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BC26_LwM2M

AT Commands Manual

NB-IoT Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2018-03-26	Randy LI	Initial
1.1	2018-04-12	Randy LI	Added AT+QLWCFG for Configure Data Display Format, Added AT+QLWRD for Read Data from Buffer.
1.2	2018-05-09	Randy LI	Modified AT+QLWCFG Format, added “dataformat” to Identify Optional Parameters.

Contents

Table Index

1 Introduction

This document gives details of the LwM2M AT Command Set supported by Quectel NB-IoT BC26 module.

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 1: AT Command Syntax

Test Command	**AT+<cmd>=?**	This command returns the list of parameters and value ranges set by the corresponding Write Command or internal processes.
Read Command	**AT+<cmd>?**	This command returns the currently set value of the parameter or parameters.
Write Command	**AT+<cmd>=p1[,p2[,p3[.....]]]**	This command sets the user-definable parameter values.
Execution Command	**AT+<cmd>**	This command reads non-variable parameters affected by internal processes in the Module engine.

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 '=?'.

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>

2 Implementation Status

Table 2: Types of AT Commands and Implementation Status

AT Command	Description	Implementation Status
AT+QLWSERV	Configure the IoT Platform Address and Port	R01A04
AT+QLWCONF	Configure the IoT Platform Parameters	R01A04
AT+QLWADDOBJ	Add a LwM2M Object	R01A04
AT+QLWDELOBJ	Delete a LwM2M Object	R01A04
AT+QLWOPEN	Send a Register Request	R01A04
AT+QLWUPDATE	Send an Update Request	R01A04
AT+QLWCLOSE	Send a Deregister Request	R01A04
AT+QLWDATASEND	Send Data with Mode	R01A04
AT+QLWDATASTATUS	Query CON Messages Sent Status	R01A04
AT+QLWDEL	Delete the LwM2M Configuration	R01A04
AT+QLWRD	Receive Data from Buffer	R01A04
AT+QLWCFG	Configure Optional Parameters	R01A05

NOTE

"*" means the commands listed in this chapter are under development.

3 LwM2M AT Commands

3.1. AT+QLWSERV Configure the IoT Platform Address and Port

The command is used to set address and port information for module to connect to the IoT platform.

AT+QLWSERV Configure the IoT Platform Address and Port	
Set Command **AT+QLWSERV=<"ip_addr">,<port>**	Response **OK** If there is any error, response: **ERROR**
Read Command **AT+QLWSERV?**	Response **+QLWSERV: <"ip_addr">,<port>** **OK**
Test Command **AT+QLWSERV=?**	Response **+QLWSERV: <"ip_addr">,<port>** **OK**

Parameter

<ip_addr>	String; The IoT platform ip address.
<port>	Integer; The IoT platform port.

Example

```
AT+QLWSERV="180.101.147.115",5683
OK

AT+QLWSERV?
+QLWERV:"180.101.147.115",5683

OK
```

3.2. AT+QLWCONF Configure the IoT Platform Parameters

The command is used to set configuration information for module to connect to the IoT platform.

AT+QLWCONF Configure the IoT Platform Parameters	
Set Command **AT+QLWCONF=<"endpoint">**	Response **OK** If there is any error, response: **ERROR**
Read Command **AT+QLWCONF?**	Response **+QLWCONF:<"endpoint">** **OK**
Test Command **AT+QLWCONF=?**	Response **+QLWCONF: <"endpoint">** **OK**

Parameter

<"endpoint">	String; The device's endpoint name.

Example

```
AT+QLWCONF="866971030001361"
OK

AT+QLWCONF?
+QLWCONF:"866971030001361"

OK
```

3.3. AT+QLWADDOBJ Add a LwM2M Object

The command is used to add a LwM2M object ID.

AT+QLWADDOBJ Add a LwM2M Object

Set Command **AT+QLWADDOBJ=<obj_id>,[<ins_id>[,<res_num>,<”res_id”>]]**	Response **OK** If there is any error, response: **ERROR**
Test Command **AT+QLWADDOBJ=?**	Response **+QLWADDOBJ :** **<obj_id>,[<ins_id>[,<res_num>,<”res_id”>]]** **OK**

Parameter

<obj_id>	Integer; Object id. The max object id number is 65535.
<ins_id>	Integer; Instance id.
<res_num>	Integer; Resources id number.
<”res_id”>	Resources id.

Example

```
AT+QLWADDOBJ=19,0,1,”0”        //Add /19/0/0 to the LwM2M parameters.
OK

AT+QLWADDOBJ=19,1,1,”0”        //Add /19/0/0 to the LwM2M parameters
OK
```

3.4. AT+QLWDELOBJ Delete a LwM2M Object

The command is used to delete a LwM2M object.

