BC95

AT Commands Manual

NB-IoT Module Series

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About the Document

History

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1 Introduction

This document gives details of the AT Command Set supported by Quectel NB-IoT BC95 module.

The following string will be output after booting the module:

<CR><LF>Neul<CR><LF>OK<CR><LF>

After this string has been received, the AT command processor is ready to accept AT commands.

If BC95 module is rebooted or restarted for any reason that is not a normal power-on sequence, a message would be output before the <CR><LF>Neul<CR><LF>OK<CR><LF> string. Please refer to ***Chapter 8*** for more details.

In case that an external MCU intervenes in the process of FOTA update, unsolicited information will inform the external MCU the current update state.

Table 1: Unsolicited Information of UE Update State

Unsolicited Information	Description
<CR><LF>FIRMWARE DOWNLOADING<CR><LF>	Indicates that UE is downloading update package.
<CR><LF>FIRMWARE DOWNLOAD FAILED<CR><LF>	Indicates that the download failed.
<CR><LF>FIRMWARE DOWNLOADED<CR><LF>	Indicates that the download finished.
<CR><LF>FIRMWARE UPDATING<CR><LF>	Indicates that the UE is updating.
<CR><LF>FIRMWARE UPDATE SUCCESS<CR><LF>	Indicates that the update successful, but has not report update state to firmware package server yet.
<CR><LF>FIRMWARE UPDATE FAILED<CR><LF>	Indicates that the update failed.
<CR><LF>FIRMWARE UPDATE OVER<CR><LF>	Indicates that the update successful, and update state has been reported to firmware package server. Update is done after this information.

NOTE

During updating procedure, the module should not be operated until "FIRMWARE UPDATE OVER" is reported. E.g., executing AT+NRB to power off the module are not permitted; otherwise, an error will occur.

1.1. Definitions

- <CR>: Carriage return character;
- <LF>: Line feed character;
- <..>: Parameter name. Angle brackets do not appear on command line;
- [..]: Optional parameter. Square brackets do not appear on the command line.

1.2. AT Command Syntax

Table 2: AT Command Syntax

Test Command	**AT+<cmd>=?**	Check possible sub-parameter values
Read Command	**AT+<cmd>?**	Check current sub-parameter values
Set Command	**AT+<cmd>=p1[,p2[,p3[.....]]]**	Set command
Execution Command	**AT+<cmd>**	Execution command

Multiple commands can be placed on a single line using a semi-colon (";") between commands. Only the first command should have AT prefix. Commands can be in upper or lower case.

When entering AT commands spaces are ignored except in the following cases:

- Within quoted strings, where they are preserved;
- Within an unquoted string or numeric parameter;
- Within an IP address;
- Within the AT command name up to and including a '=', '?' or '=?'.

They can be used to make the input more human-readable. On input, at least a carriage return is required. A newline character is ignored so it is permissible to use carriage return/line feed pairs on the input. For B600, the AT command processor uses carriage return/line feed pairs (\r\n, 0x0D0A) to end lines on its output.

If no command is entered after the AT token, "OK" will be returned. If an invalid command is entered, “ERROR” will be returned.

Optional parameters, unless explicitly stated, need to be provided up to the last parameter being entered.

1.3. AT Command Responses

When the AT command processor has finished processing a line, it will output either "OK" or "ERROR" indicating that it is ready to accept a new command. Solicited informational responses are sent before the final "OK" or "ERROR". Unsolicited information responses will never occur between a solicited informational response and the final “OK” or “ERROR”.

Responses will be of the format:

<CR><LF>+CMD1:<parameters><CR><LF>
<CR><LF>OK<CR><LF>

Or

<CR><LF><parameters><CR><LF>
<CR><LF>OK<CR><LF>

1.4. 3GPP Compliance

3GPP commands are complied with the *3GPP TS 27.007 v14.3.0 (2017-03)*.

2 Implementation Status

Table 3: Types of AT Commands and Implementation Status

AT Command	Description	Implementation Status
3GPP Commands (27.007)		
ATI	Display Product Identification Information	B657SP2[1)] or later
ATE	Set Command Echo Mode	B657SP2[1)] or later
AT+CGMI	Request Manufacturer Identification	B350 or later
AT+CGMM	Request Manufacturer Model	B350 or later
AT +CGMR	Request Manufacturer Revision	B350 or later
AT+CGSN	Request Product Serial Number	B350 or later
AT+CEREG	EPS Network Registration Status	B350 or later
AT+CSCON	Signalling Connection Status	B350 or later
AT+CLAC	List Available Commands	B350 or later
AT+CSQ	Get Signal Strength Indicator	B350 or later
AT+CGPADDR	Show PDP Addresses	B350 or later
AT+COPS	PLMN Selection	B350 or later
AT+CGATT	PS Attach or Detach	B350 or later
AT+CGACT	Activate or Deactivate PDP Context	B657SP1 or later
AT+CIMI	Request International Mobile Subscriber Identity	B350 or later
AT+CGDCONT	Define a PDP Context	B350 or later
AT+CFUN	Set Phone Functionality	B350 or later

AT+CMEE	Report Mobile Termination Error	B600 or later
AT+CCLK	Return Current Date & Time	B656 or later
AT+CPSMS	Power Saving Mode Setting	B657SP1 or later
AT+CEDRXS	eDRX Setting	B657SP1 or later
AT+CEER	Extended Error Report	B657SP1 or later
AT+CEDRXRDP	eDRX Read Dynamic Parameters	B657SP1 or later
AT+CTZR	Time Zone Reporting	B657SP1 or later
AT+CIPCA	Initial PDP Context Activation	B657SP3[2] or later
AT+CGAPNRC	APN Rate Control	B657SP3[2] or later
ETSI Commands (27.005)		
AT+CSMS	Select Messaging Service	B657SP1 or later
AT+CNMA	New Message Acknowledgement to ME/TA	B657SP1 or later
AT+CSCA	Service Centre Address	B657SP1 or later
AT+CMGS	Send SMS Messages	B657SP1 or later
AT+CMGC	Send SMS Command	B657SP1 or later
AT+CSODCP*	Send Originating Data via the Control Plane	B657SP1 or later
AT+CRTDCP*	Report Terminating Data via the Control Plane	B657SP1 or later
General Commands		
AT+NRB	Reboot the Terminal	B350 or later
AT+NUESTATS	Query UE Statistics	B350 or later
AT+NEARFCN	Specify Search Frequencies	B350 or later
AT+NSOCR	Create a Socket	B350 or later
AT+NSOST	SendTo Command (UDP Only)	B350 or later
AT+NSOSTF	SendTo Command with Flags (UDP Only)	B656 or later
AT+NSORF	Receive Command (UDP only)	B350 or later

AT+NSOCL	Close a Socket	B350 or later
+NSONMI	Indicator of Arrived Socket Message (Response Only)	B350 or later
AT+NPING	Test IP Network Connectivity to a Remote Host	B350 or later
AT+NBAND	Set Supported Bands	B600 or later
AT+NLOGLEVEL	Set Debug Logging Level	B600 or later
AT+NCONFIG	Configure UE Behaviour	B650 or later
AT+NATSPEED	Configure UART Port Baud Rate	B656 or later
AT+NCCID	Card Identification	B657SP1 or later
AT+NFWUPD	Firmware Update via UART	B657SP1 or later
AT+NPOWERCLASS	Set the Mapping for Band and Power Class	B657SP2[1)] or later
AT+NPSMR	Power Saving Mode Status Report	B657SP2[1)] or later
AT+NPTWEDRXS	Paging Time Window Value and eDRX Setting	B657SP2[1)] or later
Huawei's IoT Platform Commands		
AT+NCDP	Configure and Query CDP Server Settings	B350 or later
AT+QSECSWT*	Set Data Encryption Mode	B657SP3[2)] or later
AT+QSETPSK*	Set PSK ID and PSK	B657SP3[2)] or later
AT+NMGS	Send Messages	B350 or later
AT+NMGR	Get Messages	B350 or later
AT+NNMI	New Message Indications	B350 or later
AT+NSMI	Sent message Indications	B350 or later
AT+NQMGR	Query Received Messages	B350 or later
AT+NQMGS	Query Sent Messages	B350 or later
AT+NMSTATUS	Message Registration Status	B657SP1 or later
AT+QLWULDATAEX	Send CON/NON Messages	B657SP3[2)] or later
AT+QLWULDATASTATUS	Query CON Messages Sending Status	B657SP3[2)] or later

NOTES

1. "*" means the commands listed in this chapter are under development.
2. [1)] B657SP2 refers to BC95BxHBR01A02W16 version hereafter (in which “Bx” indicates B5, B8, B20 or B28).
3. [2)] B657SP3 refers to BC95BxHBR01A03W16 version hereafter (in which “Bx” indicates B5, B8, B20 or B28).

3 3GPP Commands (27.007)

3.1. ATI Display Product Identification Information

The execution command returns product identification information. Please refer to ***Chapter 7*** for possible <err> values

ATI Display Product Identification Information	
Execution Command **ATI**	Response **Quectel** **<Object Id>** **Revision:<revision>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<Object Id>	Identifier of models
<revision>	Revision of software release

Example

```
ATI
Quectel
BC95-B5
Revision:BC95B5HBR01A02W16

OK
```

3.2. ATE Set Command Echo Mode

The execution command determines whether or not the UE echoes characters received from external MCU during command state. Please refer to ***Chapter 7*** for possible <err> values.

ATE Set Command Echo Mode	
Execution Command **ATE[<value>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<value>	0	Echo mode OFF
	1	Echo mode ON

Example

```
ATE0
OK
ATI
Quectel
BC95-B5
Revision:BC95B5HBR01A02W16

OK
ATE1
OK
ATI
ATI
Quectel
BC95-B5
Revision:BC95B5HBR01A02W16

OK
```

3.3. AT+CGMI Request Manufacturer Identification

The execution command returns manufacturer information. By default it will return “Quectel” on the standard platform. Please refer to ***Chapter 7*** for possible <err> values.

AT+CGMI Request Manufacturer Identification	
Execution Command **AT+CGMI**	Response **<manufacturer>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CGMI=?**	Response **OK**

Parameter

<manufacturer>	The total number of characters, including line terminators. In the information text shall not exceed 2048 characters, and shall not contain the sequence 0<CR> or OK<CR>.

Example

```
AT+CGMI
Quectel

OK
```

3.4. AT+CGMM Request Manufacturer Model

The execution command returns manufacturer model information. Please refer to ***Chapter 7*** for possible <err> values.

AT+CGMM Request Manufacturer Model	
Execution Command **AT+CGMM**	Response **<model>** **OK**

	If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CGMM=?**	Response **OK**

Parameter

<model>	The total number of characters, including line terminators. In the information text shall not exceed 2048 characters, and shall not contain the sequence 0<CR> or OK<CR>.

Example

```
AT+CGMM
BC95HB-02-STD_850

OK
```

3.5. AT+CGMR Request Manufacturer Revision

The execution command returns the manufacturer revision. The text is human-readable and is not intended for microcontroller parsing. By default it will return the firmware revision - release and build.

The execution command returns one or more lines of information text <revision>. Please refer to ***Chapter 7*** for possible <err> values.

AT+CGMR Request Manufacturer Revision	
Execution Command **AT+CGMR**	Response **<Revision>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CGMR=?**	Response **OK**

Parameter

<revision>	The total number of characters, including line terminators. In the information text

	shall not exceed 2048 characters, and shall not contain the sequence 0<CR> or OK<CR>

NOTE

<revision> will change format over time. It should be treated as an opaque identifier.

Example

```
AT+CGMR
SECURITY,V100R100C10B657SP2

PROTOCOL,V100R100C10B657SP2

APPLICATION,V100R100C10B657SP2

SEC_UPDATER,V100R100C10B657SP2

APP_UPDATER,V100R100C10B657SP2

RADIO,BC95HB-02-STD_850

OK
AT+CGMR=?
OK
```

3.6. AT+CGSN Request Product Serial Number

The execution command returns the IMEI (International Mobile station Equipment Identity) number and related information. For a TA which does not support <snt>, only "OK" is returned. Please refer to ***Chapter 7*** for possible <err> values.

AT+CGSN Request Product Serial Number	
Execution Command **AT+CGSN[=<snt>]**	Response When <snt>=0 (or omitted) and command is executed successfully: **<sn>** When <snt>=1 and command is executed successfully: **+CGSN:<imei>**

	When <snt>=2 and command is executed successfully: **+CGSN:<imeisv>** When <snt>=3 and command is executed successfully: **+CGSN:<svn>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CGSN=?**	Response When TE supports <snt> and command is executed successfully: **+CGSN:**(list of supported **<snt>**s) **OK**

Parameter

<snt>	Integer type; indicates the serial number type that has been requested 0 Returns <sn> 1 Returns the IMEI number 2 Returns the IMEISV (International Mobile station Equipment Identity and Software Version) number 3 Returns the SVN (Software Version Number)
<sn>	The 128-bit UUID of the UE. The total number of characters, including line terminators. In the information text shall not exceed 2048 characters, and shall not contain the sequence 0 <CR> or OK<CR>.
<imei>	String type in decimal format; indicates the IMEI number
<imeisv>	String type in decimal format; indicates the IMEISV
<svn>	String type in decimal format; indicates the current SVN which is a part of IMEISV

Example

```
AT+CGSN=1                    //Request the IMEI number
+CGSN:490154203237511

OK
```

NOTE

AT+CGSN=0 (requesting serial number) is not implemented, and will return an error. This will change in a future release.

3.7. AT+CEREG EPS Network Registration Status

The set command controls the presentation of an unsolicited result code (URC) “+CEREG:<stat>” when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code “+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>]]” when <n>=2 and there is a change of the network cell in E-UTRAN. The parameters <AcT>, <tac> and <ci> are provided only if available. The value <n>=3 further extends the unsolicited result code with [,<cause_type>,<reject_cause>], when available, when the value of <stat> changes. Please refer to ***Chapter 7*** for possible <err> values.

If the UE requests PSM for reducing its power consumption, the set command controls the presentation of an unsolicited result code: “+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]”.

When <n>=4, the unsolicited result code will provide the UE with additional information for the active time value and the extended periodic TAU value if there is a change of the network cell in E-UTRAN. The value <n>=5 further enhances the unsolicited result code with <cause_type> and <reject_cause> when the value of <stat> changes. The parameters <AcT>, <tac>, <ci>, <cause_type>, <reject_cause>, <Active-Time> and <Periodic-TAU> are provided only if available.

The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <tac>, <ci> and <AcT>, if available, are returned only when <n>=2 and MT is registered on the network. The parameters [,<cause_type>,<reject_cause>], if available, are returned when <n>=3.

The test command returns supported parameter values.

