BC95

AT Commands Manual

NB-IoT Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2016-11-16	Walker HAN/ Donald TANG	Initial
1.1	2016-12-14	Walker HAN	1. Added AT+NCONFIG command 2. Updated description of Neul Hi2110 implementation for AT+COPS/CGATT/CGDCONT/NMGS/NRB/ NCDP/NTSETID
1.2	2017-01-04	Walker HAN	1. Updated description of Neul Hi2110 implementation for AT+CEREG/COPS/CGAT/NCDP/NSOST/NPING 2. Updated description of parameters for AT+COPS/ NCDP/NUESTATS/NEARFCN 3. Updated example in Chapter 7.2
1.3	2017-01-13	Donald TANG	Updated examples in Chapter 7
1.4	2017-03-24	Hayden WANG/ Donald TANG	1. Updated description of parameters for AT+NUESTATS/NEARFCN 2. Updated description of Neul Hi2110 implementation for AT+NBAND/NLOGLEVEL 3. Updated examples in Chapter 7

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1 Introduction

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

The following string will be output after booting the module:

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

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

1.1. Definitions

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

1.2. AT Command Syntax

Table 1: AT Commands Syntax

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

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

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

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

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

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

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

1.3. AT Command Responses

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

Responses will be of the format:

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

Or

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

1.4. 3GPP Compliance

3GPP commands are complied with the *3GPP TS 27.007 v13.5.0 (2016-06)*. For clarification on 3GPP commands, please refer to this document.

2 Implementation Status

Table 2: Types of AT Commands

AT Command	Description	Implemented in
3GPP		
AT+CGMI	Request Manufacturer Identification	B350 or later
AT+CGMM	Request Manufacturer Model	B350 or later
AT +CGMR	Request Manufacturer Revision	B350 or later
AT+CGSN	Request Product Serial Number	B350 or later
AT+CEREG	EPS Network Registration Status	B350 or later
AT+CSCON	Signalling Connection Status	B350 or later
AT+CLAC	List Available Commands	B350 or later
AT+CSQ	Get Signal Strength Indicator	B350 or later
AT+CGPADDR	Show PDP Addresses	B350 or later
AT+COPS	PLMN Selection	B350 or later
AT+CGATT	PS Attach or Detach	B350 or later
AT+CIMI	Request International Mobile Subscriber Identity	B350 or later
AT+CGDCONT	Define PDP Context	B350 or later
AT+CFUN	Set Phone Functionality	B350 or later
AT+CMEE	Report Mobile Termination Error	B600 or later
Neul		
AT+NMGS	Neul Send Message Command	B350 or later
AT+NMGR	Neul Get Message Command	B350 or later

AT+NNMI	Neul New Message Indications	B350 or later
AT+NSMI	Neul Send message Indications	B350 or later
AT+NQMGR	Neul Query Messages Received	B350 or later
AT+NQMGS	Neul Query Messages Sent	B350 or later
AT+NRB	Neul Reboot	B350 or later
AT+NCDP	Configure and Query CDP Server Settings	B350 or later
AT+NUESTATS	Query UE Statistics	B350 or later
AT+NEARFCN	Specify Search Frequencies	B350 or later
AT+NSOCR	Create Socket	B350 or later
AT+NSOST	SendTo Command (UDP Only)	B350 or later
AT+NSORF	Receive Command (UDP only)	B350 or later
AT+NSOCL	Close Socket	B350 or later
+NSONMI	Socket Message Arrived Indicator (Response Only)	B350 or later
AT+NPING	Test IP Network Connectivity to a Remote Host	B350 or later
AT+NBAND	Set Supported Bands	B600 or later
AT+NLOGLEVEL	Set Debug Logging Level	B600 or later
AT+NCONFIG	Configure UE Behaviour	B650
Temporary		
AT+NTSETID	Set ID	B350 or later

3 3GPP Commands

3.1. AT+CGMI   Request Manufacturer Identification

This command returns manufacturer information. By default it will return "Neul Ltd; www.neul.com/" 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** **+CME ERROR: <err>**
Test Command **AT+CGMI=?**	Response **OK**

Parameter

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

Example

AT+CGMI
Neul Ltd; www.neul.com/

OK

3.2. AT+CGMM   Request Manufacturer Model

This command returns manufacturer model information. By default it will return "Neul Hi2110" on the standard platform. Please refer to *Chapter 6* for possible <err> values.

AT+CGMM Request Manufacturer Model	
Execution Command **AT+CGMM**	Response **<model>** **OK** **+CME ERROR: <err>**
Test Command **AT+CGMM=?**	Response **OK**

Parameter

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

Example

AT+CGMM
Neul Hi2110

OK

3.3. AT+CGMR   Request Manufacturer Revision

This 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.

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** **+CME ERROR: <err>**
Test Command **AT+CGMR=?**	Response **OK**

Parameter

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

Example

```
AT+CGMR
V100R100C10B650SP6


OK
AT+CGMR=?
OK
```

Neul Hi2110 Implementation

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

3.4. AT+CGSN   Request Product Serial Number

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

AT+CGSN Request Product Serial Number	
Execution Command **AT+CGSN[=<snt>]**	Response When <snt>=0 (or omitted) and command is executed successfully: **<sn>** When <snt>=1 and command is executed successfully: **+CGSN: <imei>** When <snt>=2 and command is executed successfully: **+CGSN: <imeisv>** When <snt>=3 and command is executed successfully: **+CGSN: <svn>** **OK**

	+CME ERROR: <err>
Test Command **AT+CGSN=?**	Response When TE supports <snt> and command is executed successfully: **+CGSN:** (list of supported <snt>s) **OK**

Parameter

<snt>	Integer type indicating the serial number type that has been requested
	<u>0</u> Returns <sn>
	1 Returns the IMEI (International Mobile station Equipment Identity)
	2 Returns the IMEISV (International Mobile station Equipment Identity and Software Version)
	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. Text shall not contain the sequence 0 <CR> or OK<CR>.
<imei>	String type in decimal format indicating the IMEI
<imeisv>	String type in decimal format indicating the IMEISV
<svn>	String type in decimal format indicating the current SVN which is a part of IMEISV

Example

AT+CGSN=1 **490154203237511** **OK**	//Request the IMEI

Neul Hi2110 Implementation

● Serial number, +CGSN=0, is not implemented, and will return an error. This will change in a future release.