AT+QLWDELOBJ Delete a LwM2M Object	
Set Command **AT+QLWDELOBJ=<obj_id>**	Response **OK** If there is any error, response: **ERROR**
Test Command **AT+QLWDELOBJ=?**	Response **+QLWDELOB: <obj_id>** **OK**

Parameter

<obj_id>	The LwM2M object ID.

Example

```
AT+QLWADDOBJ=19,1,1,"0"  //Add /19/1/0 to the LwM2M parameters.
OK

AT+QLWDELOBJ=19     //Delete the object 19. If module haven't register to IoT, there are haven't notify Lwm2m Platform
OK

UPDATE OK          //Notify the LwM2M successful. If module haven't register to IoT, there are haven't update operation.
```

3.5. AT+QLWOPEN Send a Register Request with Data Mode

The command is used to send a register request to IoT platform.

AT+QLWOPEN Send a Register Request	
Execution Command **AT+QLWOPEN[=<mode>]**	Response **OK** If there is any error, response: **ERROR**
	If the module is successfully registered to the IoT platform, there are response: **CONNECT OK** If there is any error, response: **CONNECT FAIL**

Parameter

<mode>	Integer type, the data mode of lwm2m. 0 Direct push mode 1 Buffer access mode

Example

```
AT+QLWOPEN=0            //register and set direct push mode
OK

CONNECT OK             //this mean module successfully regitsted to the IoT platform; if there are any
                         error, there are show CONNECT FAIL.
```

3.6. AT+QLWUPDATE Send an Update Request

The command is used to send an update request to the IoT platform.

AT+QLWUPDATE Send an Update Request	
Execution Command **AT+QLWUPDATE**	Response **OK** If there is any error, response: **ERROR**

	If the iot platform was successfully updated, there are response:
	UPDATE OK
	
	If there is any error, response:
	UPDATE FAIL

Example

```
AT+QLWUPDATE
OK

UPDATE OK             //this means the iot platform was updated successfully. if there are any error,
                        there are show UPDATE FAIL.
```

3.7. AT+QLWCLOSE Send a Deregister Request

The command is used to control module to launch deregister to the IoT platform.

AT+QLWCLOSE Send a Deregister Request

Execution Command **AT+QLWCLOSE**	Response **OK** If there is any error, response: **ERROR**
	If the iot platform successfully responded to the module's deregister request, there are response: **CLOSE OK** If there is any error, response: **CLOSE FAIL**

Example

```
AT+QLWCLOSE
OK

CLOSE OK
```

3.8. AT+QLWDATASEND Send Data with Mode

This command is used to send CON or NON data to the IOT platform. After sending CON data, the sending result will be automatically notified to the terminal. Terminal can also use the command AT+QLWDATASTATUS? to query the status of the CON data that has been sent.

AT+QLWDATASEND Send Data with Mode	
Set Command **AT+QLWDATASEND=<obj_id>,<ins_id>,<res_id>,<length>,<data>,<mode>**	Response **OK** If there is any error, response: **ERROR**
Test Command **AT+QLWDATASEND=?**	Response **+QLWDATASEND:** **<obj_id>,<ins_id>,<res_id>,<length>,<data>,<mode>**
	If the mode is CON, when the server acked, there are automatically notified to the terminal: **SEND OK** If there is any error, response: **SEND FAIL**

Parameter

<obj_id>	Integer; Object ID.
<ins_id	Integer**;** Instance ID.
<res_id>	Integer; Resources ID.
<length>	Integer; Length of data sent.
<data>	Hexadecimal format string
<mode>	0x0000 Send NON message 0x0100 Send CON message

Example

```
AT+QLWDATASEND=19,0,0,1,00,0x0000    //Send data with NON type to the IoT platform
OK

AT+QLWDATASEND=19,0,0,1,01,0x0100    //Send string data with CON type to the IoT platform
OK

SEND OK
```

Quectel Implementation

- There is a maximum data length of 512 bytes.
- 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.

3.9. AT+QLWCFG Configure Optional Parameters

This command is used to configure optional parameters.

AT+QLWCFG Configure Optional Parameters	
Set Command **AT+QLWCFG=<"dataformat">,<send_data_format>,<recv_data_format>**	Response **OK** If there is any error, response: **ERROR**
Test Command **AT+QLWCFG=?**	Response **+QLWCFG: <"dataformat">,< send_data_format >,< recv_data_format >** **OK** If there is any error, response:

	ERROR

Parameter

<send_data_format>	Integer Type. 0 Text mode 1 Hex mode
<recv_data_format>	Integer Type. 0 Text mode 1 Hex mode

Example

```
AT+QLWCFG=”dataformat”,1,1      //set send and receive hex string mode

OK

AT+QLWCFG=”dataformat”,1,0       //send is hex mode, receive is text mode

OK
```

3.10. AT+QLWRD Receive Data from Buffer

This command receive data from buffer.

