BC35-G&BC28

AT Commands Manual

NB-IoT Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2017-12-28	Hayden WANG/ Gary TANG/ Arnold ZHAO	Initial
1.1	2018-03-15	Oven TAO/ Waner PAN/ Hayden WANG/ Donald TANG	1. Added the following AT commands: AT+NQSOS/ +NSOCO/+NSOSD/+NMGS/+NMGR/+NNMI/ +NSMI/+NQMGR/+NQMGS/+NMSTATUS 2. Updated parameter and/or example description for the following AT commands: AT+CGMR/ +CGDCONT/+CNMA/+NUESTATS/+NSOCR/ +NSOST/+NSOSTF/+NCONFIG/+NPTWEDRXS/+ QLWSREGIND/+QLEDMODE/+QLWSREGIND/+QL WULDATA/+QLWULDATAEX/ +QLWULDATASTATUS/+QLWFOTAIND/ 3. Added examples in Chapter 9.2. 4. Deleted URC +QLWULDATAEXIND.
1.2	2018-07-04	Hayden WANG/ Evan WU/ Donald TANG	1. Added the following AT commands: AT+ +CGCONTRDP/CGAUTH/CNMPSD/+NCSEARFCN /+NIPINFO/+NCPCDPR/+NQPODCP/+QDNS/+QR ESETDTLS/+QDTLSSTAT/+QBOOTSTRAPHOLDO FF/+QLWSERVERIP/+QSETBSPSK/ +QBSSECSWT. 2. Added the following URC: +NSOCLI. 3. Updated the parameter and example description for the following AT commands: AT +NSOCR/ +NBAND/+NFWUPD/+NPOWERCLASS. 4. Updated error values in Chapter 6. 5. Updated the display of reboot message. 6. Deleted the original Chapter 2. 7. Updated/added examples in Chapter 8.

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1 Introduction

This document gives details of the AT Command Set supported by Quectel NB-IoT BC35-G and BC28 modules.

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 BC35-G/BC28 module is rebooted or restarted for any reason that is not a normal power-on sequence, a message that indicates the reason for the reboot would be output before the <CR><LF>Neul<CR><LF>OK<CR><LF> string. Please refer to ***Chapter 7*** for more details.

In case that an external MCU intervenes in the process of firmware update via DFOTA, unsolicited information will be output to inform the external MCU the current update state.

Table 1: Unsolicited Information for UE Update State Indication

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 is successful, but update state has not been reported 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 has been completed, and the 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. For instance, executing AT+NRB to power off the module is 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
Write Command	**AT+<cmd>=p1[,p2[,p3[.....]]]**	Write 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.

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 "OK", "ERROR" or “+CME ERROR:<err>” to indicate that it is ready to accept a new command. Solicited informational responses are sent before the final "OK", "ERROR" or “+CME ERROR:<err>”.

Responses will be in the format of:

<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 3GPP Commands (27.007)

2.1. ATI Display Product Identification Information

The execution command returns product identification information. Please refer to ***Chapter 6*** 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: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<Object Id>	Identifier of device type
<revision>	Revision of software release

Example

```
ATI
Quectel
BC35-G
Revision:BC35GJBR01A01

OK
```

2.2. 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 6*** for possible <err> values.

ATE Set Command Echo Mode	
Execution Command **ATE<value>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<value>	0	Echo mode OFF
	1	Echo mode ON

Example

```
ATE0
OK
ATI
Quectel
BC35-G
Revision:BC35GJBR01A01

OK
ATE1
OK
ATI
ATI
Quectel
BC35-G
Revision:BC35GJBR01A01

OK
```

2.3. 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 6*** for possible <err> values.

AT+CGMI Request Manufacturer Identification	
Execution Command **AT+CGMI**	Response **<manufacturer>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGMI=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<manufacturer>	Manufacturer information. 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
```

2.4. AT+CGMM Request Manufacturer Model

The execution command returns manufacturer model information. Please refer to ***Chapter 6*** for possible <err> values.

AT+CGMM Request Manufacturer Model	
Execution Command **AT+CGMM**	Response **<model>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGMM=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<model>	Manufacturer model information. 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
BC35GJB-02-STD

OK
```

2.5. 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 6*** for possible <err> values.

AT+CGMR Request Manufacturer Revision	
Execution Command **AT+CGMR**	Response **<Revision>**

	OK If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGMR=?**	Response **OK**
Maximum Response Time	300ms

Parameter

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

Example

```
AT+CGMR
SSB,V150R100C10B200SP1

SECURITY_A,V150R100C20B300

PROTOCOL_A,V150R100C20B300

APPLICATION_A,V150R100C20B300

SECURITY_B,V150R100C20B300

RADIO,Hi2115_RF1

OK
AT+CGMR=?
OK
```

2.6. AT+CGSN Request Product Serial Number

The execution command returns the IMEI (International Mobile station Equipment Identity) number and related information. For UE which does not support <snt>, only "OK" is returned. Please refer to ***Chapter 6*** for possible <err> values.

AT+CGSN Request Product Serial Number	
Execution/Write Command **AT+CGSN[=<snt>]**	Response When <snt>=0 (or omitted) and the command is executed successfully: **<sn>** When <snt>=1 and the command is executed successfully: **+CGSN:<imei>** When <snt>=2 and the command is executed successfully: **+CGSN:<imeisv>** When <snt>=3 and the command is executed successfully: **+CGSN:<svn>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGSN=?**	Response When UE supports <snt> and the command is executed successfully: **+CGSN:**(list of supported **<snt>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<snt>	Integer type. 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 indecimal format indicating the IMEI number
<imeisv>	String type indecimal format indicating the IMEISV number
<svn>	String type indecimal format indicating the current SVN which is a part of IMEISV

Example

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

OK
```

2.7. AT+CEREG EPS Network Registration Status

The write command controls the presentation of an unsolicited result code (URC) "+CEREG:<stat>" when <n>=1 and there is a change in the UE'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 6*** for possible <err> values.

If the UE requests PSM for reducing its power consumption, the write 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 UE. Location information elements <tac>, <ci> and <AcT>, if available, are returned only when <n>=2 and UE 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	
Write Command **AT+CEREG=<n>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CEREG?**	Response When <n>=0, 1, 2 or 3 and the command is executed successfully: **+CEREG:<n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_ cause>]]]** When <n>=4 or 5 and the command is executed successfully: **+CEREG:<n>,<stat>[,[<tac>],[<ci>],[<AcT>],[<rac>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CEREG=?**	Response **+CEREG:**(list of supported **<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type 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. The EPS registration status.

0 Not registered, UE is not currently searching an operator to register to
1 Registered, home network
2 Not registered, but UE 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

<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. The access technology of the serving cell.

7 E-UTRAN
9 E-UTRAN (NB-S1 mode)

<cause_type> Integer type. 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. Indicates the active time value (T3324) allocated to the UE in E-UTRAN. The active time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes).

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.

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

<Periodic-TAU>	String type. One byte in an 8-bit format. Indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. “01000111” equals 70 hours). Bits 5 to 1 represent the binary coded timer value. Bits 6 to 8 defines the timer value unit for the GPRS timer as follows: Bits 8 7 6 0 0 0 value is incremented in multiples of 10 minutes 0 0 1 value is incremented in multiples of 1 hour 0 1 0 value is incremented in multiples of 10 hours 0 1 1 value is incremented in multiples of 2 seconds 1 0 0 value is incremented in multiples of 30 seconds 1 0 1 value is incremented in multiples of 1 minute 1 1 0 value is incremented in multiples of 320 hours 1 1 1 value indicates that the timer is deactivated

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
```

2.8. AT+CSCON Signalling Connection Status

The command gives details of the UE’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 write command controls the presentation of an unsolicited result code. If setting fails, an UE error, “+CME ERROR:<err>” is returned. Please refer to ***Chapter 6*** for possible <err> values.

When the UE is in E-UTRAN, the mode of the UE refers to idle when no PS signalling connection and to

connected mode when a PS signalling connection between UE and network is set up.

The <state> value indicates the state of the UE when the UE is in E-UTRAN.

The read command returns the status of result code presentation and an integer <mode> which shows whether the UE is currently in idle mode or connected mode.

The test command returns supported values as a compound value.

AT+CSCON Signalling Connection Status	
Write Command **AT+CSCON=<n>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CSCON?**	Response **+CSCON:<n>,<mode>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CSCON=?**	Response **+CSCON:**(list of supported **<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type. Enable/disable unsolicited result code. 0 Disable unsolicited result code 1 Enable unsolicited result code: “+CSCON:<mode>”
<mode>	Integer type. The signalling connection status.

0	Idle
1	Connected
2-255	<reserved for future use>

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
```

2.9. AT+CLAC List Available Commands

The command lists the available AT commands. The execution command causes the UE to return one or more lines of AT commands. Please refer to ***Chapter 6*** 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>** **[<AT Command>]** **[...]** **OK** If there is any error, response: **ERROR** Or

	+CME ERROR: <err>
Test Command **AT+CLAC=?**	Response **OK**
Maximum Response Time	300ms

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+NSOCR

AT+NSOST

...

OK
```

2.10. AT+CSQ Get Signal Strength Indicator

The execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the UE. Please refer to ***Chapter 6*** 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: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CSQ=?**	Response **+CSQ:**(list of supported **<rssi>**s),(list of supported **<ber>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<rssi>	Integer type. Received signal strength. Unit: dBm.	
	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 supported, and thus will always be 99.

Example

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

OK
```

2.11. 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 6*** 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/Write Command **AT+CGPADDR[=<cid>[,<cid>[,...]]]**	Response **+CGPADDR:<cid>[,<PDP_addr_1>[,<PDP_addr_2>]]** **[+CGPADDR:<cid>,[<PDP_addr_1>[,<PDP_addr_2>]]]** **[...]]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGPADDR=?**	Response **+CGPADDR:**(list of defined **<cid>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cid> Integer type. Specifies a particular PDP context definition (see the AT+CGDCONT command). <cid> values between 0 and 10 are supported.

<PDP_addr_1> and **<PDP_addr_2>** String type. Identify the UE 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 command when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2> are omitted if none is available. <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. 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. 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
```

2.12. AT+COPS PLMN Selection

The write command forces an attempt to select and register the 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 UE 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. 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 the read command (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, UE 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 6*** 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 test 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 the order of: home network, networks referenced in USIM or active application in the UICC (USIM) in the following order: HPLMN selector, user controlled PLMN selector, operator controlled PLMN selector and PLMN selector (in the USIM), and other networks.

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 UE may still re-select a cell in another access technology.

AT+COPS PLMN Selection	
Write Command **AT+COPS=<mode>[,<format>[,<oper>[,<AcT>]]]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+COPS?**	Response **+COPS:<mode>[,<format>,<oper>][,<AcT>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+COPS=?**	Response **+COPS:[**list of supported (**<stat>,**numeric **<oper>[,<AcT>]**)s**][,,**(list of supported **<mode>**s)**,**(list of supported **<format>**s)**]** **OK**

	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	630s

Parameter

<mode>	Integer type 0 Automatic (<oper> field is ignored) 1 Manual (<oper> field shall be present, and <AcT> is optional) 2 Deregister from network. When <mode>=1, the PLMN setting will not be retained after the UE is rebooted. <mode>=1 is only for development use and <mode>=0 should be used in production when AUTOCONNECT is enabled.
<format>	Integer type 2 Numeric <oper>
<oper>	String type. <format> indicates if the format is numeric; numeric format is the NB-IoT network 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. <oper> field could not be present when <mode>=0.
<stat>	Integer type 0 Unknown 1 Available 2 Current 3 Forbidden
<AcT>	Integer type. Access technology selected. No <Act> returned for AT+COPS?. 7 E-UTRAN 9 E-UTRAN (NB-S1 mode)

NOTES

1. The test command currently returns the configured values rather than performing a PLMN search.
2. The test command can only be executed in idle state, otherwise an error will be returned.