3.5. AT+CEREG   EPS Network Registration Status

The set command controls the presentation of an unsolicited result code "+CEREG: <stat>" when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code "+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]" when <n>=2 and there is a change of the network cell in E-UTRAN. The parameters <AcT>, <tac> and <ci> are provided only if available. The value <n>=3 further

extends the unsolicited result code with [,<cause_type>,<reject_cause>], when available, when the value of <stat> changes. Please refer to **Chapter 6** for possible <err> values.

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

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

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

Test command returns values supported as a compound value.

AT+CEREG EPS Network Registration Status	
Set Command **AT+CEREG=[<n>]**	Response **OK** **+CME ERROR: <err>**
Read Command **AT+CEREG?**	Response When <n>=0, 1, 2 or 3 and command is executed successfully: **+CEREG: <n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]]** When <n>=4 or 5 and command is executed successfully: **+CEREG: <n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]** **OK**
Test Command **AT+CEREG=?**	Response **+CEREG:** (list of supported <n>s) **OK**

Parameter

\<n\>	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, indicates the EPS registration status
	0 Not registered, MT is not currently searching an operator to register to
	1 Registered, home network
	2 Not registered, but MT is currently trying to attach or searching an operator to register to
	3 Registration denied
	4 Unknown (e.g. out of E-UTRAN coverage)
	5 Registered, roaming
	6 Registered for "SMS only", home network (not applicable)
	7 Registered for "SMS only", roaming (not applicable)
	8 Attached for emergency bearer services only
	9 Registered for "CSFB not preferred", home network (not applicable)
	10 Registered for "CSFB not preferred", roaming (not applicable)
\<tac\>	String type; two bytes tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)
\<ci\>	String type; four bytes E-UTRAN cell ID in hexadecimal format
\<AcT\>	Integer type; indicates the access technology of the serving cell
	0 GSM (not applicable)
	1 GSM Compact (not applicable)
	2 UTRAN (not applicable)
	3 GSM w/EGPRS (not applicable)
	4 UTRAN w/HSDPA (not applicable)
	5 UTRAN w/HSUPA (not applicable)
	6 UTRAN w/HSDPA and HSUPA (not applicable)
	7 E-UTRAN
\<cause_type\>	Integer type; indicates the type of \<reject_cause\>
	0 Indicates that \<reject_cause\> contains an EMM cause value

	1	Indicates that <reject_cause> contains a manufacturer-specific cause
<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). For the coding and the value range, please refer to the *GPRS Timer 2 IE in 3GPP TS 24.008 Table 10.5.163/3Gpp TS 24.008*, *3GPP TS 23.682* and *3GPP TS 23.401.*
<Periodic-TAU>		String type; one byte in an 8 bit format. Indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, please refer to the *GPRS Timers 3 IE in 3GPP TS 24.008 Table 10.5.163a/3GPP TS 24.008*, *3GPP TS 23.682* and *3GPP TS 23.401.*

NOTES

1. If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the AT+CREG command and AT+CREG: result codes and/or the AT+CGREG command and AT+CGREG: result codes are applied to the registration status and location information for those services.
2. *3GPP TS 24.008* and *3GPP TS 24.301* specify the condition when the MS is considered as attached for emergency bearer services.
3. *3GPP TS 44.060* specifies the system information messages which give the information about whether the serving cell supports EGPRS.
4. *3GPP TS 25.331* specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

Example

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

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

OK
```

Neul Hi2110 Implementation

- Only CEREG <n> values of 0, 1 and 2 are supported.
- <stat> return values 0-5 are supported.

3.6. AT+CSCON   Signalling Connection Status

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

The set command controls the presentation of an unsolicited result code. If <n>=1, "+CSCON: <mode>" is sent from the MT when the connection mode of the MT is changed. If <n>=2 and there is a state within the current mode, "+CSCON: <mode>[,<state>]" is sent from the MT. If <n>=3, "+CSCON: <mode>[,<state>[,<access>]]" is sent from the MT. If setting fails, an MT error, "+CME ERROR: <err>" is returned. Please refer to *Chapter 6* for possible <err> values.

When the MT is in UTRAN or E-UTRAN, the mode of the MT refers to idle when no PS signalling connection and to connected mode when a PS signalling connection between UE and network is setup. When the UE is in GERAN, the mode refers to idle when the MT is in either the IDLE state or the STANDBY state and to connected mode when the MT is in READY state.

The <state> value indicates the state of the MT when the MT is in GERAN, UTRAN connected mode or E-UTRAN.

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

Test command returns supported values as a compound value.

AT+CSCON Signalling Connection Status	
Set Command **AT+CSCON=[<n>]**	Response **OK** **+CME ERROR: <err>**
Read Command **AT+CSCON?**	Response **+CSCON:<n>,<mode>[,<state>]** **OK**

	+CME ERROR: **<err>**
Test Command **AT+CSCON=?**	Response **+CSCON:** (list of supported <n>s) **OK**

Parameter

<n>	Integer type
	0 Disable unsolicited result code
	1 Enable unsolicited result code "+CSCON: <mode>"
	2 Enable unsolicited result code "+CSCON: <mode>[,<state>]"
	3 Enable unsolicited result code "+CSCON: <mode>[,<state>[,<access>]]"
<mode>	Integer type; indicates the signalling connection status
	0 Idle
	1 Connected
	2-255 <reserved for future use>
<state>	Integer type; indicates the CS or PS state while in GERAN and the RRC state information if the MT is in connected mode while in UTRAN and E-UTRAN
	0 UTRAN URA_PCH state
	1 UTRAN Cell_PCH state
	2 UTRAN Cell_FACH state
	3 UTRAN Cell_DCH state
	4 GERAN CS connected state
	5 GERAN PS connected state
	6 GERAN CS and PS connected state
	7 E-UTRAN connected state
<access>	Integer type; indicates the current radio access type
	0 Indicates usage of radio access of type GERAN
	1 Indicates usage of radio access of type UTRAN TDD
	2 Indicates usage of radio access of type UTRAN FDD
	3 Indicates usage of radio access of type E-UTRAN TDD
	4 Indicates usage of radio access of type E-UTRAN FDD

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
```

