> • <bfr> <ul style="list-style-type: none"> 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). TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered. • <mem> Memory storage (for +CMTI and +CBMI indications) <ul style="list-style-type: none"> "SM" SMS message storage in SIM (default) "SR" status report message storage (in SIM if EF-SMR file present) or in

	MMI NVRAM if MMI present. <ul style="list-style-type: none"> • <index> Integer type indicating storage location (for +CMTI and +CBMI indications)
Unsolicited result code	<ul style="list-style-type: none"> • +CMTI: <mem>, <index> Indication that new message has been received with storage location • +CMT: <length><CR><LF><pdu> Short message is output directly
Scope	<ul style="list-style-type: none"> o Channel Specific for test and read command o Generic for set command
Reference 3GPP TS 27.005	Note <ul style="list-style-type: none"> • CB messages are not supported for NB-IoT.

2.4.2.9. AT+CPMS

AT+CPMS	Preferred SMS Message Storage
Test command	AT+CPMS=?
	Response <ul style="list-style-type: none"> • +CPMS: (list of supported <mem1>s),(list of supported <mem2>s) ,(list of supported <mem3>s) • OK
Read command	AT+CPMS?
	Response <ul style="list-style-type: none"> • +CPMS: <mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3> • OK • If error is related to ME functionality: <ul style="list-style-type: none"> o +CMS ERROR
Set command	AT+CPMS =<mem1> [,<mem2> [,<mem3>]]
	Response <ul style="list-style-type: none"> • TA selects memory storages <mem1>, <mem2> and <mem3> to be used for reading, writing, etc. • +CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> • OK • If error is related to ME functionality: <ul style="list-style-type: none"> o +CMS ERROR:<err> •
Parameters	<ul style="list-style-type: none"> • <mem1> Messages to be read and deleted from this memory storage "SM" SIM message storage "SR" Status Report message storage (EF-SMR if available on SIM). SR in SIM are only associated with SMSs stored on SIM. If EF-SMR not available and MMI is present then status reports are stored in NVRAM. In addition MMI can store status reports in NVRAM as well as ones stored on SIM (EF-SMR file), if available. • <mem2> Messages will be written and sent to this memory storage "SM" SIM message storage • <mem3> Received messages will be placed in this memory storage if routing to PC is not set (" +CNMI")

	<p>"SM" SIM message storage</p> <ul style="list-style-type: none"> <usedx> Number of messages currently in <memx> <totalx> Number of messages storable in <memx>
Scope	<ul style="list-style-type: none"> Channel Specific for test and read command Generic for set command
Reference 3GPP TS 27.005	Note

2.4.2.10. AT+CSCA

AT+CSAS Save SMS settings	
Test command	AT+CSCA=?
	Response <ul style="list-style-type: none"> OK
Read command	AT+CSCA?
	Response <ul style="list-style-type: none"> +CSCA: <sca>,<tosca> OK
Set command	AT+CSCA =<sca>[,<tosca>]
	Response <ul style="list-style-type: none"> TA updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, 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 <pdu> parameter equals zero. Note: The command writes the parameters in NON-VOLATILE memory. OK
Parameters	<ul style="list-style-type: none"> <sca> 3GPP 24.011 RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (specified by +CSCS); type of address given by <tosca> <tosca> Service center address format 3GPP 24.011 RP SC address Type-of-Address octet in integer format (default refer <toda>)
Scope	<ul style="list-style-type: none"> Channel Specific for test and read command Generic for set command
Reference 3GPP TS 27.005	Note

2.4.2.11. AT+CSDH

AT+CSDH Show SMS text mode parameters	
Test command	AT+CSDH=?
	Response <ul style="list-style-type: none"> +CSDH: list of supported <show>s OK
Read command	AT+CSDH?
	Response

	<ul style="list-style-type: none"> • +CSDH:<show> • OK
Set command	AT+CSDH=<show> Response <ul style="list-style-type: none"> • TA determines whether detailed header information is shown in text mode result codes. • OK
Parameters	<ul style="list-style-type: none"> • <show> <ul style="list-style-type: none"> 0 do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dc>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR result codes in text mode 1 show the values in result codes
Scope	<ul style="list-style-type: none"> o Channel Specific
Reference 3GPP TS 27.005	Note

2.4.2.12. AT+CSMP

AT+CSMP Set SMS text mode parameters	
Test command	AT+CSMP=? Response <ul style="list-style-type: none"> • OK
Read command	AT+CSMP? Response <ul style="list-style-type: none"> • +CSMP:<fo>,<vp>,<pid>,<dc> • OK
Set command	AT+CSMP=[<fo> [<vp>,<pid>,<dc>]]] Response <ul style="list-style-type: none"> • TA selects values for additional parameters needed when SM is sent to the network or placed in storage when text mode is selected (+CMGF=1). It is possible to set the validity period starting from when the SM is received by the SMSC (<vp> is in range 0... 255). • OK
Parameters	<ul style="list-style-type: none"> • <fo> first octet of 3GPP 23.040 SMS-DELIVER, SMS-SUBMIT in integer format. The following fields can be modified: <ul style="list-style-type: none"> o TP-Message-Type-Indicator (bits 0-1) (SMS-DELIVER or SMS-SUBMIT) o TP-Reject-Duplicates (bit 2) o TP-Validity-Period-Format (bits 3-4) o TP-Status-Report-Request (bit 5) o TP-User-Data-Header-Indicator (bit 6) o TP-Reply-Path (bit 7). Default value is 17 (SMS-SUBMIT and Validity Period in relative format) <p>When concatenated SMS is supported by M5313, attempts to change the following fields from the default will produce an ERROR:</p> <p>TP-User-Data-Header-Indicator (bit 6) – the UDHI field is used for concatenated SMSs and is set by the Background Layer where appropriate.</p>

	<ul style="list-style-type: none">• <vp> 3GPP 23.040 TP-Validity-Period in integer format (default 167).• <pid> 3GPP 23.040 TP-Protocol-Identifier in integer format (default 0)• <dc> 3GPP 23.038 SMS Data Coding Scheme in Integer format (default 0 i.e. 7-bit coding).
Scope	<ul style="list-style-type: none">○ Channel Specific for test and read command○ Generic for set command
Reference 3GPP TS 27.005	<p>Note</p> <p>The command writes the settings <vp>, <pid> and <dc> in SIM memory. <fo> field is not stored anywhere.</p> <ul style="list-style-type: none">• On startup, the settings <vp>, <pid> and <dc> are read from the SIM and used for SMS AT commands. If they cannot be found in the SIM they are set to the default values.• The <fo> field is always set to the default value at startup.



2.5. AT Commands Special for CMIOT

2.5.1. Overview

Command	Description
AT+CMVER	Request software Version
AT+GPIO	Operate GPIO
AT+CMADC	Read ADC
AT+NETLIGHT	Control the net light
AT+CMDMP	DM register

2.5.2. Detailed Description of Commands

2.5.2.1. AT+CMVER

The command returns the software version of the UE. The format is not specified.

AT+CMVER	Request Software Version
Execution command	AT+CMVER
	Response <ul style="list-style-type: none"> • <Software_Version> • OK
Parameters	< Software_Version >
Scope	Channel Specific
Reference	Note

+CMVER Examples

```
20180816174610
BR08161746
OK
```

2.5.2.2. AT+GPIO

Query GPIO configuration and Change GPIO configuration. This AT command is case sensitive.

AT+GPIO	Operate GPIO
Set command	+GPIO=<id>,<direction>,<level>
	Response <ul style="list-style-type: none"> • OK
Unsolicited result code	See Table Below
Parameters	<ul style="list-style-type: none"> • <gpio_id>: integer, gpio id number, now only 0 supported 0 Pin 34 • <direction>: integer, direction value 0 input

	1 output • <level>: integer output direction value; 0 low 1 high
Scope	Channel Specific
Reference	Note

2.5.2.3. AT+CMADC

AT+CMADC	Read ADC
Execution command	AT+CMADC
	Response • +CMADC: <voltage>,<channel> • OK
Set command	AT+CMADC=<channel>
	Response • OK
Parameters	<channel> integer type, the user channel is the forth channel <voltage> integer type, Indicate the ADC voltage.
Scope	Channel Specific
Reference	Note : channel 4 is for user

2.5.2.4. AT+NETLIGHT

AT+NETLIGHT	CONTROL THE NET LIGHT
Set command	AT+NETLIGHT=<on_off>
	Response • OK
Parameters	<on_off >: 0: close the net light 1: open the net light
Scope	Channel Specific
Reference	Note : Restart to take effect

2.5.2.5. AT+CMDMP

AT+CMDMP	DM Fuction
Set command	AT+CMDMP=<mode>[,<interval>,<key>,<pwd>,<ver>,<test>]
	Response • OK
Read command	AT+CMDMP? +CMDMP:<mode>,<interval>,<key>,<pwd>,<ver>,<test>
Parameters	<p><mode>:</p> <p>0: close the DM</p> <p>1: open for cmcc</p> <p><interval> update interval (1-1440 min)</p> <p><key> appkey</p> <p><pwd> password</p> <p><ver> version</p> <p><test></p> <p>0: for business platform (cmcc)</p> <p>1: for test paltform (cmcc)</p>
Scope	Channel Specific
Reference	Note : Restart to take effect



3. Network Related Proprietary AT Command Interface

This chapter introduces the supported proprietary platform AT command set on M5313.

We support single AT command. When executing the previous AT command is finished, the next AT command will be executed.

3.1. General Command

3.1.1 AT+CGACT

This command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT remains in V.25ter command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and then attempts to activate the specified contexts. If no <cid>s are specified the activation form of the command activates all defined contexts or deactivates all active contexts

AT+EGACT Activate or deactivate a PDN context	
Set command	AT+ CGACT=<state> [,<cid>[,<cid>[]]]
	Response <ul style="list-style-type: none"> +CGACT:<state>,<cid> OK ERROR
Parameters	<ul style="list-style-type: none"> <state> integer type; 0 deactivation requirement 1 activation requirement <cid> It is a numeric parameter specifying a particular PDP context. Here it should be equal to the <cid> returned by the activation response
Reference	Note <ul style="list-style-type: none"> This command name is temporary and may be changed in the later release.

3.1.2 AT+CDNSCFG

This command Configure Domain Name Serve.

