

# **BC20 LwM2M**

# **AT Commands Manual**

**NB-IoT/GNSS Module Series**

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# About the Document

## History

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## Contents

About the Document.....	2
Contents .....	3
Table Index.....	4
<b>1 Introduction .....</b>	<b>5</b>
1.1. Definitions .....	5
1.2. AT Command Syntax.....	5
<b>2 Implementation Status .....</b>	<b>6</b>
<b>3 LwM2M Related AT Commands .....</b>	<b>7</b>
3.1. AT+QLWSERV Configure the IoT Platform Address and Port .....	7
3.2. AT+QLWCONF Configure the IoT Platform Parameters .....	8
3.3. AT+QLWADDOBJ Add a LwM2M Object .....	9
3.4. AT+QLWDELOBJ Delete a LwM2M Object.....	9
3.5. AT+QLWOPEN Send a Register Request to IoT Platform .....	10
3.6. AT+QLWUPDATE Send an Update Request .....	11
3.7. AT+QLWCLOSE Send a Deregister Request.....	12
3.8. AT+QLWDATASEND Send Data to IoT Platform.....	13
3.9. AT+QLWDATASTATUS Query CON Message Sent Status .....	14
3.10. AT+QLWRD Retrieve the Received Data .....	15
3.11. AT+QLWCFG Configure Optional Parameters.....	17
3.12. AT+QLWDEL Delete the LwM2M Context.....	17
<b>4 LwM2M Related URCs .....</b>	<b>19</b>
4.1. "+QLWOBSERVE" URC to Indicate Observe Request from IoT Platform .....	19
4.2. "+QLWDATAARECV" URC to Indicate Write Request from IoT Platform.....	20
<b>5 Examples .....</b>	<b>21</b>
5.1. Register to the IoT Platform.....	21
5.2. Send and Receive Data in Direct Push Mode.....	22
5.3. Send and Receive Data in Buffer Access Mode .....	23
<b>6 Appendix A Reference.....</b>	<b>26</b>

## Table Index

TABLE 1: AT COMMAND SYNTAX .....	5
TABLE 2: IMPLEMENTATION STATUS OF LWM2M AT COMMANDS .....	6
TABLE 3: LWM2M RELATED URCS .....	19
TABLE 4: TERMS AND ABBREVIATIONS .....	26

# 1 Introduction

This document gives details of the LwM2M AT Command Set supported by Quectel NB-IoT module BC20.

## 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

<b>Test Command</b>	<b>AT+&lt;x&gt;=?</b>	The command returns the list of parameters and value ranges set by the corresponding Write Command or internal processes.
<b>Read Command</b>	<b>AT+&lt;x&gt;?</b>	The command returns the currently set value of the parameter or parameters.
<b>Write Command</b>	<b>AT+&lt;x&gt;=&lt;...&gt;</b>	The command sets the user-definable parameter values.
<b>Execution Command</b>	<b>AT+&lt;x&gt;</b>	The command reads non-variable parameters affected by internal processes in the module.

## 2 Implementation Status

**Table 2: Implementation Status of LwM2M AT Commands**

AT Command	Description	Implementation Status
AT+QLWSERV	Configure the IoT Platform Address and Port	NAR01A01 or later
AT+QLWCONF	Configure the IoT Platform Parameters	NAR01A01 or later
AT+QLWADDOBJ	Add a LwM2M Object	NAR01A01 or later
AT+QLWDELOBJ	Delete a LwM2M Object	NAR01A01 or later
AT+QLWOPEN	Send a Register Request to IoT Platform	NAR01A01 or later
AT+QLWUPDATE	Send an Update Request	NAR01A01 or later
AT+QLWCLOSE	Send a Deregister Request	NAR01A01 or later
AT+QLWDATASEND	Send Data to IoT Platform	NAR01A01 or later
AT+QLWDATASTATUS	Query CON Messages Sent Status	NAR01A01 or later
AT+QLWRD	Retrieve the Received Data	NAR01A01 or later
AT+QLWCFG	Configure Optional Parameters	NAR01A01 or later
AT+QLWDEL	Delete the LwM2M Context	NAR01A01 or later

## 3 LwM2M Related AT Commands

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

The command is used to set the IP address and port number of the IoT platform that the module will connect to.