Neul Hi2110 Implementation

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

3.7. AT+CLAC   List Available Commands

This command lists the available AT commands. Execution command causes the MT 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>** **[<CR><LF><AT Command>[...]]** **OK** **+CME ERROR: <err>**
AT+CLAC=?	Response **OK**

Parameter

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

Example

```
AT+CLAC
AT+GM
AT+GMI
...
AT+GSN
AT+CLAC


OK
```

3.8. AT+CSQ   Get Signal Strength Indicator

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

Execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the MT. Please refer to **Chapter 6** for possible <err> values.

Test command returns values supported as compound values.

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

Parameter

<rssi>	Integer type	
	0	-113dBm or less
	1	-111dBm
	2...30	-109... -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

Example

AT+CSQ
+CSQ:31,99

OK

Neul Hi2110 Implementation

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

3.9. AT+CGPADDR   Show PDP Addresses

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

Test Command	Response
AT+CGPADDR=?	**+CGPADDR:** (list of defined <cid>s)
	OK

Parameter

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

> **NOTE**

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>.

Example

```
AT+CGPADDR=1
+CGPADDR:1,101.43.5.1

OK
AT+CGPADDR=?
+CGPADDR:(1)
```

OK

Neul Hi2110 Implementation

- Only IPv4 is supported.
- <cid> values between 0 & 10 are supported.
- With AUTOCONNECT enabled, <cid>=0 will not be listed until an IP address is acquired.

3.10. AT+COPS   PLMN Selection

Set command forces an attempt to select and register the GSM/UMTS/EPS network operator using the (U)SIM card installed in the currently selected card slot. <mode> is used to select whether the selection is done automatically by the MT or is forced by this command to operator <oper> (it shall be given in format <format>) to a certain access technology, indicated in <AcT>. If the selected operator is not available, no other operator shall be selected (except <mode>=4). If the selected access technology is not available, then the same operator shall be selected in other access technology. The selected operator name format shall also apply to further read commands (AT+COPS?). <mode>=2 forces an attempt to deregister from the network. The selected mode affects all further network registration (e.g. after <mode>=2, MT shall be unregistered until <mode>=0 or 1 is selected). This command should be abortable when registration/deregistration attempt is made. Please refer to *Chapter 6* for possible <err> values.

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.

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 order: home network, networks referenced in SIM or active application in the UICC (GSM or USIM) in the following order: HPLMN selector, user controlled PLMN selector, operator controlled PLMN selector and PLMN selector (in the SIM or GSM application), and other networks.

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

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

AT+COPS   PLMN Selection

Se Command **AT+COPS=[\<mode>[,\<format>[,\<oper>[,\<AcT>]]]]**	Response **OK** **+CME ERROR: \<err>**
Read Command **AT+COPS?**	Response **+COPS:\<mode>[,\<format>,\<oper>][,\<AcT>]** **OK** **+CME ERROR: \<err>**
Test Command **AT+COPS=?**	Response **+COPS:** [list of supported(\<stat>,long alphanumeric \<oper>, short alphanumeric \<oper>, numeric \<oper>[,\<Act>])s][,,(list of supported \<mode>s),(list of supported \<format>s)] **OK** **+CME ERROR: \<err>**

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
	3 Set only \<format> (for read command AT+COPS?), do not attempt to register/deregister (\<oper> and \<AcT> fields are ignored); this value is not applicable in read command response
	4 Manual/automatic (\<oper> field shall be present); if manual selection fails, automatic mode (\<mode>=0) is entered
\<format>	Integer type
	0 Long format alphanumeric \<oper>
	1 Short format alphanumeric \<oper>
	2 Numeric \<oper>
\<oper>	String type; \<format> indicates if the format is alphanumeric or numeric; long alphanumeric format can be up to 16 characters long and short format up to 8 characters; numeric format is the GSM Location Area Identification number which consists of a three BCD digit ITU-T country code coded, plus a two or three BCD digit network code, which is administration specific.
\<stat>	Integer type
	0 Unknown

	1	Available
	2	Current
	3	Forbidden
<AcT>	Integer type; access technology selected	
	0	GSM
	1	GSM compact
	2	UTRAN
	3	GSM w/EGPRS
	4	UTRAN w/HSDPA
	5	UTRAN w/HSUPA
	6	UTRAN w/HSDPA and HSUPA
	7	E-UTRAN

NOTES

1. *3GPP TS 44.060* specifies the system information messages which give the information about whether the serving cell supports EGPRS.
2. *3GPP TS 25.331* specifies the system information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

Example

```
AT+COPS=0,2
OK
AT+COPS?
+COPS:0,2,"46001"

OK
AT+COPS=?
+COPS:(2,"RADIOLINJA","RL","24405"),
(0,"TELE","TELE","24491"),(2)

OK
```

Neul Hi2110 Implementation

● <Act>, if provided, must be set to 7.
● Only <format>=2 is supported.
● Only <mode>=0, <mode>=1 & <mode>=2 are supported.
● 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.
● The test command currently returns the configured values rather than performs a PLMN search.