AT+CMDNS Send a DNS request	
Set command	+CDNSCFG=<pri_dns>[,<sec_dns>]
	Response <ul style="list-style-type: none"> OK ERROR
Unsolicited result code	

Parameters	< pri_dns> PrimaryDns <sec_dnst> SecondaryDns
Reference	Note

3.1.3 AT+CMDNSGIP

This command used to query the IP address of given domain name

AT+CMDNSGIP Query The IP Address Of Given Domain Name	
Set command	AT+CMDNSGIP=<domain name>
	Response <ul style="list-style-type: none"> OK If successful <ul style="list-style-type: none"> +CMDNSGIP: <IP address> If fail <ul style="list-style-type: none"> +CMDNSGIP:0,<dns error code>
Test command	AT+CMDNSGIP=?
	OK
Parameters	<ul style="list-style-type: none"> <domain name> A string parameter which indicates the domain name <IP address> A string parameter which indicates the first IP address corresponding to the domain name <dns error code> A numeric parameter which indicates the error code <ul style="list-style-type: none"> 8 DNS COMMON ERROR 3 NETWORK ERROR There are some other error codes as well
Reference	Note NULL

3.1.4 AT+CMPING

ping server of remote

AT+CMPING Ctrl "AT+CMPING" ping server of remote	
Set command	AT+CMPING="<host>"
	Response <ul style="list-style-type: none"> OK [+CMPING:<result>[,<ipAddr>,<bytes>,<time>,<ttl>]...] +CMPING:<finresult>[,<sent>,<rcvd>,<lost>,<min>,<max>,<avg>] ERROR
Read command	AT+CMPING=?
	<ul style="list-style-type: none"> +PING:DNS/IP address OK
Parameters	<ul style="list-style-type: none"> <host> Ipaddr or domain of remote server. <timeout> Default 1s. Range 1-255.

	<ul style="list-style-type: none"> • <pingnum> Ping count. Default 4. Range 1-10 • <result> 0 : Recv response of remote server. Display:<ipAdr>,<bytes>,<time>,<ttl> 1 : Ping timeout. • <ipAdr> Ipaddr of remote server. • <bytes> Length of ping send data. • <time> Request time consuming of ping. Unit ms. • <ttl> Current time of ping response. • <finresult> 2 : Success of active GPRS. 3 : TCP/IP protocol stack busy. 4 : Not find of remote server. 5 : Fail of active PDP. • <sent> Send counts of ping. • <rcvd> Send counts of ping and recv response times. • <lost> Timeout times of ping. • <min> Min response time. Unit : ms. Max response time. Unit : ms. • <avg> Average response time. Unit : ms.
Reference	Note NULL

3.1.5 AT+CFGDUALMODE

Configure and query dual-mode parameters,can not take effect immediately before save to NV and restart.

AT+CFGDUALMODE Configure and query dual-mode parameters	
Test Command	AT+CFGDUALMODE=?
	<ul style="list-style-type: none"> • +CFGDUALMODE: dualmode=[0-2], fastSwitch=[0-1] OK
Read command	AT+CFGDUALMODE?
	+CFGDUALMODE: <dualmode>,<fastSwitch>
Set command	AT+CFGDUALMODE=[<dualmode>[,<fastSwitch>]]
	Response OK If error is related to wrong AT syntax: o +CME ERROR: <err>
Parameters	<dualmode> 0 Do not support dual mode 1 dual mode single standby 2 dual mode dual standby <fastSwitch> 0 close 1 open

3. 1. 6 AT+CFGRATPRIO

Configure and query schema priority under dual-mode single-pending, which can be modified when dual-mode fast Switch is turned on but does not work on system behavior (system behavior is fixed to NB first).

AT+CFGRATPRIO	Configure and query schema priority
Test Command	AT+CFGRATPRIO=?
	Response +CFGRATPRIO:(list of supported<priority>s) OK
Read command	AT+CFGRATPRIO?
	Response +CFGDUALMODE: <priority>
Set command	AT+CFGRATPRIO=<priority>)
	Response OK If there is an error related to ME functionality: +CME ERROR: <err>
Parameters	<priority> 2 2G priority 4 NB priority



3.2. Network Command

3.2.1. AT+IPSTART

This command is to start Up TCP or UDP connection

AT+IPSTART Start Up TCP Or UDP Connection	
Set command	AT+IPSTART=[<index>,<mode>,<IPaddress>/<domainname>,<port>
	<p>Response</p> <ul style="list-style-type: none"> • if connection already exist <ul style="list-style-type: none"> - OK - ALREADY CONNECT • if connect success <ul style="list-style-type: none"> - OK - CONNECT OK • if connect fail <ul style="list-style-type: none"> - OK - CONNECT FAIL
Test command	<ul style="list-style-type: none"> • CMMUX=0 <ul style="list-style-type: none"> - +IPSTART:("TCP"/"tcp","UDP"/"udp"),((0-255).(0-255).(0-255).(0-255)),(0-65535) • CMMUX=1 <ul style="list-style-type: none"> - +IPSTART:[(0~4),]("TCP"/"tcp","UDP"/"udp"),((0-255).(0-255).(0-255).(0-255)),(0-65535)
Parameters	<ul style="list-style-type: none"> • < <index> 0..4 A numeric parameter which indicates the connection number • <mode> A string parameter which indicates the connection type <ul style="list-style-type: none"> “TCP” Establish a TCP connection “UDP” Establish a UDP connection • <IP address> A string parameter which indicates remote server IP address. • <domain name> A string parameter which indicates remote server domain name. • <port> Remote server port
Reference	<p>Note</p> <p>This command allows establishment of a TCP/UDP connection only when the state is IP INITIAL or IP STATUS when it is in single state. In multi-IP state, the state is in IP STATUS only. So it is necessary to process “AT+CIPSHUT” before user establishes a TCP/UDP connection with this command when the state is not IP INITIAL or IP STATUS.</p>

3.2.2. AT+IPSEND

This command is to send data through TCP or UDP connection

AT+IPSEND Send Data Through TCP Or UDP Connection	
Execute command	AT+IPSEND

	Response <ul style="list-style-type: none"> if connection exist and send success <ul style="list-style-type: none"> SEND OK if send fail <ul style="list-style-type: none"> SEND FAIL if TCP/UDP disconnect <ul style="list-style-type: none"> CONNECTION CLOSE
Set command	CMMUX=0 AT+IPSEND=<length>
	Response <ul style="list-style-type: none"> if connection exist and send success <ul style="list-style-type: none"> SEND OK if send fail <ul style="list-style-type: none"> SEND FAIL if TCP/UDP disconnect <ul style="list-style-type: none"> CONNECTION CLOSE
	CMMUX=1 AT+IPSEND=<index>,<length>
	Response <ul style="list-style-type: none"> if connection exist and send success <ul style="list-style-type: none"> SEND OK if send fail <ul style="list-style-type: none"> SEND FAIL if TCP/UDP disconnect <ul style="list-style-type: none"> CONNECTION CLOSE
Parameters	<index> 0..4 A numeric parameter which indicates the connection number <length> A numeric parameter which indicates the length of sending data, MAX size 1460
Reference	Note: +IPSEND EXE Command can only be used in single IP connection mode (+CMMUX=0) and to send data on the TCP or UDP connection that has been established already. Ctrl-Z is used as a termination symbol. ESC is used to cancel sending data. There are at most 1460 bytes which can be sent at a time. Reference: <ul style="list-style-type: none"> Response >, then type data for send, tap CTRL+Z to send, tap ESC to cancel the operation The data length which can be sent depends on network status. Only send data at the status of established connection.

3.2.3. AT+IPCLOSE

This command is to close TCP or UDP connection

AT+IPCLOSE	Close TCP Or UDP Connection
Execute command	AT+CMDNSGIP=<domainame>
	Response <ul style="list-style-type: none"> OK If successful <ul style="list-style-type: none"> +CMDNSGIP: <IP address>

	<ul style="list-style-type: none"> If fail <ul style="list-style-type: none"> - +CMDNSGIP:0,<dns error code>
Test command	AT+CMDNSGIP=?
	OK
Parameters	<ul style="list-style-type: none"> <domain name> A string parameter which indicates the domain name <IP address> A string parameter which indicates the first IP address corresponding to the domain name <dns error code> A numeric parameter which indicates the error code <ul style="list-style-type: none"> 8 DNS COMMON ERROR 3 NETWORK ERROR <p>There are some other error codes as well</p>
Reference	Note NULL

AT+IPSTART Examples

```

AT+CGACT=1,1,"cmiot","", "" //activate pdn connection
OK
AT+IPSTART=1,"TCP","183.230.40.150",36000 //estabilish the tcp connection
OK
CONNECT OK //setup and connect to 183.230.40.150
AT+IPSEND
> 1234^<ctrl-z> //When the'^'appears,input data to be sent and end with
ctrl-z (0x1A)

SEND OK

AT+IPCLOSE=1 //close the connection and release the source
OK
AT+CMMUX=0 //exit the multi-connection mode.
OK
  
```

3.2.4. AT+CMPPROMPT

This command used to set show ">" & "SEND OK" when send data.

AT+CMPPROMPT Set show ">" & "SEND OK" when send data	
Set command	AT+CMPPROMPT=<send prompt>
	Response <ul style="list-style-type: none"> OK +CME ERROR
Test command	AT+CMPPROMPT=?
	Response <ul style="list-style-type: none"> +CMPPROMPT:(0,3) OK
Read command	AT+CMPPROMPT?
	Response <ul style="list-style-type: none"> +CMPPROMPT: <send prompt> OK
Parameters	<ul style="list-style-type: none"> <send prompt> A numeric parameter which indicates whether to echo prompt ">"

	after module issues AT+CIPSEND command. 0 It shows "SEND OK" but does not prompt echo ">" when sending is successful. 1 It prompts echo ">" and shows "SEND OK" when sending is successful. 2 It neither prompts echo ">" nor shows "SEND OK" when sending is successful. 3 It prompts echo ">" and shows "<index>, SEND OK" when sending is successful • <index> 0..4 A numeric parameter which indicates the connection number
Reference	Note NULL

3.2.5. AT+CMMODE

This command used to select TCPIP application mode

AT+IPCLOSE	Close Socket
Set command	AT+CMMODE=<mode> Response • OK • +CME ERROR
Test command	AT+CMMODE=? Response • +CMMODE: (0,1) • OK
Read command	AT+CMMODE? Response • +CMMODE: <mode> • OK
Parameters	<mode> • 0 Normal mode • 1 Transparent mode In transparent mode, after connection established, UART will be waiting data. Input data will be send to server, and data received from server will be output UART directly,exit waiting data with "+++", after exit call AT+IPCLOSE release the resources.
Reference	Note • 1. Transparent mode can be set only in single IP connection mode. • 2. In transparent mode use AT+IPSTART establish connection automatically enter the data transparent mode. • 3. In transparent mode establish connection success will return CONNECT, else return FAIL. • 4. If the connection disconnected, the transparent mode exit also, then need to excute "AT+IPCLOSE" release the resources. • 5. Exit transparent mode with "+++", after exit call AT+IPCLOSE release the resources

3.2.6. AT+CMMUX

This command used to start up multi-IP connection.