AT+QLWSERV Configure the IoT Platform Address and Port	
Test Command <b>AT+QLWSERV=?</b>	Response <b>+QLWSERV: "IP_address",(0-65535)</b>  <b>OK</b>
Read Command <b>AT+QLWSERV?</b>	Response <b>+QLWSERV: &lt;IP_address&gt;,&lt;port&gt;</b>  <b>OK</b>  If there is any error, response: <b>ERROR</b>
Write Command <b>AT+QLWSERV=&lt;IP_address&gt;,&lt;port&gt;</b>	Response <b>OK</b>  If there is any error, response: <b>ERROR</b>
Maximum Response Time	300ms

#### Parameter

<b>&lt;IP_address&gt;</b>	String type. The IoT platform IP address with double quotation marks.
<b>&lt;port&gt;</b>	Integer type. The port number of IoT platform. The range is 0-65535.

#### Example

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



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

OK
```

### 3.2. AT+QLWCONF Configure the IoT Platform Parameters

The command is used to configure parameters of the IoT platform that the module will connect to.

#### AT+QLWCONF Configure the IoT Platform Parameters

Test Command <b>AT+QLWCONF=?</b>	Response <b>+QLWCONF: "endpointname"</b>  <b>OK</b>
Read Command <b>AT+QLWCONF?</b>	Response <b>+QLWCONF: &lt;endpointname&gt;</b>  <b>OK</b>  If there is any error, response: <b>ERROR</b>
Write Command <b>AT+QLWCONF=&lt;endpointname&gt;</b>	Response <b>OK</b>  If there is any error, response: <b>ERROR</b>
Maximum Response Time	300ms

#### Parameter

**<endpointname>** String type. Device's endpoint name with double quotation marks.

#### 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 new LwM2M object ID.

#### AT+QLWADDOBJ Add a LwM2M Object

Write Command <b>AT+QLWADDOBJ=&lt;obj_id&gt;,[&lt;ins_id&gt; &lt;res_num&gt;,&lt;res_id&gt;]</b>	Response <b>OK</b>  If there is any error, response: <b>ERROR</b>
Maximum Response Time	300ms

#### Parameter

<obj_id>	Integer type. Object ID. The maximum object ID number is 65535.
<ins_id>	Integer type. Instance ID.
<res_num>	Integer type. Resources ID number.
<res_id>	String type. Resources ID with double quotation marks.

#### Example

```
AT+QLWADDOBJ=19,0,1,"0" //Add a LwM2M object (/19/0/0).
OK

AT+QLWADDOBJ=19,1,1,"0" //Add a LwM2M object (/19/1/0).
OK
```

### 3.4. AT+QLWDELOBJ Delete a LwM2M Object

The command is used to delete a LwM2M object.

#### AT+QLWDELOBJ Delete a LwM2M Object

Write Command <b>AT+QLWDELOBJ=&lt;obj_id&gt;</b>	Response <b>OK</b>  If there is any error, response:
-----------------------------------------------------	---------------------------------------------------------------

	<b>ERROR</b>
Maximum Response Time	300ms

## Parameter

<obj_id>	LwM2M object ID.
----------	------------------

## Example