AT+QLWRD Receive Data from Buffer	
Set Command **AT+QLWRD=<read_length>**	Response **+QLWRD:<read_actual_length>,<remain_length>** **<data>** **OK** If no data, return: **+QLWRD: 0** **OK** If there is any error, response: **ERROR**
Test Command **AT+QLWRD=?**	Response **+QLWRD: <read_length>**

	OK

Parameter

<read_length>	Integer; The maximum length of data to be retrieved, the range is 0-1024
<read_actual_length>	Integer; The actual length of received data
<remain_length>	Integer; The unread length of received data

Example

```
AT+QLWRD=2        //read data from buffer
+QLWRD:2,2
AAAA

OK
AT+QLWRD=2
+QLWRD:2,0
0000

OK

AT+QLWRD=4        //buffer is empty, there is return +QLWRD:0
+QLWRD:0

OK
```

3.11. AT+QLWDATASTATUS Query CON Messages Sent Status

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

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

Parameter

<status>	Status of the CON data has been sent 0 Have not sent 1 Sent, waiting response of IoT platform 2 Sent failed 3 Timeout 4 Success 5 Got reset message

Example

```
AT+QLWDATASEND=19,0,0,1,01,0x0100   //Send data with CON type to the iot platform
OK

SEND OK

AT+QLWDATASTATUS?
+QLWDATASTATUS:4                                //Sent success.

OK
```

Quectel Implementation

- This command only queries the status of the CON data that has been sent.

3.12. AT+QLWDEL Delete the LwM2M Configuration

This command delete the LwM2M configuration.

AT+QLWDEL Delete the LwM2M Configuration	
Execution Command **AT+QLWDEL**	Response **OK** If there is any error, response: **ERROR**

4 LwM2M Related Notifications

This chapter gives LwM2M related notifications and their descriptions.

Table 3: LWM2M Related Notifications

Index	Notification Display	Description
[1]	**+QLWOBSERVE:<flag>,<obj_id>,<ins_id>,<res_id>**	When the Application Server or IoT platform sends a observer request, If the module receive this request, and will report the URC.
[2]	**+QLWDATARECV:<obj_id>,<ins_id>,<res_id>,<length>,<data>**	When the Application Server or IoT platform sends a write request, If the module receive this request, and will report the URC.

批注 [j1]: 描述不清晰，建议调整

4.1. Description of URC "+QLWOBSERVE"

The module reports the LwM2M observe event to the device.

+QLWOBSERVE	**Notify the Device that the Observe Request from the Server**
+QLWOBSERVE:<flag>,<obj_id>,<ins_id>,<res_id>	Notify the obsereve request from Application server or IoT platform.

Paramet

<flag> Integer; Indicates whether to observe or not observe.
0 Observer
1 Cancel Observer

<obj_id> Integer; Object id.

<ins_id> Integer; Instance id.

<res_id> Integer; Resources id.
-1 All of resource about the instance.

4.2. Description of URC “+QLWDATARECV”

The module reports the LwM2M received data event to the device.

+QLWDATARECV	Notify the Device that the Received Data from the Server
+QLWDATARECV:<obj_id>,<ins_id>,<res_id>,<length>[,<data>]	Direct push mode/Buffer mode. Notify the data received from Application server or IoT platform.

Parameter

<obj_id>	Integer; Object id.
<ins_id>	Integer; Instance id.
<res_id>	Integer; Resources id.
<length>	Integer; Length of data received. The max length is 512 bytes.
<data>	The data format depends on AT+QLWCFG’s configure.

5 Examples

5.1. Register to the IoT platform

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

AT+QLWSERV=”180.101.147.115”,5683
OK               // Set IoT platform ip address, port.
                 // If wants to connect to the other IoT platform, should execute the command
AT+QLWDEL,and set again.

AT+QLWCONF=”867724030023557”
OK               // Set IoT platform IMEI number.
                 // If configuration of the IMEI is error, should execute the command AT+QLWDEL, and set
again.

AT+QLWADDOBJ=19,0,1,"0"                         //Add a LwM2M Object 19/0/0 & 19/1/0; 19/0/0---uplink
```

```
19/0/1---downlink
OK
AT+QLWADDOBJ=19,1,1,"0"
OK

AT+QLWOPEN=0                       //Start to register to the IoT platform with direct push mode
OK

CONNECT OK                                    // Registration success indication.