AT+IPRCFG	Set Socket Receive Configuration
Set command	AT+CMMUX=<mode>

	Response <ul style="list-style-type: none"> • OK • +CME ERROR
Test command	AT+CMMUX=?
	Response <ul style="list-style-type: none"> • +CMMUX: (0,1) • OK
Read command	AT+CMMUX?
	Response <ul style="list-style-type: none"> • +CMMUX: <mode> • OK
Parameters	<mode> Connection mode 0 Single IP connection 1 Multi IP connection
Reference	Note In transparent mode not allowed multi IP connection. MAX 5 connections can be established at the same time

3.2.7. AT+CMSACK

This command used to query previous connection data transmitting state

AT+CMSACK Query Previous Connection Data Transmitting State	
Set command	CMMUX=1 AT+CMSACK=<n>
	Response CMMUX=1 <ul style="list-style-type: none"> - +CMSACK:<totalSend>,<totalRecv>,<sent>,<acked>,<nAked> - OK
Test command	AT+CMSACK=?
	CMMUX=1 <ul style="list-style-type: none"> - +CMSACK:<totalSend>,<totalRecv>,<sent>,<acked>,<nAked> - OK
Read command	CMMUX=0 AT+CMSACK?
	CMMUX=0 <ul style="list-style-type: none"> - +CMSACK:<totalSend>,<totalRecv>,<sent>,<acked>,<nAked> - OK
Parameters	<ul style="list-style-type: none"> • <n> A numeric parameter which indicates the connection number • <totalSend> The data amount which has been sent from setup • <totalRecv> The data amount which has been received from setup • <sent> The data amount which has been sent • <acked> The data amount confirmed successfully by the server • <nAked> The data amount without confirmation by the serve
Reference	Note

	<ul style="list-style-type: none"> • AT+CMSACK? can be excuted only in the single mode. • AT+CMSACK=<n> can be excuted only in the multi mode. Max Response Time: 300ms
--	---

3.2.8. AT+CMNDI

This command used to cache rcv data.

AT+CMNDI	Cache rcv data
Set command	AT+CMNDI=<m>[,<sw>] <ul style="list-style-type: none"> • OK • ERROR
Read command	AT+CMNDI? <ul style="list-style-type: none"> • +CMNDI:<m>[,<sw>] • OK
Test command	AT+CMNDI=? <ul style="list-style-type: none"> • +CMNDI:(0,1),(0,1) • OK
Parameters	<ul style="list-style-type: none"> • <m> 0 : don't cache 1 : cache and response to UART with +CMRD:<sid>,<len>,<total> • [sw] 0 : close cache URC 1 : open cache URC The parameter can be no set, default is 1 • <sid> 0..4 A numeric parameter which indicates the connection number, when AT+CMMUX=0,<sid>=0 • <len> The data amount which has been received at this time • <total> The data amount which has been cached
Reference	Note NULL

3.2.9. AT+CMRD

This command is used to read data of cache rcv.

AT+CMRD	AT+CMRD Read data of cache rcv
Set command	AT+CMRD=<sid>,<len> Response <ul style="list-style-type: none"> • <data> • OK
Test command	AT+CMRD=? <ul style="list-style-type: none"> • +CMRD:(0,4),(0,4096) • OK
Read command	AT+CMRD? Response +CMRD:<sid>,<lenr>,<lenl>
Parameters	<ul style="list-style-type: none"> • <sid> A numeric parameter which indicates the connection number, range 0~4(when

	AT+CMMUX=0, <sdi>=0) <ul style="list-style-type: none"> • <len> Read data length, range 1~4096 • <data> Data • <lenlr> Read data length last time • <lentl> The rest of the data amount from cached data
Reference	Note: Max Response Time: 300ms

3.2.10. AT+CMHEAD

Add an IP head at the beginning of a package received

AT+CMHEAD	Add an IP head at the beginning of a package received
Set command	AT+CMHEAD=<mode> Response <ul style="list-style-type: none"> • OK • +CME ERROR <err>
Read command	AT+CMHEAD? <ul style="list-style-type: none"> • +CMHEAD: <mode> • OK
Test command	AT+CMHEAD=? <ul style="list-style-type: none"> • +CMHEAD:(0,1) • OK
Parameters	<mode> A numeric parameter which indicates whether an IP header is added to the received data or not. <ul style="list-style-type: none"> • 0 Not add IP header • 1 Add IP header"CONNECT FAIL"
Reference	Note NULL

3.2.11. AT+CMSHOWRA

Add an IP head at the beginning of a package received

AT+CMSHOWRA	Show Remote IP Address And Port When Received Data
Set command	AT+CMSHOWRA=<mode> Response <ul style="list-style-type: none"> • OK • +CME ERROR <err>
Read command	AT+CMSHOWRA? <ul style="list-style-type: none"> • +CMSHOWRA: <mode> • 0
Test command	AT+CMSHOWRA=? <ul style="list-style-type: none"> • +CMSHOWRA:(0,1) • OK
Parameters	<mode> A numeric parameter which shows remote IP address and port. <ul style="list-style-type: none"> • 0 Do not show the prompt • 1 Show the prompt

Reference	Note <ul style="list-style-type: none"> This command will be effective only in single connection mode (+CMMUX=0) Only when +CMHEAD is set to 1, the setting of this command will Work.
-----------	--

3.2.12. AT+CMSHOWTP

Display Transfer Protocol In IP Head When Received Data

AT+CMSHOWTP	Display Transfer Protocol In IP Head When Received Data
Set command	AT+CMSHOWTP=<mode>
	Response <ul style="list-style-type: none"> OK +CME ERROR <err>
Read command	AT+CMSHOWTP?
	<ul style="list-style-type: none"> +CMSHOWTP: <mode> OK
Test command	AT+CMSHOWTP=?
	<ul style="list-style-type: none"> +CMSHOWTP:(0,1) OK
Parameters	<mode> A numeric parameter which indicates whether to display transfer protocol in IP header to received data or not <ul style="list-style-type: none"> 0 Not display transfer protocol 1 Display transfer protocol
Reference	Note <ul style="list-style-type: none"> This command will be effective only in single connection mode (+CMMUX=0) Only when +CMHEAD is set to 1, the setting of this command will Work. If +CMSHOWTP=1, the format is +IPD,<data size>,<TCP/UDP>:<data>

3.2.13. AT+CMSHOWLA

Show remote ip address when send data

AT+CMSHOWLA	Show remote ip address when send data
Set command	AT+CMSHOWLA=<mode>
	Response <ul style="list-style-type: none"> OK ERROR
Read command	AT+CMSHOWLA?
	<ul style="list-style-type: none"> +CMSHOWLA:<mode> OK
Test command	AT+CMSHOWLA=?
	<ul style="list-style-type: none"> +CMSHOWLA:(0,1) OK
Parameters	<mode> <ul style="list-style-type: none"> 0: don't show (default)

	<ul style="list-style-type: none"> 1: show, format: TO:<IP ADDRESS>
Reference	Note <ul style="list-style-type: none"> This command will be effective only in single connection mode (+CMMUX=0) Only when +CMHEAD is set to 1, the setting of this command will Work

3.2.14. AT+CMIPMODE

Config IPSEND data mode in normal mode (CMMODE=0)

AT+CMIPMODE	Config IPSEND data mode in normal mode (CMMODE=0)
Set command	AT+CMIPMODE=<mode>
	Response <ul style="list-style-type: none"> OK ERROR
Read command	AT+CMIPMODE?
	<ul style="list-style-type: none"> +CMIPMODE:<mode> OK
Test command	AT+CMIPMODE=?
	<ul style="list-style-type: none"> +CMIPMODE:(0,1) OK
Parameters	<mode> : The data send mode with AT+IPSEND <ul style="list-style-type: none"> 0 : string data 1 : hex data
Reference	Note The max data length of sending is 1k

3.2.15. AT+CMSTATE

Query the connection status of the current access

AT+CMSTATE	Query the connection status of the current access
Execute command	AT+CMSTATE
	<ul style="list-style-type: none"> AT+CMMUX=0 <ul style="list-style-type: none"> +CMSTATE:<index>,<mode>,<addr>,<port>,<socketstate> OK AT+CMMUX=1 <ul style="list-style-type: none"> +CMSTATE:<index>,<mode>,<addr>,<port>,<state><CR><LF>) list OK
Test command	AT+CMSTATE=?
	<ul style="list-style-type: none"> OK
Parameters	<state> Strings parameter which connect state

	<ul style="list-style-type: none"> When AT+CMMUX=0 : <ul style="list-style-type: none"> “IP INITIAL” initialization “IP START” start task “IP CONFIG” configuration scene “IP IND” active GPRS/CSD “IP GPRSACT” config receiving scene “IP STATUS” get local ip addr “TCP CONNECTING” TCP connecting “UDP CONNECTING” UDP connecting “IP CLOSE” TCP/UDP connection close “CONNECT OK” TCP/UDP connection success “PDP DEACT” GPRS/CSD scene abnormal closed When AT+CMMUX=1 : <ul style="list-style-type: none"> “IP INITIAL” initialization “IP START” start task “IP CONFIG” configuration scene “IP IND” active GPRS/CSD “IP GPRSACT” config receiving scene “IP STATUS” get local ip addr “IP PROCESSING” data processing “PDP DEACT” GPRS/CSD scene abnormal closed <p>448 Chapter 21. 21 CMIOT_TCP/IP CommandsAT Command Manual, Release DualMode1.0</p> <ul style="list-style-type: none"> <index> 0~4 <mode> Connection type “TCP” TCP connection “UDP” UDP connection <addr> ip address <port> port <socketstate> connection status of the current access, “INITIAL”, “CONNECTED”
Reference	Note NULL

3.2.16. AT+CMLPORT

Get Local Port

AT+CMLPORT	Get Local Port
Set command	AT+CMLPORT=<index>,<port> <ul style="list-style-type: none"> • OK • ERROR
Read command	AT+CMLPORT? <ul style="list-style-type: none"> • +CMLPORT: <index>,<port><CR><LF>) • list • OK
Parameters	<ul style="list-style-type: none"> • <index> 0..4 A numeric parameter which indicates the connection number • <port> 0-65535 A numeric parameter which indicates the local port. Default value is 0, a port can be dynamically allocated a port.