Example

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

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

OK
```

2.13. AT+CGATT PS Attach or Detach

The execution command is used to attach the UE to, or detach the UE from, the packet domain service. After the command has completed, the UE remains in V.250 command state. If the UE is already in the requested state, the command is ignored and the "OK" response is returned. If AT+CGATT is in progress, further execution of this command before the finishing of attach or detach procedure will return an error. If the requested state cannot be achieved, an "ERROR" or "+CME ERROR" response is returned. Please refer to ***Chapter 6*** 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	
Write Command **AT+CGATT=<state>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CGATT?**	Response **+CGATT:<state>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGATT=?**	Response **+CGATT:**(list of supported **<state>**s)

	OK If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	1s, determined by network.

Parameter

<state>	Integer type. Indicates the state of PDP context activation. 0 Detached 1 Attached When <state>=1, AT+COPS=0 is automatically selected.

NOTE

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup.

Example

```
AT+CGATT?
+CGATT:0

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

OK
```

2.14. 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 UE remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the 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 UE is not PS attached when the activation form of the command is executed, the UE first performs a PS attach and then attempts to activate the specified

contexts. If the attach fails then the UE responds with error or, if extended error responses are enabled, with the appropriate failure-to-attach error message. Please refer to ***Chapter 6*** for possible <err> values.

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

For EPS, the activation request for an EPS bearer resource will be answered by the network by either an EPS dedicated bearer activation or EPS bearer modification request. The request must be accepted by the UE before the PDP context can be set 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	
Write Command **AT+CGACT=<state>,<cid>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CGACT?**	Response **+CGACT:<cid>,<state>** **[+ CGACT:<cid>,<state>]** **[...]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGACT=?**	Response **+CGACT:**(list of supported **<state>**s) **OK** If there is any error, response:

	ERROR Or **+CME ERROR: <err>**
Maximum Response Time	1s, determined by network.

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). Only one <cid> can be activated or deactivated at a time.

NOTE

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup.

Example

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

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

OK
```

2.15. AT+CIMI Request International Mobile Subscriber Identity

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

The execution command causes the UE to return <IMSI>, which is intended to permit the TE to identify the individual USIM card or active application in the UICC (USIM) which is attached to UE.

Please refer to ***Chapter 6*** for possible <err> values.

AT+CIMI Request International Mobile Subscriber Identity	
Execution Command **AT+CIMI**	Response **<IMSI>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CIMI=?**	Response **OK**
Maximum Response Time	300ms

Parameter

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

NOTE

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

Example

```
AT+CIMI
460001357924680

OK
```

2.16. AT+CGDCONT Define a PDP Context

The write 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 6*** for possible <err> values.

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

A special form of the write 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, 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 UE supports several PDP types, the parameter value ranges for each <PDP_type> are returned on a separate line.

AT+CGDCONT Define a PDP Context	
Write Command **AT+CGDCONT=<cid>[,<PDP_type>[,<APN>[,,,,,,,,<NSLPI>]]]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CGDCONT?**	Response **+CGDCONT:<cid>,<PDP_type>,<APN>[,,,,,,,,<NSLPI>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGDCONT=?**	Response **+CGDCONT:**(range of supported **<cid>**s),**<PDP_type>,,,,,,,,,**(list of supported **<NSLPI>**s) **[...]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**

Maximum Response Time	300ms

Parameter

<cid>	Integer type. Specifies a particular PDP context definition. The parameter is local to the TE-UE 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 command. <cid> values of 0-10 are supported. <cid>=0 is read only and is only defined when AUTOCONNECT is enabled. <cid> value of 7 cannot be set when BIP is enabled.
<PDP_type>	String type. Specifies the type of packet data protocol. IP Internet Protocol (IETF STD 5 [103]) IPv6 Internet Protocol, version 6 IPv4v6 Virtual <PDP_type> introduced to handle dual IP stack UE capability 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. Maximum number of <APN> string is 63 characters.
<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 UE. 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 UE utilizes the provided NSLPI information as specified in *3GPP TS 24.301 [83]* and *3GPP TS 24.008*.

Example

```
AT+CGDCONT=?
+CGDCONT:(0-10),("IP","NONIP","IPV6","IPV4V6"),,,(0),(0),,,,,(0,1)
OK
AT+CGDCONT=1,"IP","HUAWEI.COM"
OK
AT+CGDCONT?
+CGDCONT:0,"IPV4V6",,,0,0,,,,,0
+CGDCONT:1,"IP","HUAWEI.COM",,0,0,,,,,0

OK
```

2.17. AT+CFUN Set UE Functionality

The write command selects the level of functionality in the UE. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn.

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

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

Please refer to ***Chapter 6*** for possible <err> values.

AT+CFUN Set UE Functionality	
Write Command **AT+CFUN=<fun>[,<rst>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CFUN?**	Response **+CFUN:<fun>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CFUN=?**	Response **+CFUN:**(list of supported **<fun>**s),(list of supported **<rst>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	6s

Parameter

<fun>	Integer type. UE functionality level	
	0	Minimum functionality
	1	Full functionality. Enable UE to transmit and receive RF circuits for all supported radio access technologies. For UE 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. After this action and AT+CFUN has returned "OK", the UE can be shut down with <fun>=0, or by other means.
<rst>	Integer type. UE resetting	
	0	Do not reset the UE before setting it to <fun> power level. This shall always be defaulted when <rst> is not given.
	1	Reset the UE before setting it to <fun> power level (not supported and will be ignored)

NOTE

Deep sleep mode will be entered 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
```

2.18. AT+CMEE Report UE Error

The write 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 UE. When enabled, UE 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 UE functionality.

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

The test command returns values supported as a compound value.

Please refer to ***Chapter 6*** for possible <err> values.

AT+CMEE Report UE Error	
Write Command **AT+CMEE=<n>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CMEE?**	Response **+CMEE:<n>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CMEE=?**	Response **+CMEE:**(list of supported **<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type. Error mode.	
	0	Disable “+CME ERROR:<err>” result code and use “ERROR” instead
	1	Enable “+CME ERROR:<err>” result code and use numeric <err> values (Please refer to ***Chapter 6*** for possible <err> values)

2.19. AT+CCLK Return Current Date and 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 6*** for possible <err> values.

AT+CCLK Return Current Date and Time	
Read Command **AT+CCLK?**	Response **+CCLK:<time>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CCLK=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<time>	String type. The 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). For instance, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08"

NOTES

1. If UE does not support time zone information, then the three last characters of <time> are not returned by AT+CCLK? command.
2. No value will be returned before the core network sends "EMM INFORMATION".

Example

```
AT+CCLK?
+CCLK:18/06/21,11:39:20+32

OK
```

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

2.20. AT+CPSMS Power Saving Mode Setting

The write 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+CGREG 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 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 6*** for possible <err> values.

AT+CPSMS Power Saving Mode Setting	
Write Command **AT+CPSMS=<mode>[,,,<Requested_Periodic-TAU>[,<Requested_Active-Time>]]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CPSMS?**	Response **+CPSMS:<mode>[,,,<Requested_Periodic-TAU>],[<Requested_Active-Time>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CPSMS=?**	Response **+CPSMS:**(list of supported **<mode>**s),,,(range of supported **<Requested_Periodic-TAU>**s),(range of supported

	<Requested_Active-Time>s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<mode> Integer type. 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 default values.

<Requested_Periodic-TAU> String type. One byte in an 8 bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. The requested extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours).

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(note)

1 1 1 value indicates that the timer is deactivated.

The default value is 10 hours.

<Requested_Active-Time> String type. One byte in an 8 bit format. Requested Active Time value (T3324) to be allocated to the UE. The requested Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes).

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. The default value is 10 seconds.

NOTES

1. This timer value unit is only applicable to the T3412 extended value IE. If it is received in an integrity protected message, value shall be interpreted as multiples of 320 hours. Otherwise value shall be interpreted as multiples of 1 hour.
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
```

2.21. AT+CEDRXS eDRX Setting

The write 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 write 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.

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 6*** for possible <err> values.

AT+CEDRXS eDRX Setting	
Write Command **AT+CEDRXS=<mode>,<AcT-type>[,<Requested_eDRX_value>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CEDRXS?**	Response **+CEDRXS:<AcT-type>,<Requested_eDRX_value>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CEDRXS=?**	Response **+CEDRXS:**(list of supported **<mode>**s)**,**(list of supported **<AcT-type>**s)**,**(range of supported **<Requested_eDRX_value>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<mode>	Integer type. 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.
<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.
	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
1	1	1	1	40.96 seconds

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
```

2.22. AT+CEER Extended Error Report

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

- The failure in the last call release;
- The failure in the last unsuccessful PDP context activation;
- The failure in the PDP context deactivation.

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

AT+CEER Extended Error Report	
Execution Command **AT+CEER**	Response **+CEER:<report>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CEER=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<report>	Extended error report. The total number of characters, including line terminators, in the information text shall not exceed 2041 characters. The 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
```

2.23. 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 UE is currently registered to.

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

Please refer to ***Chapter 6*** 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** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CEDRXRDP=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<AcT-type> Integer type. 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

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

Example

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

OK
AT+CEDRXRDP=?
OK
```

2.24. AT+CTZR Time Zone Reporting

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

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

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

Please refer to ***Chapter 6*** for possible <err> values.

AT+CTZR Time Zone Reporting	
Write Command **AT+CTZR=<reporting>**	Response **+CTZR:<reporting>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CTZR?**	Response **+CTZR:<reporting>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CTZR=?**	Response **+CZTR:**(list of supported **<reporting>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<reporting>	Integer type. 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 digit 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 UE 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.

Example

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

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

OK
```

2.25. AT+CIPCA Initial PDP Context Activation

The write command controls whether the UE is attached to E-UTRAN with or without a PDN connection.

The value of <n>=3 applies to E-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 6*** for possible <err> values.

AT+CIPCA Initial PDP Context Activation	
Write Command **AT+CIPCA=<n>[,<AttachWithoutPDN>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CIPCA?**	Response **+CIPCA:<n>[,<AttachWithoutPDN>]** **OK** If there is any error, response: **ERROR** Or **+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: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type. Activation of PDP context upon attachment. 3 No change in current setting
<AttachWithoutPDN>	Integer type. EPS attach with or without PDN connection. If <AttachWithoutPDN> is omitted, will use the default value 0. 0 EPS attach with PDN connection 1 EPS attach without PDN connection

NOTE

For this command, the term roaming corresponds to being registered to a VPLMN which is not equivalent to HPLMN or EHPLMN.

Example

```
AT+CIPCA=3
OK

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

OK
```

2.26. AT+CGAPNRC APN Rate Control

This 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 6*** for possible <err> values.

AT+CGAPNRC APN Rate Control	
Execution/Write Command **AT+CGAPNRC[=<cid>]**	Response **[+CGAPNRC:<cid>[,<Additional_exception_reports>[,<Uplink_time_unit>[,<Maximum_uplink_rate>]]]]** **[+CGAPNRC:<cid>[,<Additional_exception_reports>[,<U**

	plink_time_unit>[,<Maximum_uplink_rate>]]]] **[...]]]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGAPNRC=?**	Response **+CGAPNRC:**(list of **<cid>**s associated with active contexts) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see the AT+CGDCONT command).
<Additional_exception_reports>	Integer type. Indicates whether or not additional exception reports are allowed to be sent when the maximum uplink rate is reached. 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. 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. The time unit is indicated in the uplink time unit. If the uplink time unit is set to "unrestricted", the maximum uplink data volume the UE can

send is not restricted.

Example

```
AT+CGAPNRC
+CGAPNRC:0,0,0

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

OK
```

2.27. AT+CSODCP* Sending Originating Data via the Control Plane

Send a non-IP message.

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

This command optionally indicates that the application on the UE 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 UE, supported <RAI>s and supported <type_of_user_data>s as a compound value.

Please refer to ***Chapter 6*** for possible <err> values.

AT+CSODCP* Sending Originating Data via the Control Plane	
Write Command **AT+CSODCP=<cid>,<cpdata_length>,<cpdata>[,<RAI>[,<type_of_user_data>[,<sequence>]]]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CSODCP=?**	Response **+CSODCP:**(range 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),(range of supported **<sequence>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

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-UE interface and identifies the PDP or EPS bearer contexts which have been setup via AT commands (see the AT+CGDCONT command).
<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. 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 (refer to *3GPP TS 27.007 [9]*). The coding format of the user data container and the maximum length of <cpdata> are implementation specific. Maximum data length will be 1358 bytes when non-IP is used, otherwise will be 0.
<RAI>	Integer type. Indicates the value of the release assistance indication. 0 No information available 1 The UE expects that exchange of data will be completed with the transmission of the "ESM DATA TRANSPORT" message. 2 The UE 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
<sequence>	Sequence of data. The range is 1-255. If it is omitted, data sent status will not be reported.