AT+QLWUPDATE                                  // Update to the IoT platform.
OK

UPDATE OK                                    // Update success indication.

AT+QLWCLOSE                                  // Deregister to the IoT platform.
OK

CLOSE OK                                    // Deregister success indication.
```

5.2. Send data and receive data with direct push mode

```
AT+CGATT?
+CGATT:1

OK

AT+QLWSERV=”180.101.147.115”,5683
OK          // Set IoT platform ip address, port.
            // If wants to connect to the other IoT platform, should execute the command
AT+QLWDEL,and set again.

AT+QLWCONF=”867724030023557”
OK          // Set IoT platform IMEI number.
            // If configuration of the IMEI is error, should execute the command AT+QLWDEL, and set
again.

AT+QLWADDOBJ=19,0,1,"0"                  //Add /19/0/0, 19/1/0 to the LwM2M parameters.
OK
AT+QLWADDOBJ=19,1,1,"0"
OK

AT+QLWOPEN=0                            //Start to register to the IoT platform with direct push mode .
OK
```

```
CONNECT OK                                   // Registration success indication.

+QLWOBSERVE: 0,19,0,0                        // The server observe the /19/0, /19/1.

AT+QLWCFG="dataformat",1,1                  //Configure send and receive hex string mode
OK

// Send hex string data with NON mode, it does not need the IoT platform to ACK this data message.
AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD3836333730333033303733353132353343
63031313131373438303837383500000015FFB289A180100040200010097,0x0000
OK

+QLWDATARECV: 19,1,0,4,AAAA0000        //The IoT platform response data automatically.

AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD3836333730333033303733353132353343
63031313131373438303837383500000015FFB289A180100040200010097,0x0100

OK                              // Send hex string data with CON mode, it needs the IoT platform ACK

SEND OK                          // Message sent success.

+QLWDATARECV: 19,1,0, 4,AAAA0000      //The IoT platform response data automatically.

AT+QLWDATASTATUS?                           // Query the data sent status.
+QLWDATASTATUS: 4                            // Message sent success.

OK
```

5.3. Send data and receive data with buffer access mode

```
AT+CGATT?
+CGATT:1

OK

AT+QLWSERV=180.101.147.115,5683
OK              // Set IoT platform ip address, port.
                //  If  wants  to  connect  to  the  other  IoT  platform,  should  execute  the  command
AT+QLWDEL,and set again.

AT+QLWCONF="866971030001361"
OK              // Set IoT platform IMEI number.
                // If configuration of the IMEI is error, should execute the command AT+QLWDEL, and set
```

```
again.

AT+QLWADDOBJ=19,0,1,"0"                //Add /19/0/0, 19/1/0 to the LwM2M parameters.
OK
AT+QLWADDOBJ=19,1,1,"0"
OK

AT+QLWOPEN=1                           //Start to register to the IoT platform with buffer access mode.
OK

CONNECT OK                             // Registration success indication.

+QLWOBSERVE: 0,19,0,0                   // The server observe the /19/0/0, /19/1/0.

AT+QLWCFG=”dataformat”,1,1              /Configure send and receive hex string mode
OK

// Send hex string data with NON mode, it does not need the IoT platform to ACK this data message.
AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD383633373033303330373335313235343
63031313131373438303837383500000015FFB289A180100040200010097,0x0000
OK

+QLWDATARECV: 19,1,0,4      //The IoT platform response data length automatically.

AT+QLWRD=4        //read buffer data
+QLWRD: 4,0
AAAA0000

OK
AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD383633373033303330373335313235343
63031313131373438303837383500000015FFB289A180100040200010097,0x0100

OK                           // Send hex string data with CON mode, it needs the IoT platform ACK

SEND OK                                 // Message sent success.

+QLWDATARECV: 19,1,0,4          //The IoT platform response data length automatically.

AT+QLWRD=2        //read buffer data
+QLWRD: 2,2
AAAA

OK
AT+QLWRD=2        //read buffer data
```

```
+QLWRD: 2,0
0000

OK

AT+QLWDATASTATUS?                      // Query the data sent status.
+QLWDATASTATUS: 4                       // Message sent success.

OK
```

6 Appendix A Reference

Table 4: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
IMEI	International Mobile Equipment Identity
IMEISV	International Mobile Equipment Identity and Software Version
MS	Mobile Station
NB-IoT	Narrow Band Internet of Thing
PDP	Packet Data Protocol
RRC	Radio Resource Control
RTC	Real Time Clock
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