Reference	Note This command will be effective when +CMMUX=1
-----------	--

3.2.17. AT+CMLOCIP

Get Local IP Address

AT+CMLOCIP	Get Local IP Address
Execute command	AT+CMLOCIP
	Response <ul style="list-style-type: none"> • <IP address> • OK • ERROR
Test command	AT+CMLOCIP=?
	• OK
Parameters	<IP address> A string parameter which indicates the IP address assigned from GPRS or CSD
Reference	<p>Note</p> <p>Only after PDP context is activated, local IP address can be obtained by AT+CMLOCIP, otherwise it will respond ERROR. To see the status use AT+CMSTATE command. Status should be: IP GPRSACT, TCP CONNECTING, UDP CONNECTING, SERVER LISTENING, IP STATUS, CONNECT OK, TCP CLOSING, UDP CLOSING, TCP CLOSED, UDP CLOSED in single-connection mode (see <state> parameter); IP STATUS, IP PROCESSING in multi-connection mode (see <state> parameter).</p> <p>Max Response Time: 300ms</p>

3.2.18. AT+CMSTAT

Query the current connection state

AT+CMSTAT	Query the current connection state
Execute command	AT+CMSTAT
	Response <ul style="list-style-type: none"> • AT+CMMUX=0 <ul style="list-style-type: none"> - STATE:<index>,<mode>,<addr>,<port> - OK • AT+CMMUX=1 <ul style="list-style-type: none"> - (+CMSTAT:<index>,<mode>,<addr>,<port><CR><LF>) - list - OK
Read command	AT+CMSTAT?
	• OK
Parameters	<ul style="list-style-type: none"> • <state> Strings parameter which connect state <ul style="list-style-type: none"> “IP INITIAL” initialization “IP START” start task “IP CONFIG” configuration scene

-
- | | |
|--|--|
| | <p>“IP IND” active GPRS/CSD</p> <p>“IP GPRSACT” config receiving scene</p> <p>“IP STATUS” get local ip addrs</p> <p>“TCP CONNECTING” TCP connecting</p> <p>“UDP CONNECTING” UDP connecting</p> <p>“IP CLOSE” TCP/UDP connection close</p> <p>“CONNECT OK” TCP/UDP connection success</p> <p>“PDP DEACT” GPRS/CSD scene abnormal closed</p> <ul style="list-style-type: none">• In ATV0:<ul style="list-style-type: none">0 “IP INITIAL”1 “IP START”2 “IP CONFIG”3 “IP IND”4 “IP GPRSACT”6 “TCP CONNECTING” or “UDP CONNECTING”7 “IP CLOSE”8 “CONNECT OK”9 “PDP DEACT”• <index> 0~5• <mode> Connection type “TCP” TCP connection “UDP” UDP connection• <addr> ip address• <port> port |
|--|--|
-



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3.3. MQTT Command

3.3.1 AT+MQTTCFG

This command is used to config the MQTT client

AT+MQTTCFG	Config the Client
Set command	AT+MQTTCFG=<server>,<port>,<id>,<keepAlive>,<user>,<passwd>,<clean>,<encrypt>
	Response <ul style="list-style-type: none"> OK
Parameters	<ul style="list-style-type: none"> <server> string, MQTT server IP address <port> string, MQTT server port <id> string, client ID, should be unique <cmdtimeout> integer, ack should be received during the interval <keepAlive> integer, keep alive interval (s) <user> string, user name <passwd> string, password <clean> integer, clean session(0-1) <encrypt> integer, 0 : TCP , 1 : SSL
Reference	Note if encrypt =1 ,write the CA in flash before using

+MQTTCFG Examples

```
AT+MQTTCFG=183.230.40.39,6002,4069959,15,75829,
IIOu0oFUg1guk20ornTK1uzAcnM=,1,0
OK
```

3.3.2 AT+MQTTOPEN

This command is used to send MQTT connection packet.

AT+MQTTOPEN	Send Connection Packet
Set command	AT+MQTTOPEN=<usrFlag>,<pwdFlag>,<willFlag>,[<willRetain>,<willQos>,<will-topic>,<will-mesg>]
	Response <ul style="list-style-type: none"> OK ERROR
Unsolicited result code	+MQTTOPEN: OK/FAIL

Parameters	<ul style="list-style-type: none"> • <usrFlag> integer, whether to use username (0-1) • <pwdFlag> integer, whether to use pwdFlag (0-1) • <willFlag> integer, whether to set willmsg (0-1) • <willRetain> integer, retained flag(0-1) • <willQos> integer, message Qos(0-2) • <will-topic> string, topic name of will • <will-mesg> string, message of will
Reference	Note

+MQTTOPEN Examples

```

AT+MQTTOPEN=1,1,0
+MQTTOPEN: OK
AT+MQTTOPEN=1,1,1,1,1,mywill,bye
+MQTTCONACK: FAIL
  
```

3.3.3 AT+MQTTSTAT

This command is used to query MQTT client's state.

AT+MQTTSTAT	Query MQTT Client's State												
Query command	AT+MQTTSTAT?												
	Response <ul style="list-style-type: none"> • +MQTTSTAT:<stat> • OK • ERROR 												
Parameters	<ul style="list-style-type: none"> • <stat> <table border="0"> <tr><td>0</td><td>UNINITIALED</td></tr> <tr><td>1</td><td>INITIALED</td></tr> <tr><td>2</td><td>DISCONNECTED</td></tr> <tr><td>3</td><td>CONNECTING</td></tr> <tr><td>4</td><td>RECONNECTING</td></tr> <tr><td>5</td><td>CONNECTED</td></tr> </table> 	0	UNINITIALED	1	INITIALED	2	DISCONNECTED	3	CONNECTING	4	RECONNECTING	5	CONNECTED
0	UNINITIALED												
1	INITIALED												
2	DISCONNECTED												
3	CONNECTING												
4	RECONNECTING												
5	CONNECTED												
Reference	Note												

3.3.4 AT+MQTTSUB

This command is used to send MQTT subscribe packet.

AT+MQTTSUB	Send MQTT Subscribe Packet
Set command	AT+MQTTSUB=<topic>,<Qos>,<index>
	Response <ul style="list-style-type: none"> • OK • ERROR

Unsolicited result code	+MQTTSUBACK:<packet id>,<qos>,<topic name>
Parameters	<ul style="list-style-type: none"> • <topic> string, topic of subscribe message • <Qos> integer, message Qos, can be 0, 1, or 2 • <index> 0-text (now only support 0)
Reference	Note

3.3.5 AT+MQTTPUB

This command is used to send MQTT publish packet.

AT+MQTTPUB Send MQTT Publish Packet	
Set command	AT+MQTTPUB=<topic>,<Qos>,<retained>,<dup>,<message_len>,<message>
	Response <ul style="list-style-type: none"> • OK • ERROR
Unsolicited result code	+MQTTPUBACK: <packet_id>,<dup> (qos =1) +MQTTPUBREC: <packet_id>,<dup> +MQTTPUBCOMP: <packet_id>,<dup> (qos =2)
Parameters	<ul style="list-style-type: none"> • <topic> string, topic of message • <Qos> integer, message Qos, can be 0, 1, or 2 • <retained> interger, retained flag, can be 0 or 1 • <dup> integer, duplicate flag, can be 0 or 1 • <message_len> integer, length of publish message(option), if set to 0 or omitted, <message> will be parsed in text format, else hexidecimal format • <message> string, publish message
Reference	Note

+MQTTPUB Examples

```

AT+MQTTPUB=pyr,1,0,0,3,7E7A7A    (HEX)
OK
AT+MQTTPUB=pyr,1,0,0,0,abcdef    (TEXT)
OK
  
```

3.3.6 AT+MQTTUNSUB

This command is used to send MQTT unsubscribe packet.

AT+MQTTUNSUB Send MQTT Unsubscribe Packet	
Set command	+MQTTUNSUB=<topic>
	Response <ul style="list-style-type: none"> • OK • ERROR

Unsolicited result code	+MQTTUNSUBACK:<packet id>,<topic name>
Parameters	<ul style="list-style-type: none"> <topic> string, topic of unsubscribe message
Reference	Note

3.3.7 AT+MQTTDISC

This command is used to send MQTT disconnect packet.

AT+MQTTDISC Send MQTT Disconnect Packet	
Execute command	AT+MQTTDISC
	Response <ul style="list-style-type: none"> OK ERROR
Unsolicited result code	+MQTTDISC
Reference	Note

3.3.8 AT+MQTTDEL

This command is used to delete MQTT client's configuration.

AT+MQTTDEL Delete MQTT Client's Configuration	
Execute command	AT+MQTTDEL
	Response <ul style="list-style-type: none"> OK ERROR
Reference	Note

3.3.9 AT+MQTTTO

This command is used to set MQTT command timeout.

AT+MQTTTO Set MQTT Command Timeout	
Set command	AT+MQTTTO=<tiemout>
	Response <ul style="list-style-type: none"> OK ERROR
parameter	<ul style="list-style-type: none"> <timeout> integer, mqtt command timeout in second, default 10s
Reference	Note

3.3.10 +MQTTPUBLISH

This urc is used to receive MQTT publish packet.

+MQTTPUBLISH Receive MQTT Publish Packet	
Unsolicited result code	AT+MQTTPUBLISH=<dup>,<qos>,<retained>,<packet_id>,<message_len>,<message>
Parameters	<ul style="list-style-type: none"> • <dup> integer, duplicate flag, can be 0 or 1 • <qos> integer, message Qos, can be 0, 1, or 2 • <retained> integer, retained flag, can be 0 or 1 • <packet_id> integer, the id of current packet • <message_len> integer, length of publish message • <message> string, publish message
Reference	Note

3.3.11 +MQTTTO

This urc is used to indicate timeout when user send a MQTT command without ACK during the setting time .

+MQTTTO Indicate Time Out													
Unsolicited result code	+MQTTTO: <cmd>												
Parameters	<ul style="list-style-type: none"> • <cmd> integer, mqtt command type <table border="0"> <tr><td>1</td><td>connect timeout</td></tr> <tr><td>2</td><td>publish timeout</td></tr> <tr><td>3</td><td>subscribe timeout</td></tr> <tr><td>4</td><td>unsubscribe timeout</td></tr> <tr><td>5</td><td>ping timeout</td></tr> <tr><td>6</td><td>unkown timeout type</td></tr> </table> 	1	connect timeout	2	publish timeout	3	subscribe timeout	4	unsubscribe timeout	5	ping timeout	6	unkown timeout type
1	connect timeout												
2	publish timeout												
3	subscribe timeout												
4	unsubscribe timeout												
5	ping timeout												
6	unkown timeout type												
Reference	Note												

3.4. HTTP/HTTPS Command

3.4.1 AT+HTTPIPINIT

This command is used to initialize the HTTP service. Before this command executed, it is necessary to process “AT+CGACT=1,1”.