AT+CEREG EPS Network Registration Status	
Set Command **AT+CEREG=[<n>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CEREG?**	Response When <n>=0, 1, 2 or 3 and command is executed successfully: **+CEREG:<n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>**

	,<reject_ cause>]]] When <n>=4 or 5 and command is executed successfully: **+CEREG:<n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]** **OK**
Test Command **AT+CEREG=?**	Response **+CEREG:**(list of supported **<n>**s) **OK**

Parameter

<n>	0	Disable network registration unsolicited result code
	1	Enable network registration unsolicited result code: “+CEREG:<stat>”
	2	Enable network registration and location information unsolicited result code: “+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>]]”
	3	Enable network registration, location information and EMM cause value information unsolicited result code: “+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]”
	4	For a UE that requests PSM, enable network registration and location information unsolicited result code: “+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]”
	5	For a UE that requests PSM, enable network registration, location information and EMM cause value information unsolicited result code: “+CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]”
<stat>	Integer type; indicates the EPS registration status	
	0	Not registered, MT is not currently searching an operator to register to
	1	Registered, home network
	2	Not registered, but MT is currently trying to attach or searching an operator to register to
	3	Registration denied
	4	Unknown (e.g. out of E-UTRAN coverage)
	5	Registered, roaming
	6	Registered for “SMS only”, home network (not applicable)
	7	Registered for “SMS only”, roaming (not applicable)
	8	Attached for emergency bearer services only
	9	Registered for “CSFB not preferred”, home network (not applicable)
	10	Registered for “CSFB not preferred”, roaming (not applicable)
<tac>	String type; two bytes tracking area code in hexadecimal format (e.g. “00C3” equals 195 in	

decimal)

<ci> String type; four bytes E-UTRAN cell ID in hexadecimal format

<AcT> Integer type; indicates the access technology of the serving cell

0 GSM (not applicable)
1 GSM Compact (not applicable)
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
8 EC-GSM-IoT (A/Gb mode) (see NOTES 5) (not applicable)
9 E-UTRAN (NB-S1 mode) (see NOTES 6)

<cause_type> Integer type; indicates the type of <reject_cause>

0 Indicates that <reject_cause> contains an EMM cause value
1 Indicates that <reject_cause> contains a manufacturer-specific cause value

<reject_cause> Integer type; contains the cause of the failed registration. The value is of type as defined by <cause_type>.

<Active-Time> String type; one byte in an 8-bit format. Requested Active Time value (T3324) to be allocated to the UE. (e.g. "00100100" equals 4 minutes).

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 decihours
1 1 1 value indicates that the timer is deactivated.

<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. (e.g. "01000111" equals 70 hours).

Bits 5 to 1 represent the binary coded timer value

Bits 6 to 8 define the timer value unit 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
1 1 1 value indicates that the timer is deactivated

NOTES

1. If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the AT+CREG command and AT+CGREG command can be used to query the registration status and location information for those services.
2. *3GPP TS 24.008* and *3GPP TS 24.301* specify the condition when the MS is considered as attached for emergency bearer services.
3. *3GPP TS 44.060* specifies the system information messages which give the information about whether the serving cell supports EGPRS.
4. *3GPP TS 25.331* specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.
5. 3GPP TS 44.018 [156] specifies the EC-SCH INFORMATION message which, if present, indicates that the serving cell supports EC-GSM-IoT.
6. 3GPP TS 36.331 [86] specifies the system information blocks which give the information about whether the serving cell supports NB-IoT, which corresponds to E-UTRAN (NB-S1 mode).

Example

```
AT+CEREG=1              //Enable network registration URC.
OK
AT+CEREG?
+CEREG:1,1

OK
AT+CEREG=?
+CEREG:(0,1,2,3,4,5)

OK
```

3.8. AT+CSCON Signalling Connection Status

The command gives details of the terminal's perceived radio connection status (i.e. to the base station). It returns an indication of the current state. Please note that this state is only updated when radio events, such as sending and receiving, take place. This means that the current state may be out of date. The terminal may think it is "Connected" yet cannot currently use a base station due to a change in the link quality.

The set command controls the presentation of an unsolicited result code. 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. Please refer to ***Chapter 7*** 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.

The test command returns supported values as a compound value.

AT+CSCON Signalling Connection Status	
Set Command **AT+CSCON=<n>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CSCON?**	Response **+CSCON:<n>,<mode>[,<state>]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CSCON=?**	Response **+CSCON:**(list of supported **<n>**s) **OK**

Parameter

<n>	0	Disable unsolicited result code
	1	Enable unsolicited result code: "+CSCON:<mode>"
	2	Enable unsolicited result code: "+CSCON:<mode>[,<state>]"
	3	Enable unsolicited result code: "+CSCON:<mode>[,<state>[,<access>]]"
<mode>	Integer type; indicates the signalling connection status	
	0	Idle
	1	Connected

	2-255 <reserved for future use>
<state>	Integer type; indicates the CS or PS state while in GERAN and the RRC state information if the MT is in connected mode while in UTRAN and E-UTRAN
	0 UTRAN URA_PCH state
	1 UTRAN Cell_PCH state
	2 UTRAN Cell_FACH state
	3 UTRAN Cell_DCH state
	4 GERAN CS connected state
	5 GERAN PS connected state
	6 GERAN CS and PS connected state
	7 E-UTRAN connected state
<access>	Integer type; indicates the current radio access type
	0 Indicates usage of radio access type of GERAN
	1 Indicates usage of radio access type of UTRAN TDD
	2 Indicates usage of radio access type of UTRAN FDD
	3 Indicates usage of radio access type of E-UTRAN TDD
	4 Indicates usage of radio access type of E-UTRAN FDD

NOTES

1. Only <n>=0 and <n>=1 are supported.
2. Unsolicited notifications are not currently supported. This functionality will be added in a future release.

Example

```
AT+CSCON=0
OK
AT+CSCON?
+CSCON:0,1

OK
AT+CSCON=?
+CSCON:(0,1)

OK
AT+CSCON=1
OK
AT+CSCON?
+CSCON:1,1

OK
```

3.9. AT+CLAC List Available Commands

The command lists the available AT commands. The execution command causes the MT to return one or more lines of AT commands. Please refer to ***Chapter 7*** for possible <err> values. Please note that this command only returns the AT commands that are available for the user.

AT+CLAC List Available Commands	
Execution Command **AT+CLAC**	Response **<AT Command>** **[<CR><LF><AT Command>[...]]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CLAC=?**	Response **OK**

Parameter

<AT Command>	Defines the AT command including the prefix AT. Text shall not contain the sequence 0<CR> or OK<CR>

Example

```
AT+CLAC
AT+COPS

AT+CGATT

...

AT+NQMGR

AT+NQMGS

…

OK
```

3.10. AT+CSQ Get Signal Strength Indicator

The terminal will provide a current signal strength indicator of 0 to 255 where larger is generally better. This information is based on a single measurement so can be expected to change greatly over short periods of time and may never use all (or even the majority) of the entire possible range or codes.

The execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the MT. Please refer to ***Chapter 7*** for possible <err> values.

The test command returns values supported as compound values.

AT+CSQ Get Signal Strength Indicator	
Execution Command **AT+CSQ**	Response **+CSQ:<rssi>,<ber>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CSQ=?**	Response **+CSQ:**(list of supported **<rssi>**s),(list of supported **<ber>**s) **OK**

Parameter

<rssi>	0	-113dBm or less
	1	-111dBm
	2...30	-109dBm... -53dBm
	31	-51dBm or greater
	99	Not known or not detectable
<ber>	Integer type; channel bit error rate (in percent)	
	0...7	As RXQUAL values (please refer to 3GPP specifications)
	99	Not known or not detectable

NOTE

<ber> is currently not implemented, and will always be 99.

Example

```
AT+CSQ
+CSQ:31,99

OK
```

3.11. AT+CGPADDR Show PDP Addresses

The command returns the IP address of the device.

The execution command returns a list of PDP addresses for the specified context identifiers. If no <cid> is specified, the addresses for all defined contexts are returned. Please refer to ***Chapter 7*** for possible <err> values.

The test command returns a list of defined <cid>s. These are <cid>s that have been activated and may or may not have an IP address associated with them.

AT+CGPADDR Show PDP Addresses	
Execution Command **AT+CGPADDR[=<cid>[,<cid>[,...]]]**	Response **[+CGPADDR:<cid>[,<PDP_addr_1>[,<PDP_addr_2>]]]** **[<CR><LF>+CGPADDR:** **<cid>,[<PDP_addr_1>[,<PDP_addr_2>]]** **[...]]** **OK** IPv4: The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 IPv6: The string is given as colon-separated hexadecimal parameter.
Test Command **AT+CGPADDR=?**	Response **+CGPADDR:**(list of defined **<cid>**s) **OK**

Parameter

<cid>	Integer type; specifies a particular PDP context definition (see the AT+CGDCONT and AT+CGDSCONT commands).

<PDP_addr_1> and **<PDP_addr_2>**	String type; identify the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the AT+CGDCONT and AT+CGDSCONT commands 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>. Both <PDP_addr_1> and <PDP_addr_2> are omitted if none is available. Both <PDP_addr_1> and <PDP_addr_2> are included when both IPv4 and IPv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address. The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6. When AT+CGPIAF is supported, its settings can influence the format of the IPv6 address in parameter <PDP_addr_1> or <PDP_addr_2> returned with the execute form of AT+CGPADDR.

NOTES

1. In dual-stack terminals (<PDP_type>=IPv4v6), the IPv6 address will be provided in <PDP_addr_2>. For terminals with a single IPv6 stack (<PDP_type>=IPv6) or due to backwards compatibility, the IPv6 address can be provided in parameter <PDP_addr_1>.
2. Only IPv4 is supported.
3. <cid> values between 0 & 10 are supported.
4. With AUTOCONNECT enabled, <cid>=0 will not be listed until an IP address is acquired.

Example

```
AT+CGPADDR=0
+CGPADDR:0,101.43.5.1

OK
AT+CGPADDR=?
+CGPADDR:(0)

OK
```

3.12. AT+COPS PLMN Selection

The set command forces an attempt to select and register the GSM/UMTS/EPS network operator using the USIM card installed in the currently selected card slot. <mode> is used to select whether the selection is done automatically by the MT or is forced by this command to operator <oper> (it shall be given in format <format>) to a certain access technology, indicated in <AcT>. If the selected operator is not available, no other operator shall be selected (except <mode>=4). If the selected access technology is not available, then the same operator shall be selected in other access technology. The selected operator name format shall also apply to further read commands (AT+COPS?). <mode>=2 forces an attempt to deregister from the network. The selected mode affects all further network registration (e.g. after <mode>=2, MT shall be unregistered until <mode>=0 or 1 is selected). This command should be abortable when registration/deregistration attempt is made. Please refer to ***Chapter 7*** for possible <err> values.

The read command returns the current mode, the currently selected operator and the current access technology. If no operator is selected, <format>, <oper> and <AcT> are omitted.

The rest command returns a set of five parameters, each representing an operator present in the network. A set consists of an integer indicating the availability of the operator <stat>, long and short alphanumeric format of the operator's name, numeric format representation of the operator and access technology. 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 USIM or active application in the UICC (GSM or USIM) in the following order: HPLMN selector, user controlled PLMN selector, operator controlled PLMN selector and PLMN selector (in the USIM or GSM application), and other networks.

It is recommended (although optional) that after the operator list TA returns lists of supported <mode>s and <format>s. These lists shall be delimited from the operator list by two commas.

The <AcT> access technology selected parameters should only be used in terminals capable to register to more than one access technology. Selection of <AcT> does not limit the capability to cell reselections, even though an attempt is made to select an access technology, the phone may still re-select a cell in another access technology.

AT+COPS PLMN Selection	
Set Command **AT+COPS=<mode>[,<format>[,<oper>[,<AcT>]]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+COPS?**	Response **+COPS:<mode>[,<format>,<oper>][,<AcT>]** **OK**

	If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+COPS=?**	Response **+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 there is any error, response: **+CME ERROR:<err>**

Parameter

<mode>	0	Automatic (<oper> field is ignored)
	1	Manual (<oper> field shall be present, and <AcT> is optional)
	2	Deregister from network
	3	Set only <format> (for read command AT+COPS?), do not attempt to register/deregister (<oper> and <AcT> fields are ignored); this value is not applicable in read command response
	4	Manual/automatic (<oper> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered
<format>	0	Long format alphanumeric <oper>
	1	Short format alphanumeric <oper>
	2	Numeric <oper>
<oper>	String type; <format> indicates if the format is alphanumeric or numeric; long alphanumeric format can be up to 16 characters long and short format up to 8 characters; numeric format is the GSM location area identification number which consists of a three BCD digit ITU-T country code coded, plus a two or three BCD digit network code, which is administration specific.	
<stat>	0	Unknown
	1	Available
	2	Current
	3	Forbidden
<AcT>	Integer type; access technology selected	
	0	GSM
	1	GSM compact
	2	UTRAN
	3	GSM w/EGPRS
	4	UTRAN w/HSDPA
	5	UTRAN w/HSUPA

6	UTRAN w/HSDPA and HSUPA
7	E-UTRAN
8	EC-GSM-IoT (A/Gb mode) (see NOTES 3)
9	E-UTRAN (NB-S1 mode) (see NOTES 4)

NOTES

1. *3GPP TS 44.060* specifies the system information messages which give the information about whether the serving cell supports EGPRS.
2. *3GPP TS 25.331* specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.
3. 3GPP TS 44.018 [156] specifies the EC-SCH INFORMATION message which, if present, indicates that the serving cell supports EC-GSM-IoT.
4. 3GPP TS 36.331 [86] specifies the system information blocks which give the information about whether the serving cell supports NB-IoT, which corresponds to E-UTRAN (NB-S1 mode).
5. <Act>, if provided, must be set to 7.
6. Only <format>=2 is supported.
7. Only <mode>=0, <mode>=1 and <mode>=2 are supported.
8. When <mode>=1, the PLMN setting will not be retained after the UE is rebooted.
9. <mode>=1 is only for development use and <mode>=0 should be used in production when AUTOCONNECT is enabled.
10. The test command currently returns the configured values rather than performs a PLMN search.
11. <ACT> will not be returned for AT+COPS?.
12. <oper> field could not be present when <mode>=0.

Example

```
AT+COPS=0
OK
AT+COPS?
+COPS:0,2,"46000"

OK
AT+COPS=?
+COPS:(2,,,"46000"),,(0-2),(2)

OK
```

3.13. AT+CGATT PS Attach or Detach

The execution command is used to attach the MT to, or detach the MT from, the packet domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the “OK” response is returned. If the requested state cannot be achieved, an “ERROR” or “+CME ERROR” response is returned. Please refer to ***Chapter 7*** for possible <err> values.

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

The read command returns the current packet domain service state.

The test command is used for requesting information on the supported packet domain service states.

AT+CGATT PS Attach or Detach	
Execution/Set Command **AT+CGATT=<state>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CGATT?**	Response **+CGATT:<state>** **OK**
Test Command **AT+CGATT=?**	Response **+CGATT:**(list of supported **<state>**s) **OK**

Parameter

<state>	Integer type; indicates the state of PDP context activation. 0 Detached 1 Attached
<err>	Error value

NOTES

1. If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup.
2. This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

3. When <state>=1, AT+COPS=0 is automatically selected.
4. If AT+CGATT is in progress, further execution of this command before the finishing of attach or detach procedure will return error.