3.11. AT+CGATT   PS Attach or Detach

The execution command is used to attach the MT to, or detach the MT from, the packet domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the "OK" response is returned. If the requested state cannot be achieved, an "ERROR" or "+CME ERROR" response is returned. Please refer to **Chapter 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	
Execution/Set Command **AT+CGATT=<state>**	Response **OK** **+CME ERROR: <err>**
Read Command **AT+CGATT?**	Response **+CGATT:<state>** **OK**
Test Command **AT+CGATT=?**	Response **+CGATT:** (list of supported <state>s) **OK**

Parameter

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

Example

AT+CGATT?
+CGATT:0

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

OK
```

NOTES

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

Neul Hi2110 Implementation

● When <state>=1, AT+COPS=0 is automatically selected.
● If a AT+CGATT command is in progress, further execution of the AT+CGATT command will return an "Uplink busy" error.

3.12. AT+CIMI   Request International Mobile Subscriber Identity

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

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

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

AT+CIMI Request International Mobile Subscriber Identity	
Execution Command **AT+CIMI**	Response **<IMSI>** **OK** **+CME ERROR: <err>**
Test Command **AT+CIMI=?**	Response **OK**

Parameter

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

Example

```
AT+CIMI
460001357924680

OK
```

Neul Hi2110 Implementation

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

3.13. AT+CGDCONT   Define PDP Context

The set command specifies PDP context parameter values for a PDP context identified by \<cid>, the (local) context identification parameter, and 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 set command, AT+CGDCONT=\<cid> causes the values for context number \<cid> to become undefined.

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

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

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

AT+CGDCONT　Define PDP Context

AT+CGDCONT　Define PDP Context	
Execution/Set Command **AT+CGDCONT=[<cid>[,<PDP_type>[, <APN>[,<PDP_addr>[,<d_comp>[,<h_ comp>[,<IPv4AddrAlloc>[,<request_t ype>[,<P-CSCF_discovery>[,<IM_CN _Si_gnalling_Flag_Ind>[,<NSLPI>[,<s ecurePCO>[,<IPv4_MTU_discovery>][,<Local_Addr_Ind>]]]]]]]]]]]]]**	Response **OK**
Read Command **AT+CGDCONT?**	Response **[+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_co mp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_disco very>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<secure PCO>[,<IPv4_MTU_discovery>]]]]]]]]** **[<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_co mp>[,<IPv4AddrAlloc>[,<request_type>[,<P-CSCF_disco very>[,<IM_CN_Signalling_Flag_Ind>[,<NSLPI>[,<secure PCO>[,<I Pv4_MTU_discovery>]]]]]]]]** **[...]]** **OK**
Test Command **AT+CGDCONT=?**	Response **+CGDCONT:** (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s),(list of supported <IPv4_MTU_discovery>s) **[<CR><LF>+CGDCONT:** (range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <request_type>s),(list of supported <p-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) ,(list of supported <NSLPI>s),(list of supported <securePCO>s,(list of supported <IPv4_MTU_discovery>s)) [...]] **OK**

Parameter

\<cid\>	Integer type; specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value=1 or if the initial PDP context is supported, minimum value=0) is returned by the test form of the command.
	The \<cid\>s for network-initiated PDP contexts will have values outside the ranges indicated for the \<cid\> in the test form of the AT+CGDCONT and AT+CGDSCONT commands.
\<PDP_type\>	String type; specifies the type of packet data protocol. The default value is manufacturer specific.

X.25	ITU-T/CCITT X.25 layer 3 (Obsolete)
IP	Internet Protocol (IETF STD 5 [103])
IPV6	Internet Protocol, version 6
IPV4V6	Virtual \<PDP_type\> introduced to handle dual IP stack UE capability
OSPIH	Internet Hosted Octect Stream Protocol (Obsolete)
PPP	Point to Point Protocol (IETF STD 51 [104])

Only IP, IPV6 and IPV4V6 values are supported for EPS services.

\<APN\>	String type; a logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested. The APN is a string of up to 82 characters.
\<PDP_addr\>	String type; identifies the MT in the address space applicable to the PDP. This parameter can be left blank.
	When AT+CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of AT+CGDCONT.
	The value of this parameter is ignored with the set command. The parameter is included in the set command for backwards compatibility reasons only.
\<d_comp\>	Integer type; controls PDP data compression

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

\<h_comp\>	Integer type; controls PDP header compression

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

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

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

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

24.008 (subclause 4.2.4.2.2 and subclause 4.2.5.1.4) and *3GPP TS 24.301 (subclause 5.2.2.3.3 and subclause 5.2.3.2.2),* a separate PDP context must be established for emergency bearer services.

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

<u>0</u>   PDP context is for new PDP context establishment or for handover from a non-3GPP access network (how the MT decides whether the PDP context is for new PDP context establishment or for handover is implementation specific).

1   PDP context is for emergency bearer services

2   PDP context is for new PDP context establishment

3   PDP context is for handover from a non-3GPP access network

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

<u>0</u>   Preference of P-CSCF address discovery not influenced by +CGDCONT

1   Preference of P-CSCF address discovery through NAS signalling

2   Preference of P-CSCF address discovery through DHCP

<IM_CN_Signalling_Flag_Ind> Integer type; indicates to the network whether the PDP context is for IM CN subsystem related signalling only or not.

<u>0</u>   UE indicates that the PDP context is not for IM CN subsystem-related signalling only

1   UE indicates that the PDP context is for IM CN subsystem-related signalling only

<NSLPI> Integer type; indicates the NAS signalling priority requested for this PDP context

<u>0</u>   Indicates that this PDP context is to be activated with the value for the low priority indicator configured in the MT.

1   Indicates that this PDP context is to be activated with the value for the low priority indicator set to "MS is not configured for NAS signalling low priority".

The MT utilizes the provided NSLPI information as specified in *3GPP TS 24.301 [83]* and *3GPP TS 24.008.*

<securePCO> Integer type. Specifies if security protected transmission of PCO is requested or not (applicable for EPS only).

<u>0</u>   Security protected transmission of PCO is not requested

1   Security protected transmission of PCO is requested

<IPv4_MTU_discovery> Integer type; influences how the MT/TA requests to get the IPv4 MTU size, refer to *3GPP TS 24.008 subclause 10.5.6.3.*

<u>0</u>   Preference of IPv4 MTU size discovery not influenced by AT+CGDCONT

1   Preference of IPv4 MTU size discovery through NAS signalling

Example

AT+CGDCONT=?
+CGDCONT:(1-3),("IP"),,,(0-1),(0-1)

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

OK

Neul Hi2110 Implementation

- Only <PDP_type>="IP" is supported. <PDP_type>="IPV6" will be supported in a future release.
- Neul supports AT+CGDCONT=<cid>,<PDP_type>,<APN> only.
- <cid> values of 0-10 are supported.
- <cid>=0 is read only and is only defined when AUTOCONNECT is enabled.
- Only <hcomp> and <dcomp> values of 0 are supported.

3.14. AT+CFUN   Set Phone Functionality

Set command selects the level of functionality in the MT. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn. Level of functionality between these may also be specified by manufacturers. When supported by manufacturers, MT resetting with <rst> parameter may be utilized. Please refer to *Chapter 6* for possible <err> values.

NOTE

It is manufacturer specific if this command affects network registration. AT+COPS is used to force registration/deregistration.

Read command returns the current setting of <fun>.

Test command returns values supported by the MT as compound values.

AT+CFUN Set Phone Functionality	
Set Command **AT+CFUN=[<fun>[,<rst>]]**	Response **OK** **+CME ERROR: <err>**

Read Command **AT+CFUN?**	Response **+CFUN:<fun>** **OK**
Test Command **AT+CFUN=?**	Response **+CFUN:**(list of supported**<fun>**s), (list of supported**<rst>**s) **OK**

Parameter

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

Example

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

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

OK
```