AT+HTTPIPINIT Initialize the HTTP service	
Execute command	AT+HTTPIPINIT
	Response <ul style="list-style-type: none"> • OK • + CME ERROR: <err>
Test command	AT+HTTPIPINIT=?
	Response <ul style="list-style-type: none"> • + HTTPIPINIT • OK • + CME ERROR: <err>
Parameters	NULL
Reference	<ul style="list-style-type: none"> • Note: <ol style="list-style-type: none"> 1. Before this command executed, it is necessary to process “AT+CGACT=1,1”. 2. HTTPIPINIT should first be executed to initialize the HTTP service • Reference: AT+HTTPIPINIT OK

3.4.2 AT+HTTPTERM

This command is used to terminate HTTP service

AT+HTTPTERM Terminate HTTP service	
Execute command	AT+HTTPTERM
	Response <ul style="list-style-type: none"> • OK • + CME ERROR: <err>
Test command	AT+HTTPIPINIT=?
	Response <ul style="list-style-type: none"> • + HTTPTERM

	<ul style="list-style-type: none"> • OK • + CME ERROR: <err>
Parameters	NULL
Reference	<ul style="list-style-type: none"> • Note: <ol style="list-style-type: none"> 1. Before this command executed, it is necessary to process "AT+HTTPIPINIT". 2. HTTPTERM should last be executed to terminate the HTTP service. • Reference: AT+HTTPTERM OK

3. 4. 3 AT+HTTPPARA

This command is used to set HTTP parameters' value

AT+HTTPPARA	Set HTTP parameters' value
Set command	AT+HTTPPARA= <httpparamTag><httpparamValue> Response <ul style="list-style-type: none"> • OK • + CME ERROR: <err>
Test command	AT+HTTPPARA=? Response <ul style="list-style-type: none"> • + HTTPPARA=<HTTPParamTag>,<HTTPParamValue> • OK • + CME ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <HTTPParamTag> Name of HTTP parameter. parameter list: <ul style="list-style-type: none"> "CID" (Mandatory Parameter) Bearer profile identifier "URL" (Mandatory Parameter) HTTP client URL: "http://server'/path':tcpPort'". "server": FQDN or IPaddress, "path": path of file or directory, "tcpPort": default value is 80. Refer to "IETF-RFC 2616". "UA" The user agent string which is set by the application to identify the mobile. Usually this parameter is set as operation system and software version information. Default value is "RDA8955". "PROIP" The IP address of HTTP proxy server "PROPORT" The port of HTTP proxy server "REDIR" This flag controls the redirection mechanism of the RDA8955 when it is acting as HTTP client (numeric). If the server sends a redirect code (range 30x), the client will automatically send a new HTTP request when the flag is set to (1). "BREAK" Parameter for HTTP method "GET", used for resuming broken transfer. "BREAKEND" Parameter for HTTP method "GET", used for resuming broken transfer. which is used together with "BREAK",If the value of "BREAKEND" is bigger than "BREAK", the transfer scope is from "BREAK" to "BREAKEND". If the value of "BREAKEND" is smaller than "BREAK", the transfer scope is from "BREAK" to the end of the file. "TIMEOUT" If both "BREAKEND" and "BREAK" are 0, the resume broken transfer function is disabled.HTTP session timeout value, scope: 30-1000 second.Default value is 120 seconds. HTTP Parameter value.Type and supported content depend on related <HTTPParamTag>. "CONTENT" Used to set the "Content-Type" field in HTTP header. "USERDATA" User data

	<ul style="list-style-type: none"> • <HTTPParamValue> HTTP Parameter value.Type and supported content depend on related <HTTPParamTag>.
Reference	<p>Note:</p> <ul style="list-style-type: none"> • 1. Before this command is executed, it is necessary to process "AT+HTTPIPINIT" • 2. Not all the HTTP Server supports "BREAK" and "BREAKEND" parameters <p>Reference: AT+HTTTPARA="CID","1" OK</p>

AT+HTTTPARA example:

```
AT+HTTPIPINIT
OK
AT+HTTTPARA = "CID","1"
OK
AT+HTTTPARA = "URL",http://api.heclouds.com/devices/25336211/datapoints?type=5
OK
AT+HTTTPARA="CONTENT","application/json"
OK
AT+HTTTPARA="API_KEY","qnx1RqyuLFOfiMXmwe243HUZeo="
OK
```

3. 4. 4 AT+HTTPDATA

This command is used to input HTTP data.

AT+HTTPDATA	Input HTTP data
Execute command	<p>AT+HTTPDATA</p> <p>Response</p> <ul style="list-style-type: none"> • > • OK • + CME ERROR: <err>
Test command	<p>AT+HTTPDATA=?</p> <ul style="list-style-type: none"> • + HTTPDATA • OK • + CME ERROR: <err>
Parameters	<ul style="list-style-type: none"> • <'>'> When receive this parameters, you can enter your data in send box and send out. When you send out your data,you should focus your cursor in receive box and use combination key: "CTRL+Z" to finish this command.
Reference	<p>Note: Before this command is executed, it is necessary to process "AT+HTTPIPINIT"</p> <p>Reference: AT+HTTPDATA > 1234567 -> OK</p>

3.4.5 AT+HTTPSETCRT

This command is used to set HTTPS certificates

AT+HTTPSETCRT	Set HTTPS certificates
Set command	AT+HTTPSETCRT= <certFlag>
	Response <ul style="list-style-type: none"> • OK • <response_data> • + CME ERROR: <err>
Test command	AT+HTTPSETCRT=?
	Response <ul style="list-style-type: none"> • +HTTPSETCRT=<certFlag> • OK • + CME ERROR: <err>
Parameters	<certFlag> : 0 Set CA certificate 1 Set client certificate 2 Set client private key
Reference	Note: After this command is executed, it is necessary to process "AT+HTTPDATA" to finish set CRT.

3.4.6 AT+HTTPACTION

This command is used to conduct HTTP method action

AT+HTTPACTION	Conduct HTTP method action
Set command	AT+HTTPACTION=<method_code>
	Response <ul style="list-style-type: none"> • OK • <method_code>,<status_code>,<content_length> • +CME ERROR: <err>
Test command	AT+HTTPACTION=?
	<ul style="list-style-type: none"> • +HTTPACTION=<method_code> • OK • +CME ERROR: <err>
Parameters	<ul style="list-style-type: none"> • <method_code> HTTP methods. 0 GET 1 POST 2 HEAD 3 DELETE 4 DELETE(for onenet) 5 PUT(for onenet) • <status_code> HTTP Status Code responded by remote server, it identifier refer to HTTP1.1(RFC2616) 100 Continue 101 Switching Protocols 200 OK 201 Created 202 Accepted 203 Non-Authoritative Information 204 No Content

	<p>205 Reset Content 206 Partial Content 300 Multiple Choices 301 Moved Permanently 302 Found 303 See Other 304 Not Modified 305 Use Proxy 307 Temporary Redirect 400 Bad Request 401 Unauthorized 402 Payment Required 403 Forbidden 404 Not Found 405 Method Not Allowed 406 Not Acceptable 407 Proxy Authentication Required 408 Request Time-out 409 Conflict 410 Gone 411 Length Required 412 Precondition Failed 413 Request Entity Too Large 414 Request-URI Too Large 415 Unsupported Media Type 416 Requested range not satisfiable 417 Expectation Failed 500 Internal Server Error 501 Not Implemented 502 Bad Gateway 503 Service Unavailable 504 Gateway Time-out 505 HTTP Version not supported 600 Not HTTP PDU 601 Network Error 602 No memory 603 DNS Error 604 Stack Busy</p> <ul style="list-style-type: none"> • <content_length> HTTP content_length responded by remote server.
Reference	<p>Note: 1. Before this command is executed, it is necessary to process "AT+HTTPPARA" 2. The <content_length> will be 0 except GET method.</p> <p>Reference: AT+HTTPACTION=0 OK 0,200,10</p>

3. 4. 7 AT+HTTPREAD

This command is used to read the HTTP server response

AT+HTTPNMIH	Header of the response from host
Set command	AT+HTTPREAD=<start_address>,<byte_size>
	Response:

	<ul style="list-style-type: none"> • + HTTPREAD:<data_len>,<data> • OK • + CME ERROR: <err>
Test command	<ul style="list-style-type: none"> • T+HTTPREAD=? Response: <ul style="list-style-type: none"> • AT+HTTPREAD=<start_address>,<byte_size> • OK • + CME ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <start_address> The starting point for data output. 0-319488 (bytes) • <byte_size> The length for data output.1-319488 (bytes) • <data_len> The actual length for data output. • <data> Data from HTTP server or user input
Reference	Note: 1. Read data when AT+HTTPACTION=0 or AT+HTTPDATA is executed. If<byte_size> is bigger than the data size received, module will only Return actual data size. 2. It is strongly recommended to set enough time to input all data with the length of <byte_size>. Reference: AT+HTTPREAD=2,8 OK +HTTPREAD:8 12345678

3. 4. 8 AT+HTTPSTATUS

This command is used to read HTTP status

AT+HTTPSTATUS	Read HTTP status
Execute command	AT+HTTPSTATUS Response: <ul style="list-style-type: none"> • OK • +HTTPSTATUS: <mode>,<status>,<finish>,<remain> • + CME ERROR:<err>
Test command	<ul style="list-style-type: none"> • AT+HTTPSTATUS=? Response: <ul style="list-style-type: none"> • +HTTPSTATUS: <mode>,<status>,<finish>,<remain> • OK • + CME ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <mode> GET POST HEAD • <status> 0 idle 1 receiving 2 sending • <finish> The amount of data which have been transmitted • <remain> The amount of data remaining to be sent or received
Reference	Note Before this command is executed, it is necessary to process "AT+HTTPACTION" Reference: AT+HTTPSTATUS GET,1,210,0

	OK
--	----



中国移动
China Mobile

3.5. OneNET Command

3.5.1. AT+MIPLCREATE

This command create an instance of communication to CMloT OneNET platform.