NOTES

1. "*" means under development.

2. Only one message will be buffered at any one time.

Example

```
AT+CSODCP=?
+CSODCP:(0-10),(0),(0,1,2),(0,1),(1-255)

OK
```

2.28. AT+CRTDCP* Reporting Terminating Data via the Control Plane

Receive a message from the CDP server.

The write command is used to enable and disable reporting of data from the network to the UE that is transmitted via the control plane in downlink direction. If reporting is enabled, the UE 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 6*** for possible <err> values.

AT+CRTDCP* Reporting Terminating Data via the Control Plane	
Write Command **AT+CRTDCP=<reporting>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CRTDCP?**	Response **+CRTDCP:<reporting>** **OK** If there is any error, response: **ERROR** Or

	+CME ERROR: <err>
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** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<reporting>	Integer type. Controls reporting of mobile terminated control plane data events 0 Disable reporting of UE control plane data 1 Enable reporting of UE 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-UE interface and identifies the PDP or EPS bearer contexts which have been setup via AT command (see AT+CGDCONT command).
<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. 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 (refer to *3GPP TS 27.007 [9]*). The coding format of the user data container and the maximum length of <cpdata> are implementation specific. Maximum received data length will be 1358 bytes when non-IP is set by AT+CGDCONT, otherwise will be 0.

NOTE

"*" means under development.

Example

```
AT+CRTDCP=1
OK
```

```
AT+CRTDCP?
+CRTDCP:1

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

OK

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

2.29. AT+CGCONTRDP Read PDP Context Dynamic Parameters

The execution command returns the relevant information <DNS_prim_addr> and <DNS_sec_addr> for an active non secondary PDP context with the context identifier <cid>.

- If the UE indicates more than two IP addresses of P-CSCF servers or more than two IP addresses of DNS servers, multiple lines of information per <cid> will be returned.
- If the UE has dual stack capabilities, at least one pair of lines with information is returned per <cid>: one line with IPv4 parameters followed by one line with IPv6 parameters. If this UE with dual stack capabilities indicates more than two IP addresses of P-CSCF servers or more than two IP addresses of DNS servers, multiple of such pairs of lines will be returned.
- If the parameter <cid> is omitted, the relevant information for all active non secondary PDP contexts is returned.

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

Please refer to ***Chapter 6*** for possible <err> values.

AT+CGCONTRDP Read PDP Context Dynamic Parameters	
Execution/Write Command **AT+CGCONTRDP[=<cid>]**	Response **+CGCONTRDP:<cid>[,,,,,<DNS_prim_addr>[,<DNS_sec_addr>]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGCONTRDP=?**	Response **+CGCONTRDP:**(list of **<cid>**s associated with active

	contexts) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cid>	Integer type. Specifies a particular non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see the AT+CGDCONT command).
<DNS_prim_addr>	String type. Shows the IP address of the primary DNS server. When AT+CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of AT+CGCONTRDP.
<DNS_sec_addr>	String type. Shows the IP address of the secondary DNS server. When AT+CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of AT+CGCONTRDP.

NOTES

1. <DNS_prim_addr> and <DNS_sec_addr> could display only when <PDP_type> (see the AT+CGDCONT command) is “IP” or “IPv6”.
2. PDP context dynamic parameters to be read can be configured by AT+NCPCDPR.

Example

```
AT+CGCONTRDP
+CGCONTRDP:0

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

OK
```

2.30. AT+CGAUTH Define PDP Context Authentication Parameters

The write command allows the TE to specify authentication parameters for a PDP context identified by the (local) context identification parameter <cid> used during the PDP context activation and the PDP context modification procedures. Since the <cid> is the same parameter that is used in the AT+CGDCONT command, AT+CGAUTH is effectively as an extension to the command.

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

The test command returns values supported as compound values.

Please refer to ***Chapter 6*** for possible <err> values.

AT+CGAUTH Define PDP Context Authentication Parameters	
Write Command **AT+CGAUTH=<cid>[,<auth_prot>[,<userid>[,<password>]]]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CGAUTH?**	Response **[+CGAUTH:<cid>,<auth_prot>,<userid>,<password>]** **[+CGAUTH:<cid>,<auth_prot>,<userid>,<password>]** **[...]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CGAUTH=?**	Response **+CGAUTH:**(range of supported **<cid>**s)**,**(list of supported **<auth_prot>**s)**,**(range of supported **<userid>**s)**,**(range of supported **<password>**s) **OK** If there is any error, response: **ERROR**

	Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cid>	Integer type. Specifies a particular PDP context definition (see the AT+CGDCONT command).
<auth_prot>	Integer type. Authentication protocol used for this PDP context. 0 None. Used to indicate that no authentication protocol is used for this PDP context. Username and password are removed if previously specified. 1 PAP 2 CHAP
<userid>	String type. User name for access to the IP network. <userid> is needed when <auth_prot> is 1 or 2. The maximum <userid> string length is 60 bytes.
<password>	String type. Password for access to the IP network. The string length is 60 bytes.

Example

```
AT+CGAUTH=1,2,"1234","1234"
OK
AT+CGAUTH?
+CGAUTH:0,1,"1234","1234"

OK
AT+CGAUTH=?
+CGAUTH:(0-10),(0,1,2),(0-60),(0-60)

OK
```

2.31. AT+CNMPSD No More PS Data

The execution command indicates that no application on the UE is expected to exchange data. This command may be used in both normal and modem compatibility modes.

Please refer to ***Chapter 6*** for possible <err> values.

AT+CNMPSD No More PS Data	
Execution Command **AT+CNMPSD**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CNMPSD=?**	Response **OK**
Maximum Response Time	300ms

Example

```
AT+CNMPSD
OK
AT+CNMPSD=?
OK
```

3 3GPP Commands (27.005)

3.1. AT+CSMS Select Message Service

The write command selects messaging service. It returns the types of messages supported by the UE: <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, 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 UE.

Please refer to ***Chapter 6*** for possible <err> values.

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

	OK If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<service>	Integer type. Messaging service 0 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] (the syntax of SMS AT commands is compatible with *3GPP TS 27.005 Phase 2 version 4.7.0*; Phase 2+ features which do not require new command syntax may be supported, e.g. correct routing of messages with new Phase 2+ data coding schemes). 1 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] (the syntax of SMS AT commands is compatible with *3GPP TS 27.005 Phase 2+ version*; the requirement of <service> setting 1 is mentioned under corresponding command descriptions) 2...128 Reserved
<mt>	Mobile terminated messages 0 Type not supported 1 Type supported
<mo>	Mobile originated messages 0 Type not supported 1 Type supported
<bm>	Broadcast type messages 0 Type not supported 1 Type supported

NOTES

1. UE will report the following URC if received SMS messages:
   +CMT:[<alpha>],<length><CR><LF><pdu> (PDU mode enabled)
2. <alpha> in the above URC will always be 0. For more details about the URC, please refer to AT+CNMI in *3GPP TS 27005*.

Example

```
AT+CSMS=1
+CSMS:2,3,4
```

```
OK
AT+CSMS?
+CSMS:1,2,3,4

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

OK
```

3.2. AT+CNMA New Message Acknowledgement to UE

The execution command confirms reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the UE. 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. UE shall not send another "+CMT" or "+CDS" result code to TE before previous one is acknowledged.

If UE does not get acknowledgement within required time (network timeout), UE should respond as specified in *3GPP TS 24.011 [6]* to the network.

If the command is executed, but no acknowledgement is expected, or some other UE related error occurs, final result code "+CME ERROR:<err>" is returned. In case that a directly routed message must be buffered in UE 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[=0] acknowledgement for each result code. In this way, UE can determine if message should be placed in non-volatile memory and routing to TE disabled (+CNMA[=0] not received).

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 6*** for possible <err> values.

AT+CNMA New Message Acknowledgement to UE	
Execution/Write Command	Response
AT+CNMA=[<n>[,<length>[<CR>PDU	**OK**

is given<ctrl-Z/ESC>]]]	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CNMA=?**	Response **+CNMA:**(list of supported**<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type 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). <length> range is 0-232.

NOTES

1. UE will report the following URC if received SMS messages:
   "+CMT:[<alpha>],<length><CR><LF><pdu>" (PDU mode enabled)
2. <alpha> in the above URC will always be 0. For more details about the URC, please refer to AT+CNMI in *3GPP TS 27005*.

Example

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

OK
```

3.3. AT+CSCA Service Centre Address

The write 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 6*** for possible <err> values.

AT+CSCA Service Centre Address	
Write Command **AT+CSCA=<sca>[,<tosca>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+CSCA?**	Response **+CSCA:<sca>[,<tosca>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CSCA=?**	Response **OK**
Maximum Response Time	300ms

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 is 145, otherwise default is 129).

Example

```
AT+CSCA=358501234567,145
OK
```

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

OK
AT+CSCA=?
OK
```

3.4. AT+CMGS Send SMS Message

The execution command sends message 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 UE 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 UE 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 UE.
- The DCD signal shall be in ON state while PDU is given.
- The echoing of given characters back from the UE is controlled by V.25ter echo command E.
- The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; UE 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 6*** for possible <err> values.

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

Test Command **AT+CMGS=?**	Response **OK**
Maximum Response Time	300ms

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. The 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. For address field in PDU (*3GPP TS 24.011*), the country code should be added at the beginning of it, i.e., 86 for China.

3.5. AT+CMGC Send SMS Command

The execution command sends a command message from 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 character long hexadecimal numbers which UE 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 UE error, final result code “+CME ERROR:<err>” is returned. This command should be abortable.

Please refer to ***Chapter 6*** for possible <err> values.

AT+CMGC Send SMS Command	
Write Command **AT+CMGC=<length><CR>**PDU is given**<ctrl-Z/ESC>**	Response **+CMGC:<mr>[,<ackpdu>]** **OK**

	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+CMGC=?**	Response **OK**
Maximum Response Time	300ms

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. The 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. For address field in PDU (*3GPP TS 24.011*), the country code should be added at the beginning of it, i.e., 86 for China.

4 General Commands

4.1. AT+NRB Reboot the UE

The command reboots the UE. There is a short delay after issuing this command before the UE reboots. No further AT commands will be processed. Please refer to ***Chapter 6*** 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 UE	
Execution Command **AT+NRB**	Response **REBOOTING**
Maximum Response Time	300ms

Example

```
AT+NRB
REBOOTING
```

4.2. AT+NUESTATS Query UE Statistics

The command fetches the most recent operational statistics. Please refer to ***Chapter 6*** 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	
Execution Command **AT+NUESTATS**	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>** **OPERATOR MODE:<operator mode>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+NUESTATS=RADIO**	Response **NUESTATS:RADIO,Signal power:<signal power in centibels>** **NUESTATS:RADIO,Total power:<total power in centibels>** **NUESTATS:RADIO,TX power:<current Tx power level in centibels>** **NUESTATS:RADIO,TX time:<total Tx time since last reboot in millisecond>** **NUESTATS:RADIO,RX time:<total Rx time since last reboot in millisecond>** **NUESTATS:RADIO,Cell ID:<last cell ID>** **NUESTATS:RADIO,ECL:<last ECL value>** **NUESTATS:RADIO,SNR:< last snr value>** **NUESTATS:RADIO,EARFCN:<last earfcn value>** **NUESTATS:RADIO,PCI:<last pci value>** **NUESTATS:RADIO,RSRQ:<rsrq in centibels>** **NUESTATS:RADIO,OPERATOR MODE:<operator mode>**

	OK If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+NUESTATS=CELL**	Response **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: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+NUESTATS=THP**	Response **NUESTATS:THP,<throughput_type>,<throughput>** **[...NUESTATS:THP,<throughput_type>,<throughput>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Write Command **AT+NUESTATS=APPSMEM**	Response **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** If there is any error, response:

	ERROR Or **+CME ERROR: <err>**
Write Command **AT+NUESTATS=<type>**	Response **NUESTATS:<type>,<name/value>,<value>[,<value[,<value>[...]]]** **[...NUESTATS:<type>,<name/value>,<value>[,<value[,<value>[...]]]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NUESTATS=?**	Response **NUESTATS:**(list of supported **<type>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

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
<operator mode>	Operator mode for SIB1: 0 Unknown mode 1 Inband different PCI mode 2 Inband same PCI mode 3 Guardband mode 4 Standalone mode

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
OPERATOR MODE:4

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
```

4.3. AT+NEARFCN Specify Search Frequencies

The write command provides a mechanism to lock to a specific E-UTRAN 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 6*** for possible <err> values.