Neul Hi2110 Implementation

- Only <fun>=0&1 are supported.
- <rst> is not supported and will be ignored.

3.15. AT+CMEE   Report Mobile Termination Error

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

Read command returns the current setting of <n>.

Test command returns values supported as a compound value.

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

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

Parameter

<n>	Integer type	
	<u>0</u>	Disable "+CMEE ERROR: <err>" result code and use "ERROR" instead
	1	Enable "+CMEE ERROR: <err>" result code and use numeric <err> values (Please refer to *Chapter 6* for possible <err> values)
	2	Enable "+CMEE ERROR: <err>" result code and use verbose <err> values

Neul Hi2110 Implementation

● Only <n>=0 & <n>=1 are supported.

4 Neul Commands

4.1. AT+NMGS　Neul Send Message Command

The send message command is used to send a message from the terminal to the network via the CDP server. This command will give an <err> code and description as an intermediate message if it cannot send the message. Please refer to **Chapter 6** for possible <err> values.

AT+NMGS　Neul Send Message Command	
Set Command AT+NMGS=<length>,<data>	Response **OK** **+CME ERROR: <err>**

Parameter

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

Example

AT+NMGS=3,AA11BB
OK

Neul Hi2110 Implementation

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

4.2. AT+NMGR　Neul Get Message Command

Receive a message from the CDP server.

The get message command returns the oldest buffered message and deletes 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 Neul Get Message Command	
Execution Command **AT+NMGR**	Response **<length>,<data>** **OK** **+CME ERROR: <err>**

Parameter

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

Example

AT+NMGR
5,48656C6C6F

OK

Neul Hi2110 Implementation

● Maximum received data length is 512 bytes.

4.3. AT+NNMI   Neul New Message Indications

This command sets or gets new message indications that are sent. New message indications can be sent when a downstream message is received by the terminal from the CDP server. Please refer to **Chapter 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 0: no indications are sent.

AT+NNMI Neul New Message Indications	
Set Command **AT+NNMI=<status>**	Response **OK** **+CME ERROR: <err>**
Read Command **AT+NNMI?**	Response **+NNMI:<status>** **OK**

Parameter

<status>	0	No indications, the default setting
	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
```

4.4. AT+NSMI   Neul Sent Message Indications

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

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

The default setting is 0: no indications are sent.

AT+NSMI Neul Sent Message Indications	
Set Command **AT+NSMI=<indications>**	Response **OK** **+CME ERROR: <err>**
Read Command **AT+NSMI?**	Response **+NSMI:<indications>** **OK**

Parameter

<indications>	0	No indications, the default setting
	1	Indications will be sent
<status>	SENT	
	DISCARDED	

Example

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

OK
```

4.5. AT+NQMGR   Neul Query Messages Received

This command queries the status of the downstream messages received from the CDP server. Please refer to *Chapter 6* for possible <err> values.