AT+MIPLCREATE Create OneNET Instance	
Excute command	AT+MIPLCREAT
	Response <ul style="list-style-type: none"> • <ref> • OK +CIS ERROR:<err>
Set command	AT+MIPLCREATE=<totalsize>,<config>,<index>,<currentsize>,<flag>
	Response <ul style="list-style-type: none"> • <ref> • OK • +CIS ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <totalsize> integer, total size of configuration data of OneNET connection parameter. • <config> string, configuration data, refer to configuration structure. • <index> integer, index of each configuration data block, beginning from N-1 to 0. • <currentsize> integer, current size of this AT command. • <flag> integer, flag indicates if configuration stream is started or finished(first packet,middle packet,last packet), if set to 0,the last configuration package is sent, and the whole setting goes into effect. 1: first packet 2: middle packet 3: last packet
Reference Other Proprietary commands	Note

+MIPLCREATE Example

```

AT+MIPLCREATE
Or
AT+MIPLCREATE=56,130038F10003F2002A04001100000000000010196E62696F7462742E686
5636C6F7564732E636F6D3A35363833000131F30008F000000000,0,56,0
OK
  
```

3.5.2. AT+MIPLDELETE

Delete a specified OneNET communication instance.

AT+MIPLDELETE	
Set command	AT+MIPLDELETE=<ref>
	Response <ul style="list-style-type: none"> • OK • +CIS ERROR: <err>

Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance.
Reference	Note

3.5.3. AT+MIPLOPEN

Sending register request to OneNET with set command, and querying registre state with read command.

AT+MIPLOPEN Send OneNET Register Request	
Set command	AT+MIPLOPEN=<ref>,<lifetime>[,<timeout>]
	Response <ul style="list-style-type: none"> OK +CIS ERROR:<err>
Read command	AT+MIPLOPEN?
	Response <ul style="list-style-type: none"> OK +CIS ERROR:<err>
Unsolicited result code	+MIPLEVENT:<ref>,<evt_code>
Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance. <lifetime> the lifetime of this registration <timeout> timeout of current login, if no response from server overtime, UE will response +MIPLEVENT, default 15s.
Reference	<ul style="list-style-type: none"> Note

+MIPLOPEN Example

```
AT+MIPLOPEN=0,3000,30
OK
+MIPLEVENT:0,4
+MIPLEVENT:0,6
```

3.5.4. AT+MIPLUPDATE

This command updates the register information, such as lifetime.

AT+MIPLUPDATE Send OneNET Register Request	
Set command	AT+MIPLUPDATE=<ref>,<lifetime>,<withobjectflag>
	Response <ul style="list-style-type: none"> OK +CIS ERROR:<err>
Unsolicited result code	+MIPLEVENT:<ref>,<evt_code>
Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance.

	<ul style="list-style-type: none"> • <lifetime> update lifetime value in second of the client • <withobjectflag> 1:update object info at the same time 0:don't update object info
Reference	Note

3. 5. 5. AT+MIPLADDOBJ

Add lwm2m object to a specified OneNET instance. Concepts and definitions of Object, instance and resource, please refer to Lightweight Machine to Machine Technical Specification, ext-label Objects Produced by IPSO Alliance and oma-label Objects Produced by OMA.

<http://www.openmobilealliance.org/wp/OMNA/Lwm2M/Lwm2MRegistry.html>

AT+MIPLADDOBJ Add LWM2M Object	
Set command	AT+MIPLADDOBJ=<ref>,<objectid>,<instancecount>,<instancebitmap>,<attributecount>,<actioncount>
	Response <ul style="list-style-type: none"> • OK • +CIS ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <ref> reference ID of OneNET communication instance. • <objectid> object identity.(refer to documentation above) • <instancecount> the number of new instance identity • <instancebitmap> instance bitmap, string format, each character is represented as an instance, of which 1 is available, and 0 is unavailable. For example, the currently added object has 5 instances, of which 1, 3 are available, and the instance bitmap is 00101. • <attributecount> readable number of resources • <actioncount> executable number of resources
References	Note

3. 5. 6. AT+MIPLDELOBJ

Delete an object from a specified OneNET instance.

AT+MIPLDELOBJ Delete LWM2M Object	
Set command	AT+MIPLDELOBJ=<ref>,<objectid>
	Response <ul style="list-style-type: none"> • OK • +CIS ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <ref> reference ID of OneNET communication instance. • <objectid> object identity.
Reference	Note

3. 5. 7. AT+MIPLCLOSE

Sending unregister request to OneNET according to specified reference ID.

AT+MIPLCLOSE	Send OneNET Unregister Request
Set command	AT+MIPLCLOSE=<ref>
	Response <ul style="list-style-type: none"> • OK • +CIS ERROR:<err>
Parameters	<ul style="list-style-type: none"> • <ref> reference ID of OneNET communication instance.
Reference	Note

3. 5. 8. AT+MIPLNOTIFY

Notify OneNET that specified values changed.

AT+MIPLNOTIFY		Notify Value Changes														
Set command	+MIPLNOTIFY=<ref>,<msgid>,<objectid>,<instanceid>,<resourceid>,<valuetype>,<len>,<value>,<index>,<flag>[,<ackid>]															
	Response <ul style="list-style-type: none">• OK• +CIS ERROR:<err>															
Parameters	<ul style="list-style-type: none">• <ref> reference ID of OneNET communication instance.• <msgid> message id, It should be the msgid when the resource is observed• <objectid> object identity• <instanceid> instance identity• <resourceid> resource identity• <valuetype> data type <table><tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>string</td><td>opaque</td><td>integer</td><td>float</td><td>bool</td></tr></table>						1	2	3	4	5	string	opaque	integer	float	bool
	1	2	3	4	5											
string	opaque	integer	float	bool												
	<ul style="list-style-type: none">• <len> The length of the value• <value> values of specified value type• <flag> Message identification.1:The first message; 2:Middle message; 0: The last message.• <index> Instruction sequence number. If a Notify operation requires some messages combination to be a complete instruction, the index is numbered from N-1 to 0, and the end of the Notify instruction when the index number is 0.• <ackid> If <ackid> is set, OneNET server will response ACK message to UE, if UE received ack-messages, output following message:+MIPLEVENT. If <ackid> omitted, no ACK will response, set to 0 causes errors.															
References	Note															

3. 5. 9. AT+MIPLREADRSP

The read command set specified resource values, and when flag set to 1, upload these updating values to OneNET. This

should be operated when +MIPLREAD URC is received as reply of remote read command.

AT+MIPLREADRSP Upload Read Messages													
Set command	AT+MIPLREADRSP=<ref>,<msgid>,<result>[,<objid>,<insid>,<resid>,<valuetype>,<len>,<value>,<index>,<flag>] Response <ul style="list-style-type: none"> OK +CIS ERROR:<err> 												
Unsolicited result code	+MIPLREAD:<ref>,<msgid>,<objectid>,<instanceid>,<resourceid>[,<count>]												
Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance. <msgid> message identity from +MIPLREAD. <result> the result of the read operation; the code can be returned as <table border="1" data-bbox="780 741 1281 952"> <tr><td>1</td><td>2.05 Content OK</td></tr> <tr><td>11</td><td>4.00 Bad Request</td></tr> <tr><td>12</td><td>4.01 Unauthorized</td></tr> <tr><td>13</td><td>4.04 Not Found</td></tr> <tr><td>14</td><td>4.05 Method Not Allowed</td></tr> <tr><td>15</td><td>4.06 Not Acceptable</td></tr> </table> <objectid> object identity <instanceid> instance identity <resourceid> resource identity <valuetype> data type of value, refer to +MIPLNOTIFY command <len> The length of the value <value> values of specified value type <index> The N message combination is a complete instruction, and the index is numbered from N-1 to 0, and when the index number is 0, the local Notify instruction is finished. <flag> Message identification. refer to +MIPLNOTIFY command. 	1	2.05 Content OK	11	4.00 Bad Request	12	4.01 Unauthorized	13	4.04 Not Found	14	4.05 Method Not Allowed	15	4.06 Not Acceptable
1	2.05 Content OK												
11	4.00 Bad Request												
12	4.01 Unauthorized												
13	4.04 Not Found												
14	4.05 Method Not Allowed												
15	4.06 Not Acceptable												
Reference	Note												

3. 5. 10. AT+MIPLWRITERSP

This command used as reply of remote write command after +MIPLWRITE URC received, to feedback the results of updating specified resource value.

AT+MIPLWRITERSP Upload Write Result	
Set command	AT+MIPLWRITERSP=<ref>,<msgid>,<result> Response <ul style="list-style-type: none"> OK +CIS ERROR:<err>
Unsolicited result code	+MIPLWRITE:<ref>,<msgid>,<objectid>,<instanceid>,<resourceid>,<valuetype>,<len>,<value>,<flag>
Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance. <msgid> message identity in +MIPLWRIT.

	<ul style="list-style-type: none"> • <result> result of writing specified resource; the code can be returned as <table border="1"> <tr><td>2</td><td>2.04 Changed OK</td></tr> <tr><td>11</td><td>4.00 Bad Request</td></tr> <tr><td>12</td><td>4.01 Unauthorized</td></tr> <tr><td>13</td><td>4.04 Not Found</td></tr> <tr><td>14</td><td>4.05 Method Not Allowed</td></tr> <tr><td>15</td><td>4.06 Not Acceptable</td></tr> </table> • <objectid> object identity • <instanceid> instance identity • <resourceid> resource identity • <valuetype> data type of value, refer to +MIPLNOTIFY command • <len> The length of the value • <value> values of specified value type • <flag> Message identification. refer to +MIPLNOTIFY command 	2	2.04 Changed OK	11	4.00 Bad Request	12	4.01 Unauthorized	13	4.04 Not Found	14	4.05 Method Not Allowed	15	4.06 Not Acceptable
2	2.04 Changed OK												
11	4.00 Bad Request												
12	4.01 Unauthorized												
13	4.04 Not Found												
14	4.05 Method Not Allowed												
15	4.06 Not Acceptable												
Reference	Note												

+MIPLWRITERSP Example

```
+MIPLWRITE:0,321,3200,0,5750,1,3,123,0
AT+MIPLWRITERSP=0,321,2
OK
```

3.5.11. AT+MIPLEXECUTERSP

This command is used as reply of remote execute command after +MIPLEXECUTE URC received to feedback the results of user-defined operation.

AT+MIPLWRITERSP	Upload Write Result
Set command	AT+MIPLEXECUTERSP=<ref>,<msgid>,<result> Response <ul style="list-style-type: none"> • OK • +CIS ERROR:<err>
Unsolicited result code	+MIPLEXECUTE:<ref>,<msgid>,<objectid>,<instanceid>,<resourceid>[,<len>,<value>,<flag>]
Parameters	<ul style="list-style-type: none"> • <ref> reference ID of OneNET communication instance. • <msgid> message identity in +MIPLWRIT. • <result> result of writing specified resource; refer to +MIPLWRITERSP • <objectid> object identity • <instanceid> instance identity • <resourceid> resource identity • <len> The length of the value • <value> values of specified value type • <flag> Message identification. refer to +MIPLNOTIFY command

Reference	Note
-----------	------

3. 5. 12. AT+MIPLDISCOVERRSP

This command is used as reply of remote execute command after +MIPLEXECUTE URC received to feedback the results of user-defined operation.