AT+NEARFCN Specify Search Frequencies	
Write Command **AT+NEARFCN=<search_mode>,<earfcn>[,<pci>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NEARFCN=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<search_mode>	Integer type. Specifies the type of search and defines the supplied parameters 0 Lock to a specific EARFCN
<earfcn>	Integer type. A number in the range of 1-65535 representing the EARFCN to

	search.
<pci>	Integer type. E-UTRAN physical cell ID in hexadecimal format. Valid range 0-1F7.

Example

```
AT+NEARFCN=0,2506,AB
OK
```

4.4. 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 6*** 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	
Write Command **AT+NSOCR=<type>,<protocol>,<listenport>[,<receive control>[,<af_type>[,<ip address>]]]**	Response **<socket>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Socket type. DGRAM UDP STREAM TCP
<protocol>	Integer type. Standard internet protocol definition. For example, UDP is 17, and TCP is 6.
<listen port>	Integer type. A number in the range of 0-65535 except 5683. This is the local port that will be included in sent messages and on which messages will be received. If it is 0 or omitted, the module will assign a random <listen port> for this socket.

<socket>	This is a reference to the created socket. It is an integer greater than or equal to 0. A maximum of 7 sockets are supported, but other services may reduce this number.
<receive control>	Set to 1 if incoming messages should be received, 0 if incoming messages should be ignored. The default value is 1 (messages will be received).
<af_type>	String type, “AF_INET” for IPv4 and “AF_INET6” for IPv6. The default value is "AF_INET”.
<ip address>	IP address. The IP address of the network assigned to UE.

NOTES

1. When BIP (Bearer Independent Protocol) is enabled, <listen port> cannot be set into 20000 for TCP.
2. A maximum of 7 sockets are supported, but other services such as MQTT, CoAP, etc. may reduce this number.

Example

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

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

OK
```

4.5. 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 6*** for possible <err> values.

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

	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by AT+NSOCR.
<remote_addr>	IP address which can be specified in decimal, octal or hexadecimal notation.
<remote_port>	Integer type. A number in the range of 0-65535. This is the remote port on which messages will be received
<length>	Integer type. Decimal length of data to be sent.
<data>	Data received in hex string format. Maximum length of received data is 1358 bytes.
<sequence>	Sequence of data. Range: 1-255. If it is omitted, data sent status will not be reported. If not omitted, when datagram is sent by RF or is discarded, then the result will be reported: +NSOSTR:<socket>,<sequence>,<status>
<status>	The status of datagram. 0 Error 1 Sent

Example

```
AT+NSOST=1,192.158.5.1,1024,2,AB30,1
1,2

OK
```

4.6. 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 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, the AT+NSOSTF return value will indicate how much of the data was successfully sent. Please refer to ***Chapter 6*** for possible <err> values.

AT+NSOSTF SendTo Command with Flags (UDP Only)	
Write Command **AT+NSOSTF=<socket>,<remote_addr>,<remote_port>,<flag>,<length>,<data>[,<sequence>]**	Response **<socket>,<length>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by AT+NSOCR.
<remote_addr>	A dot notation IPv4 address. IP addresses can be specified in decimal, octal or hexadecimal notation.
<remote_port>	Integer type. A number in the range of 0-65535. This is the remote port on which messages will be received.
<flag>	Integer type. 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>	Integer type. Decimal length of data to be sent. Maximum data size is 1358 bytes.
<data>	Data to be transmitted in hex string format.
<sequence>	Sequence of data. Range 1-255. If it is omitted, data sent status will not be reported. If not omitted, when datagram is sent by RF or is discard, then the result will be reported: +NSOSTR:<socket>,<sequence>,<status>
<status>	The status of datagram. 0 Error 1 Sent

Example

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

OK

4.7. AT+NQSOS Query the List of Pending Socket Message

This command queries the list of the pending upstream message by UE.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NQSOS Query the List of Pending Socket Message	
Write Command **AT+NQSOS=<socket>[,<socket>[,<socket>[…]]]**	Response **[+NQSOS:<socket>,<sequence>]** **[+NQSOS:<socket>,<sequence>]** **[…]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NQSOS?**	Response **[+NQSOS:<socket>,<sequence>]** **[+NQSOS:<socket>,<sequence>]** **[…]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<socket>	Socket number.
<sequence>	The sequence of pending upstream message. Range: 1-255.

Example

```
AT+NQSOS=1,2
+NQSOS:1,2
+NQSOS:2,3

OK
AT+NQSOS?
+NQSOS:1,2
+NQSOS:2,3

OK
```

4.8. AT+NSORF Receive Command

The command can read up to <req_length> characters of 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 6*** 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	
Write Command **AT+NSORF=<socket>,<req_length>**	Response **<socket>,<ip_addr>,<port>,<length>,<data>,<remaining_length>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**

Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by AT+NSOCR.
<req_length>	Maximum amount of data to be returned as a decimal byte length. The maximum request data length is 1358 bytes.
<**ip_addr**>	Address of system sending the message A dot notation IPv4 address. IP addresses can be specified in decimal, octal or hexadecimal notation. Only IPv4 is supported.
<**port**>	A number in the range of 0-65535. This is the remote port that messages were 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. Remaining length is always 0. The remaining data is readable.
<data>	Data received in hex string format. Maximum length of received data is 1358 bytes.

Example

```
AT+NSORF=1,10
1,192.168.5.1,1024,2,ABAB,0

OK
```

4.9. AT+NSOCO Connect Command (TCP Only)

The command connect a TCP server to the specified host:port.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NSOCO Connect Command (TCP Only)	
Write Command **AT+NSOCO=<socket>,<remote_addr>,<remote_port>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by AT+NSOCR.
<remote_addr>	Address of system sending the message. IP addresses can be specified in decimal, octal or hexadecimal notation.
<remote port>	A number in the range of 0-65535. This is the remote port to be connected to.

Example

```
AT+NSOCO=1,192.158.5.1,1024
OK
```

4.10. AT+NSOSD Send Command (TCP Only)

The command sends a TCP datagram to the TCP server. 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, then AT+NSOSD return value will indicate how much the data was successfully sent.

If <sequence>is not omitted, when datagram is acked by server or discarded by UE, the result will be reported.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NSOSD Send Command (TCP Only)	
Write Command **AT+NSOSD=<socket>,<length>,<data>[,<flag>[,<sequence>]]**	Response **<socket>,<length>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by AT+NSOCR.
<length>	Integer type. Decimal length of data to be sent.
<data>	Data to be transmitted in hex string format. The maximum data size is 1358 bytes.

<flag>	Integer type. 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.
<sequence>	Sequence of data. Range 1-255. If it is omitted, data sent status will not be reported. If not omitted, when datagram is acked by server or discarded by UE, the result will be reported: +NSOSTR:<socket>,<sequence>,<status>
<status>	The status of datagram. 0 Error 1 Sent

NOTE

<flag> could not work currently.

Example

```
AT+NSOSD=1,2,AB30
1,2

OK
AT+NSOSD=1,2,AB30,0x100
1,2

OK
AT+NSOSD=1,2,AB30,0x100,255
1,2

OK
```

4.11. 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	
Write Command **AT+NSOCL=<socket>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<socket>	Integer type. Socket number returned by AT+NSOCR.

Example

```
AT+NSOCL=1
OK
```

4.12. +NSONMI Indicator of Arrived Socket Message (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.

+NSONMI Indicator or Arrived Socket Message (Response Only)	
URC Format: **+NSONMI:<socket>,<length>**	

Parameter

<socket>	Integer type. Socket on which data is received. Decimal number returned by AT+NSOCR.
<length>	Integer type. 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.

4.13. +NSOCLI Socket Close Indicator (Response Only)

This is an unsolicited message to notify that a socket has been closed by LwIP internally. It returns the socket number.

+NSOCLI Socket Close Indicator (Response Only)	
URC Format: **+NSOCLI: <socket>**	

Parameter

<socket>	Integer type. The socket on which data is received. It is a decimal number returned by AT+NSOCR.

NOTE

The URC will be reported under TCP only.

4.14. 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 6*** 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	
Write Command **AT+NPING=<remote_address>[,<p_size>[,<timeout>]]**	Response **OK** **+NPING:<remote_address>,<ttl>,<rtt>** If there is any error, response: **ERROR** Or **+NPINGERR:<err>**
Maximum Response Time	300ms

Parameter

<remote_address>	Address of system sending the message A dot notation IPv4 address. IP addresses can be specified in decimal, octal or hexadecimal notation. Only IPv4 is supported.
<p_size>	Integer type. Size in bytes of echo packet payload. The range is 12-1500, and the default value is 12.
<timeout>	Integer type. Maximum time in ms to wait for an echo reply response. The range is 10-600000, and the default value is 10000.
<ttl>	Integer type. TTL received in the response packet.
<rtt>	Integer type. Elapsed time in msec from packet sent to response received.
<err>	Integer type. 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

4.15. AT+NBAND Set Supported Bands

The command sets the bands to be used. Please refer to ***Chapter 6*** for possible <err> values.

AT+NBAND Set Supported Bands	
Write Command **AT+NBAND=<n>[,<n>[,<n>[…]]]**	Response **OK** If there is any error, response: **ERROR** Or

	+CME ERROR: <err>
Read Command **AT+NBAND?**	Response **+NBAND:<n>[,<n>[,<n>[…]]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NBAND=?**	Response Returns the list of bands supported by the hardware. **+NBAND:**(list of supported **<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type. Band in a decimal number.

NOTE

AT+NBAND=<n> must be executed when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).

Example

```
AT+NBAND=?
+NBAND:(1,3,5,8,20,28)

OK
```

4.16. AT+NLOGLEVEL Set Debug Logging Level

The command sets the logging level. Logging level is not persistent. It can take one of the following values. This value is persistent across reboots. Please refer to ***Chapter 6*** for possible <err> values.

AT+NLOGLEVEL Set Debug Logging Level	
Write Command **AT+NLOGLEVEL=<core>,<level>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NLOGLEVEL?**	Response **+NLOGLEVEL:<core>,<level>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NLOGLEVEL=?**	Response **+NLOGLEVEL:**(list of supported **<core>**s)**,**(list of supported **<level>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<core>	String type. Core required. PROTOCOL APPLICATION SECURITY
<level>	String type. Logging level required VERBOSE

	NORMAL WARNING ERROR NONE

Example