AT+NQMGR Neul Query Messages Received	
Execution Command **AT+NQMGR**	Response **BUFFERED=<buffered>,** **RECEIVED=<received>,** **DROPPED=<dropped>** **OK** **+CME ERROR: <err>**

Parameter

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

Example

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

OK

4.6. AT+NQMGS   Neul Query Messages Sent

This command queries the status of the upstream messages sent to the CDP server. Please refer to **Chapter 6** for possible <err> values.

AT+NQMGS Neul Query Messages Sent	
Execution Command **AT+NQMGS**	Response **PENDING=<pending>, SEND=<sent>, ERROR=<error>** **OK** **+CME ERROR: <err>**

Parameter

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

Example

AT+NQMGS
PENDING=1,SEND=34,ERROR=0

OK

4.7. AT+NRB   Neul Reboot

This command reboots the terminal. There is a short delay after issuing this command before the terminal 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 Neul Reboot	
Execution Command **AT+NRB**	Response **REBOOTING**

Example
AT+NRB **REBOOTING**

4.8. AT+NCDP   Configure and Query CDP Server Settings

This command is used to set and query the server IP address and port for the Connected Device Platform (CDP) server. It is used when there is a Neul CDP or Huawei IoT platform acting as gateway to network server applications. Please refer to *Chapter 6* for possible <err> values.

AT+NCDP Configure and Query CDP Server Settings	
Set Command **AT+NCDP=<ip_addr>[,<port>]**	Response Update the CDP server configuration from the supplied parameters. If they are set correctly, return "OK". If it fails, an error is returned. **+CME ERROR: <err>**
Test Command **AT+NCDP?**	Response Return the current CDP server IP address and port. Return an error if not set. **+NCDP:<ip_addr>,<port>** **OK** **+CME ERROR: <err>**

Parameter

<ip_addr>	IPv4 address, IP address in dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4
<port>	Unsigned integer, 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.

Example

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

OK

Neul Hi2110 Implementation

- Only IPv4 is supported.
- The values assigned are persistent across reboots.
- This command is available after the IMEI has been configured.
- This command must be executed when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).
- IP addresses can be specified in decimal, octal or hexadecimal notation.

4.9. AT+NUESTATS Query UE Statistics

This 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 "RADIO" <type> provides the default set of values. <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>** **DL MCS: <last DL MCS value>** **UL MCS: <last UL MCS value>**

	DCI_MCS: <last DCI MCS value>
	ECL: <last ECL value>
	SNR:<last snr value>
	EARFCN: <last earfcn value>
	PCI: <last pci value>
	OK
	+CME ERROR: <err>
AT+NUESTATS=CELL	NUESTATS:CELL, <earfcn>,<physical cell id>,<primary cell>,<rsrp>,<rsrq>,<rssi>
	[...
	NUESTATS:CELL, <earfcn>,<physical cell id>,<primary cell>,<rsrp>,<rsrq>,<rssi>]
	+CME ERROR: <err>
AT+NUESTATS=THP	NUESTATS:THP,<throughput_type>,<throughput>
	[...
	NUESTATS:THP,<throughput_type>,<throughput>]
	+CME ERROR: <err>
AT+NUESTATS=<type>	NUESTATS:<type>,<name/value>,<value>[,<value[,<value>[...]]]
	[...
	NUESTATS:<type>,<name/value>,<value>[,<value[,<value>[...]]]
	+CME ERROR: <err>

Parameter

<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 cell ID>	Last cell ID
<last DL MCS value>	Last DL MCS value
<last UL MCS value>	Last UL MCS value
<last DCI MCS value>	Last DCI MCS value
<last ECL value>	Last ECL value

\<last snr value\>	Last snr value
\<last earfcn value\>	Last earfcn value
\<last pci value\>	Last pci value
\<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
ALL	All information. The value of \<type\> output is the correct one for each data type.

If the \<type\>=RADIO, return the default set of values:

\<signal power in centibels\>
\<total power in centibels\>
\<current Tx power level in centibels\>
\<total Tx time since last reboot in millisecond\>
\<total Rx time since last reboot in millisecond\>
\<last cell ID\>
\<last DL MCS value\>
\<last UL MCS value\>
\<last DCI MCS value\>
\<last ECL value\>
\<last snr value\>
\<last earfcn value\>
\<last pci value\>

If the \<type\> = CELL, 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

If the \<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 the <type>=THP, returned entries are:

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

Example

AT+NEUSTATS
Signal power:-904
Total power:-874
TX power:23
TX time:4322
RX time:17847
Cell ID:256
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:300
EARFCN:2525
PCI:0

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

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

Neul Hi2110 Implementation

● The variant of NUESTATS without an argument may be deprecated in a future release.
● AT+NUESTATS=CELL is not implemented now, and it will be added in the future.

4.10. AT+NEARFCN   Specify Search Frequencies

The set command provides a mechanism to lock to a specific E-ULTRA Absolut Radio Frequency Channel Number (EARFCN). All actions will be locked to this carrier until either the lock is removed or the UE is rebooted. Please refer to **Chapter 6** for possible <err> values.

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

Parameter

<search_mode>	Specifies the type of search and defines the supplied parameters 0 Single point EARFCN search
<earfcn>	A number in the range 1-65535 representing the EARFCN to search. An <earfcn> value of 0 will remove the restriction.