Example

```
AT+CGATT?
+CGATT:0

OK
AT+CGATT=1
OK
AT+CGATT=?
+CGATT:(0,1)

OK
```

3.14. AT+CGACT Activate or Deactivate PDP Context

The execution command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT 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 requested state for any specified context cannot be achieved, an “ERROR” or “+CME ERROR” response is returned. Extended error responses are enabled by the AT+CMEE command. 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 the attach fails then the MT responds with error or, if extended error responses are enabled, with the appropriate failure-to-attach error message. Please refer to *Subclause 9.2* for possible <err> values.

For EPS, if an attempt is made to disconnect the last PDN connection, then the MT responds with “ERROR” or, if extended error responses are enabled, a “+CME 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 MT before the PDP context can be set into established state.

If no <cid>s are specified, the activation form of the command activates all defined non-emergency contexts, and 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 Activate or Deactivate PDP Context	
Execution/Set Command **AT+CGACT=<state>[,<cid>[,<cid>[,...]]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CGACT?**	Response **+CGACT:<cid>,<state>[...]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CGACT=?**	Response **+CGACT:**(list of supported **<state>**s) **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<state>	Integer type; indicates the activation state of PDP context. 0 Deactivated 1 Activated
<cid>	Integer type; specifies a particular PDP context definition (see the AT+CGDCONT).

NOTES

1. If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup.
2. This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

Example

```
AT+CGACT=0,1
OK
AT+CGACT?
+CGACT:1,0
```

```
OK
AT+CGACT=?
+CGACT:(0,1)

OK
```

3.15. AT+CIMI Request International Mobile Subscriber Identity

The command returns International Mobile Subscriber Identity (string without double quotes).

Execution command causes the TA to return <IMSI>, which is intended to permit the TE to identify the individual USIM card or active application in the UICC (GSM or USIM) which is attached to MT.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CIMI Request International Mobile Subscriber Identity	
Execution Command **AT+CIMI**	Response **<IMSI>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CIMI=?**	Response **OK**

Parameter

<IMSI>	International Mobile Subscriber Identity (string without double quotes)
<err>	TBD

NOTE

IMSI may not be displayed for a few seconds after power-on.

Example

```
AT+CIMI
460001357924680
```

OK

3.16. AT+CGDCONT Define a PDP Context

The set command specifies PDP context parameter values for a PDP context identified by <cid>, and the (local) context identification parameter. It also allows the TE to specify whether security protected transmission of ESM information is requested, because the PCO can include information that requires ciphering. There can be other reasons for the UE to use security protected transmission of ESM information, e.g. if the UE needs to transfer an APN. 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. Please refer to ***Chapter 7*** for possible <err> values.

For EPS, the PDN connection and its associated EPS default bearer is identified herewith.

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

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup, please refer to *3GPP TS 27.007 V13.5.0, subclause 10.1.0*. As for all other contexts, the parameters for <cid>=0 can be modified with AT+CGDCONT. If the initial PDP context is supported, AT+CGDCONT=0 resets context number 0 to its particular default settings.

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

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

AT+CGDCONT Define a PDP Context	
Execution/Set Command **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>]]]]]]]]]]]]**	Response **OK**
Read Command **AT+CGDCONT?**	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>]]]]]]]]** **[<CR><LF>+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>]]]]]]] **[...]]** **OK**
Test Command **AT+CGDCONT=?**	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) **[<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)) **[...]]** **OK**

Parameter

<cid>	Integer type; specifies a particular PDP context definition. The parameter is local to the TE-MT 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. The <cid>s for network-initiated PDP contexts will have values outside the ranges indicated for the <cid> in the test form of the AT+CGDCONT and AT+CGDSCONT commands.	
<PDP_type>	String type; specifies the type of packet data protocol.	
	X.25	ITU-T/CCITT X.25 layer 3 (Obsolete)
	IP	Internet Protocol (IETF STD 5 [103])
	IPv6	Internet Protocol, version 6
	IPv4v6	Virtual <PDP_type> introduced to handle dual IP stack UE capability
	OSPIH	Internet Hosted Octect Stream Protocol (Obsolete)
	PPP	Point to Point Protocol (IETF STD 51 [104])
		Only IP, IPv6 and IPv4v6 values are supported for EPS services.

NONIP None IP

<APN> String type; a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. The APN is a string of up to 82 characters.

<PDP_addr> String type; identifies the MT in the address space applicable to the PDP. This parameter can be left blank.

When AT+CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of AT+CGDCONT.

The value of this parameter is ignored with the set command. The parameter is included in the set command for backwards compatibility reasons only.

<d_comp> Integer type; controls PDP data compression

0 Off
1 On (manufacturer preferred compression)
2 V.42bis
3 V.44bis

<h_comp> Integer type; controls PDP header compression

0 Off
1 On (manufacturer preferred compression)
2 RFC 1144 [105] (applicable for SNDCP only)
3 RFC 2507 [107]
4 RFC 3095 [108] (applicable for PDCP only)

<IPv4AddrAlloc> Integer type; controls how the MT/TA requests to get the IPv4 address information

0 IPv4 address allocation through NAS signalling
1 IPv4 address allocated through DHCP

<request_type> Integer type; indicates the type of PDP context activation request for the PDP context. Please refer to *3GPP TS 24.301 (subclause 6.5.1.2)* and *3GPP TS 24.008 (subclause 10.5.6.17)*. If the initial PDP context is supported it is not allowed to assign <cid>=0 for emergency bearer services. According to *3GPP TS 24.008 (subclause 4.2.4.2.2 and subclause 4.2.5.1.4)* and *3GPP TS 24.301 (subclause 5.2.2.3.3 and subclause 5.2.3.2.2),* a separate PDP context must be established for emergency bearer services.

If the PDP context for emergency bearer services is the only activated context, only emergency calls are allowed, refer to *3GPP TS 23.401 subclause 4.3.12.9*.

0 PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific).
1 PDP context is for emergency bearer services
2 PDP context is for new PDP context establishment
3 PDP context is for handover from a non-3GPP access network

<P-CSCF_discovery> Integer type; influences how the MT/TA requests to get the P-CSCF address, refer to *3GPP TS 24.229 [89] annex B and annex L.*

0 Preference of P-CSCF address discovery not influenced by AT+CGDCONT

1	Preference of P-CSCF address discovery through NAS signalling
2	Preference of P-CSCF address discovery through DHCP
<IM_CN_Signalling_Flag_Ind>	Integer type; indicates to the network whether the PDP context is for IM CN subsystem related signalling only or not.
0	UE indicates that the PDP context is not for IM CN subsystem-related signalling only
1	UE indicates that the PDP context is for IM CN subsystem-related signalling only
<NSLPI>	Integer type; indicates the NAS signalling priority requested for this PDP context
0	Indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT.
1	Indicates that this PDP context is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signalling low priority". The MT utilizes the provided NSLPI information as specified in *3GPP TS 24.301 [83]* and *3GPP TS 24.008*.
<securePCO>	Integer type; specifies if security protected transmission of PCO is requested or not (applicable for EPS only).
0	Security protected transmission of PCO is not requested
1	Security protected transmission of PCO is requested
<IPv4_MTU_discovery>	Integer type; influences how the MT/TA requests to get the IPv4 MTU size, refer to *3GPP TS 24.008 subclause 10.5.6.3*.
0	Preference of IPv4 MTU size discovery not influenced by AT+CGDCONT
1	Preference of IPv4 MTU size discovery through NAS signalling

NOTES

1. Only <PDP_type>="IP" is supported. <PDP_type>="IPv6" will be supported in a future release.
2. Support AT+CGDCONT=<cid>,<PDP_type>,<APN> only.
3. <cid> values of 0-10 are supported.
4. <cid>=0 is read only and is only defined when AUTOCONNECT is enabled.
5. Only <hcomp> and <dcomp> values of 0 are supported.
6. No default <PDP_type > value specific.
7. <cid> value of 7 cannot be set when BIP is enabled.

Example

```
AT+CGDCONT=?
+CGDCONT:(0-10),("IP","NONIP"),,,(0),(0),,,,,(0,1)

OK
```

```
AT+CGDCONT=1,"IP","HUAWEI.COM"
OK
AT+CGDCONT?
+CGDCONT:1,"IP","HUAWEI.COM" ,,0,0,,,,,0

OK
```

3.17. AT+CFUN Set Phone Functionality

The set command selects the level of functionality in the MT. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn. Level of functionality between these may also be specified by manufacturers. When supported by manufacturers, MT resetting with <rst> parameter may be utilized. Please refer to ***Chapter 7*** for possible <err> values.

The read command returns the current setting of <fun>.

The test command returns values supported by the MT as compound values.

AT+CFUN Set Phone Functionality	
Set Command **AT+CFUN=<fun>[,<rst>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CFUN?**	Response **+CFUN:<fun>** **OK**
Test Command **AT+CFUN=?**	Response **+CFUN:**(list of supported **<fun>**s)**,** (list of supported **<rst>**s) **OK**

Parameter

<fun>	0	Minimum functionality
	1	Full functionality. Enable MT to transmit and receive RF circuits for all supported radio access technologies. For MTs supporting AT+CSRA, this equals the RATs indicated by the response of AT+CSRA=?. Currently AT+CSRA setting is ignored. It is not required that the transmitting and receiving RF circuits are in a disabled state when this setting takes effect.

	2	Disable MT to transmit RF circuits only
	3	Disable MT to receive RF circuits only
	4	Disable MT to transmit and receive RF circuits
	5...127	Reserved for manufacturers as intermediate states between full and minimum functionality
	128	Full functionality with radio access support according to the setting of AT+CSRA. Enables MT to transmit and receive RF circuits if it not already enabled. This <fun> setting is applicable for MTs supporting AT+CSRA.
	129	Prepare for shutdown. This setting has its prime use when some of the MT's resources (e.g. file system) are located on a tightly integrated TE (host). The MT will execute pending actions resulting in "permanent" changes, e.g. execute pending file system operations. The MT will also make an orderly network detachment. After this action and AT+CFUN has returned "OK", the MT can be shut down with <fun>=0, or by other means. After setting <fun>=129, only <fun>=0 is valid. All other values will make AT+CFUN return "ERROR".
<rst>	Integer type; MT resetting	
	0	Do not reset the MT before setting it to <fun> power level. This shall always be defaulted when <rst> is not given.
	1	Reset the MT before setting it to <fun> power level

NOTES

1. Only <fun>=0 and <fun>=1 are supported.
2. <rst> is not supported and will be ignored.
3. The module will enter deep sleep mode when the system is quiescent, but only if it has been enabled by the network.

Example

```
AT+CFUN=?
+CFUN:(0,1),(0,1)

OK
AT+CFUN=1
OK
AT+CFUN?
+CFUN:1

OK
```

3.18. AT+CMEE Report Mobile Termination Error

The set command disables or enables the use of final result code “+CME ERROR:<err>” as an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause “+CME ERROR:<err>” final result code instead of the regular “ERROR” final result code. “ERROR” is returned normally when error is related to syntax, invalid parameters or TA functionality.

The read command returns the current setting of <n>.

The test command returns values supported as a compound value.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CMEE Report Mobile Termination Error	
Set Command **AT+CMEE=<n>**	Response **OK**
Read Command **AT+CMEE?**	Response **+CMEE:<n>** **OK**
Test Command **AT+CMEE=?**	Response **+CMEE:**(list of supported **<n>**s) **OK**

Parameter

<n>	Integer type	
	0	Disable “+CMEE ERROR:<err>” result code and use “ERROR” instead
	1	Enable “+CMEE ERROR:<err>” result code and use numeric <err> values (Please refer to ***Chapter 7*** for possible <err> values)
	2	Enable “+CMEE ERROR:<err>” result code and use verbose <err> values

NOTE

Only <n>=0 & <n>=1 are supported.

3.19. AT+CCLK Return Current Date & Time

The clock will be set automatically once the UE has connected to the network.

The read command returns the current setting of the clock.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CCLK Return Current Date & Time	
Read Command **AT+CCLK?**	Response **+CCLK:[<yy/MM/dd,hh:mm:ss>[<±zz>]]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CCLK=?**	Response **OK**

Parameter

<time>	String type; format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minute, second and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; and range is -96 ~ +96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08"

NOTES

1. If MT does not support time zone information then the three last characters of <time> are not returned by AT+CCLK? command.
2. If the RTC has not been set by the network, no value is returned.

Example

```
AT+CCLK?
OK
AT+CCLK=?
OK
```

3.20. AT+CPSMS Power Saving Mode Setting

The set command controls the setting of the UE's power saving mode (PSM) parameters. It can be used to control whether the UE wants to apply PSM or not. Please refer to the unsolicited result codes provided by AT+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 AT+CPSMS=2. In this form, the use of PSM will be disabled and data for all parameters in AT+CPSMS command 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.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CPSMS Power Saving Mode Setting	
Execution/Set Command **AT+CPSMS=<mode>[,<Requested_Periodic-RAU>[,<Requested_GPRS-READY-timer>[,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CPSMS?**	Response **+CPSMS:<mode>,[<Requested_Periodic-RAU>],[<Requested_GPRS-READY-timer>],[<Requested_Periodic-TAU>],[<Requested_Active-Time>]** **OK**
Test Command **AT+CPSMS=?**	Response **+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) **OK**

Parameter

<mode>	Integer type; indicates to disable or enable the use of PSM in the UE

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.

<Requested_Periodic-RAU> String type; one byte in an 8-bit format. Requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN/UTRAN. (e.g. "01000111" equals 70 hours).
Bits 5 to 1 represent the binary coded timer value
Bits 6 to 8 define the timer value unit 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
1 1 1 value indicates that the timer is deactivated

<Requested_GPRS-READY-timer> String type; one byte in an 8-bit format. Requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN/UTRAN. (e.g. "01000011" equals 3 decihours or 18 minutes).
Bits 5 to 1 represent the binary coded timer value
Bits 6 to 8 define the timer value unit 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 decihours
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.

<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. (e.g. "01000111" equals 70 hours).
Bits 5 to 1 represent the binary coded timer value
Bits 6 to 8 define the timer value unit 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 1 1 1 value indicates that the timer is deactivated
<Requested_Active-Time>	String type; one byte in an 8-bit format. Requested Active Time value (T3324) to be allocated to the UE. (e.g. "00100100" equals 4 minutes). 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 decihours 1 1 1 value indicates that the timer is deactivated

NOTES

1. <Requested_Periodic-RAU> and <Requested_GPRS-READY-timer> are not supported by NB-IoT. No value will be output, and any input will be ignored.
2. AT+CPSMS? read command could only get mode value 0 and 1.