```

AT+QLWADDOBJ=19,1,1,"0" //Add a LwM2M object (/19/1/0).
OK

AT+QLWDELOBJ=19 //Delete the object 19.
OK

UPDATE OK //Update the delete result to platform. If the module has not registered to
the platform, no "UPDATE OK" is indicated.

```

## 3.5. AT+QLWOPEN Send a Register Request to IoT Platform

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

AT+QLWOPEN Send a Register Request to IoT Platform	
Write Command <b>AT+QLWOPEN=&lt;mode&gt;</b>	<p>Response</p> <p>If the module is successfully registered to the IoT platform, response:</p> <p><b>OK</b></p> <p><b>CONNECT OK</b></p> <p>If the module fails to register to the IoT platform, response:</p> <p><b>OK</b></p> <p><b>CONNECT FAIL</b></p> <p>If there is any error, response:</p> <p><b>ERROR</b></p>
Maximum Response Time	300ms

## Parameter

<b>&lt;mode&gt;</b>	Integer type. The data mode of LwM2M.
0	Direct push mode
1	Buffer access mode

## Example

```
AT+QLWOPEN=0 //Register to IoT platform in direct push mode.
OK
CONNECT OK //The module has successfully registered to the IoT platform.
```

### NOTE

By default, the maximum timeout for response **CONNECT OK** or **CONNECT FAIL** is about 128s.

## 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 <b>AT+QLWUPDATE</b>	<p>Response</p> <p>If the IoT platform is successfully updated, response:</p> <p><b>OK</b></p> <p><b>UPDATE OK</b></p> <p>If update failed, response:</p> <p><b>OK</b></p> <p><b>UPDATE FAIL</b></p> <p>If there is any error, response:</p> <p><b>ERROR</b></p>
Maximum Response Time	300ms

### Example

```
AT+QLWUPDATE
OK
```

```
UPDATE OK          //Updated successfully.
```

#### NOTE

By default, the maximum timeout for response **UPDATE OK** or **UPDATE FAIL** is about 128s.

## 3.7. AT+QLWCLOSE Send a Deregister Request

The command is used to launch a deregister request to the IoT platform.

### AT+QLWCLOSE Send a Deregister Request

Execution Command <b>AT+QLWCLOSE</b>	<p>Response</p> <p>If the module is successfully deregistered from the IoT platform, response:</p> <p><b>OK</b></p> <p><b>CLOSE OK</b></p> <p>If deregistration failed , response:</p> <p><b>OK</b></p> <p><b>CLOSE FAIL</b></p> <p>If there is any error, response:</p> <p><b>ERROR</b></p>
Maximum Response Time	300ms

### Example

```
AT+QLWCLOSE
OK
```

```
CLOSE OK          //Successfully deregistered from the IoT platform.
```

**NOTE**

By default, the maximum timeout for response **CLOSE OK** or **CLOSE FAIL** is about 128s.

### 3.8. AT+QLWDATASEND Send Data to IoT Platform

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. The terminal can also use the **AT+QLWDATASTATUS?** Command to query the status of the CON data that has been sent.

#### AT+QLWDATASEND Send Data to IoT Platform

Write Command	Response
<b>AT+QLWDATASEND=&lt;obj_id&gt;,&lt;ins_id&gt;,&lt;res_id&gt;,&lt;length&gt;,&lt;data&gt;,&lt;mode&gt;</b>	If sending NON message and the command format is correct, response: <b>OK</b>
	If sending CON message and the sent message has been acknowledged by the IoT platform, response: <b>OK</b>
	<b>SEND OK</b>
	If sending CON message fails, response: <b>OK</b>
	<b>SEND FAIL</b>
	If there is any error, response: <b>ERROR</b>
Maximum Response Time	300ms

#### Parameter

<obj_id>	Integer type. Object ID.
<ins_id>	Integer type. Instance ID.
<res_id>	Integer type. Resources ID.
<length>	Integer type. Length of the data to be sent. The max length is 512 bytes.
<data>	String type. The data to be sent.
<mode>	0x0000 Send NON message

0x0100      Send CON message

### Example

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

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

SEND OK

### NOTES

1. If sending CON data, the next sending request is not allowed to be executed before the previous CON message sending result is returned.
2. By default, the maximum timeout for sending CON message is about 128s.

## 3.9. AT+QLWDATASTATUS Query CON Message Sent Status

This command is used to query the sent status of the last CON message.

### AT+QLWDATASTATUS Query CON Message Sent Status

Read Command <b>AT+QLWDATASTATUS?</b>	Response <b>+QLWDATASTATUS: &lt;status&gt;</b>  <b>OK</b>  If there is any error, response: <b>ERROR</b>
------------------------------------------	----------------------------------------------------------------------------------------------------------------------------

Maximum Response Time	300ms
-----------------------	-------

### Parameter

<b>&lt;status&gt;</b>	Status of the last CON message that has been sent
0	Have not been 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 CON data to the IoT platform.
OK

SEND OK

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

OK
```