AT+MIPLDISCOVERRSP Upload Discover Result	
Set command	+MIPLEXEDISCOVERRSP=<ref>,<msgid>,<result>,<length>,<value>
	Response <ul style="list-style-type: none"> OK +CIS ERROR:<err>
Unsolicited result code	+MIPLPARAMETER:<ref>,<msgid>,<objectid>
Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance. <msgid> message identity in +MIPLWRIT. <result> result of writing specified resource; refer to +MIPLREADRSP <objectid> object identity <len> The length of the value <value> The object attribute requires the use of a semicolon between multiple attributes to separate "1101;1102;1103".
Reference	Note

+MIPLDISCOVERRSP Example

```
+MIPLDISCOVER=0,879,1,3200
AT+MIPLDISCOVERRSP=0,879,3200,9,"5600;5750"
OK
```

3. 5. 13. AT+MIPLOBSERVERSP

This command is used as reply of remote execute command after +MIPLOBSERVE URC received to feedback the results of user-defined operation.

AT+MIPLOBSERVERSP Upload Discover Result	
Set command	AT+MIPLOBSERVERSP=<ref>,<msgid>,<result>
	Response <ul style="list-style-type: none"> OK +CIS ERROR:<err>
Unsolicited result code	+MIPLOBSERVE:<ref>,<msgid>,<oper>,<objectid>,<instanceid>,<resourceid>
Parameters	<ul style="list-style-type: none"> <ref> reference ID of OneNET communication instance. <msgid> message identity in +MIPLWRIT. <result> result of writing specified resource; refer to +MIPLREADRSP <oper> 1:observe added; 0: observe canceled

	<ul style="list-style-type: none"> • <objectid> object identity • <instanceid> instance identity • <resourceid> resource identity
Reference	Note

+MIPLOBSERVERSP Example

```
+MIPLOBSERVE:0,2657,1,3200,0,-1
AT+MIPLOBSERVERSP=0,2657,1
OK
```

3. 5. 14. AT+MIPLPARAMETERRSP

This command is used as reply of remote execute command after MIPLPARAMETER URC received to feedback the results of user-defined operation.

AT+MIPLPARAMETERRSP Upload Discover Result	
Set command	AT+MIPLPARAMETERRSP=<ref>,<msgid>,<result>
	Response <ul style="list-style-type: none"> • OK • +CIS ERROR:<err>
Unsolicited result code	+MIPLPARAMETER:<ref>,<msgid>,<objectid>,<instanceid>,<resourceid>,<len>,<parameter>
Parameters	<ul style="list-style-type: none"> • <ref> reference ID of OneNET communication instance. • <msgid> message identity in +MIPLWRIT. • <result> result of writing specified resource; refer to +MIPLWRITERSP • <objectid> object identity • <instanceid> instance identity • <resourceid> resource identity • <len> The length of the parameter • <parameter> string type, like: pmin=xxx;pmax=xxx;gt=xxx;lt=xxx;stp=xxx
Reference	Note

3. 5. 15. AT+MIPLVER

Get version of OneNET protocol.

AT+MIPLVER Upload Discover Result	
Read command	AT+MIPLVER?
	Response <ul style="list-style-type: none"> • +MIPLVER:<version> • OK
Reference Other Proprietary commands	Note



3.6. coap Command (temporary)

3.6.1. AT^COAPGET

AT+MIPLPARAMETERRSP Upload Discover Result	
Set command	<p>AT^COAPGET=<url>,<cmdline>,[timer]</p> <p>Response</p> <p>if success it returns the resource length,contents and OK, if error ir returns +CME ERROR:<err></p>
Parameters	<ul style="list-style-type: none"> • <url> A string parameter which is the address of the resource, usually the url includes uri-host, uri-port, uri-path and uri- query • <cmdline> A string parameter which includes many optional parameters, each optional parameter must be followed by an optional tag • <timer> A integer parameter which indicates the execution cycle of the request, and if timeout request must be terminated and clear the request.
Reference	<p>Note</p> <p>If [timer] is not set, the max response time 90 seconds.</p> <p>If [timer] is set, the max response time [timer]+5 seconds.</p>

3. 6. 2. AT^COAPPUT

AT+MIPLPARAMETERRSP Upload Discover Result	
Set command	<p>AT^COAPPUT=<url>,<cmdline>,[timer],[data]</p> <p>Response</p> <p>if success it returns the resource length,contents and OK, if error ir returns +CME ERROR:<err></p>
Parameters	<ul style="list-style-type: none"> • <url> A string parameter which is the address of the resource, usually the url includes uri-host, uri-port, uri-path and uri- query • <cmdline> A string parameter which includes many optional parameters, each optional parameter must be followed by an optional tag • <timer> A integer parameter which indicates the execution cycle of the request, and if timeout request must be terminated and clear the request. • <data> 0 No need data input,1 need input data
Reference	<p>Note</p> <p>If [timer] is not set, the max response time 90 seconds.</p> <p>If [timer] is set, the max response time [timer]+5 seconds.</p> <p>Before executed COAPPUT needs GPRS or WIFI connect and data input, use AT^COAPDATA prepare the input resource data.</p>

3. 6. 3. AT^COAPDATA

Set command	<p>AT^COAPDATA=<length>,[timer]</p> <p>Response</p> <p>If success it returns OK, if error ir returns +CME ERROR: <err></p>
Parameters	<ul style="list-style-type: none"> • <length> 1 to 319488 The data length of input • <timer> A integer parameter which indicates the execution cycle of the request, and if timeout request must be terminated and clear the request.

Reference	<p>Note</p> <p>If [timer] is not set, the max response time 90 seconds.</p> <p>If [timer] is set, the max response time [timer]+5 seconds.</p> <p>If auto input end with resource or length or timer, if manual end with ctrl+z.</p>
-----------	--

3. 6. 4. AT^COAPPOST

AT+MIPLPARAMETERRSP Upload Discover Result	
Set command	<p>AT^COAPPOST=<url>,<cmdline>,[timer],[data]</p> <p>Response</p> <p>if success it returns the resource length,contents and OK, if error ir returns +CME ERROR:<err></p>
Parameters	<ul style="list-style-type: none"> • <url> A string parameter which is the address of the resource, usually the url includes uri-host, uri-port, uri-path and uri- query • <cmdline> A string parameter which includes many optional parameters, each optional parameter must be followed by an optional tag • <timer> A integer parameter which indicates the execution cycle of the request, and if timeout request must be terminated and clear the request. • <data> 0 No need data input,1 need input data
Reference	<p>Note</p> <p>If [timer] is not set, the max response time 90 seconds.</p> <p>If [timer] is set, the max response time [timer]+5 seconds.</p> <p>Before executed COAPPUT needs GPRS or WIFI connect and data input, use AT^COAPDATA prepare the input resource data.</p>

3. 6. 5. AT^COAPDELETE

AT+MIPLPARAMETERRSP Upload Discover Result	
Set command	<p>AT^COAPDELETE=<url>,<cmdline>,[timer]</p> <p>Response</p> <p>if success it returns the resource length,contents and OK, if error ir returns +CME ERROR:<err></p>
Parameters	<ul style="list-style-type: none"> • <url> A string parameter which is the address of the resource, usually the url includes uri-host, uri-port, uri-path and uri- query • <cmdline> A string parameter which includes many optional parameters, each optional parameter must be followed by an optional tag • <timer> A integer parameter which indicates the execution cycle of the request, and if timeout request must be terminated and clear the request.
Reference	<p>Note</p> <p>If [timer] is not set, the max response time 90 seconds.</p> <p>If [timer] is set, the max response time [timer]+5 seconds.</p>

4. Appendix

4.1. Extended DRX parameters(3GPP TS 24.008)

The purpose of the Extended DRX parameters information element is to indicate that the MS wants to use eDRX and for the network to indicate the Paging Time Window length value and the extended DRX cycle value to be used for eDRX.

The Extended DRX parameters is a type 4 information element with a length of 3 octets.

The Extended DRX parameters information element is coded as shown in figure 10.5.5.32/3GPP TS 24.008 and table 10.5.5.32/3GPP TS 24.008.

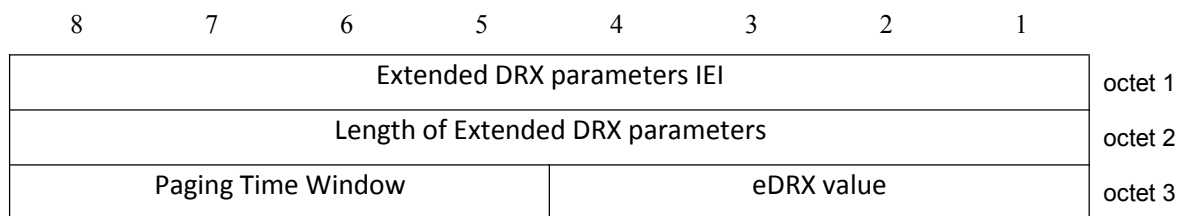


Figure 10.5.5.32/3GPP TS 24.008: Extended DRX parameters information element

Table 10.5.5.32/3GPP TS 24.008: Extended DRX parameters information element

Paging Time Window (PTW), octet 3 (bit 8 to 5)				
The field contains a PTW value. The PTW value can be applied for Iu mode, WB-S1 mode and NB-S1 mode as specified below.				
Iu mode				
The field contains the PTW value in seconds for Iu mode. The PTW value is used as specified in 3GPP TS 23.682 [133a]. The PTW value is derived as follows:				
BIT				
8	7	6	5	Paging Time Window length
0	0	0	0	0 seconds (PTW not used)
0	0	0	1	1 second
0	0	1	0	2 seconds
0	0	1	1	3 seconds
0	1	0	0	4 seconds
0	1	0	1	5 seconds
0	1	1	0	6 seconds
0	1	1	1	7 seconds
1	0	0	0	8 seconds
1	0	0	1	9 seconds
1	0	1	0	10 seconds
1	0	1	1	12 seconds
1	1	0	0	14 seconds
1	1	0	1	16 seconds

1	1	1	0	18 seconds
1	1	1	1	20 seconds
WB-S1 mode The field contains the PTW value in seconds for WB-S1 mode. The PTW value is used as specified in 3GPP TS 23.682 [133a]. The PTW value is derived as follows: BIT				
8	7	6	5	Paging Time Window length
0	0	0	0	1,28 seconds
0	0	0	1	2,56 seconds
0	0	1	0	3,84 seconds
0	0	1	1	5,12 seconds
0	1	0	0	6,4 seconds
0	1	0	1	7,68 seconds
0	1	1	0	8,96 seconds
0	1	1	1	10,24 seconds
1	0	0	0	11,52 seconds
1	0	0	1	12,8 seconds
1	0	1	0	14,08 seconds
1	0	1	1	15,36 seconds
1	1	0	0	16,64 seconds
1	1	0	1	17,92 seconds
1	1	1	0	19,20 seconds
1	1	1	1	20,48 seconds
NB-S1 mode The field contains the PTW value in seconds for NB-S1 mode. The PTW value is used as specified in 3GPP TS 23.682 [133a]. The PTW value is derived as follows: BIT				
8	7	6	5	Paging Time Window length
0	0	0	0	2,56 seconds
0	0	0	1	5,12 seconds
0	0	1	0	7,68 seconds
0	0	1	1	10,24 seconds
0	1	0	0	12,8 seconds
0	1	0	1	15,36 seconds
0	1	1	0	17,92 seconds
0	1	1	1	20,48 seconds
1	0	0	0	23,04 seconds
1	0	0	1	25,6 seconds
1	0	1	0	28,16 seconds
1	0	1	1	30,72 seconds
1	1	0	0	33,28 seconds
1	1	0	1	35,84 seconds
1	1	1	0	38,4 seconds
1	1	1	1	40,96 seconds
eDRX value, octet 3 (bit 4 to 1) The octet contains the eDRX value field. The parameter values are applied for A/Gb mode, Iu mode or S1				

mode according to the tables below.