```
AT+NLOGLEVEL?
+NLOGLEVEL:SECURITY,NORMAL

+NLOGLEVEL:PROTOCOL,NORMAL

+NLOGLEVEL:APPLICATION,NORMAL

OK
```

4.17. 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	
Write Command **AT+NCONFIG=<function>,<value>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NCONFIG?**	Response **+NCONFIG:<function>,<value>** **[+NCONFIG:<function>,<value>]** **[…]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command	Response

AT+NCONFIG=?	**+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))** **[+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))]** **[…]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<function> UE function to be configured

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
MULTITONE	Enable/disable multitone
NAS_SIM_POWER_SAVING_ENABLE	Enable/disable USIM card power saving mode.
BARRING_RELEASE_DELAY	Time (in seconds) to delay release from barring. Range: 0-1800.
RELEASE_VERSION	Release version, only release 13 and 14 are supported. Could be set to 13 only when UE does not use power class 6.
RPM	Enable/disable RPM. If RPM files present on USIM, the USIM settings will have precedence.
SYNC_TIME_PERIOD	The synchronization time period from eNB. Unit: hour. Range 0-65535. 0 means close time sync synchronization.
IPV6_GET_PREFIX_TIME	Set the maximum time of getting IPv6 prefix. Unit: second. Range 0-65535. 0 means to get IPv6 prefix immediately, and 65535 means not to get IPv6 prefix.
NB_CATEGORY	Configure the NB-IoT category. Only support 1 and 2 now.
RAI	Enable/Disable RAI.
HEAD_COMPRESS	Enable/Disable head compress.

	RLF_UPDATE	"FALSE" represents the occurrence of radio link failure, and NAS will TAU immediately. And "TRUE" representative when occurred radio link failure, ACK is expected before TAU.
	CONNECTION_REESTABLISHMENT	Enable/Disable connection re-establishment.
<value>	Bool type TRUE FALSE	

NOTES

1. "CR_" function is temporary and will be retired when no longer required.
2. MULTITONE, RELEASE_VERSION, SYNC_TIME_PERIOD, NB_CATEGORY, HEAD_COMPRESS and NAS_SIM_POWER_SAVING_ENABLE can be set only when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).

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,TRUE
+NCONFIG:ENABLE_BIP,FALSE
+NCONFIG:MULTITONE,TRUE
+NCONFIG:NAS_SIM_POWER_SAVING_ENABLE,TRUE
+NCONFIG:BARRING_RELEASE_DELAY,64
+NCONFIG:RELEASE_VERSION,13
+NCONFIG:RPM,FALSE
+NCONFIG:SYNC_TIME_PERIOD,0
+NCONFIG:IPV6_GET_PREFIX_TIME,15
+NCONFIG:NB_CATEGORY,1
+NCONFIG:RAI,FALSE
+NCONFIG:HEAD_COMPRESS,FALSE
+NCONFIG:RLF_UPDATE,FALSE
+NCONFIG:CONNECTION_REESTABLISHMENT,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))
+NCONFIG:(MULTITONE,(FALSE,TRUE))
+NCONFIG:(NAS_SIM_POWER_SAVING_ENABLE,(FALSE,TRUE))
+NCONFIG:(BARRING_RELEASE_DELAY,(0-1800))
+NCONFIG:(RELEASE_VERSION,(13,14))
+NCONFIG:(RPM,(FALSE,TRUE))
+NCONFIG:(SYNC_TIME_PERIOD,(0-65535))
+NCONFIG:(IPV6_GET_PREFIX_TIME,(0-65535))
+NCONFIG:(NB_CATEGORY,(1,2))
+NCONFIG:(RAI,(FALSE,TRUE))
+NCONFIG:(HEAD_COMPRESS,(FALSE,TRUE))
+NCONFIG:(RLF_UPDATE,(FALSE,TRUE))
+NCONFIG:(CONNECTION_REESTABLISHMENT,(FALSE,TRUE))

OK
```

4.18. AT+NATSPEED Configure UART Port Baud Rate

The command is used to configure UART port baud rate. Please refer to ***Chapter 6*** for possible <err> values.

AT+NATSPEED Configure UART Port Baud Rate	
Write Command **AT+NATSPEED=<baud_rate>,<timeout>,<store>,<sync_mode>[,<stopbits>[,<parity>[,<xonxoff>]]]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NATSPEED?**	Response **+NATSPEED:<baud_rate>,<sync_mode>,<stopbits>,<parity>[,<xonxoff>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
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**),** (list of supported **<parity>**s**),(**list of supported **<xonxoff>**s**)** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<baud_rate>	Integer type indicating the baud rate of UART port that has been requested. <baud_rate> value higher than the fastest speed supported by the low power UART will disable deep sleep low power operation.
<timeout>	Integer type indicating the time to wait for communication before switching back to the original speed. Unit: second. Default value: 3. Maximum value: 30. 0 means using default value.
<store>	Integer type indicating 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>	Integer type. 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. <sync mode> do not support 3 when <baud rate> is 4800bps and 57600bps. This parameter may be removed in a future release. 0 Sample normally 1 Sample later 2 Sample earlier 3 Sample even earlier
<stopbits>	Integer type. The LP UART stop bits. 1 1 stop bit 2 2 stop bits
<parity>	Integer type. The AT UART parity. 0 No parity enabled (default value) 1 Odd parity 2 Even parity
<xonxoff>	AT UART Software (XON/XOFF) Flow Control 0 Software flow control disabled 1 Software flow control enabled

Example

```
AT+NATSPEED=9600,3,1,2,1
OK
AT+NATSPEED?
+NATSPEED:9600,2,1,0,0

OK
AT+NATSPEED=?
+NATSPEED:(4800,9600,57600,115200,230400,460800),(0-30),(0,1),(0-3),(1,2),(0-2),(0,1)

OK
```

4.19. AT+NCCID USIM 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 6*** for possible <err> values.

AT+NCCID USIM Card Identification	
Execution Command **AT+NCCID**	Response **+NCCID:<ICCID>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NCCID?**	Response **+NCCID:<ICCID>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NCCID=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<ICCID>	USIM Card Identification Number

Example

```
AT+NCCID
+NCCID:44123456789012345678

OK
AT+NCCID?
+NCCID:44123456789012345678

OK
```

4.20. AT+NFWUPD Firmware Update via UART

This command supports firmware updating. It allows package zone erasing, package downloading, package's last validation result checking, package name and version querying, and firmware upgrading.

Before upgrading firmware, it needs to erase package zone and download package first. After downloading finished, it sends firmware upgrading command. Then the system will reboot and validate the package, and if the package is legal, it will start to upgrade the firmware to a new version, otherwise it will reboot and not to upgrade, then the user can check the package validation error information with corresponding AT command.

Please refer to ***Chapter 6*** for possible <err> values.

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

	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<cmd>	Integer type. Package process command 0 Erase package zone in internal flash 1 <sn>,<len>,<data>,<crc>. Download a package segment. Download a DFOTA package. Package segments are continuous segments of the DFOTA package. Segments can be of any length, but must be provided in order. 2 Get the package validation result of last updating 3 Get the package name 4 Get the package version 5 Upgrade firmware
<sn>	Integer type. Sequence number. It starts with 0, and increments by one for each package segment.
<len>	Integer type. Data length in bytes of data.
<data>	Data to be transmitted in hex string format.
<crc>	Integer type. An XOR8 of each byte in the package segment. It is sent as hex string.

NOTE

<cmd>=3 and <cmd>=4 are supported in B300 or later versions.

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

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

Please refer to ***Chapter 6*** for possible <err> values.

AT+NPOWERCLASS Set the Mapping for Band and Power Class	
Write Command **AT+NPOWERCLASS=<band>,<power class>**	Response **OK** If there is any error, response:

	ERROR Or **+CME ERROR: <err>**
Read Command **AT+NPOWERCLASS?**	Response **+NPOWERCLASS:<band>,<power class>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NPOWERCLASS=?**	Response **+NPOWERCLASS:**(list of supported **<band>**s)**,**(list of supported **<power class>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<band>	Integer type. Band as key to map
<power class>	Integer type. Power class value for band, only 3, 5 and 6 are supported currently. The parameter can be set only when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).

NOTE

<power class> can be set to 6 only when <function> “RELEASE_VERSION” in AT+NCONFIG is 14.

4.22. AT+NPSMR Power Saving Mode Status Report

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

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

The test command returns supported values as a compound value.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NPSMR Power Saving Mode Status Report	
Write Command **AT+NPSMR=<n>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NPSMR?**	Response **+NPSMR:<n>[,<mode>]** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NPSMR=?**	Response **+NPSMR:**(list of supported **<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type. Enable/disable unsolicited result code. 0 Disable unsolicited result code 1 Enable unsolicited result code “+NPSMR:<mode>”
<mode>	Integer type. Indicates the power mode of UE. 0 Normal mode 1 Power saving mode

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

The write command controls the setting of the UE 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 write 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 will be removed.

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 6*** for possible <err> values.

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

	<Requested_eDRX_value>s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

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>. When set <mode> to 0 and do not have parameter <Requested_Paging_time_window> or <Requested_eDRX_value>, it will set omit value to invalid value like 0x00.

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.

<Act-type> Integer type. Indicates the type of access technology. This parameter is used to specify the relationship between the type of access technology and the requested eDRX value.

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

4.24. AT+NPIN* PIN Operator

The write command is used to verify, change, enable, disable, or unblock PIN. An unsolicited result will be received when execute pin command is completed.

USIM PIN, USIM PUK refer to the PIN of the selected application on the UICC. For example, in an E-UTRAN context, the selected application on the currently selected UICC should be a USIM and the USIM PIN then represents the PIN of the selected USIM. See *3GPP TS 31.101 [65]* for further details on application selection on the UICC.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NPIN* PIN Operator	
Write Command **AT+NPIN=<command>,<parameter1>[,<parameter2>]**	Response **OK** **+NPIN:<npin result>** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<command>	Integer type. PIN operation mode.			
	<command>	<parameter1>	<parameter2>	PIN Operation Mode
	0	<pin>		Verify PIN
	1	<old pin>	<new pin>	Change PIN
	2	<pin>		Enable PIN
	3	<pin>		Disable PIN
	4	<puk>	<pin>	Unblock PIN

<parameter1>	A parameter varies with the setting of <command>. When <command>=0, 2, and 3, it is <pin>. When <command>=1, it is <old pin>. When <command>=4, it is <puk>.
<parameter2>	A parameter varies with the setting of <command>. When <command>=0, 2, and 3, it is omitted. When <command>=1, it is <new pin>. When <command>=4, it is <pin>.
<pin>,<old pin>,<new pin>	Decimal string format. <old pin> shall be the same as password specified for the facility from the MT user interface or with command AT+NPIN=1,<old pin>,<new pin>. <new pin> is the new password. The minimum length is 4, and the maximum length is 8. Unit: byte.
<puk>	Decimal string format. The string size is 8.
<npin result>	String type. Result. "OK" "ERROR PIN disabled" "ERROR PIN blocked" "ERROR wrong PIN <pin retries remaining>" "ERROR wrong format" "ERROR"
<pin retries remaining>	Decimal type. Remained PIN retries. If no retries left then PIN is blocked. AT+NPIN=4,<puk>,<pin> needs to be entered before the PIN can be used again.

NOTE

"*" means under development.

Example

```
AT+NPIN=0,29102394
OK

+NPIN:OK
```

4.25. AT+NCSEARFCN Clear Stored EARFCN

This command is used to clear stored EARFCN. Please refer to ***Chapter 6*** for possible <err> values.

AT+NCSEARFCN Clear Stored EARFCN	
Execution Command **AT+NCSEARFCN**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

NOTE

This command must be executed when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).

Example

```
AT+NCSEARFCN
OK
```

4.26. AT+NIPINFO IP Address Information Report

This command is used to report IP address information. The write command controls the presentation of an unsolicited result code:

- If the IP address is obtained successfully, <failure_cause> will be omitted. The URC will be reported in the format of "+NIPINFO:<cid>,<IP_type>,<IP_addr>".
- If it fails to obtain an IP address, <IP_addr> will be omitted. The URC will be reported in the format of "+NIPINFO:<cid>,<IP_type>,,<failure_cause>".

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

The test command returns supported parameter values.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NIPINFO IP Address Information Report	
Write Command **AT+NIPINFO=<n>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NIPINFO?**	Response **+NIPINFO:<n>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NIPINFO=?**	Response **+NIPINFO:**(list of supported **<n>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<n>	Integer type. 0 Disable unsolicited result code (default value) 1 Enable unsolicited result code "+NIPINFO:<cid>,<IP_type>,[<IP_addr>][,<failure_cause>]"
<cid>	Integer type. Specifies a particular PDP context definition (see AT+CGDCONT).
<IP_type>	Integer type. Specifies the type of IP address. IP Internet Protocol (*IETF STD 5 [103]*) IPV6 Internet Protocol, version 6 IPV4V6 Virtual <PDP_type> introduced to handle dual IP stack UE capability.
<IP_addr>	String type. IP address. The IPv4 address is expressed in decimal numbers and dots, such as 100.1.0.26. The IPV6 address is expressed in hexadecimal numbers and colon, such as 108F: 0: 0: 0: 8: 800: 200C: 417A. This parameter is not displayed

	when the address acquisition failed.
<failure_cause>	Integer type. Causes for the failure to get an IP address. 1 PDN type IPv4 only allowed 2 PDN type IPv6 only allowed 3 Single address bearers only allowed 4 IPv6 RA timeout 5 Unspecified

Example

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

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

OK
```

4.27. AT+NCPCDPR Configure PDP Context Dynamic Parameters to be Read

This command allows the configuration of PDP context dynamic parameters to be read.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NCPCDPR Configure PDP Context Dynamic Parameters to be Read	
Write Command **AT+NCPCDPR=<parameter>,<state>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NCPCDPR?**	Response **+NCPCDPR:<parameter>,<state>** **[+NCPCDPR:<parameter>,<state>]** **[...]**

	OK If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NCPCDPR=?**	Response **+NCPCDPR:**(list of supported **<parameter>**s)**,**(list of supported **<state>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<parameter>	Unsigned char format. Dynamic parameters to be read. 0 Get DNS Server IPv4 Address request 1 Get DNS Server IPv6 Address request
<state>	Integer type. PDP context dynamic parameters read state. 0 Disable to get 1 Enable to get

NOTE

The command can be set only when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).

Example

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

OK
AT+NCPCDPR=?
```

```
+NCPCDPR:(0,1),(0,1)

OK
```

4.28. AT+NQPODCP Query Pending Originating Data List via the Control Plane

This command queries the pending originating data list via the control plane by UE.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NQPODCP Query Pending Originating Data List via the Control Plane	
Execution Command **AT+NQPODCP**	Response **[+NQPODCP:[<sequence>[<sequence>…]]]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+NQPODCP=?**	Response **OK**
Maximum Response Time	300ms

Parameter

<sequence>	Integer type. The sequence number of pending originating message. Range: 1-255.