Example

```
AT+CPSMS=1,,,01000011,01000011
OK
AT+CPSMS?
+CPSMS:1,,,01000011,01000011

OK
AT+CPSMS=?
+CPSMS:(0,1,2),,,( 00000000-11111111),(00000000-11111111)

OK
```

3.21. AT+CEDRXS eDRX Setting

The set command controls the setting of the UE's eDRX parameters. It can be used to control 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 AT+CEDRXS=3. In this form, eDRX will be disabled and data for all parameters in AT+CEDRXS command will be removed or, if available, set to the manufacturer specific default values.

The read command returns the current settings for each defined value of <AcT-type>.

The test command returns the supported <mode>s and the value ranges for the access technology and the requested eDRX value as compound values.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CEDRXS eDRX Setting	
Set Command **AT+CEDRXS=<mode>,<AcT-type>[,<Requested_eDRX_value>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CEDRXS?**	Response **+CEDRXS:<AcT-type>,<Requested_eDRX_value>** **OK**
Test Command **AT+CEDRXS=?**	Response **+CEDRXS:**(list of supported **<mode>s**),(list of supported **<AcT-type>s**),(list of supported **<Requested_eDRX_value>s**) **OK**

Parameter

<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-type>. 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.

<AcT-type> Integer type; indicates the type of access technology. AT+CEDRXS? is used to specify the relationship between the type of access technology and the requested eDRX value.

0	Access technology is not using eDRX. This parameter value is only used in the unsolicited result code.
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. NB-S1 mode.

bit				
4	3	2	1	E-UTRAN eDRX cycle length duration
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	1	81.92 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<NW-provided_eDRX_value> String type; half a byte in a 4-bit format. NB-S1 mode.

bit				
4	3	2	1	E-UTRAN eDRX cycle length duration
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	1	81.,92 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds

<Paging_time_window> String type; half a byte in a 4-bit format. NB-S1 mode.

bit				
4	3	2	1	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

NOTES

1. <AcT-type> value 5 is supported.
2. When set <mode> to 0 and <Requested_eDRX_value> is omitted, it will set <Requested_eDRX_value> to invalid value like 0.

Example

```
AT+CEDRXS=1,5,"0101"
OK
AT+CEDRXS?
+CEDRXS:5,"0101"

OK
AT+CEDRXS=?
+CEDRXS:(0,1,2,3),(5),("0000"-"1111")

OK
AT+CEDRXS=0,5
OK
```

3.22. AT+CEER Extended Error Report

The execution command causes the TA to return one or more lines of information text <report>, determined by the MT manufacturer, which should offer the user of the TA an extended report of the reason for the following errors:

- The failure in the last unsuccessful call setup (originating or answering) or in call modification;
- The failure in the last call release;
- The failure in the last unsuccessful GPRS attach or unsuccessful PDP context activation;
- The failure in the last GPRS detach or PDP context deactivation.

Typically, the text will consist of a single line containing the cause information given by GSM/UMTS network in textual format.

AT+CEER Extended Error Report	
Execution Command **AT+CEER**	Response **+CEER <report>** **OK**
Test Command **AT+CEER=?**	Response **OK**

Parameter

<report>	The total number of characters, including line terminators, in the information, text shall not exceed 2041 characters. Text shall not contain the sequence 0<CR> or OK<CR>.

Example

```
AT+CEER
+CEER:EMM_CAUSE_EPS_AND_NON_EPS_SERVICES_NOT_ALLOWED

OK
AT+CEER=?
OK
```

3.23. AT+CEDRXRDP eDRX Read Dynamic Parameters

The execution command returns <AcT-type>, <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.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CEDRXRDP eDRX Read Dynamic Parameters	
Execution Command **AT+CEDRXRDP**	Response **+CEDRXRDP:<AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]** **OK**
Test Command **AT+CEDRXRDP=?**	Response **OK**

Parameter

<AcT-type> Integer type; indicates the type of access technology. AT+CEDRXS? is used to specify the relationship between the type of access technology and the requested eDRX value.

0	Access technology is not using eDRX. This parameter value is only used in the unsolicited result code
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.

bit				
4	3	2	1	E-UTRAN eDRX cycle length duration
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	1	81.92 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds
1	1	1	1	10485.76 seconds.

<NW-provided_eDRX_value> String type; half a byte in a 4-bit format.

bit				
4	3	2	1	E-UTRAN eDRX cycle length duration
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	1	81.92 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds

	1	0	1	1	655.36 seconds
	1	1	0	0	1310.72 seconds
	1	1	0	1	2621.44 seconds
	1	1	1	0	5242.88 seconds
	1	1	1	1	10485.76 seconds
<Paging_time_window>	String type; half a byte in a 4-bit format.				
	bit				
	4	3	2	1	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

Example

```
AT+CEDRXRDP
+CEDRXRDP:5,"0010","1110","0101"

OK
AT+CEDRXRDP=?
OK
```

NOTE

<AcT-type> value 5 is supported.

3.24. AT+CTZR Time Zone Reporting

The set command controls the time zone change event reporting. If reporting is enabled, the MT returns an unsolicited result code "+CTZV:<tz>, +CTZE:<tz>,<dst>,[<time>]", or "+CTZEU:<tz>,<dst>,[<utime>]" whenever the time zone is changed. The MT also provides the time zone upon network registration if provided by the network. If setting fails in an MT error, "+CME ERROR:<err>" is returned.

The read command returns the current reporting settings in the MT.

The test command returns supported <reporting> values as a compound value.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CTZR Time Zone Reporting	
Execution/Set Command **AT+CTZR[=<reporting>]**	Response **+CTZR <reporting>** **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CTZR?**	Response **+CTZR:<reporting>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CTZR=?**	Response **+CZTR:**(list of supported **<reporting>**s) **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<reporting>	Integer type; indicates reporting status 0 Disable time zone change event reporting 1 Enable time zone change event reporting by unsolicited result code "+CTZV:<tz>".

	2 Enable extended time zone and local time reporting by unsolicited result code "+CTZE:<tz>,<dst>,[<time>]". 3 Enable extended time zone and universal time reporting by unsolicited result code "+CTZEU:<tz>,<dst>,[<utime>]".
<tz>	String type; represents the sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two digits integer with the range -48 ~ +56. To maintain a fixed width, numbers in the range -9 ~ +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".
<dst>	Integer type; indicates whether <tz> includes daylight savings adjustment 0 <tz> includes no adjustment for daylight saving time 1 <tz> includes +1 hour (equals 4 quarters in <tz>) adjustment for daylight saving time 2 <tz> includes +2 hours (equals 8 quarters in <tz>) adjustment for daylight saving time
<time>	String type; represents the local time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). The local time can be derived by the MT from information provided by the network at the time of delivering time zone information and will be present in the unsolicited result code for extended time zone and local time reporting if the universal time is provided by the network.
<utime>	String type; represents the universal time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). The universal time can be provided by the network at the time of delivering time zone information and will be present in the unsolicited result code for extended time zone and universal time reporting if provided by the network.

NOTE

The time zone reporting is not affected by the automatic time zone setting command, if implemented +CTZU.

Example

```
AT+CTZR=0
OK
AT+CTZR?
+CTZR:0

OK
AT+CTZR=?
+CTZR:(0,1,2,3)

OK
```

3.25. AT+CIPCA Initial PDP Context Activation

The set command controls whether an initial PDP context (see *subclause 10.1.0*) shall be established automatically following an attach procedure when the UE is attached to GERAN or UTRAN RATs and whether the UE is attached to E-UTRAN with or without a PDN connection.

For <n>≠0, deactivating the last (active) PDP context can lead to a (re)establishment of the initial PDP context. Changing setting of <n> from 0 to 1 will cause an immediate attempt to (re)establish the initial PDP context if no PDP context is active. Changing <n> from 0 to 2 will, if not roaming, cause an immediate attempt to (re)establish the initial PDP context if no other PDP context is active. The value of <n>=3 applies to E-UTRAN RATs and does not change the setting of PDP context activation in GERAN or UTRAN RATs. Changing <n> will never cause a PDP context deactivation.

For <AttachWithoutPDN>=1, the EPS attach is performed without a PDN connection.

The read command returns the current setting of the command.

The test command returns values supported as a compound value.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CIPCA Initial PDP Context Activation	
Set Command **AT+CIPCA=<n>[,<AttachWithoutPDN>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CIPCA?**	Response **+CIPCA:<n>[,<AttachWithoutPDN>]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CIPCA=?**	Response **+CIPCA:(**list of supported **<n>s),(**list of supported **<AttachWithoutPDN>s)** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<n>	Integer type; activation of PDP context upon attaching 0 Do not activate 1 Always activate 2 Activate when not roaming 3 No change in current setting
<AttachWithoutPDN>	Integer type; EPS attach with or without PDN connection. 0 EPS attach with PDN connection 1 EPS attach without PDN connection

NOTES

1. For this command, the term roaming corresponds to being registered on a VPLMN which is not equivalent to HPLMN or EHPLMN.
2. Only <n>=3 is supported.
3. If <AttachWithoutPDN> is omitted, default value 0 will be used.

Example

```
AT+CIPCA=3,1
OK
AT+CIPCA?
+CIPCA:3,1

OK
AT+CIPCA=?
+CIPCA:(3),(0,1)

OK
```

3.26. AT+CGAPNRC APN Rate Control

The execution command returns the APN rate control parameters (see *3GPP TS 24.008 [8]*) 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.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CGAPNRC APN Rate Control	
Execution Command **AT+CGAPNRC[=<cid>]**	Response **[+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** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CGAPNRC=?**	Response **+CGAPNRC:** (list of **<cid>s** associated with active contexts) **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<cid>	Integer type; specifies a particular PDP context definition (see the AT+CGDCONT and AT+CGDSCONT commands).
<Additional_exception_reports>	Integer type; indicates whether or not additional exception reports are allowed to be sent 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 [8] subclause 10.5.6.3.2*. 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 be sent.
<Uplink_time_unit>	Integer type; specifies the time unit to be used for the 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 [8] subclause 10.5.6.3.2*. 0 Unrestricted 1 Minute 2 Hour 3 Day 4 Week

<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 [8] subclause 10.5.6.3.2*.

Example

```
AT+CGAPNRC
+CGAPNRC=1,0,2,2
+CGAPNRC=2,1,2,3

OK
AT+CGAPNRC=?
+CGAPNRC:(1,2)

OK
```

4 ETSI Commands (27.005)

4.1. AT+CSMS Select Messaging Service

The set command selects messaging service. It returns the types of messages supported by the ME:<mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages. If chosen service is not supported by the ME (but is supported by the TA), final result code "+CME ERROR:<err>" will be returned.

The read command returns supported message types along the current service setting.

The test command returns a list of all services supported by the TA.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CSMS Select Messaging Service	
Execution/Set Command **AT+CSMS=<service>**	Response **+CSMS:<mt>,<mo>,<bm>** **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CSMS?**	Response **+CSMS:<service>,<mt>,<mo>,<bm>** **OK**
Test Command **AT+CSMS=?**	Response **+CSMS:**(list of supported **<service>**s) **OK**

Parameter

<service>	Integer type; messaging service 0 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4]

	1	3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] (the requirement of <service> setting 1 is mentioned under corresponding command descriptions)
	2...127	Reserved
	128...	Manufacturer specific
<mt>	Integer type; mobile terminated messages	
	0	Mobile terminated messages not supported
	1	Mobile terminated messages supported
<mo>	Integer type; mobile originated messages	
	0	Mobile originated messages not supported
	1	Nobile originated messages supported
<bm>	Integer type; broadcast messages	
	0	Broadcast messages not supported
	1	Broadcast messages supported

NOTE

MT will report to the user if received SMS messages in PDU mode:
"+CMT: [<alpha>],<length><CR><LF><pdu>".

Example

```
AT+CSMS=1
+CSMS:1,1,0

OK
AT+CSMS?
+CSMS:1,1,1,0

OK
AT+CSMS=?
+CSMS:(0,1)

OK
```

4.2. AT+CNMA New Message Acknowledgement to ME/TA

The execution command confirms reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE. This acknowledgement command shall be used when AT+CSMS parameter <service> equals 1. In PDU mode, it is possible to send either positive (RPACK) or negative (RP-ERROR) acknowledgement to the network. Parameter <n> defines which one will be sent. Optionally (when <length> is greater than zero) an acknowledgement TPDU

(SMS-DELIVER-REPORT for RPACK or RP-ERROR) may be sent to the network. The entering of PDU is done similarly as specified in command AT+CMGS, except that the format of <ackpdu> is used instead of <pdu> (i.e. SMSC address field is not present). PDU shall not be bounded by double quotes. TA shall not send another +CMT or +CDS result code to TE before previous one is acknowledged.

If ME does not get acknowledgement within required time (network timeout), ME should respond as specified in *3GPP TS 24.011 [6]* to the network. ME/TA shall automatically disable routing to TE by setting both <mt> and <ds> values of AT+CNMI to zero.

If command is executed, but no acknowledgement is expected, or some other ME related error occurs, final result code "+CME ERROR:<err>" is returned. In case that a directly routed message must be buffered in ME/TA (possible when AT+CNMI parameter <mode> equals 0 or 2) or AT interpreter remains too long in a state where result codes cannot be sent to TE (e.g. user is entering a message using AT+CMGS), acknowledgement (RP-ACK) must be sent to the network without waiting AT+CNMA command from TE. Later, when buffered result codes are flushed to TE, TE must send +CNMA acknowledgement for each result code. In this way, ME/TA can determine if message should be placed in non-volatile memory and routing to TE disabled (+CNMA not received). Refer to command AT+CNMI for more details about how to use <mode> parameter reliably.

The test command returns a list of supported <n> values. If the only value supported is 0, the device does not support sending of TPDU.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CNMA New Message Acknowledgement to ME/TA	
Execution/Set Command **AT+CNMA=<n>[,<length>[<CR>**PDU is given**<ctrl-Z/ESC>]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CNMA=?**	Response **+CNMA:**(list of supported**<n>**s) **OK**

Parameter

<n>	0	Command operates similarly as defined for the text mode (UE does not support text mode for SMS currently)
	1	Send RP-ACK (or buffered result code received correctly)
	2	Send RP-ERROR [if PDU is not given, ME/TA shall send SMS-DELIVER-REPORT with *3GPP TS 23.040 [3]* TP-FCS value set to 'FF' (unspecified error cause)]
<length>	Integer type; indicates in the text mode (AT+CMGF=1) the length of the message body	

	<data> > (or <cdata>) in characters; or in PDU mode (AT+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). The range is 0-232.

NOTES

1. Only <n>=1 and <n>=2 are supported.
2. AT+CNMI is not supported currently.

Example

```
AT+CNMA=1
OK
AT+CNMA=?
+CNMA:(0-2)

OK
```

4.3. AT+CSCA Service Centre Address

The set command 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.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CSCA Service Centre Address	
Execution/Set Command **AT+CSCA=<sca>[,<tosca>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+CSCA?**	Response **+CSCA:<sca>[,<tosca>]** **OK**
Test Command **AT+CSCA=?**	Response **OK**

Parameter

<sca>	*3GPP TS 24.011 [6]* RP SC address Address-Value field in string format; BCD numbers (or GSM 7-bit default alphabet characters) are converted to characters of the currently selected TE character set (refer to AT+CSCS command in *3GPP TS 27.007 [9]*); type of address given by <tosca>.
<tosca>	*3GPP TS 24.011 [6]* RP SC address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43), default value is 145, otherwise default value is 129).