Example

AT+NEARFCN=0,10
OK

4.11. AT+NSOCR   Create a Socket

This 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, port combination, AT+NSOCR will fail if requested a second time.

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

Parameter

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

Example

```
AT+NSOCR=DGRAM,17,5683,1
0

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

OK
```

Neul Hi2110 Implementation

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

4.12. AT+NSOST   SendTo Command (UDP Only)

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

This 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)	
Set Command **AT+NSOST=socket,remote_addr,remote_port, length,data**	Response **<socket>,<length>** **OK** **+CME ERROR: <err>**

Parameter

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

Example

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

OK

Neul Hi2110 Implementation

● Maximum data size is 512 bytes.
● Only IPv4 is supported.
● <data>: only hex string format is supported.
● IP addresses can be specified in decimal, octal or hexadecimal notation.

4.13. AT+NSORF   Receive Command (UDP Only)

Read up to <req_length> characters of data from <socket>, and returned length is the actual number of characters returned.

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 (UDP Only)	
Set Command **AT+NSORF=<socket>,<req_length>**	Response **<socket>,<ip_addr>,<port>,<length>,<data>,<remaining_ length>** **OK** **+CME ERROR: <err>**

Parameter

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

Example

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

OK

Neul Hi2110 Implementation

● Maximum data size is 512 bytes.
● Only IPv4 is supported.
● Remaining length is always 0. The remaining data is readable.

4.14. AT+NSOCL   Close Socket

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 Socket	
Set Command **AT+NSOCL=<socket>**	Response **OK** **+CME ERROR: <err>**

Parameter

<socket>	Socket number returned by AT+NSOCR

Example

AT+NSOCL=0
OK

4.15. +NSONMI   Socket Message Arrived Indicator (Response Only)

Unsolicited message to notify that data has been received on a socket and is ready to be read. This command returns socket number and number of bytes of data available to read for the first message that is queued. If another message is received on the same socket, it will only be notified when the preceding

message has been completely read. Please refer to *Chapter 6* for possible <err> values.

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

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

Neul Hi2110 Implementation

● Maximum data size is 512 bytes.
● 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.

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

This 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	
Set Command **AT+NPING=<remote_address>**	Response **OK** **+NPING:<retry_num>,<remote_address>,<ttl>,<rtt>** If failed to test, response: **+NPINGERR: <err>**

Parameter

\<remote_address\>	Address of system sending the message
	IPv4 A dot notation IP address
\<retry_num\>	Number of packets sent before a response was received
\<ttl\>	TTL in the response packet
\<rtt\>	Elapsed time in msec from packet sent to response received
\<err\>	An integer value to provide some information on why the ping request failed
	1 No response from remote host within timeout period
	2 Failed to send ping request

Neul Hi2110 Implementation

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

4.17. AT+NBAND   Set Supported Bands

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

AT+NBAND Set Supported Bands	
Set Command **AT+NBAND=n[,n[,n[…]]]**	Response **OK** **+CME ERROR: \<err\>**
Read Command **AT+NBAND?**	Response **+NBAND: n[,n[,n[…]]]** **OK**
Execution Command **AT+NBAND=?**	Response **+NBAND: (n[,n[,n[…]]])** **OK**

Parameter

\<n\>	Band in a decimal number

Neul Hi2110 Implementation

● Only bands 5, 8 and 20 are supported currently.

4.18. AT+NLOGLEVEL   Set Debug Logging Level

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

AT+NLOGLEVEL Set Debug Logging Level	
Set Command **AT+NLOGLEVEL=\<core>,\<level>**	Response **OK** **+CME ERROR: \<err>**
Read Command **AT+NLOGLEVEL?**	Response **+NLOGLEVEL:\<core>,\<level>** **OK**
Execution Command **AT+NLOGLEVEL=?**	Response **+NLOGLEVEL:(\<core>, …),(\<level>,\<level>, …)** **OK**

Parameter

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

Neul Hi2110 Implementation

- Logging level is not persistent.
- Default logging level is NORMAL
- APPLICATION and SECURITY core logging are not supported.

4.19. AT+NCONFIG   Configure UE Behaviour

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

AT+NCONFIG   Configure UE Behaviour

Set Command	Response
AT+NCONFIG=<function>,<value>	**OK**
	+CME ERROR: <err>
Read Command	Response
AT+NCONFIG?	**+NCONFIG:<function>,<value>**
	[+NCONFIG:<function>,<value>
	[…]]
	OK
Execution Command	Response
AT+NCONFIG=?	**+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))**
	[+NCONFIG:(<function>,(<value1>,<value2>[,<value3>[,…]]))
	[,…]]
	OK

Parameter

<function>	UE function to configure
	AUTOCONNECT: Control whether the platform will automatically attempt to connect to the network after power-on or reboot. When enabled, it will set AT+CFUN=1 and read the PLMN from the SIM. And it will use the APN provided by the network.

5 Temporary Commands

As part of development, some commands are temporarily added. They are unsupported and may disappear or change behaviour, without warning. They are listed here for completeness.

5.1. AT+NTSETID   Set ID

Set system identities such as UUID or IMEI value. This is a temporary command that will be replaced with a production tool.

AT+NTSETID Set ID	
Set Command AT+NTSETID=<snt>,<data>	Response **OK** **+CME ERROR: <err>**

Parameter

<snt>	Integer type indicating the serial number type that has been requested		
	1	Set the IMEI	
	2	SVN	
<data>	If <snt>=1	IMEI	15-character string type in decimal format
	If <snt>=2	SVN	2 digit SVN

Example

AT+NTSETID=1,123456789012345
OK

Neul Hi2110 Implementation

● IMEI is persistent.
● SVN is not persistent and will default to 0x00.
● IMEI can only be set when the radio is inactive (AT+CFUN=0 will force the module to enter into this state).