Example

```
AT+NQPODCP
+NQPODCP:1,2,3

OK
AT+NQPODCP=?
OK
```

4.29. AT+QLEDMODE Set NETLIGHT LED Function Mode

The write command is used to set the function mode of NETLIGHT LED.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QLEDMODE Set NETLIGHT LED Function Mode	
Write Command **AT+QLEDMODE=<ledmode>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+QLEDMODE?**	Response **+QLEDMODE:<ledmode>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Test Command **AT+QLEDMODE=?**	Response **+QLEDMODE:**(list of supported **<ledmode>**s) **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<ledmode>	Integer type. Function mode of NETLIGHT LED. 0 Disable NETLIGHT LED function, and the NETLIGHT pin outputs a low level. 1 Enable NETLIGHT LED function, and the NETLIGHT pin outputs PWM signal, different high-level duration and low-level duration of which indicate different network status. High-level duration Low-level duration Network Status

	64ms	800ms	Network searching
	64ms	2000ms	Connected status

NOTE

If NETLIGHT LED is enabled, it may cause the module to consume more power.

Example

```
AT+QLEDMODE=1
OK
```

4.30. AT+QDNS Trigger DNS Domain Name Resolution

This command is used to trigger the DNS domain name resolution. Please refer to ***Chapter 6*** for possible <err> values.

AT+QDNS Trigger DNS Domain Name Resolution	
Write Command **AT+QDNS=<mode>[,<hostname>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<mode>	Integer type.	
	0	DNS domain name resolution, hostname cannot be NULL.
	1	If the hostname is not NULL, then clear the hostname parsing data in memory and KV. If the hostname is NULL, all parsing data will be cleared.
<hostname>	Domain name.	

Example

```
AT+QDNS=0,www.baidu.com
```

```
OK

+QDNS:111.13.100.91
```

5 Huawei's IoT Platform Commands

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

5.1. 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 server. It is used when there is a HiSilicon CDP or Huawei's IoT platform acting as gateway to network server applications.

This command is available after the IMEI number has been set.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NCDP Configure and Query CDP Server Settings	
Write Command **AT+NCDP=<ip_addr>[,<port>]**	Response Update the CDP server configuration from the supplied parameters. **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read 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: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<ip_addr>	IoT platform address. Support IPv4, IPv6 and domain name.
<port>	Integer type. 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. The write command is available after the IMEI number has been set.
2. The changes will take effect before successful network attachment.

Example

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

OK
```

5.2. 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 6*** for possible <err> values.

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

	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Encryption mode type.	
	0	None encryption
	1	Standard DTLS encryption mode
	2	DTLS+ encryption mode
<NAT type>	Standard DTLS NAT network.	
	0	The DTLS link is rebuilt every time when the data is sent
	1	Every time when the module is powered on or when the module IP address changes, the DTLS encryption mode will be triggered

Example

```
AT+QSECSWT=0
OK
AT+QSECSWT=1,1
OK
AT+QSECSWT?
+NSECSWT:1,1

OK
```

5.3. AT+QSETPSK Set PSK ID and PSK

This command is used to configure PSK ID and PSK. The command will take effect after rebooting the module. Please refer to ***Chapter 6*** for possible <err> values.

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

	+CME ERROR:<err>
Read Command **AT+QSETPSK?**	Response **+QSETPSK: <pskid>,<psk>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	2s

Parameter

<pskid>	Indicates the PSK index. The fixed length is 15 decimal digits, The value must be the same as the device IMEI. In addition, this parameter must also be set to the same value on the IoT platform. When <pskid> is set to 0, the IMEI is used as the PSKID.
<psk>	Indicates the PSK. This parameter must be set to a 16-digit hexadecimal number. In addition, it must also be set to the same value on Huawei's IoT platform.

Example

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

OK
```

5.4. AT+QLWSREGIND Register Control

The command is used to control module to launch register, deregister or update to the IoT platform. It will give an <err> code and description as an intermediate message if the message cannot be sent. Please refer to ***Chapter 6*** for possible <err> values.

AT+QLWSREGIND Register Control	
Write Command **AT+QLWSREGIND=<type>**	Response **OK**

	If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Integer type. Action type.	
	0	Trigger register operation
	1	Trigger deregister operation

Example

```
AT+QLWSREGIND=0
OK
```

5.5. AT+QLWULDATA Send Data

The command is used to send data to Huawei's IoT platform with LWM2M protocol. It will give an <err> code and description as an intermediate message if the message cannot be sent. Before the module registered to the IoT platform, executing the command will trigger register operation and discard the data. Please refer to ***Chapter 6*** for possible <err> values.

AT+QLWULDATA Send Data	
Write Command **AT+QLWULDATA=<length>,<data>[,<seq_num>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<length>	Integer type. Length of data sent.
<data>	Hexadecimal format string. Maximum length of data to be sent is 512 bytes.
<seq_num>	Sequence number. Range: 1-255. If non-zero <seq_num> is used to send CoAP

	data and there is CON or NON CoAP data with the same <seq_num> which has not been sent completely, the data to be sent will be discarded and an error will be returned.

Example

```
AT+QLWULDATA=3,AA34BB
OK
```

5.6. AT+QLWULDATAEX Send CON/NON Message

This command is used to send confirmable (CON) or non-confirmable (NON) message with the identifier of RAI (Release Assistant Indication) to Huawei's IoT platform with the LWM2M protocol. After sending CON data, the sending result will be automatically notified to the TE. TE can also use the command AT+QLWULDATASTATUS? to query the status of the CON data that has been sent. If sending CON data, it must acquire the state (fail/timeout/success/got reset message) of sending CON data before sending the next CON or NON data. If the module is not registered to NB-IoT platform, this command will get the module to initiate registration only, and the module will discard the sent data.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QLWULDATAEX Send CON/NON Message	
Write Command **AT+QLWULDATAEX=<length>,<data>,<mode>[,<seq_num>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<length>	Integer type. Length of data sent.
<data>	Hexadecimal format string. Maximum length of data to be sent is 512 bytes.
<mode>	0x0000 Send NON message 0x0001 Send NON message and carry out the RELEASE auxiliary instructions 0x0100 Send CON message 0x0101 Send CON message and carry out the RELEASE_AFTER_REPLY auxiliary instructions

<seq_num>	Sequence number. Range: 0-255. If non-zero <seq_num> is used to send CoAP data and there is CON or NON CoAP data with the same <seq_num> which has not been sent completely, the data to be sent will be discarded and an error will be returned. If <seq_num> is 0 it will be ignored.

Example

```
AT+QLWULDATAEX=3,AA34BB,0x0001
OK
```

5.7. AT+QLWULDATASTATUS Query CON Messages Sent Status

This command queries the status of the sending CON data to NB-IoT platform. This command only queries the status of the CON data that has been sent.

When non-zero <seq_num> is used to send CON CoAP data, the response of this command is: +QLWULDATASTATUS: <status>,<seq_num>. When there is no <seq_num> in the AT command to send CON CoAP data or the <seq_num> is zero, the response of this command is +QLWULDATASTATUS: <status>.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QLWULDATASTATUS Query CON Messages Sent Status	
Read Command **AT+QLWULDATASTATUS?**	Response **+QLWULDATASTATUS:<status>[,<seq_num>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<status>	Integer type. Status of CON data sending. 0 Have not sent 1 Sent, waiting response of IoT platform 2 Sent failed

	3 Timeout 4 Success 5 Got reset message
<seq_num>	Sequence number. Range: 0-255. If <seq_num> is 0 it will be ignored.

Example

```
AT+QLWULDATASTATUS?
+QLWULDATASTATUS:4

OK
```

5.8. AT+QLWFOTAIND Set DFOTA Update Mode

This command is used to set the DFOTA upgrade mode to either of the following modes:

- Automatic mode: DFOTA-based download and upgrade are automatically completed without command instruction from the MCU.
- Controlled mode: the MCU uses this command to control whether to download or upgrade firmware.

In controlled mode, when URC "+QLWEVTIND:6" (received "put package URI" message) or URC "+QLWEVTIND:7" (received "update" message) has been received, the MCU uses this command to control whether to download or upgrade firmware.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QLWFOTAIND Set DFOTA Update Mode	
Write Command **AT+QLWFOTAIND=<type>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Integer type. DFOTA update mode 0 The automatic FOTA upgrade mode is used.

1	The controlled FOTA upgrade mode is used
2	MCU notify module to start downloading the version file.
3	MCU notify module to cancel version file download.
4	MCU notify module to start update.
5	MCU notify module to cancel update .

Example

```
AT+QLWFOTAIND=1
OK
```

5.9. AT+QREGSWT Set Registration Mode

The command is used to set registration mode after the module reboot.

- If set <type> to 1, after reboot and attached to network, the module will trigger automatic registration.
- If set <type> to 0, after reboot and attached to network, the module will send REGISTERNOTIFY message to the device, then the device triggers registration by command AT+QLWSREGIND.

It will give an <err> code and description as an intermediate message if the message cannot be sent. Please refer to ***Chapter 6*** for possible <err> values.

AT+QREGSWT Set Registration Mode	
Write Command **AT+QREGSWT=<type>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+QREGSWT?**	Response **+QREGSWT:<type>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Integer type. Registration mode. 0 Manual registration mode 1 Automatic registration mode 2 Disable registration

Example

```
AT+QREGSWT=1
OK

AT+QREGSWT?
+QREGSWT:1

OK
```

5.10. AT+NMGS Send a Message

The command is used to send data to Huawei's IoT platform. It will give an <err> code and description as an intermediate message if the message cannot be sent. Before the module is registered to the IoT platform, executing the command will trigger registration operation and discard the data.

Please refer to ***Chapter 6*** for possible <err> values.

AT+NMGS Send a Message	
Write Command **AT+NMGS=<length>,<data>[,<seq_num>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<length>	Decimal length of message.
<data>	Data to be transmitted in hex string format. The maximum length of data to be sent is 512 bytes.

<seq_num>	Sequence number. Range: 1-255. If non-zero <seq_num> is used to send CoAP data and there is CON or NON CoAP data with the same <seq_num> which has not been sent completely, the data to be sent will be discarded and an error will be returned.

Example

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

5.11. AT+NMGR Get a Message

The command is used to receive a message from the Huawei's IoT platform with LWM2M protocol.

The command returns the oldest buffered message and deletes it 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 a Message	
Execution Command **AT+NMGR**	Response **<length>,<data>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<length>	Decimal length of message.
<data>	Data received in hex string format. The maximum length of received data is 512 bytes.

Example

```
AT+NMGR
5,48656C6C6F

OK
```

5.12. 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 UE from the Huawei's IoT platform. Please refer to ***Chapter 6*** 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 using the unsolicited informational response. The buffered messages can be collected using AT+NMGR. The format of response is: "+NNMI". The default setting is 1, which indicates no indications are sent. The <status> will restore to the default value (1 by default) after reboot.