Example

```
AT+CSCA=358501234567,145
OK
AT+CSCA?
+CSCA:"358501234567",145

OK
AT+CSCA=?
OK
```

4.4. AT+CMGS Send SMS Messages

The execution command sends messages from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Optionally (when AT+CSMS <service> value is 1 and network supports) <ackpdu> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code "+CME ERROR:<err>" is returned. This command should be abortable.

- <length> must indicate the number of octets coded in the TP layer data unit to be given (i.e. SMSC address octets are excluded).
- The TA shall send a four character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that PDU can be given from TE to ME/TA.
- The DCD signal shall be in ON state while PDU is given.
- The echoing of given characters back from the TA is controlled by V.25ter echo command E.
- The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; ME/TA converts this coding into the actual octets of PDU.
- When the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with AT+CSCA command is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet.
- Sending can be cancelled by giving <ESC> character (IRA 27).
- <ctrl-Z> (IRA 26) must be used to indicate the ending of PDU.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CMGS Send SMS Message	
Execution/Set Command **AT+CMGS=<length><CR>**PDU is given**<ctrl-Z/ESC>**	Response **+CMGS:<mr>[,<ackpdu>]]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CMGS=?**	Response **OK**

Parameter

<mr>	*3GPP TS 23.040 [3]* TP-Message-Reference in integer format.
<length>	Integer type; indicates in the text mode (AT+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (AT+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). The range is 7-220.
<ackpdu>	*3GPP TS 23.040 [3]* RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without *3GPP TS 24.011 [6]* SC address field and parameter shall be bounded by double quote characters like a normal string type parameter.

NOTES

1. <ackpdu> is not returned currently.
2. MT will report to the user if received SMS messages in PDU mode:
   "+CMT: [<alpha>],<length><CR><LF><pdu>".

4.5. AT+CMGC Send SMS Command

The execution command sends a command message from a TE to the network (SMS-COMMAND). The entering of text (*3GPP TS 23.040 [3]* TP-Command-Data) is done similarly as specified in AT+CMGS command, but the format is fixed to be a sequence of two IRA characters long hexadecimal numbers which ME/TA converts into 8-bit octets (refer to AT+CMGS). Message reference value <mr> is returned to the TE on successful message delivery. Optionally (when AT+CSMS <service> value is 1 and network supports) <scts> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code "+CME ERROR:<err>" is

returned. This command should be abortable.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CMGC Send SMS Command	
Execution/Set Command **AT+CMGC=<length><CR>**PDU is given**<ctrl-Z/ESC>**	Response **+CMGC:<mr>[,<ackpdu>]]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CMGC=?**	Response **OK**

Parameter

<mr>	*3GPP TS 23.040 [3]* TP-Message-Reference in integer format
<length>	Integer type; indicates in the text mode (AT+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (AT+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). The range is 8-220.
<ackpdu>	*3GPP TS 23.040 [3]* RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without *3GPP TS 24.011 [6]* SC address field and parameter shall be bounded by double quote characters like a normal string type parameter

NOTES

1. <ackpdu> is not returned currently.
2. MT will report to the user if received SMS messages in PDU mode:
   "+CMT: [<alpha>],<length><CR><LF><pdu>".

4.6. AT+CSODCP* Send Originating Data via Control Plane

Send a non-IP message.

The set command is used by the TE to transmit data over control plane to network via MT. Context identifier <cid> is used to link the data to particular context.

This command optionally indicates that the application on the MT expects that the exchange of data will be completed with this uplink data transfer; or will be completed with the next received downlink data.

This command also optionally indicates whether or not the data to be transmitted is an exception data. It causes transmission of an ESM DATA TRANSPORT message, as defined in *3GPP TS 24.301 [83]*.

The test command returns the maximum number of bytes of the user data container supported by the MT, and returns supported <RAI>s and supported <type_of_user_data>s as a compound value.

Please refer to ***Chapter 7*** for possible <err> values.

AT+CSODCP Send Originating Data via the Control Plane	
Execution/Set Command **AT+CSODCP=<cid>,<cpdata_length>,<cpdata>[,<RAI>[,<type_of_user_data>]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+CSODCP=?**	Response **+CSODCP:**(rane of supported **<cid>s**),(maximum number of bytes of the **<cpdata_length>**),(list of supported **<RAI>s**),(list of supported **<type_of_user_data>**s) **OK**

Parameter

<cid>	Integer type; a numeric parameter which specifies a particular PDP context or EPS bearer context definition. The <cid> parameter is local to the TE-MT interface and identifies the PDP or EPS bearer contexts which have been setup via AT commands (see the AT+CGDCONT and AT+CGDSCONT commands).
<cpdata_length>	Integer type; indicates the number of bytes of the <cpdata> information element. When there is no data to transmit, the value shall be set to zero.
<cpdata>	String of octets. Contains the user data container contents (refer to *3GPP TS 24.301 [83] subclause 9.9.4.24*). When there is no data to transmit, the <cpdata> shall be an empty string (""). This parameter shall not be subject to conventional character conversion as per AT+CSCS. The coding format of the user data container and the maximum length of <cpdata> are implementation specific.
<RAI>	Integer type; indicates the value of the release assistance indication, refer to *3GPP TS 24.301 [83] subclause 9.9.4.25*. 0 No information available 1 The MT expects that exchange of data will be completed with the transmission of the “ESM DATA TRANSPORT” message.

	2	The MT expects that exchange of data will be completed with the receipt of an “ESM DATA TRANSPORT” message.
<type_of_user_data>	Integer type; indicates whether the user data that is transmitted is regular or exceptional.	
	0	Regular data
	1	Exception data

NOTES

1. "*" means under development.
2. There is a maximum data length of 512 bytes.
3. Only one message will be buffered at any one time.

Example

```
AT+CSODCP=?
+CSODCP:(0-10),(512),(0,1,2),(0,1)

OK
```

4.7. AT+CRTDCP* Report Terminating Data via Control Plane

Receive a message from the CDP server.

The set command is used to enable and disable reporting of data from the network to the MT that is transmitted via the control plane in downlink direction. If reporting is enabled, the MT returns the unsolicited result code “+CRTDCP:<cid>,<cpdata_length>,<cpdata>” when data is received from the network.

The read command returns the current settings.

The test command returns supported values as compound values

Please refer to ***Chapter 7*** for possible <err> values.

AT+CRTDCP Report Terminating Data via Control Plane	
Execution/Set Command **AT+CRTDCP=<reporting>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**

Read Command **AT+CRTDCP?**	Response **+CRTDCP:<reporting>** **OK**
Test Command **AT+CRTDCP=?**	Response **+CRTDCP:**(list of supported **<reporting>s**),(range of supported **<cid>s**),(maximum number of octets of user data indicated by **<cpdata_length>)** **OK**

Parameter

<reporting>	Integer type; controls reporting of mobile terminated control plane data events 0 Disable reporting of MT control plane data 1 Enable reporting of MT control plane data by the unsolicited result code "+CRTDCP:<cid>,<cpdata_length>,<cpdata>"
<cid>	Integer type; a numeric parameter which specifies a particular PDP context or EPS bearer context definition. The <cid> parameter is local to the TE-MT interface and identifies the PDP or EPS bearer contexts which have been setup via AT commands (see AT+CGDCONT and AT+CGDSCONT commands)
<cpdata_length>	Integer type; indicates the number of bytes of the <cpdata> information element. When there is no data to transmit, the value shall be set to zero.
<cpdata>	String of octets. Contains the user data container contents (refer to *3GPP TS 24.301 [83] slause 9.9.4.24*). When there is no data to transmit, the <cpdata> shall be an empty string (""). This parameter shall not be subject to conventional character conversion as per AT+CSCS. The coding format of the user data container and the maximum length of <cpdata> are implementation specific.

NOTES

1. "*" means under development.
2. There is a maximum data length of 512 bytes.
3. Only one message will be buffered at any one time.

Example

```
AT+CRTDCP=1
OK
AT+CRTDCP?
+CRTDCP:1

OK
```

```
AT+CRTDCP=?
+CRTDCP:(0-1),(0-10),(512)

OK

+CRTDCP:0,2,"ab"          //URC
```

5 General Commands

5.1. AT+NRB Reboot the Module

The command reboots the module. There is a short delay after issuing this command before the terminal reboots. No further AT commands will be processed. Please refer to ***Chapter 7*** for possible <err> values.

Please note that there is no final "OK" to signal that the command line has finished processing as AT command processing terminates with this command. No confirmation messages are expected until the reboot.

AT+NRB Reboot the Module	
Execution Command **AT+NRB**	Response **REBOOTING**

Example

```
AT+NRB
REBOOTING
```

5.2. AT+NUESTATS Query UE Statistics

The command fetches the most recent operational statistics. Please refer to ***Chapter 7*** for possible <err> values. It can take an optional parameter that allows different sets of statistics to be displayed. The <type>=RADIO provides the default set of values, and <type>=ALL will print all data.

AT+NUESTATS Query UE Statistics	
Set Command **AT+NUESTATS=RADIO**	Response **Signal power:<signal power in centibels>** **Total power:<total power in centibels>** **TX power:<current Tx power level in centibels>** **TX time:<total Tx time since last reboot in millisecond>** **RX time:<total Rx time since last reboot in millisecond>** **Cell ID:<last cell ID>**

	ECL:<last ECL value> **SNR:<last snr value>** **EARFCN:<last earfcn value>** **PCI:<last pci value>** **RSRQ:<rsrq in centibels>** **OK** If there is any error, response: **+CME ERROR:<err>**
AT+NUESTATS=CELL	**NUESTATS:CELL,<earfcn>,<physical cell id>,<primarycell>,<rsrp>,<rsrq>,<rssi>,<snr>** **[...NUESTATS:CELL,<earfcn>,<physical cell id>,<primarycell>,<rsrp>,<rsrq>,<rssi>,<snr>]** **OK** If there is any error, response: **+CME ERROR:<err>**
AT+NUESTATS=THP	**NUESTATS:THP,<throughput_type>,<throughput>** **[...NUESTATS:THP,<throughput_type>,<throughput>]** **OK** If there is any error, response: **+CME ERROR:<err>**
AT+NUESTATS=APPSMEM	**NUESTATS:APPSMEM,Current Allocated:<allocated>** **NUESTATS:APPSMEM,Total Free:<free>** **NUESTATS:APPSMEM,Max Free:<max free>** **NUESTATS:APPSMEM,Num Allocs:<num allocs>** **NUESTATS:APPSMEM,Num Frees:<num frees>** **OK**
AT+NUESTATS=<type>	**NUESTATS:<type>,<name/value>,<value>[,<value[,<value>[...]]]** **[...NUESTATS:<type>,<name/value>,<value>[,<value[,<value>[...]]]]**

	OK If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NUESTATS=?**	Response **NUESTATS:[<type>,…]** **OK**

Parameter

<type>	Type of data to be displayed as an unquoted string. Supported values of <type> are:	
	RADIO	Radio specific information
	CELL	Per-cell information for the top 8 cells
	BLER	Block error rate information
	THP	Throughput
	APPSMEM	Dynamic memory usage
	ALL	All information. The value of <type> output is the correct one for each data type.
If <type>=RADIO, return the default set of values:		
<signal power in centibels>		Signal power in centibels
<total power in centibels>		Total power in centibels
<current TX power level in centibels>		Current Tx power level in centibels
<total TX time since last reboot in millisecond>		Total Tx time since last reboot in millisecond
<total RX time since last reboot in millisecond>		Total Rx time since last reboot in millisecond
<last SIB1 cell ID>		Last SIB1 cell ID
<last ECL value>		Last ECL value
< last snr value>		Last SNR value
< last earfcn value>		Last EARFCN value
< last pci value>		Last PCI value
<rsrq in centibels>		Reference signal received quality in centibels
If <type>=CELL, per-cell information for the top 5 cells. Returned entries are of the form: <earfcn>,<physical cell id>,<primary cell>,<rsrp>,<rsrq>,<rssi>		
<earfcn>		Absolute radio-frequency channel number
<physical cell id>		Physical id of the cell
<primary cell>		1 indicates the current serving cell
<rsrp>		Reference signal received power
<rsrq>		Reference signal received quality
<rssi>		Received signal strength indicator
<snr>		Signal to noise ratio
If <type>=BLER, returned entries are:		
<rlc_ul_bler>		RLC layer block error rate (uplink). Integer %
<rlc_dl_bler>		RLC layer block error rate (downlink). Integer %

<mac_ul_bler>	Physical layer block error rate (uplink). Integer %
<mac_dl_bler>	Physical layer block error rate (downlink). Integer %
<total bytes transmitted>	Total bytes transmitted
<total bytes received>	Total bytes received
<transport blocks sent>	Transport blocks sent
<transport blocks received>	Transport blocks received
<transport blocks retransmitted>	Transport blocks retransmitted
<total ack/nack messages received>	Total ACK/NACK messages received

If <type>=THP, returned entries are:

<rlc_ul>	RLC layer throughput (uplink). Integer bps
<rlc_dl>	RLC layer throughput (downlink). Integer bps
<mac_ul>	Physical layer throughput (uplink). Integer bps
<mac_dl>	Physical layer throughput (downlink). Integer bps

If <type>=APPSMEM, dynamic memory usage, returned entries are:

<allocated>	Current allocated size
<free>	Total free size
<max free>	Max free size
<num allocs>	Number of times to allocate memory
<num frees>	Number of times to free memory

NOTE

The variant of NUESTATS without an argument prints out the RADIO arguments without the command and variant prefixes. This will be removed in a future release.

Example

```
AT+NUESTATS
Signal power:-663
Total power:-632
TX power:-35
TX time:1572
RX time:17847
Cell ID:27447553
ECL:0
SNR:290
EARFCN:3701
PCI:37
RSRQ:-108

OK
AT+NUESTATS=CELL
NUESTATS:CELL,3569,69,1,23,-1073,-1145,286
```

```
OK
AT+NUESTATS=THP
NUESTATS:THP,RLC UL,100

NUESTATS:THP,RLC DL,98

NUESTATS:THP,MAC UL,103

NUESTATS:THP,MAC DL,100

OK
AT+NUESTATS=BLER
NUESTATS:BLER,RLC UL BLER,10

NUESTATS:BLER,RLC DL BLER,5

NUESTATS:BLER,MAC UL BLER,8

NUESTATS:BLER,MAC DL BLER,3

NUESTATS:BLER,Total TX bytes,1080

NUESTATS:BLER,Total RX bytes,900

NUESTATS:BLER,Total TX blocks,80

NUESTATS:BLER,Total RX blocks,80

NUESTATS:BLER,Total RTX blocks,100

NUESTATS:BLER,Total ACK/NACK RX,100

OK
```

5.3. AT+NEARFCN Specify Search Frequencies

The set command provides a mechanism to lock to a specific E-UTRA Absolute Radio Frequency Channel Number (EARFCN) and, if desired, Physical Cell ID. All actions will be locked to this carrier until either the lock is removed or the UE is rebooted. It is not persistent over reboots. If the specified EARFCN is not present, the UE will enter out of service mode. If the specified PCI is not present, the UE will enter out of service mode. Please refer to ***Chapter 7*** for possible <err> values.