#### NOTE

This command is only used to query the status of the CON message that has been sent.

## 3.10. AT+QLWRD Retrieve the Received Data

This command is used to retrieve the received data in buffer access mode.

In buffer access mode, when data is received, the module will buffer the data and report URC: **+QLWDATARECV: <obj\_id>,<ins\_id>,<res\_id>,<length>**.

### AT+QLWRD Retrieve the Received Data

Test Command <b>AT+QLWRD=?</b>	Response <b>+QLWRD: (1-512)</b>  <b>OK</b>
Write Command <b>AT+QLWRD=&lt;read_length&gt;</b>	Response <b>+QLWRD: &lt;read_actual_length&gt;,&lt;remain_length&gt;</b>  <b>&lt;data&gt;</b>  <b>OK</b>  If no data, response: <b>+QLWRD: 0</b>



	OK
	If there is any error, response: <b>ERROR</b>
Maximum Response Time	300ms

## Parameter

<read_length>	The length of data to be retrieved. The range is 1-512. Unit: byte.
<read_actual_length>	The actual length of retrieved data. Unit: byte.
<remain_length>	The unread length of received data. Unit: byte.
<data>	The data retrieved.

## Example

```

AT+QLWRD=2           //Read data from the buffer.
+QLWRD: 2,2
AAAA

OK

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

OK

AT+QLWRD=4
+QLWRD: 0           //The buffer is empty and no data can be retrieved.

OK

```

## NOTES

1. If the received buffer is not empty, and the module receives data again, then it will not report a new URC until all the received data has been retrieved from buffer.
2. The remaining length is not the total received bytes in buffer, which only indicates the current remaining data stored in one node.

### 3.11. AT+QLWCFG Configure Optional Parameters

This command is used to configure optional parameters.

AT+QLWCFG Configure Optional Parameters	
Test Command <b>AT+QLWCFG=?</b>	Response <b>+QLWCFG: "dataformat",(0,1),(0,1)</b>  <b>OK</b>
Write Command <b>AT+QLWCFG="dataformat",&lt;send_data_format&gt;,&lt;recv_data_format&gt;</b>	Response <b>OK</b>  If there is any error, response: <b>ERROR</b>
Maximum Response Time	300ms

#### Parameter

<b>&lt;send_data_format&gt;</b>	Integer Type. Sending data format. 0 Text mode 1 Hex mode
<b>&lt;recv_data_format&gt;</b>	Integer Type. Received data format. 0 Text mode 1 Hex mode

#### Example

```
AT+QLWCFG="dataformat",1,1 //Set sending and received data into hex mode.
OK

AT+QLWCFG="dataformat",1,0 //Set sending data into hex mode and received data into text mode.
OK
```

### 3.12. AT+QLWDEL Delete the LwM2M Context

This command is used to delete the LwM2M context.

### AT+QLWDEL Delete the LwM2M Context

Execution Command

**AT+QLWDEL**

Response

**OK**

If there is any error, response:

**ERROR**

Maximum Response Time

5s

## 4 LwM2M Related URCs

This chapter gives LwM2M related URCs and their descriptions.