AT+NNMI New Message Indications	
Write Command **AT+NNMI=<status>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+NNMI?**	Response **+NNMI:<status>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

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
```

5.13. AT+NSMI Send Message Indications

The command sets or gets indications that are sent when an upstream message is sent to the Huawei's IoT platform.

If sent message indications are turned on, the unsolicited informational response: "+NSMI:<status>[,<seq_num>]" (e.g. "+NSMI:SENT") will be issued when a new message is sent into NB-IoT stack. Please refer to ***Chapter 6*** for possible <err> values.

Only when there is non-zero <seq_num> in the AT command to send data, the notification message sent by the module to the MCU contains <seq_num>, and the value of <seq_num> is the same as the value of <seq_num> carried by the AT command.

When there is non-zero <seq_num> in the AT command to send CoAP data and the CoAP data is sent to NB-IoT platform successfully, the value of <status> in notification message sent by the module to the MCU is SENT_TO_AIR_INTERFACE. When there is no <seq_num> or the value of the <seq_num> is zero in the AT command to send CoAP data and the CoAP data is sent to NB-IoT platform successfully, the value of <status> in notification message sent by the module to the MCU is SENT.

For CON data, SENT and SENT_TO_AIR_INTERFACE indicate the results of sending data to the NB-IoT platform.

For NON data, SENT indicates that data is sent to the C core. SENT_TO_AIR_INTERFACE indicates that data is sent to the air interface of the base station.

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

AT+NSMI Sent Message Indications	
Write Command **AT+NSMI=<indications>**	Response **OK** If there is any error, response: **ERROR**

	Or **+CME ERROR: <err>**
Read Command **AT+NSMI?**	Response **+NSMI:<indications>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<indications>	0	No indications
	1	Indications will be sent
<status>	SENT	
	SENT_TO_AIR_INTERFACE	
	DISCARDED	
<seq_num>	Sequence number. Range: 1-255. Indicates the non-zero <seq_num> carried in the AT command to send data to IoT platform.	

Example

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

OK
```

5.14. AT+NQMGR Query the Status of Messages Received

The command queries the status of the downstream messages received from the Huawei's IoT platform. Please refer to ***Chapter 6*** for possible <err> values.

AT+NQMGR Query the Status of Messages Received	
Execution Command **AT+NQMGR**	Response **BUFFERED=<buffered>,RECEIVED=<received>,DROPPE**

	D=<dropped> **OK** If there is any error, response: **ERROR** Or **+CME ERROR:<err>**
Maximum Response Time	300ms

Parameter

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

Example

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

OK
```

5.15. AT+NQMGS Query the Status of Messages Sent

The command queries the status of the upstream messages sent to the Huawei's IoT platform. Please refer to ***Chapter 6*** for possible <err> values.

AT+NQMGS Query the Status of Messages Sent	
Execution Command **AT+NQMGS**	Response **PENDING=<pending>,SENT=<sent>,ERROR=<error>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

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 UE boot.
<error>	The number of messages that could not be sent by the UE due to an error since UE boot.

NOTES

1. For CON CoAP data, the statistics are modified only after timeout, RST, sent_fail, or sent_success.
2. For NON CoAP data, if a non-zero <seq_num> is carried during data transmission, the statistics are modified only when the data is sent to the air interface. If the sent data does not carry <seq_num> or the <seq_num> is zero, the statistics are modified when the data is sent to the C core.

Example

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

OK
```

5.16. AT+NMSTATUS Message Registration Status

The command reports the current registration status when connected to the CDP server. When LWM2M is in the status of "MO_DATA_ENABLED", the UE can send data. Please refer to ***Chapter 6*** 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: **ERROR** Or **+CME ERROR: <err>**

Read Command **AT+NMSTATUS?**	Response **+NMSTATUS:<registration_status>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<registration_status>	Current registration status: UNINITIALISED MISSING_CONFIG INIITIALISING INIITIALISED INIT_FAILED REGISTERING REGISTERED DEREGISTERED MO_DATA_ENABLED NO_UE_IP REJECTED_BY_SERVER TIMEOUT_AND_RETRYING REG_FAILED DEREG_FAILED

5.17. +QLWEVTIND LwM2M Event Report (Response Only)

The module reports the LwM2M event to the device.

+QLWEVTIND LwM2M Event Report (Response Only)	
URC Format **+QLWEVTIND:<type>**	

Parameter

<type>	0	Register completed
	1	Deregister completed
	2	Registration status updated
	3	Object 19/0/0 observe completed
	4	Bootstrap completed
	5	5/0/3 resource observe completed
	6	Notify the device to receive update package URL
	7	Notify the device download has been completed
	9	Cancel object 19/0/0 observe

5.18. AT+QRESETDTLS Reset DTLS Mode

The command is used to reset DTLS mode.

- If DTLS has completed the handshake or re-negotiation, the DTLS state can be set to INIT state through this AT command, and the handshake process will run when the data is sent next time.
- If the current state of DTLS is shaking hands or during re-negotiation, the command will return “OK” directly. The next data sending will not trigger a handshake.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QRESETDTLS Reset DTLS Mode	
Execution Command **AT+QRESETDTLS**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Example

```
AT+QRESETDTLS
OK
```

5.19. AT+QDTLSSTAT Query the State of DTLS

This command is used to query the current link state of DTLS. In every 8 seconds of sending uplink data, if DTLS is not negotiated, then the DTLS state will not be able to be queried.

- If DTLS negotiation can be completed within 8 seconds, DTLS status can be queried after completion of negotiation.
- Whether it is register by the module power on or manually register by the AT command, the IoT platform registration process is triggered by LwM2M and will not block any AT command.

After DTLS negotiation or handshaking is completed, the module initiatively sends the "+MDTLSSTAT:0/3" message to the terminal. Please refer to ***Chapter 6*** for possible <err> values.

AT+QDTLSSTAT Query the State of DTLS	
Read Command **AT+QDTLSSTAT?**	Response **+QDTLSSTAT:<type>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	0	DTLS negotiation or handshake completed
	1	Not start negotiation or handshake
	2	In the negotiation or handshake state
	3	Negotiation or handshake failed

Example

```
AT+QDTLSSTAT?
+QDTLSSTAT:0

OK
```

5.20. AT+QBOOTSTRAPHOLDOFF* Bootstrap Hold off Time

The command is used to set and query client hold off time (relevant only for bootstrap server). The default value is 600 seconds, and the maximum time is recommended not exceeding 3000 seconds.

- If the time is configured too long (>3000s), the terminal's Bootstrap Sequence time will be delayed, then affecting the power consumption of terminal access.
- If the time is configured too short (<600s), the time of Factory Bootstrap and Server Initiated Bootstrap is too short, which will affect the success rate of Factory Bootstrap and Server Initiated bootstrap. Therefore, if the module needs to execute the Server Initiated bootstrap process (without configuring Bootstrap Server and LwM2M server addresses), or the LwM2M server address has been configured, the client hold off time value is not recommended to be less than 600s.

When the Bootstrap Server address is configured, the client hold off time can be set as 0. In such case, the module will go directly into the Client Initiated Bootstrap, thus shortening the Client Initiated Bootstrap time.

- If the Bootstrap Server address is not configured, AT+QBOOTSTRAPHOLDOFF=0 will return "ERROR".
- If Bootstrap Server does not exist, the client hold off time cannot be set to 0. If the client hold off time is 0, the Bootstrap Server IP cannot be erased.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QBOOTSTRAPHOLDOFF* Bootstrap Hold off Time	
Write Command **AT+QBOOTSTRAPHOLDOFF=<ClientHoldOffTime>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+QBOOTSTRAPHOLDOFF?**	Response **+QBOOTSTRAPHOLDOFF:<ClientHoldOffTime>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<ClientHoldOffTime>	Integer type. Client hold off time. Default set to 600 seconds. Recommended not exceeding 3000 seconds.

NOTE

"*" means under development.

Example

```
AT+QBOOTSTRAPHOLDOFF=600
OK
AT+QBOOTSTRAPHOLDOFF?
+QBOOTSTRAPHOLDOFF:600

OK
```

5.21. AT+QLWSERVERIP Set/Delete Bootstrap/LwM2M Server IP

The command is used to set or delete the IP address of Bootstrap/IoT server. The KV used in AT+QLWSERVERIP and AT+NCDP command is the same.

- AT+QLWSERVERIP=DEL,<ip_addr>,<port> will delete the IP information when the IP address and the port can match the KV.
- AT+QLWSERVERIP=DEL,<ip_addr> will delete the IP information when the IP address can match the KV.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QLWSERVERIP Set/Delete Bootstrap/LwM2M Server IP	
Write Command **AT+QLWSERVERIP=<type>,<ip_addr>[,<port>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**

Read Command **AT+QLWSERVERIP?**	Response **+QLWSERVERIP: <type>,<ip_addr>,<port>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Bootstrap/LwM2M Server IP type. LWM2M IoT Server IP BS Bootstrap Server IP DEL Delete the IP information
<ip_addr>	Domain name or IP address. IP address format: decimal format. IPv4 address is a1.a2.a3.a4. The range is 0-255.
<port>	Integer type. Port number. The range is 0-65535.

Example

```
AT+QLWSERVERIP=BS,180.101.147.115,5683
OK
AT+QLWSERVERIP=LWM2M,180.101.147.115,5683
OK
AT+QLWSERVERIP?
+QLWSERVERIP:BS,180.101.147.115,5683
+QLWSERVERIP:LWM2M,180.101.147.115,5683

OK
AT+QLWSERVERIP=DEL,180.101.147.115,5683
OK
```

5.22. AT+QSETBSPSK* Configure PSK ID and PSK to Bootstrap

This command is used to configure the PSK ID and PSK which are used to set DTLS connection with Bootstrap Server. The command will take effect after rebooting the module

Please refer to ***Chapter 6*** for possible <err> values.

AT+QSETBSPSK* Configure PSK ID and PSK to Bootstrap	
Write Command **AT+QSETBSPSK=<pskid>,<psk>**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+QSETBSPSK?**	Response **+QSETBSPSK:<pskid>,<psk>** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	2s

Parameter

<pskid>	Key index. Fixed length of 15-bit decimal digits number for indexing PSK. The value needs to be the same with the IMEI number of device, and it needs to be consistent with Huawei's IoT platform. When <pskid> is set to 0, the IMEI number is used as the PSK ID.
<psk>	Preset key. Fixed length of 16 bytes hexadecimal number, which need to be consistent with the IoT platform.

NOTE

"*" means under development.

Example

```
AT+QSETBSPSK=201703230000024,0123456789ABCDEF0123456789ABCDEF
OK
AT+QSETBSPSK?
+QSETBSPSK:201703230000024,***

OK
```

5.23. AT+QBSSECSWT* Configure Bootstrap Server Connection Switches

This command is used to configure DTLS connection switches with Bootstrap Server and standard DTLS negotiation time. Start the timer when the DTLS negotiated at the first time, and restart the timer when received the DTLS message from Bootstrap Server. When the uplink message is sent and the timer has expired, it is necessary to trigger a re-negotiation.

Please refer to ***Chapter 6*** for possible <err> values.

AT+QBSSECSWT* Configure Bootstrap Server Connection Switches	
Write Command **AT+QBSSECSWT=<type>[,<NAT type>]**	Response **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Read Command **AT+QBSSECSWT?**	Response **+QBSSECSWT:<type>[,<NAT type>]** **OK** If there is any error, response: **ERROR** Or **+CME ERROR: <err>**
Maximum Response Time	300ms

Parameter

<type>	Encryption mode type.	
	0	None encryption
	1	Standard DTLS encryption mode
<NAT type>	Standard DTLS NAT network.	
	0	The DTLS link is rebuilt every time when the data is send
	1	Every time when the module is powered on or when the module IP address changes, the DTLS encryption mode will be triggered

NOTE

"*" means under development.

Example

```
AT+QBSSECSWT=1,1
OK
AT+QBSSECSWT?
+QBSSECSWT:1,1

OK
```

6 Error Values

This chapter introduces the error values related to BC35-G and BC28 modules.

The error codes listed in the following two tables are compliant with the 3GPP specifications. Customers can refer to *3GPP TS 27.007 V13.5.0, sub-clause 9.2* for all possible <err> values.