AT+NEARFCN Specify Search Frequencies	
Set Command **AT+NEARFCN=<search_mode>,<earfcn>[,<pci>]**	Response **OK** **+CME ERROR:<err>**
Execution Command **AT+NEARFCN=?**	Response **OK**

Parameter

<search_mode>	Specifies the type of search and defines the supplied parameters 0 Lock to a specific EARFCN
<earfcn>	A number in the range 1-65535 representing the EARFCN to search. An <earfcn> value of 0 will remove the EARFCN restriction and any associated physical cell ID lock.
<pci>	String type; E-UTRAN physical cell ID in hexadecimal format. Valid range 0 -1F7.

Example

```
AT+NEARFCN=0,10,AB
OK
```

5.4. AT+NSOCR Create a Socket

The command creates a socket on the UE and associates with specified protocol. If the port is set, receiving is enabled and "+NSONMI" unsolicited messages will appear for any message that is received on that port. Please refer to ***Chapter 7*** for possible <err> values.

If a socket has already been created for a protocol or port combination, then AT+NSOCR will fail if requested a second time.

AT+NSOCR Create a Socket	
Set Command **AT+NSOCR=<type>,<protocol>,<listen port>[,<receive control>]**	Response **<socket>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<type>	Socket type; supported value is DGRAM
<protocol>	Standard internet protocol definition. For example, UDP is 17
<listen port>	A number in the range 0-65535. This is the local port that will be included in sent messages and on which messages will be received.
<socket>	This is a reference to the created socket. It is an integer greater than or equal to 0.
<receive control>	Set to 1 if incoming messages should be received, 0 if incoming messages should be ignored. Default is 1 (messages will be received).

NOTES

1. A maximum of 7 sockets are supported, but other services may reduce this number.
2. Only UDP protocol 17 is supported.
3. <type>=RAW and <protocol>=6 will be accepted, but are not supported and should not be used.

Example

```
AT+NSOCR=DGRAM,17,4587,1
0

OK
AT+NSOCR=DGRAM,17,1234,0
1

OK
```

5.5. AT+NSOST SendTo Command (UDP Only)

Send a UDP datagram containing length bytes of data to remote_port on remote_addr.

The command sends a UDP datagram containing length bytes of data to the specified host:port. It will return with the socket that it was sent on, and the number of bytes of data sent. If the amount of data is larger than the largest datagram that can be sent, return value of AT+NSOST will indicate how much of the data was successfully sent. Please refer to ***Chapter 7*** for possible <err> values.

AT+NSOST SendTo Command (UDP Only)	
Set Command **AT+NSOST=<socket>,<remote_addr>,<remote_port>, <length>,<data>**	Response **<socket>,<length>** **OK**

	If there is any error, response: **+CME ERROR:<err>**

Parameter

<socket>	Socket number returned by AT+NSOCR
<remote_addr>	IPv4 A dot notation IP address
<remote_port>	A number in the range 0-65535. This is the remote port on which messages will be received
<length>	Decimal length of data to be sent
<data>	Data received in hex string format, or quoted string format

Example

```
AT+NSOST=0,192.158.5.1,1024,2,AB30
0,2

OK
```

NOTES

1. Maximum length of received data is 512 bytes.
2. Only IPv4 is supported.
3. Only hex string format is supported for <data> currently.
4. IP addresses can be specified in decimal, octal or hexadecimal notation.

5.6. AT+NSOSTF SendTo Command with Flags (UDP Only)

Send a UDP datagram containing length bytes of data to remote_port on remote_addr and allows meta-data flags to be set.

The command sends a UDP datagram to the specified host:port. It will return with the socket that was sent on, and the number of bytes of data sent. If the amount of data is larger than the largest datagram that can be sent, the AT+NSOSTF return value will indicate how much of the data was successfully sent. Please refer to ***Chapter 7*** for possible <err> values.

AT+NSOSTF SendTo Command with Flags (UDP Only)	
Set Command **AT+NSOSTF=<socket>,<remote_addr>,<remote_port>,<flag>,<length>,<dat**	Response **<socket>,<length>**

a>	**OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<socket>	Socket number returned by AT+NSOCR
<remote_addr>	IPv4 A dot notation IP address
<remote_port>	A number in the range 0-65535. This is the remote port on which messages will be received
<flag>	Specifies the type of message transmission. Values of this argument are in hex format and are formed by logically OR'ing zero or more of the following flags: 0x100 Exception Message: send message with high priority 0x200 Release Indicator: indicate release after next message 0x400 Release Indicator: indicate release after next message has been replied to If no flags are set, a value of 0 should be provided
<length>	Decimal length of data to be sent
<data>	Data received in hex string format, or quoted string format

NOTES

1. There is a maximum data length of 512 bytes.
2. Only IPv4 is supported.
3. Only hex string format is supported for <data> currently.
4. IP addresses can be specified in decimal, octal or hexadecimal notation.
5. <flag>=0x100 could only work when USIM supports exception data.

Example

```
AT+NSOSTF=1,192.158.5.1,1024,0x100,2,AB30
1,2

OK
```

5.7. AT+NSORF Receive Command (UDP Only)

Read the maximally returned data from socket, and returned length is the actual number of characters returned.

The command is use to receive data on a socket. When data arrives, a “+NSONMI” response will be generated to indicate the socket the message was received on and also the amount of data. The AT+NSORF command takes a length, which is the maximum amount of data that will be returned.

If the requested length is larger than the actual size of the returned data, only the length of returned data is provided, and the remaining length is returned as 0. If the requested length is less than the amount of data returned, only the requested amount of data will be returned, plus an indication of the number of bytes remaining. Once a message has been fully read, a new “+NSONMI” notification will be sent if there is another message to process. Please refer to ***Chapter 7*** for possible <err> values.

If messages arrive faster than they are read, and the internal message buffer is full, the most recent message will be discarded.

AT+NSORF Receive Command (UDP Only)	
Set Command **AT+NSORF=<socket>,<req_length>**	Response **<socket>,<ip_addr>,<port>,<length>,<data>,<remaining_length>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<socket>	Socket number returned by AT+NSOCR
<req_length>	Maximum amount of data to be returned as a decimal byte length
<**ip_addr**>	Address of system sending the message IPv4 A dot notation IP address
<**port**>	A number in the range 0-65535. This is the remote port that messages was sent from
<length>	Amount of data returned as a decimal byte length
<remaining_length>	Amount of data left to read for this message as a decimal byte length
<data>	Data received in hex string format

NOTES

1. Maximum length of received data is 512 bytes.
2. Only IPv4 is supported.
3. Remaining length is always 0. The remaining data is readable.

Example

```
AT+NSORF=0,10
0,192.168.5.1,1024,2,ABAB,0

OK
```

5.8. AT+NSOCL Close a Socket

The command is used to close the specified socket. If there are pending messages to be read, they will be dropped. No further unsolicited "+NSONMI" notifications will be generated. If the socket has already been closed, or was never created, an error will be returned.

AT+NSOCL Close a Socket	
Set Command **AT+NSOCL=<socket>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<socket>	Socket number returned by AT+NSOCR

Example

```
AT+NSOCL=0
OK
```

5.9. +NSONMI Indicator of Arrived Socket Messages (Response Only)

This is an unsolicited message to notify that data has been received on a socket and is ready to be read. It returns socket number and number of bytes of data available to read for the first message that is queued. If another message is received on the same socket, it will only be notified when the preceding message has been completely read. Please refer to ***Chapter 7*** for possible <err> values.

+NSONMI Indicator of Arrived Socket Messages (Response Only)	
URC **+NSONMI:**	Response **<socket>,<length>**

Parameter

<socket>	Socket on which data is received. Decimal number returned by AT+NSOCR
<length>	Number of bytes of data in the first message

NOTE

This message can occur at any point if it is indicating a new message with no messages buffered. If there are buffered messages, it will occur in the AT+NSORF command before the data is returned.

5.10. AT+NPING Test IP Network Connectivity to a Remote Host

The command sends an ICMP packet to the specified host address. Please refer to ***Chapter 7*** for possible <err> values.

AT+NPING initiates the sending of a PING packet to the specified address. This will either cause a packet to be returned if the remote system is connected and responding to PING packets or no response will be received. A maximum of 1 ping attempts will be tried. If none of the packets receive a response within the timeout period, an error will be raised.

If a response is received, the unsolicited "+NPING" message will be returned. If no response is received the "+NPINGERR" unsolicited response will be returned with an error value.

AT+NPING Test IP Network Connectivity to a Remote Host	
Set Command **AT+NPING=<remote_address>[,<p_size>[,<timeout>]]**	Response **OK** **+NPING:<remote_address>,<ttl>,<rtt>** If there is any error, response: **+NPINGERR:<err>**

Parameter

<remote_address>	Address of system sending the message IPv4 A dot notation IP address
<p_size>	Size of echo packet payload. Range is 8-1460, and default value is 8. Unit: byte.
<timeout>	Maximum time to wait for an echo reply response. Range is 10-60000, and default value is 10000. Unit: ms.

<ttl>	TTL received in the response packet
<rtt>	Elapsed time from packet sent to response received. Unit: msec.
<err>	An integer value to provide some information on why the ping request failed 1 No response from remote host within timeout period 2 Failed to send ping request

NOTE

IP addresses can be specified in decimal, octal or hexadecimal notation.

5.11. AT+NBAND Set Supported Bands

The command sets the bands to be used. Please refer to ***Chapter 7*** for possible <err> values.

AT+NBAND Set Supported Bands	
Set Command **AT+NBAND=n[,n[,n[…]]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NBAND?**	Response **+NBAND:n[,n[,n[…]]]** **OK**
Execution Command **AT+NBAND=?**	Response **+NBAND:(n[,n[,n[…]]])** **OK**

Parameter

<n>	Band in a decimal number

NOTE

AT+NBAND=? returns the list of bands supported by the hardware.

5.12. AT+NLOGLEVEL Set Debug Logging Level

The command sets the logging level. It can take one of the following values.

AT+NLOGLEVEL Set Debug Logging Level	
Set Command **AT+NLOGLEVEL=<core>,<level>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NLOGLEVEL?**	Response **+NLOGLEVEL:<core>,<level>** **OK**
Execution Command **AT+NLOGLEVEL=?**	Response **+NLOGLEVEL:(<core>, …),(<level>,<level>, …)** **OK**

Parameter

<core>	PROTOCOL
	APPLICATION
	SECURITY
<level>	Logging level required
	VERBOSE
	NORMAL
	WARNING
	ERROR
	NONE

NOTES

1. Logging levels for application core and security core are not persistent.
2. Default logging level is NORMAL.

5.13. AT+NCONFIG Configure UE Behaviour

The command allows configuring certain aspects of UE behavior. It takes a function and a value that controls operation of that function.

AT+NCONFIG Configure UE Behaviour	
Set Command **AT+NCONFIG=<function>,<value>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NCONFIG?**	Response **+NCONFIG:<function>,<value>** **[+NCONFIG:<function>,<value>** **[…]]** **OK**
Test Command **AT+NCONFIG=?**	Response **+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))** **[+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))** **[,…]]** **OK**

Parameter

<function>	UE function to configure **AUTOCONNECT**: Control whether the platform will automatically attempt to connect to the network after power-on or reboot. When enabled, it will set AT+CFUN=1 and read the PLMN from the USIM. And it will use the APN provided by the network. **COMBINE_ATTACH**: Enable/disable combine attach. **CELL_RESELECTION**: Enable support for RRC cell reselection **ENABLE_BIP**: Enable/disable BIP

Example

```
AT+NCONFIG?
+NCONFIG:AUTOCONNECT,TRUE
+NCONFIG:CR_0354_0338_SCRAMBLING,TRUE
```

```
+NCONFIG:CR_0859_SI_AVOID,TRUE
+NCONFIG:COMBINE_ATTACH,FALSE
+NCONFIG:CELL_RESELECTION,FALSE
+NCONFIG:ENABLE_BIP,FALSE

OK
AT+NCONFIG=?
+NCONFIG:(AUTOCONNECT,(FALSE,TRUE))
+NCONFIG:(CR_0354_0338_SCRAMBLING,(FALSE,TRUE))
+NCONFIG:(CR_0859_SI_AVOID,(FALSE,TRUE))
+NCONFIG:(COMBINE_ATTACH,(FALSE,TRUE))
+NCONFIG:(CELL_RESELECTION,(FALSE,TRUE))
+NCONFIG:(ENABLE_BIP,(FALSE,TRUE))

OK
```

NOTE

CR_ function is temporary and will be discarded when no longer required.

5.14. AT+NATSPEED Configure UART Port Baud Rate

The command is used to configure UART port baud rate. Please refer to ***Chapter 7*** for possible <err> values.

AT+NATSPEED Configure UART Port Baud Rate	
Set Command **AT+NATSPEED=<baud_rate>[,<timeout>[,<store>[,<sync_mode>[,<stopbits>]]]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NATSPEED?**	Response **+NATSPEED:<baud_rate>,<sync_mode>,<stopbits>** **OK**
Test Command **AT+NATSPEED=?**	Response **+NATSPEED:**(list of supported **<baud rate>**s),(list of supported **<timeout>**s),(list of supported **<store>**s),(list of supported **<sync_mode>**s),(list of supported **<stopbits>**s)

	OK

Parameter

<baud_rate>	Integer type; indicates the baud rate of UART port that has been requested
<timeout>	Integer type; indicates the time to wait for communication before switching back to the original speed. Unit: second. Default value is 3 second. Maximum value is 30s. 0 means using default value.
<store>	Integer type; indicates whether to store <baud_rate> and <sync_mode> to NV or not. 0 Do not store to NV, need to configure again after reboot 1 Store to NV, while there is interaction before timeout
<sync_mode>	The LP UART synchronizes to each start bit that it detects and uses this to configure its optimum sampling point for each subsequent bit in a data word. The Sync Mode field allows this sampling point to be modified if required 0 Sample normally 1 Sample later 2 Sample earlier 3 Sample even earlier
<stopbits>	The LP UART stop bits 1 1 stop bit 2 2 stop bits

NOTES

1. <baud_rate> value higher than the fastest speed supported by the low power UART will disable deep sleep low power operation.
2. <sync_mode> does not support 3 when <baud rate> is 4800bps, and it may be removed in a future release.
3. <sync_mode> is defaulted as 2 for BC95BxHBR01A02W16 version or later.