Table 3: LWM2M Related URCs

Index	URC Format	Description
[1]	<b>+QLWOBSERVE:</b> <flag>,<obj_id>,<ins_id>,<res_id>	Indicate the observe request from IoT platform.
[2]	<b>+QLWDATARECV:</b> <obj_id>,<ins_id>,<res_id>,<length>[,<data>]	Indicate the write request from IoT platform.

### 4.1. "+QLWOBSERVE" URC to Indicate Observe Request from IoT Platform

#### **"+QLWOBSERVE" URC to Indicate Observe Request from IoT Platform**

<b>+QLWOBSERVE:</b> <flag>,<obj_id>,<ins_id>,<res_id>	The IoT platform will send an observe request to module after registered for observing a specified object/instance/resource. The URC is used to indicate the observe request from IoT platform.
-------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

#### Parameter

<b>&lt;flag&gt;</b>	Integer type. Indicates whether or not to observe. 0 Observe 1 Cancel Observation
<b>&lt;obj_id&gt;</b>	Integer type. Object ID.
<b>&lt;ins_id&gt;</b>	Integer type. Instance ID.
<b>&lt;res_id&gt;</b>	Integer type. Resources ID. -1 All resources related to <ins_id>.

## 4.2. "+QLWDATARECV" URC to Indicate Write Request from IoT Platform

### "+QLWDATARECV" URC to Indicate Write Request from IoT Platform

**+QLWDATARECV: <obj\_id>,<ins\_id>,<res\_id>,<length>[,<data>]** The URC is used to indicate the write request from IoT platform.

#### Parameter

<b>&lt;obj_id&gt;</b>	Integer type. Object ID.
<b>&lt;ins_id&gt;</b>	Integer type. Instance ID.
<b>&lt;res_id&gt;</b>	Integer type. Resources ID.
<b>&lt;length&gt;</b>	Integer type. Length of data received. The maximum length is 512 bytes.
<b>&lt;data&gt;</b>	Hex/string type data received from IoT platform. The data format depends on the configuration of <b>AT+QLWCFG</b> command. <b>&lt;data&gt;</b> is optional which depends on the configuration of <b>AT+QLWOPEN</b> command.

# 5 Examples

## 5.1. Register to the IoT Platform

```
AT+CGPADDR=1 //Check the allocated IP address for default PDN.
+CGPADDR: 1,10.52.241.198

OK

//Set IoT platform IP address and port.
//If there is a need to connect to another IoT platform, AT+QLWDEL should be executed before setting
the IP address and port.

AT+QLWSERV="180.101.147.115",5683
OK

AT+QLWCONF="867724030023557" //Set IoT platform IMEI number.
OK

AT+QLWADDOBJ=19,0,1,"0" //Add a LwM2M object 19/0/0.
OK

AT+QLWADDOBJ=19,1,1,"0" //Add a LwM2M object 19/1/0.
OK

AT+QLWOPEN=0 //Register to the IoT platform in direct push mode.

OK

CONNECT OK //Registered successfully.

+QLWOBSERVE: 0,19,0,0 //Received observe (19/0/0) request

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

UPDATE OK //Updated successfully.
```

```
AT+QLWCLOSE //Deregister to the IoT platform.  
OK  
  
CLOSE OK //Deregistered successfully.  
  
AT+QLWDEL //Delete the LwM2M context.  
OK
```