A/Gb mode

The field contains the eDRX value for A/Gb mode. The GERAN eDRX cycle length duration and Number of 51-MF per GERAN eDRX cycle values are derived from the eDRX value as follows:

BIT

4	3	2	1	GERAN eDRX cycle length duration	Number of 51-MF per GERAN eDRX cycle
0	0	0	0	~1,88 seconds (NOTE 1, NOTE 2)	8
0	0	0	1	~3,76 seconds (NOTE 1, NOTE 2)	16
0	0	1	0	~7,53 seconds (NOTE 1, NOTE 2)	32
0	0	1	1	12,24 seconds (NOTE 2)	52
0	1	0	0	24,48 seconds (NOTE 2)	104
0	1	0	1	48,96 seconds (NOTE 2)	208
0	1	1	0	97,92 seconds (NOTE 2)	416
0	1	1	1	195,84 seconds (NOTE 2)	832
1	0	0	0	391,68 seconds (NOTE 2)	1664
1	0	0	1	783,36 seconds (NOTE 2)	3328
1	0	1	0	1566,72 seconds (NOTE 2)	6656
1	0	1	1	3133,44 seconds (NOTE 2)	13312
1	1	0	0	GERAN eDRX cycle length duration	Number of 51-MF per GERAN eDRX cycle
1	1	0	1	~1,88 seconds (NOTE 1, NOTE 2)	8
1	1	1	0	~3,76 seconds (NOTE 1, NOTE 2)	16
1	1	1	1	~7,53 seconds (NOTE 1, NOTE 2)	32

All other values shall be interpreted as 0000 by this version of the protocol.

NOTE 1: The listed values are rounded.

NOTE 2: The value in seconds can be calculated with the formula $((3,06 / 13) * (\text{Number of 51-MF}))$.

See 3GPP TS 45.001 [157], subclause 5.1.

Iu mode

The field contains the eDRX value for Iu mode. The UTRAN eDRX cycle length duration value is derived from the eDRX value as follows:

BIT

4	3	2	1	UTRAN eDRX cycle length duration
0	0	0	0	10,24 seconds
0	0	0	1	20,48 seconds
0	0	1	0	40,96 seconds
0	0	1	1	81,92 seconds
0	1	0	0	163,84 seconds
0	1	0	1	327,68 seconds
0	1	1	0	655,36 seconds
0	1	1	1	1310,72 seconds
1	0	0	0	1966,08 seconds
1	0	0	1	2621,44 seconds
1	0	1	0	UTRAN eDRX cycle length duration
1	0	1	1	10,24 seconds
1	1	0	0	20,48 seconds
1	1	0	1	40,96 seconds
1	1	1	0	81,92 seconds

1	1	1	1	163,84 seconds	
All other values shall be interpreted as 0000 by this version of the protocol.					
S1 mode					
The field contains the eDRX value for S1 mode. The E-UTRAN eDRX cycle length duration value and the eDRX cycle parameter 'T _{eDRX} ' as defined in 3GPP TS 36.304 [121] are derived from the eDRX value as follows:					
BIT					
4	3	2	1	E-UTRAN eDRX cycle length duration	eDRX cycle parameter 'T _{eDRX} '
0	0	0	0	5,12 seconds (NOTE 4)	NOTE 3
0	0	0	1	10,24 seconds (NOTE 4)	2 ⁰
0	0	1	0	20,48 seconds	2 ¹
0	0	1	1	40,96 seconds	2 ²
0	1	0	0	61,44 seconds (NOTE 5)	6
0	1	0	1	81,92 seconds	2 ³
0	1	1	0	102,4 seconds (NOTE 5)	10
0	1	1	1	122,88 seconds (NOTE 5)	12
1	0	0	0	143,36 seconds (NOTE 5)	14
1	0	0	1	163,84 seconds	2 ⁴
1	0	1	0	327,68 seconds	2 ⁵
1	0	1	1	655,36 seconds	2 ⁶
1	1	0	0	1310,72 seconds	2 ⁷
1	1	0	1	2621,44 seconds	2 ⁸
1	1	1	0	5242,88 seconds (NOTE 6)	2 ⁹
1	1	1	1	10485,76 seconds (NOTE 6)	2 ¹⁰
All other values shall be interpreted as 0000 by this version of the protocol.					
NOTE 3: For E-UTRAN eDRX cycle length duration of 5,12 seconds the eDRX cycle parameter 'T _{eDRX} ' is not used as a different algorithm compared to the other values is applied. See 3GPP TS 36.304 [121] for details.					
NOTE 4: The value is applicable only in WB-S1 mode. If received in NB-S1 mode it is interpreted as if the Extended DRX parameters IE were not included in the message by this version of the protocol.					
NOTE 5: The value is applicable only in WB-S1 mode. If received in NB-S1 mode it is interpreted as 0010 by this version of the protocol.					
NOTE 6: The value is applicable only in NB-S1 mode. If received in WB-S1 mode it is interpreted as 1101 by this version of the protocol.					

4.2. GPRS Timer (3GPP TS 24.008)

4.2.1 GPRS Timer

The purpose of the *GPRS timer* information element is to specify GPRS specific timer values, e.g. for the READY timer.

The *GPRS timer* is a type 3 information element with 2 octets length.

The *GPRS timer* information element is coded as shown in figure 10.5.146/3GPP TS 24.008 and table 10.5.172/3GPP TS 24.008.

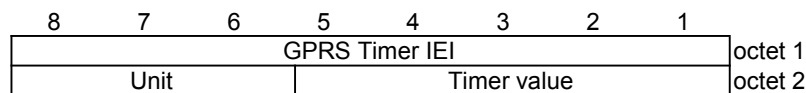


Figure 10.5.146/3GPP TS 24.008: GPRS *Timer* information element

Table 10.5.172/3GPP TS 24.008: GPRS *Timer* information element

Timer value (octet 2)

Bits 5 to 1 represent the binary coded timer value.

Bits 6 to 8 defines the timer value unit for the GPRS timer as follows:

Bits

8 7 6

0 0 0 value is incremented in multiples of 2 seconds

0 0 1 value is incremented in multiples of 1 minute

0 1 0 value is incremented in multiples of dechours

1 1 1 value indicates that the timer is deactivated.

Other values shall be interpreted as multiples of 1 minute in this version of the protocol.

4.2.2 GPRS Timer 2

The purpose of the *GPRS timer 2* information element is to specify GPRS specific timer values, e.g. for the timer T3302 or timer T3319.

The *GPRS timer 2* is a type 4 information element with 3 octets length.

The *GPRS timer 2* information element is coded as shown in figure 10.5.147/3GPP TS 24.008 and table 10.5.163/3GPP TS 24.008.

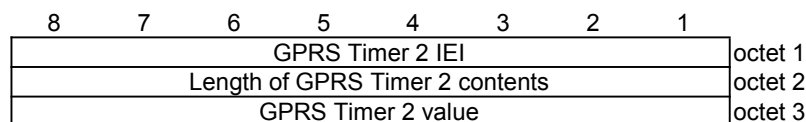


Figure 10.5.147/3GPP TS 24.008: GPRS Timer 2 information element

Table 10.5.163/3GPP TS 24.008: GPRS Timer 2 information element

GPRS Timer 2 value is coded as octet 2 of the *GPRS timer* information element.

4.2.3 GPRS Timer 3

The purpose of the *GPRS timer 3* information element is to specify GPRS specific timer values, e.g. for the timer T3396.

The *GPRS timer 3* is a type 4 information element with 3 octets length.

The *GPRS timer 3* information element is coded as shown in figure 10.5.147a/3GPP TS 24.008 and table 10.5.163a/3GPP TS 24.008.

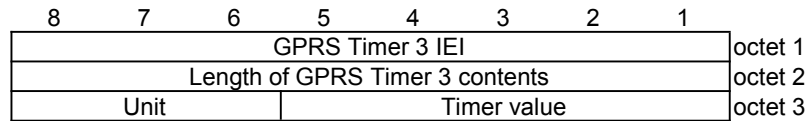


Figure 10.5.147a/3GPP TS 24.008: GPRS Timer 3 information element

Table 10.5.163a/3GPP TS 24.008: GPRS Timer 3 information element

GPRS Timer 3 value (octet 3)	
Bits 5 to 1 represent the binary coded timer value.	
Bits 6 to 8 defines the timer value unit for the GPRS timer as follows:	
Bits	
8 7 6	
0 0 0	value is incremented in multiples of 10 minutes
0 0 1	value is incremented in multiples of 1 hour
0 1 0	value is incremented in multiples of 10 hours
0 1 1	value is incremented in multiples of 2 seconds
1 0 0	value is incremented in multiples of 30 seconds
1 0 1	value is incremented in multiples of 1 minute
1 1 0	value is incremented in multiples of 320 hours (NOTE)
1 1 1	value indicates that the timer is deactivated.
NOTE:	This timer value unit is only applicable to the T3312 extended value IE and T3412 extended value IE (see 3GPP TS 24.301 [120]). If it is received in an integrity protected message, value shall be interpreted as multiples of 320 hours. Otherwise value shall be interpreted as multiples of 1 hour.