Example

```
AT+NATSPEED=9600,3,1,2,1
OK
AT+NATSPEED?
+NATSPEED:9600,2,1

OK
AT+NATSPEED=?
+NATSPEED:(4800,9600,57600,115200),(0-30),(0,1),(0-3),(1,2)
```

OK

5.15. AT+NCCID Card Identification

Both the execution and read commands read the ICCID off the USIM card. If no USIM card is present, or the USIM card is unreadable, no data is returned. Please refer to ***Chapter 7*** for possible <err> values.

AT+NCCID Card Identification	
Set Command **AT+NCCID**	Response **+NCCID:<ICCID>** **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NCCID?**	Response **+NCCID:<ICCID>** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NCCID=?**	Response **OK**

Parameter

<ICCID>	USIM card identification number

Example

```
AT+NCCID
+NCCID:44123456789012345678

OK
AT+NCCID?
+NCCID:44123456789012345678

OK
```

5.16. AT+NFWUPD Firmware Update via UART

This command enables firmware updating. It allows package downloading, package validation, package name and version querying and firmware upgrading. Package needs to be downloaded first before upgrading the firmware. After downloading is finished, it sends package validity command. If package is legal, “OK” will be returned, otherwise return error and print reason. When validation is ongoing, it refuses to execute other commands with error return. After validation is finished, it sends firmware upgrade command. It refuses to execute firmware upgrade command without package validity.

Please refer to ***Chapter 7*** for possible <err> values.

AT+NFWUPD Firmware Update via UART	
Set Command **AT+NFWUPD=<cmd>[,<sn>,<len>,<data>,<crc>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NFWUPD=?**	Response **+NFWUPD:**(list of supported **<cmd>**s) **OK**

Parameter

<cmd>	Package process command 1 <sn>,<len>,<data>,<crc>. Download a package segment. Download a FOTA package. Package segments are continuous segments of the FOTA package. Segments can be of any length, but must be provided in order. 2 Validate package 3 Get package name 4 Get package version 5 Upgrade firmware
<sn>	Sequence number. It starts with 0, and increments by one for each package segment
<len>	Data length. Unit: byte.
<data>	Hex string format
<crc>	CRC of the package segment binary data. CRC is sent as a hex string, and it is an XOR8 of each byte in the package segment

NOTE

<cmd>=3 and <cmd>=4 are not supported currently.

5.17. AT+NPOWERCLASS Set the Mapping for Band and Power Class

This command sets the mapping for band and power class. The read command list all mapping of bands and power classes.

Please refer to ***Chapter 7*** for possible <err> values.

AT+NPOWERCLASS Set the Mapping for Band and Power Class	
Set Command **AT+NPOWERCLASS=<band>,<power class>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NPOWERCLASS?**	Response **+NPOWERCLASS:<band>,<power class>** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NPOWERCLASS=?**	Response **+NPOWERCLASS:**(list of supported **<band>**s),(list of supported **<power class>**s) **OK**

Parameter

<band>	Band as key to map
<power class>	Power class value for band

NOTE

<power class> only supports 3 and 5 currently.

5.18. AT+NPSMR Power Saving Mode Status Report

The set command controls the presentation of an unsolicited result code "+NPSMR". If <n>=1, +NPSMR:<mode> is sent from the MT when the power mode of the MT is changed.

Please refer to ***Chapter 7*** for possible <err> values.

The read command returns the status of result code presentation and an integer <mode> which shows whether the MT is currently in power saving mode or normal mode.

The test command returns supported values as a compound value.

AT+NPSMR Power Saving Mode Status Report	
Set Command **AT+NPSMR=<n>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NPSMR?**	Response **+NPSMR:<n>[,<mode>]** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NPSMR=?**	Response **+NPSMR:**(list of supported **<n>**s) **OK**

Parameter

<n>	0	Disable unsolicited result code
	1	Enable unsolicited result code “+NPSMR:<mode>”
<mode >	Integer type; indicates the power mode of MT	
	0	Normal mode
	1	Power saving mode

5.19. AT+NPTWEDRXS Paging Time Window Value and eDRX Setting

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

The set command also controls the presentation of an unsolicited result code “+NPTWEDRXP:<AcT-type>[,<Requested_Paging_time_window>[,<Requested_eDRX_value>[,<NW_provided_eDRX_value>[,<Paging_time_window>]]]]” when <n>=2 and there is a change in the paging time window and eDRX parameters provided by the network.

A special form of the command can be given as AT+NPTWEDRXS=3. In this form, paging time window and eDRX will be disabled and data for all parameters in the command AT+NPTWEDRXS will be

removed or, if available, set to the manufacturer specific default values.

The read command returns the current settings for each defined value of <AcT-type>. The test command returns the supported <mode>s and the value ranges for the access technology and the requested paging time window and requested eDRX value as compound values.

Please refer to ***Chapter 7*** for possible <err> values.

AT+NPTWEDRXS Paging Time Window Value and EDRX Setting	
Set Command **AT+NPTWEDRXS=<mode>[,<Act-type>[,<Requested_Paging_time_window>[,<Requested_eDRX_value>]]]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NPTWEDRXS?**	Response **+NPTWEDRXS:<Act-type>,<Requested_Paging_time_window>,<Requested_eDRX_value>[,<NW_provided_eDRX_value>[,<Paging_time_window>]]** **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NPTWEDRXS=?**	Response **+NPTWEDRXS:**(list of supported **<mode>**s),(list of supported **<Act-type>**s),(list of supported **<Requested_Paging_time_window>**s),(list of supported **<Requested_eDRX_value>**s) **OK**

Parameter

<mode>	Integer type; indicates to disable or enable the use of requested paging time window and 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>. 0 Disable the use of requested paging time window and eDRX 1 Enable the use of requested paging time window and eDRX 2 Enable the use of requested paging time window and eDRX, and enable the unsolicited result code: "+NPTWEDRXP:<AcT-type>[,<Requested_Paging_time_window>[,<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.

<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.

0 Access technology is not using eDRX. This parameter value is only used in the unsolicited result code.
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_Paging_time_window> String type; half a byte in a 4-bit format. NB-S1 mode.

bit				
4	3	2	1	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

<Requested_eDRX_value> String type; half a byte in a 4-bit format. NB-S1 mode.

bit				
4	3	2	1	E-UTRAN eDRX cycle length duration
0	0	1	0	20.48 seconds
0	0	1	1	40.96 seconds
0	1	0	1	81.92 seconds
1	0	0	1	163.84 seconds
1	0	1	0	327.68 seconds
1	0	1	1	655.36 seconds
1	1	0	0	1310.72 seconds
1	1	0	1	2621.44 seconds
1	1	1	0	5242.88 seconds

	1	1	1	1	10485.76 seconds
<NW_Provided_eDRX_value>	String type; half a byte in a 4-bit format. NB-S1 mode.				
	bit				
	4	3	2	1	E-UTRAN eDRX cycle length duration
	0	0	1	0	20.48 seconds
	0	0	1	1	40.96 seconds
	0	1	0	1	81.92 seconds
	1	0	0	1	163.84 seconds
	1	0	1	0	327.68 seconds
	1	0	1	1	655.36 seconds
	1	1	0	0	1310.72 seconds
	1	1	0	1	2621.44 seconds
	1	1	1	0	5242.88 seconds
	1	1	1	1	10485.76 seconds
<Paging_time_window>	String type; half a byte in a 4-bit format. NB-S1 mode.				
	bit				
	4	3	2	1	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

NOTES

1. <AcT-type> value 5 is supported.
2. When set <mode> to 0 and <Requested_Paging_time_window> or <Requested_eDRX_value> is omitted, it will set omitted value to invalid value like 0x00.

6 Huawei's IoT Platform Commands

This chapter describes the AT command related to the Huawei's IoT platform.

6.1. Description of Huawei's IoT Platform Commands

6.1.1. AT+NCDP Configure and Query CDP Server Settings

The command is used to set and query the server IP address and port for the CDP (Connected Device Platform) server. It is used when there is a HiSilicon CDP or Huawei's IoT platform acting as gateway to network server applications. Please refer to ***Chapter 7*** for possible <err> values.

AT+NCDP Configure and Query CDP Server Settings	
Set Command **AT+NCDP=<ip_addr>[,<port>]**	Response Update the CDP server configuration from the supplied parameters. **OK** If there is any error, response: **+CME ERROR:<err>**
Test Command **AT+NCDP?**	Response Return the current CDP server IP address and port. **+NCDP:<ip_addr>,<port>** **OK** If CDP server is not set, response: **+CME ERROR:<err>**

Parameter

<ip_addr>	IPv4 address, IP address is a dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4
<port>	Unsigned integer. The range is 0-65535. If port 0 is provided, the default port (5683) will be used. If no port is specified the previously set port will be used. If no port is specified, and no port was previously set, the default port will be used.

NOTES

1. Only IPv4 is supported.
2. The values assigned are persistent across reboots.
3. This command is available after the IMEI number has been set.
4. The command must be executed when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).
5. IP addresses can be specified in decimal, octal or hexadecimal notation.
6. The changes will take effect after reboot.

Example

```
AT+NCDP=192.168.5.1
OK
AT+NCDP?
+NCDP:192.168.5.1,5683

OK
```

6.1.2. AT+QSECSWT* Set Data Encryption Mode

This command is used to set the encryption mode of the data and standard DTLS session timeout renegotiation interval.

Please refer to ***Chapter 7*** for possible <err> values.

AT+QSECSWT Set Data Encryption Mode	
Set Command **AT+QSECSWT=<type>[,<renegotiation time>]**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+QSECSWT?**	Response **+QSECSWT:<type>[,<renegotiation time>]** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<type>	Indicates the encryption mode 0 No encryption 1 Encryption using standard DTLS 2 Encryption using DTLS+
<renegotiation time>	Standard DTLS session timeout renegotiation interval. Unit: minute. The value range is 1~525600. Valid only for the standard DTLS.

NOTES

1. "*" means under development.
2. When <type> is set to 2, the fixed renegotiation time is 1 month.
3. The <renegotiation time> can be configured only when <type> is set to 1, and it must be set to a value less than the network's NAT change time.

Example

```
AT+QSECSWT=0
OK
AT+QSECSWT=1,100
OK
AT+QSECSWT=2
OK
AT+QSECSWT?
+QSECSWT:0

OK
```

6.1.3. AT+QSETPSK* Set PSK ID and PSK

This command is used to configure PSK ID and PSK.

Please refer to ***Chapter 7*** for possible <err> values.

AT+QSETPSK Set PSK ID and PSK	
Set Command **AT+QSETPSK=<pskid>,<psk>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command	Response

AT+QSETPSK?	**+QSETPSK: <pskid>,<psk>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<pskid>	Indicates the PSK index. The fixed length is 15 decimal digits. The value must be the same as the IMEI number of the module. In addition, this parameter must also be set to the same value on the IoT platform.
<psk>	Indicates the PSK. This parameter must be set to a 16-digit hexadecimal number. In addition, this parameter must also be set to the same value on the IoT platform.

NOTES

1. "*" means under development.
2. When <pskid> is set to 0, the IMEI number is used as the PSK ID.
3. This command must be executed when the radio is inactive (AT+CFUN=0 will force the module to enter this state).

Example

```
AT+QSETPSK=867724030000225,E8E19CC16CE1F388E8E19CC16CE1F388
OK
AT+QSETPSK?
+QSETPSK: 867724030000225,***

OK
```

6.1.4. AT+NMGS Send Messages

The command is used to send messages from the terminal to the network via the CDP server. It will give an <err> code and description as an intermediate message if the message cannot be sent.

Please refer to ***Chapter 7*** for possible <err> values.

AT+NMGS Send Messages	
Set Command **AT+NMGS=<length>,<data>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<length>	Decimal length of a message
<data>	Data to be transmitted in hex string format

NOTES

1. There is a maximum data length of 512 bytes.
2. Only one message will be buffered at any one time.

Example

```
AT+NMGS=3,AA11BB
OK
```

6.1.5. AT+NMGR Get Messages

Receive a message from the CDP server.

The command returns the oldest buffered messages and deletes them from the buffer. If there are no messages then no command response will be given. If new message indications (AT+NNMI) are turned on, then received messages will not be available via this command.

AT+NMGR Get Messages	
Execution Command **AT+NMGR**	Response **<length>,<data>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<length>	Decimal length of a message
<data>	Data received in hex string format

NOTES

1. There is a maximum data length of 512 bytes.
2. Only one message will be buffered at any one time.

Example

```
AT+NMGR
5,48656C6C6F

OK
```

6.1.6. AT+NNMI New Message Indications

The command sets or gets new message indications that are sent. New message indications can be sent when a downstream message is received by the terminal from the CDP server. Please refer to ***Chapter 7*** for possible <err> values.

When new message indications and messages are enabled (AT+NNMI=1), all currently buffered messages will be returned in the format of "+NNMI:<length>,<data>". For example: "+NNMI:5,48656C6C6F".

If indications alone are turned on (AT+NNMI=2), each newly received message triggers an indication that a new datagram is waiting to use the unsolicited informational response. The buffered messages can be collected using AT+NMGR. The format of response is: "+NNMI". The default setting is 0, which indicates no indications are sent.

AT+NNMI New Message Indications	
Set Command **AT+NNMI=<status>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NNMI?**	Response **+NNMI:<status>** **OK**

Parameter

<status>	0	No indications
	1	Indications and message
	2	Indications only
<length>	Decimal length of message	
<data>	Data to be transmitted in hex string format	

Example

```
AT+NNMI=1
OK
AT+NNMI?
+NNMI:1

OK
```

6.1.7. AT+NSMI Sent Message Indications

The command sets or gets indications that are sent when an upstream message is sent to the CDP server.

If sent message indications are turned on, the unsolicited informational response: "+NSMI:<status>" (e.g. "+NSMI:SENT") will be issued when a new message is sent into NB-IoT stack. Please refer to ***Chapter 7*** for possible <err> values.

The default setting is 0, which indicates no indications are sent.

AT+NSMI Sent Message Indications	
Set Command **AT+NSMI=<indications>**	Response **OK** If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NSMI?**	Response **+NSMI:<indications>** **OK**

Parameter

<indications>	0	No indications
	1	Indications will be sent
<status>	SENT	
	DISCARDED	

Example

```
AT+NSMI=1
OK
AT+NSMI?
+NSMI:1

OK
```

6.1.8. AT+NQMGR Query Received Messages

The command queries the status of the downstream messages received from the CDP server. Please refer to ***Chapter 7*** for possible <err> values.

AT+NQMGR Query Received Messages	
Execution Command **AT+NQMGR**	Response **BUFFERED=<buffered>,RECEIVED=<received>,DROPPED=<dropped>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<buffered>	The number of messages waiting to be read in the downstream buffer
<received>	The total number of messages received by the terminal since terminal boot
<dropped>	The number of messages dropped by the terminal since terminal boot

Example

```
AT+NQMGR
BUFFERED=0,RECEIVED=34,DROPPED=2
```

```
OK
```

6.1.9. AT+NQMGS Query Sent Messages

The command queries the status of the upstream messages sent to the CDP server. Please refer to ***Chapter 7*** for possible <err> values.