## 5.2. Send and Receive Data in Direct Push Mode

```
AT+CGPADDR=1 //Check the allocated IP address for default PDN.  
+CGPADDR: 1,10.52.241.198  
  
OK  
  
//Set IoT platform IP address and port.  
//If there is a need to connect to another IoT platform, AT+QLWDEL should be executed before setting  
the IP address and port.  
  
AT+QLWSERV="180.101.147.115",5683  
OK  
  
AT+QLWCONF="867724030023557" //Set IoT platform IMEI number.  
OK  
  
AT+QLWADDOBJ=19,0,1,"0" //Add a LwM2M object 19/0/0.  
OK  
  
AT+QLWADDOBJ=19,1,1,"0" //Add a LwM2M object 19/1/0.  
OK  
  
AT+QLWOPEN=0 //Register to the IoT platform in direct push mode.  
OK  
  
CONNECT OK //Registered successfully.  
  
+QLWOBSERVE: 0,19,0,0 //Received the observe (19/0/0) request.  
  
AT+QLWCFG="dataformat",1,1 //Configure hex string mode for sending and received data.  
OK  
  
//Send NON message to the IoT platform.
```

```

AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD383633373033303330373335313235343
6303131313137343830383738350000015FFB289A180100040200010097,0x0000
OK

+QLWDATARECV: 19,1,0,4,AAAA0000 //Received the data from IoT platform.

//Send CON data to the IoT platform, waiting for ACK from the IoT platform.
AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD383633373033303330373335313235343
6303131313137343830383738350000015FFB289A180100040200010097,0x0100

OK

SEND OK //The message has been sent successfully.

+QLWDATARECV: 19,1,0,4,AAAA0000 //Received the data from IoT platform.

AT+QLWDATASTATUS? //Query the data sent status of CON message.
+QLWDATASTATUS: 4 //The message has been sent successfully.

OK

```

### 5.3. Send and Receive Data in Buffer Access Mode

```

AT+CGPADDR=1 //Check the allocated IP address for default PDN.
+CGPADDR: 1,10.52.241.198

OK

//Set IoT platform IP address and port.
//If there is a need to connect to another IoT platform, AT+QLWDEL should be executed before setting
the IP address and port.

AT+QLWSERV="180.101.147.115",5683
OK

AT+QLWCONF="867724030023557" // Set IoT platform IMEI number.
OK

AT+QLWADDOBJ=19,0,1,"0" //Add a LwM2M object 19/0/0.
OK

AT+QLWADDOBJ=19,1,1,"0" //Add a LwM2M object 19/1/0.

```



OK

**AT+QLWOPEN=1** //Register to the IoT platform in buffer access mode.

OK

CONNECT OK //Registered successfully.

+QLWOBSERVE: 0,19,0,0 //Received the observe (19/0/0) request.

**AT+QLWCFG="dataformat",1,1** //Configure hex string mode for sending and received data.

OK

//Send NON message to the IoT platform.

**AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD3836333730333033303733353132353436303131313137343830383738350000015FFB289A180100040200010097,0x0000**

OK

+QLWDATARECV: 19,1,0,4 //Received the data from IoT platform.

**AT+QLWRD=4** //Read the data from received buffer.

+QLWRD: 4,0

AAAA0000

OK

//Send CON data to the IoT platform, waiting for ACK from the IoT platform.

**AT+QLWDATASEND=19,0,0,57,01F00035020056FFFFFFCD3836333730333033303733353132353436303131313137343830383738350000015FFB289A180100040200010097,0x0100**

OK

SEND OK //The message has been sent successfully.

+QLWDATARECV: 19,1,0,4 //Received the data from IoT platform.

**AT+QLWRD=2** //Read the data from received buffer.

+QLWRD: 2,2

AAAA

OK

**AT+QLWRD=2** //Read the data from received buffer.

+QLWRD: 2,0

0000

OK

**AT+QLWDATASTATUS?**

//Query the data sent status of CON message.

**+QLWDATASTATUS: 4**

//The message has been sent successfully.

OK

# 6 Appendix A Reference

**Table 4: Terms and Abbreviations**

Abbreviation	Description
CON	Confirmable
IMEI	International Mobile Equipment Identity
IoT	Internet of Things
LwM2M	Lightweight Machine to Machine
NB-IoT	Narrow Band Internet of Thing
NON	Non-confirmable
PDN	Public Data Network
URC	Unsolicited Result Code