6 Error Values

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

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

Error codes are compliant with the 3GPP specifications. Please refer to *3GPP TS 27.007 V13.5.0, sub-clause 9.2* for all possible <err> values. The error codes listed are those returned for the Hi2110 implementation.

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

Table 3: Error Values

Error Code	Error Text
3	Operation not allowed
4	Operation not supported
23	Memory failure
32	Flow control
50	Incorrect parameters
159	Uplink busy
256	Required parameter not configured

7 Examples

7.1. Attach Network

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

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

The module's band is defaulted as 900MHz (factory setting), customers can configure the band by AT+NBAND=n command and the configuration will take effect after restarting the module by using AT+NRB.

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

Module Type	BC95-B8 (BC95-CM)	BC95-B5 (BC95-SL)	BC95-B20 (BC95-VF)
Frequency band	900MHz	850MHz	800MHz

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

AT+NBAND?　　　　//Query the band

+NBAND:8

OK
AT+CFUN?　　　　//Value is 1.

+CFUN:1

OK
AT+CIMI　　　　//Query the IMSI.

460012345678969

OK
AT+CSQ   //Query the signal strength.

+CSQ:21,99

OK
AT+NUESTATS   //Query the module status.

Signal power:-904
Total power:-874
TX power:23
TX time:4322
RX time:17847
Cell ID:256
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:300
EARFCN:2525
PCI:0

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

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

OK
AT+CSCON?   //Query the signal connection status, 1 means CONNECT, 0 means IDLE.

+CSCON:0,1

OK

The following shows two ways of manual network attachment process.

1. Do not specify PLMN.

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

460012345678966

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

OK
AT+CGDCONT=1,"IP","APN"   //APN is a local access point, and it needs to be configured accordingly or not configured.

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

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

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

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

AT+CSQ   //Query current signal quality.

+CSQ:31,99

OK
AT+NUESTATS   //Query the module status.

```
Signal power:-904
Total power:-874
TX power:23
TX time:4322
RX time:17847
Cell ID:256
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:300
EARFCN:2525
PCI:0

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

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

OK
AT+CSCON?          //Query the signaling connection status, 1 means CONNECT, 0 means IDLE.
+CSCON:1,1

OK
```

2. Specify PLMN.

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

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

OK
AT+CGDCONT=1,"IP","APN"   //APN is a local access point, and it needs to be configured accordingly
                                                             or not configured.
OK
AT+CEREG=1   //Set to automatically report network registration status, when the
                                                       module is registered on the network, a URC will be reported.
OK
AT+CSCON=1   //Set to automatically report network registration status, when the
                                                       module is registered on the network, a URC will be reported.
OK
AT+COPS=1,2,"46000"   //Specify the PLMN searching or automatic searching, PLMN needs to
                                                       be configured by customers.
OK
AT+CSQ   //Query current signal quality.

+CSQ:31,99

OK
AT+NUESTATS   //Query the module status.

Signal power:-904
Total power:-874
TX power:23
TX time:4322
RX time:17847
Cell ID:256
DL MCS:0
UL MCS:0
DCI MCS:2
ECL:0
SNR:300
EARFCN:2525
PCI:0

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

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

OK

AT+CSCON?   //Query the signaling connection status, 1 means CONNECT, 0 means IDLE.
+CSCON:1,1

OK

7.2. CoAP Messages

The following is a simple example of sending, receiving and reading a CoAP message.

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

+CGSN: 863703030104298

OK
AT+NCDP=192.53.100.53   //Configuration CDP server, the value will be saved and configure it only once. This command must be executed after executing AT+CFUN=0. (The server can be configured before attaching the network)
OK
AT+NCDP?   //Query CDP server

+NCDP:192.53.100.53,5683

OK
AT+NSMI=1   //Enable to send message indications.

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

OK

+NSMI:SENT   //Message is sent.

AT+NQMGS   //Query whether the messages is sent successfully.

PENDING=0,SEND=1,ERROR=0

OK

+NNMI   //Receive a downstream message.

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

OK
AT+NMGR   //Get the message.

2,AABB

OK
AT+NQMGR   //Query whether the messages is received.

BUFFERED=0,RECEIVED=1,DROPPED=0

OK

7.3. UDP Messages

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

AT+NSOCR= DGRAM,17,5683,1   //Create a socket
0

OK
AT+NSOST=0,192.53.100.53,5683,25,400241C7B17401724D0265703D3230313630383233331363438
                                  //Send a message
0,25

OK
+NSONMI:0,4   //Receive the message

AT+NSORF=0,4   //Read the messages

0,192.53.100.53,5683,4,60A041C7,0

OK
AT+NSOCL=0   //Close the socket

OK

8 Appendix A Reference

Table 4: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
CDP	Connected Device Platform
CS	Circuit Switched
DCE	Data Communication Equipment
EGPRS	Enhanced General Packet Radio Service
GPRS	General Packet Radio Service
GERAN	GSM/EDGE Radio Access Network
HPLMN	Home Public Land Mobile Network
HSDPA	High Speed Downlink Packet Access
HSUPA	High-Speed Uplink Packet Access
IMEI	International Mobile Equipment Identity
IMEISV	International Mobile Equipment Identity and Software Version
ICMP	Internet Control Messages Protocol
MS	Mobile Station
NB-IoT	Narrow Band Internet of Thing
PDP	Packet Data Protocol
RRC	Radio Resource Control
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
UUID	Universally Unique Identifier