AT+NQMGS Query Sent Messages	
Execution Command **AT+NQMGS**	Response **PENDING=<pending>,SENT=<sent>,ERROR=<error>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<pending>	The number of messages waiting to be sent in the upstream buffer, if layer 3 is registered and activated
<sent>	The total number of uplink messages sent into the NB-IoT stack since terminal boot
<error>	The number of messages that could not be sent by the terminal due to an error since terminal boot

Example

```
AT+NQMGS
PENDING=1,SENT=34,ERROR=0

OK
```

6.1.10. AT+NMSTATUS Message Registration Status

Report the current registration status when connected to the CDP server. Please refer to ***Chapter 7*** for possible <err> values.

AT+NMSTATUS Message Registration Status	
Test Command **AT+NMSTATUS=?**	Response (list of supported **<registration_status>**s) **OK**

	If there is any error, response: **+CME ERROR:<err>**
Read Command **AT+NMSTATUS?**	Response **+NMSTATUS:<registration_status>** **OK**

Parameter

<registration_status>	Current registration status: "UNINITIALISED", "MISSING_CONFIG", "INIT_FAILED", "INIITIALISED", "REGISTERING", "REREGISTERING", "REGISTERED", "REREGISTERED", "MO_DATA_ENABLED", "NO_UE_IP", "MEMORY_ERROR", "COAP_ERROR", "MSG_SEND_FAILED", "REJECTED_BY_SERVER", "TIMEOUT_AND_RETRYING", "TIMEOUT_AND_FAILED"

6.1.11. AT+QLWULDATAEX Send CON/NON Messages

This command is used to send confirmable (CON) or non-confirmable (NON) messages to the IoT platform. After sending a CON message, the sending result will be automatically notified to the terminal. Terminal can also use the command AT+QLWULDATASTATUS? to query the status of the CON message that has been sent.

Please refer to ***Chapter 7*** for possible <err> values.

AT+QLWULDATAEX Send CON/NON Messages	
Set Command **AT+QLWULDATAEX=<length>,<data>,<mode>**	Response **OK** If there is any error, response:

	+CME ERROR:<err>

Parameter

<length>	Decimal length of message
<data>	Data in hex string format
<mode>	0x0000: Send NON message 0x0100: Send CON message

NOTES

1. There is a maximum data length of 512 bytes.
2. If sending a CON message, it must acquire the status of sending the CON message before sending the next CON or NON message.

Example

```
AT+QLWULDATAEX=3,AA34BB,0x0100
OK
```

6.1.12. AT+QLWULDATASTATUS Query CON Messages Sending Status

This command queries the status of sending CON message to NB-IoT platform.

Please refer to ***Chapter 7*** for possible <err> values.

AT+QLWULDATASTATUS	**Query CON Messages Sending Status**
Read Command **AT+QLWULDATASTATUS?**	Response **+ QLWULDATASTATUS :<status>** **OK** If there is any error, response: **+CME ERROR:<err>**

Parameter

<status>	Status of the sent CON messages 0 Have not sent 1 Sent, waiting response of IoT platform 2 Sent failed 3 Timeout

4	Success
5	Got reset message

Example

```
AT+QLWULDATASTATUS?
+QLWULDATASTATUS :4

OK
```

7 Error Values

The <err> error codes listed below are not implemented, and only a subset will be implemented.

In B600 version and later, AT+CMEE command is implemented and it supports modes 0 & 1. In mode 1, a limited set of error codes are returned.

Error codes are compliant with the 3GPP specifications. Please refer to *3GPP TS 27.007 V13.5.0*, *sub-clause 9.2* for all possible <err> values. The error codes listed are those returned for the Quectel module.

Error codes 0-255 are reserved and defined in *3GPP TS 27.007* and may be used in future releases.

Table 4: General Errors (27.007)

Code of <err>	Description
3	Operation not allowed
4	Operation not supported
23	Memory failure
30	No network service
50	Incorrect parameters
51	Command implemented but currently disabled
52	Command aborted by user
159	Uplink busy/flow control

Table 5: General Errors (127.005)

Code of <err>	Description
300	ME failure

301	SMS service of ME reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode parameter
305	Invalid text mode parameter
310	USIM not inserted
311	USIM PIN required
312	PH-USIM PIN required
313	USIM failure
314	USIM busy
315	USIM wrong
316	USIM PUK required
317	USIM PIN2 required
318	USIM PUK2 required
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network service
332	Network timeout
340	No +CNMA acknowledgement expected
500	Unknown error

Specific error codes are in the range 512 onwards. Error codes 256 & 257 are listed in the following table for compatibility reasons.

Table 6: Specific Error Codes

Code of <err>	Description
256	Required parameter not configured
257	TUP not registered
512	Required parameter not configured
513	TUP not registered
514	AT internal error
515	CID is active

8 Reset Reasons

If the module is rebooted for any reason apart from either being power cycled or being externally reset, it will return a message before the <CR><LF>Neul<CR><LF>OK<CR><LF> message that indicates the reason for the reboot.

Table 7: Reboot Messages Displayed

No.	Reboot Message Displayed
1	REBOOT_CAUSE_SECURITY_RESET_UNKNOWN
2	REBOOT_CAUSE_SECURITY_SYSRESETREQ
3	REBOOT_CAUSE_SECURITY_WATCHDOG
4	REBOOT_CAUSE_SECURITY_SELF
5	REBOOT_CAUSE_SECURITY_ALTBOOT
6	REBOOT_CAUSE_SECURITY_REGIONS_UPDATED
7	REBOOT_CAUSE_PROTOCOL_UNKNOWN
8	REBOOT_CAUSE_PROTOCOL_SYSRESETREQ
9	REBOOT_CAUSE_PROTOCOL_WATCHDOG
10	REBOOT_CAUSE_PROTOCOL_MONITOR_REBOOT_REQ
11	REBOOT_CAUSE_APPLICATION_UNKNOWN
12	REBOOT_CAUSE_APPLICATION_SYSRESETREQ
13	REBOOT_CAUSE_APPLICATION_WATCHDOG
14	REBOOT_CAUSE_APPLICATION_AT
15	REBOOT_CAUSE_UNKNOWN

9 Examples

9.1. Attach Network

The module can automatically attach network by default on B650 version or later, which is controlled by AT+NCONFIG=AUTOCONNECT,TRUE command. If customers want to manually attach the network, please execute AT+NCONFIG=AUTOCONNECT,FALSE to disable automatic attachment. This value will be saved to NV and take effect after restarting the module by using AT+NRB.

Customers need to make sure the module type corresponds to the frequency band (AT+NBAND? command can be used to query the band) before attaching network.

The module types and corresponding frequency bands are shown as follows:

Module Type	BC95-B8	BC95-B5	BC95-B20	BC95-B28
Frequency band	900MHz	850MHz	800MHz	700MHz

The following shows a simple example to automatically attach the network. Customers only need to query whether the module has attached network by the following commands:

```
AT+NBAND?          //Query the band
+NBAND:8

OK
AT+CFUN?           //Value is 1.
+CFUN:1

OK
AT+CIMI            //Query the IMSI number.
460012345678969

OK
AT+CSQ             //Query the signal strength.
+CSQ:21,99

OK
```

```
AT+NUESTATS          //Query the module status.
Signal power:-663
Total power:-632
TX power:-35
TX time:1572
RX time:17847
Cell ID:27447553
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:290
EARFCN:3701
PCI:37
RSRQ:-108

OK
AT+CGATT?            //Query whether network is activated, +CGATT:1 means activated successfully, sometimes customers need to wait for 30s.
+CGATT:1

OK
AT+CEREG?            //Query the network registration status, 1 means registered on network, 2 means searching the network.
+CEREG:0,1

OK
AT+CSCON?            //Query the signal connection status, 1 means “Connected”, 0 means “Idle”.
+CSCON:0,1

OK
```

The following shows two ways of manual network attachment process.

1. Do not specify PLMN.

```
AT+CFUN=1            //Configure the level of functionality in the MT.
OK
AT+CIMI              //Query the IMSI number and wait for 4 seconds after executing AT+CFUN=1. If IMSI number is returned, it means the card has been identified; if not returned, please check whether it is a USIM card and whether the card is properly inserted.
460012345678966

OK
```

```
AT+NBAND?                    //Query the band information. Set BC95-B8 to band 8, BC95-B5 to band 5, BC95-B20 to band 20 and BC95-B28 to band 28 by AT+NBAND=n. It will take effect after restart.
+NBAND:8

OK
AT+CGDCONT=1,"IP","APN"      //APN is a local access point. This step is optional. If needed, please configure it accordingly.

OK
AT+CEREG=1                   //Set to automatically report network registration status, when the module is registered on the network, a URC will be reported.
OK
AT+CSCON=1                   //Set to automatically report network registration status, when the module is registered on the network, a URC will be reported.
OK
AT+CGATT=1                   //Activate the network.

OK
+CEREG:2                     //Report the URC, the MT is currently trying to attach or searching an operator to register to.

+CSCON:1                     //Report the URC, the MT is connected.

+CEREG:1                     //Report the URC, the MT is registered.

AT+CSQ                       //Query current signal quality.
+CSQ:31,99

OK
AT+NUESTATS                  //Query the module status.
Signal power:-663
Total power:-632
TX power:-35
TX time:1572
RX time:17847
Cell ID:27447553
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:290
EARFCN:3701
PCI:37
```

```
RSRQ:-108

OK
AT+CGATT?          //Query whether network is activated, +CGATT:1 means activated successfully
                     sometimes customers need to wait for 30s
+CGATT:1

OK
AT+CEREG?          //Query current EPS network registration status: Registered.
+CEREG:1,1

OK
AT+CSCON?          //Query the signaling connection status, 1 means “Connected”, 0 means “Idle”.
+CSCON:1,1

OK
```

2. Specify PLMN.

```
AT+CFUN=1          //Configure the level of functionality in the MT.
OK
AT+CIMI            //Query the IMSI number and wait for 4 seconds after executing AT+CFUN=1. If
                     IMSI number is returned, it means the card has been identified; if not returned,
                     please check whether it is a USIM card and whether the card is properly inserted.
460012345678966

OK
AT+NBAND?          //Query the band information. Set BC95-B8 to band 8, BC95-B5 to band 5,
                     BC95-B20 to band 20 and BC95-B28 to band 28 by AT+NBAND=n. It will take
                     effect after restart.
+NBAND:8

OK
AT+CGDCONT=1,"IP","APN"   //APN is a local access point. This step is optional. If needed, please
                            configure it accordingly.
OK
AT+CEREG=1         //Set to automatically report network registration status, when the
                     module is registered on the network, a URC will be reported.
OK
AT+CSCON=1         //Set to automatically report network registration status, when the
                     module is registered on the network, a URC will be reported.
OK
AT+COPS=1,2,"46000"   //Specify the PLMN searching or automatic searching, PLMN needs to
                        be configured by customers.
```

```
OK
AT+CSQ                          //Query current signal quality.
+CSQ:31,99

OK
AT+NUESTATS                     //Query the module status.
Signal power:-663
Total power:-632
TX power:-35
TX time:1572
RX time:17847
Cell ID:27447553
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:290
EARFCN:3701
PCI:37
RSRQ:-108

OK
AT+CGATT?                       //Query whether network is activated, +CGATT:1 means activated successfully,
                                  sometimes customers need to wait for 30s
+CGATT:1

OK
AT+CEREG?                       //Query current EPS network registration status: registered.
+CEREG:1,1

OK
AT+CSCON?                       //Query the signaling connection status, 1 means “Connected”, 0 means “Idle”.
+CSCON:1,1

OK
```

9.2. Send/Receive/Read UDP Messages

The following shows a simple example of sending, receiving and reading a UDP message. Once the socket is closed, no replies will be received.

```
AT+NSOCR=DGRAM,17,4587,1          //Create a socket
0

OK
AT+NSOST=0,192.53.100.53,5683,25,400241C7B17401724D0265703D32303136303832333136343 8
                                  //Send a message
0,25

OK

+NSONMI:0,4                       //Receive the message

AT+NSORF=0,4                      //Read the messages
0,192.53.100.53,5683,4,60A041C7,0

OK
AT+NSOCL=0                        //Close the socket

OK
```

9.3. Send/Receive/Read Messages via Huawei's IoT Platform

The following is a simple example of sending, receiving and reading a message via the Huawei's IoT platform.

```
AT+CGSN=1                         //Query the IMEI number. If only "ERROR" is
                                  returned, customers need to write the IMEI number.
+CGSN:863703030104298

OK
AT+NCDP=192.53.100.53             //Configuration CDP server, the value will be saved and
                                  can only be configured once. For versions earlier than
                                  B657SP1, this command must be executed after
                                  executing AT+CFUN=0. (The server can be configured
                                  before attaching the network)
OK
AT+NCDP?                          //Query CDP server
+NCDP:192.53.100.53,5683

OK
AT+NSMI=1                         //Sending message indications is enabled.
```

```
OK
AT+NNMI=2                                  //Enable new message indications when a downstream
                                           message is received by the terminal from the CDP
                                           server.
OK
AT+NMGS=10, AA7232088D0320623399           //Send a message.

OK

+NSMI:SENT                                 //Message is sent.
AT+NQMGS                                   //Query whether the messages is sent successfully.
PENDING=0,SENT=1,ERROR=0

OK

+NNMI                                      //Receive a downstream message.
AT+NQMGR                                   //Query whether the messages is received.
BUFFERED=1,RECEIVED=1,DROPPED=0

OK
AT+NMGR                                    //Get the message.
2,AABB

OK
AT+NQMGR                                   //Query whether the messages is received.
BUFFERED=0,RECEIVED=1,DROPPED=0

OK
```

10 Appendix A Reference

Table 8: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
CDP	Connected Device Platform
CS	Circuit Switched
DCE	Data Communication Equipment
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
eDRX	Extended Discontinuous Reception
EGPRS	Enhanced General Packet Radio Service
GERAN	GSM/EDGE Radio Access Network
GMT	Greenwich Mean Time
GPRS	General Packet Radio Service
HPLMN	Home Public Land Mobile Network
HSDPA	High Speed Downlink Packet Access
HSUPA	High-Speed Uplink Packet Access
ICMP	Internet Control Messages Protocol
IMEI	International Mobile Equipment Identity
IMEISV	International Mobile Equipment Identity and Software Version
MS	Mobile Station
NB-IoT	Narrow Band Internet of Thing
PDP	Packet Data Protocol

RRC	Radio Resource Control
RTC	Real Time Clock
SVN	Software Version Number
TA	Terminal Adapter
TCP	Transmission Control Protocol
TE	Terminal Equipment
TTL	Time To Live
UDP	User Datagram Protocol
UE	User Equipment
UICC	Universal Integrated Circuit Card
URC	Unsolicited Result Code
UUID	Universally Unique Identifier