Table 3: General Errors (27.007)

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

Table 4: General Errors (27.005)

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

The following error codes are specific ones for BC35-G and BC28 modules. Error code 512 was previously error code 256. Error code 513 was previously error code 257.

Table 5: Specific Error Codes

Code of <err>	Description
512	Required parameter not configured
513	TUP not registered
514	AT internal error
515	CID is active
516	Incorrect state for command
517	CID is invalid
518	CID is not active
520	Deactive the last active CID
521	CID is not defined
522	UART parity error
523	UART frame error
524	MT not powered on
525	AT command aborted: in processing
526	AT command aborted: error
527	Command interrupted
528	Configuration conflicts
529	During FOTA updating
530	Not the AT allocated socket

NOTE

AT+CMEE=<n> command disables (<n>=0) or enables (<n>=1) the use of final result code “+CME ERROR:<err>”. When <n>=1, a limited set of error codes will be returned.

7 Reboot 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 to indicate the reboot reason.

Table 6: 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_REG_0
7	REBOOT_CAUSE_SECURITY_REG_3
8	REBOOT_CAUSE_SECURITY_STANDARD_CHIP_WATCHDOG
9	REBOOT_CAUSE_SECURITY_UPDATER_CHIP_WATCHDOG
10	REBOOT_CAUSE_SEUCRITY_SCAN_ENTER_EXIT
11	REBOOT_CAUSE_SECURITY_PMU_POWER_ON_RESET
12	REBOOT_CAUSE_SECURITY_RESET_PIN
13	REBOOT_CAUSE_SECURITY_REGIONS_UPDATED
14	REBOOT_CAUSE_SECURITY_FOTA_UPGRADE
15	REBOOT_CAUSE_PROTOCOL_SYSRESETREQ
16	REBOOT_CAUSE_PROTOCOL_WATCHDOG

17	REBOOT_CAUSE_PROTOCOL_MONITOR_REBOOT_REQ
18	REBOOT_CAUSE_PROTOCOL_RPC_TIMEOUT
19	REBOOT_CAUSE_APPLICATION_SYSRESETREQ
20	REBOOT_CAUSE_APPLICATION_WATCHDOG
21	REBOOT_CAUSE_APPLICATION_AT
22	REBOOT_CAUSE_APPLICATION_RPC_TIMEOUT
23	REBOOT_CAUSE_PROTOCOL_IMSI_UPDATE
24	REBOOT_CAUSE_UNKNOWN

8 Examples

8.1. Network Attachment

- Through AT+NCONFIG=AUTOCONNECT,TRUE command, the module supports automatic network attachment.
- If manual network attachment is desired, then please disable automatic network attachment through AT+NCONFIG=AUTOCONNECT,FALSE. The setting will be saved to NV and take effect after rebooting the module by AT+NRB.

8.1.1. Automatic Network Attachment

The following shows a simple example for automatic network attachment. Customers only need to query whether the module has attached on network by the following commands:

```
REBOOT_CAUSE_SECURITY_PMU_POWER_ON_RESET
Neul
OK                          //Power on the module

AT+CFUN?
+CFUN:1

OK
AT+CIMI                     //Query the IMSI number.
460111174590523

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

OK
AT+CGATT?                   //Query whether the network has been activated.
+CGATT:1                    //The network has been activated successfully. Sometimes, there might
                            be a need to wait for 30s.
```

```
OK
AT+CGPADDR                    // Query the IP address of the module
+CGPADDR:0,10.169.241.248

OK
```

8.1.2. Manual Network Attachment

Full-band search may take more time. Therefore, it is recommended to specify the band(s) to be searched when manual network attachment is selected.

```
AT+NCONFIG=AUTOCONNECT,FALSE      //Disable automatic network attachment
OK

AT+NRB                            //Reboot the module
REBOOTING

REBOOT_CAUSE_APPLICATION_AT       //Reboot cause
Neul
OK
AT+NBAND=5                        //Specify the band to be searched
OK
AT+CFUN=1                         //Set the UE into full functionality mode
OK
AT+CIMI                           //Query the IMSI number
460111174590523

OK
AT+CGATT=1                        //Trigger network attachment
OK

AT+NUESTATS                       //Query the module status
Signal power:-827
Total power:-684
TX power:230
TX time:2272
RX time:9354
Cell ID:110258001
ECL:1
SNR:-30
EARFCN:2506
PCI:100
RSRQ:-157
```

```
OPERATOR MODE:4

OK

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

OK
AT+CGATT?                    //Query whether the network has been activated.
+CGATT:1                     //The network has been activated successfully. Sometimes, there
                             might be a need to wait for 30s.

OK
AT+CGPADDR                   //Query the IP address of the module
+CGPADDR:0,10.3.42.109

OK
```

8.2. Send/Receive/Read a UDP Message

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

```
AT+QREGSWT=2                 //Disable registration function of Huawei's IoT platform
OK
…                            //Attach on network

AT+CGPADDR                   //Query the IP address of the module
+CGPADDR:0,10.3.42.109

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

OK
AT+NSOST=1,220.180.239.212,8012,5,1245783132,100   //Send a message
1,5

OK

+NSOSTR:1,100,1              //Datagram is sent by RF
```

```
+NSONMI:1,5                                  //Received the message

AT+NSORF=1,5                                 //Read the message
1,220.180.239.212,8012,5,1245783132,0

OK
AT+NSOCL=1                                   //Close the socket
OK
```

8.3. Send/Receive/Read a TCP Message

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

```
AT+QREGSWT=2                                 //Disable registration function of Huawei's IoT platform
OK
…                                            //Attach on network

AT+CGPADDR                                   //Query the IP address of the module
+CGPADDR:0,10.3.42.79

OK
AT+NSOCR=STREAM,6,0,1                        //Create a socket
1

OK
AT+NSOCO=1,220.180.239.212,8009              //Connect to the server
OK

AT+NSOSD=1,4,01020304,0x100,101              //Send the messages
1,4

OK

+NSOSTR:1,101,1                              //Datagram has been confirmed to be received by the server

+NSONMI:1,4                                  //Received the message

AT+NSORF=1,4                                 //Read the message
1,220.180.239.212,8009,4,01020304,0
```

```
OK
AT+NSOCL=1                          //Close the socket
OK
```

8.4. Examples Relating to Huawei's IoT Platform

8.4.1. Register to Huawei's IoT Platform

8.4.1.1. Automatic Registration Mode

```
AT+QREGSWT?
+QREGSWT:1                          //Automatic registration mode (default mode)

OK
AT+NCDP=180.101.147.115,5683        //Set IP address and port for the IoT platform
OK

AT+NRB                              //Reboot the module
REBOOTING

REBOOT_CAUSE_APPLICATION_AT         //Reboot cause
Neul
OK

AT+CGPADDR                          //Query the IP address of the module
+CGPADDR:0,10.3.42.109

OK

+QLWEVTIND:0                        //Successful registration indication.

+QLWEVTIND:3                        //IoT platform has observed the data object 19. When the
                                    module reports this message, the data can be sent to the
                                    IoT platform.
```

8.4.1.2. Manual Registration Mode

```
AT+CGATT?                           //Query the PS service attachment status
+CGATT:1                            //Attached to the PS service
```

```
OK
AT+NCDP=180.101.147.115,5683          //Set IP address and port for the IoT platform
OK

AT+QREGSWT?                           //Query the registration mode
+QREGSWT:0                            //Manual registration mode

OK
AT+QLWSREGIND=0                       //Start to register to the IoT platform
OK

+QLWEVTIND:0                          //Successful registration indication

+QLWEVTIND:3                          //IoT platform has observed the data object 19. When
                                      the module reports this message, the data can be sent
                                      to the IoT platform.

AT+QLWSREGIND=1                       //Deregister from the IoT platform
OK

+QLWEVTIND:1                          //Successful deregistration indication
```

8.4.2. Send/Receive Data with Huawei's IoT Platform

```
+QLWEVTIND:0                          //Successful registration indication

+QLWEVTIND:3                          //IoT platform has observed the data object 19. When
                                      the module reports this message, the data can be sent
                                      to the IoT platform.
AT+QLWULDATA=3,313233                 //Send data with NON mode. It does not need the IoT
                                      platform to ACK this data message.
OK

+NNMI:4,AAAA0000                      //The module has received data from the IoT platform

AT+QLWULDATAEX=3,313233,0X0100        //Send CON message. The IoT platform needs to
                                      ACK this data message.
OK

+QLWULDATASTATUS:4                    //Successful message sending

+NNMI:4,AAAA0000                      //The module has received data from the IoT platform
```

```
AT+QLWULDATASTATUS?                    //Query the data sending status
+QLWULDATASTATUS:4                     //Successful message sending

OK
```

8.4.3. Upgrade Firmware on Huawei's IoT Platform

8.4.3.1. Automatic Firmware Upgrade via DFOTA

```
//Create a firmware upgrade task on the IoT platform.

+QLWEVTIND:0                           //Successful registration indication

+QLWEVTIND:3                           //IoT platform has observed the data object 19

AT+QLWULDATA=3,313233                  //Send any packet of upstream data and trigger an
                                        online firmware upgrade
OK

+QLWEVTIND:5                           //IoT platform has observed the firmware object 5

FIRMWARE DOWNLOADING

FIRMWARE DOWNLOADED

FIRMWARE UPDATING

//The module is undergoing local updates, which can result in multiple reboots and thus will take some
time.
REBOOT_CAUSE_SECURITY_FOTA_UPGRADE     //The module reboots
Neul
OK

FIRMWARE UPDATE SUCCESS

+QLWEVTIND:0                           //Successful registration indication

+QLWEVTIND:3                           //IoT platform has observed the data object 19

FIRMWARE UPDATE OVER
```

8.4.3.2. Controlled Firmware Upgrade via DFOTA

```
//Create a firmware upgrade task on the IoT platform.

AT+QLWFOTAIND?                          //Query the firmware upgrade mode
+QLWFOTAIND:1                           //Manual mode

OK

AT+QLWSREGIND=0                         //Start to register to the IoT platform
OK

+QLWEVTIND:0                            //Successful registration indication

+QLWEVTIND:3                            //IoT platform has observed the data object 19

+QLWEVTIND:5                            //IoT platform has observed the firmware object 5

FIRMWARE DOWNLOADING

+QLWEVTIND:6                            //Notify the device to receive update package URL

AT+QLWFOTAIND=2                         //Device notifies the module to start downloading
OK


FIRMWARE DOWNLOADED

+QLWEVTIND:7                            //Notify the device that download has been completed

AT+QLWFOTAIND=4                         //Device notifies the module to start updating
OK

FIRMWARE UPDATING

REBOOT_CAUSE_SECURITY_FOTA_UPGRADE      //The module reboots
Neul
OK

FIRMWARE UPDATE SUCCESS

+QLWEVTIND:0                            //Successful registration indication

+QLWEVTIND:3                            //IoT platform has observed the data object 19
```

```
FIRMWARE UPDATE OVER
```

8.4.4. Register to Huawei's IoT Platform with DTLS

```
AT+CGATT?                                   //Query the PS service attach status
+CGATT:1                                    //Attached to the PS service

OK
AT+NCDP= 180.101.147.115,5684               //Set IoT platform IP address and port. The port is 5684.
OK
AT+QSECSWT=1                                //Encryption using standard DTLS
OK
AT+QSETPSK=201703230000024,0123456789ABCDEF0123456789ABCDEF
OK                                          //Set PSK ID and PSK
AT+QREGSWT?                                 //Query the registration mode
+QREGSWT:0                                  //Manual registration mode

OK
AT+QLWSREGIND=0                             //Start to register to the IoT platform
OK

+QLWEVTIND:0                                //Successful registration indication
```

9 Appendix A Reference

Table 7: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
BS	Bootstrap
CDP	Connected Device Platform
CS	Circuit Switched
DCE	Data Communication Equipment
DTLS	Datagram Transport Layer Security
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
eDRX	Extended Discontinuous Reception
EGPRS	Enhanced General Packet Radio Service
eNB	Evolved Node B
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
KV	Key Value
LwIP	Lightweight IP
MS	Mobile Station
NAT	Network Address Translation
NB-IoT	Narrow Band Internet of Thing
PDP	Packet Data Protocol
PSK	Pre-shared Key
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
XOFF	Transmit off
XON	Transmit on