

N58

AT Command Manuals (Bluetooth)

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This document provides guide for users to use N58.

This document is intended for system engineers (SEs), development engineers, and test engineers.

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Contents

About This Document	iv
Scope	iv
Audience	iv
Change History.....	iv
Conventions	iv
1 Basic AT Commands for BT/BLE	5
1.1 AT+NWBTBLEPWR–Powering on or off the BT/BLE Module	5
1.2 AT+NWBTBLENAME–Setting the BT/BLE Name.....	6
1.3 AT+NWBTBLEMAC–Reading the MAC Address of the BT/BLE Device	7
2 General Commands for BLE	8
2.1 AT+NWBLEROLE–Setting the BLE Mode	8
2.2 AT+NWBLEADV–Setting the BLE Advertising Parameters	9
2.3 AT+NWBLEADVEN–Enabling BLE Advertising	10
2.4 +NWURCBLESTAT–Reporting the BLE Status in Unsolicited Manner	11
3 Commands for BLE Peripheral Devices	12
3.1 AT+NWBLEPREG–Registering an Application (Currently Not Supported).....	12
3.2 AT+NWBLEPSRV–Creating a Service.....	13
3.3 AT+NWBLEPCRT–Adding a Characteristic to a Service	14
3.4 AT+NWBLEPSTR–Starting a Service	16
3.5 AT+NWBLEPSEND–Sending Data.....	16
3.6 +NLWDATARECV–Receiving Data.....	18
3.7 AT+NWBLEPWRITE–Writing Data	19
3.8 AT+NWBLERCVMODE–Setting the Format of Received Data	19
3.9 AT+NWBLEDISCON–Querying or Closing the BLE Connection	20
3.10 AT+NWBLESVRM–Removing the Specified Service.....	21
3.11 AT+NWBLECRTRM–Removing the Specified Characteristic.....	22
3.12 AT+NWIBEACON–Setting the iBeacon Parameters.....	23
4 Commands for BLE Central Devices	25
4.1 AT+NWBLESCAN–Scanning Peripheral BLE Devices by the Local BLE Device	25
4.2 AT+NWBLECCON–Setting up a BLE Connection	26
4.3 AT+NWBLECDISCON–Closing a BLE Connection	27
4.4 AT+NWBLEQSRV–Discovering Services of a BLE Device	28
4.5 AT+NWBLEQCHAR–Discovering Characteristics of a BLE Device	29
4.6 AT+NWBLECSSEND–Sending Data.....	30
4.7 +NWURCBLECRECV–Receiving Data	31
4.8 AT+NWBLECREAD–Reading the Characteristic Data	32
A Appendix.....	34

About This Document

Scope

This document is applicable to the N58 series.




Audience

This document is intended for [system engineers \(SEs\)](#), [development engineers](#), and [test engineers](#).

Change History

Issue	Date	Change	Changed By
1.0	2021-03	Initial draft	Li Xuanting

Conventions

Symbol	Indication
	Indicates danger or warning. This information must be followed. Otherwise, a catastrophic module or user device failure or bodily injury may occur.
	Indicates caution. This symbol alerts the user to important points about using the module. If these points are not followed, the module or user device may fail.
	Indicates instructions or tips. This symbol provides advices or suggestions that may be useful when using the module.

1 Basic AT Commands for BT/BLE

1.1 AT+NWBTBLEPWR—Powering on or off the BT/BLE Module

To power on or off the Bluetooth/Bluetooth Low Energy (BT/BLE) module, enable or disable the Bluetooth protocol stack, and initialize data transmission.

After the BT/BLE is powered on, it is disabled by default. After the BT/BLE is enabled, it is in detectable and connectible mode.

Format

Type	Command	Response
Set	AT+NWBTBLEPWR=<status><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWBTBLEPWR?<CR>	<CR><LF>+NWBTBLEPWR: <status><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NWBTBLEPWR=?<CR>	<CR><LF>+NWBTBLEPWR: (range of supported <status>value)<CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 10s.

Parameter

<status> The value is an integer ranging from 0 to 1.
0: Bluetooth disabled
1: Bluetooth enabled

Example

```

AT+NWBTBLEPWR=1           Enable the BT/BLE module.
OK
AT+NWBTBLEPWR?           Read the current BT/BLE status. The BT/BLE is enabled.
+NWBTBLEPWR: 1
OK
AT+NWBTBLEPWR=?         READ parameter list
+NWBTBLEPWR: (0-1)
OK
    
```

1.2 AT+NWBTBLENAME–Setting the BT/BLE Name

To set/query the name of the current BT/BLE device.

The BT/BLE name can be modified only when the BT/BLE is disabled. The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+NWBTBLENAME=<name><CR>	<CR><LF>OK<CR><LF>
Query	AT+NWBTBLENAME?<CR>	<CR><LF>+NWBTBLENAME: <name><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NWBTBLENAME=?<CR>	<CR><LF>+NWBTBLENAME: <name><CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<name> Local BT/BLE name, which is a string of 1-32 characters.
The BT/BLE name cannot be Chinese, and its maximum length is 32 bytes.

Example

```

AT+NWBTBLENAME="Neoway"   Set the BT/BLE name to "Neoway".
OK
    
```

```

AT+NWBTBLENAM?                               Read the current BT/BLE name.
+NWBTBLENAM: Neoway

OK

AT+NWBTBLENAM=?                               READ parameter list
+NWBTBLENAM: <name>

OK

```

1.3 AT+NWBTBLEMAC–Reading the MAC Address of the BT/BLE Device

To read the MAC address of the current BT/BLE device.

Format

Type	Command	Response
Query	AT+NWBTBLEMAC?<CR>	<CR><LF>+NWBTBLEMAC: <mac><CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Example

```

AT+NWBTBLEMAC?
+NWBTBLEMAC: 12:7B:59:96:96:1B             Read the MAC address of the BT/BLE device, which is
OK                                         12:7B:59:96:96:1B.

```

2 General Commands for BLE

Currently BLE-enabled peripherals allow users to create services, add properties and characteristics, and start services. Some projects do not support dynamic adding of services, and support only fixed service. Therefore, you must read the GATT service of the local device before using the BLE function.

2.1 AT+NWBLEROLE—Setting the BLE Mode

To set the BLE mode (that is, switch between the Master and Slave modes) on the precondition that Bluetooth is disabled.

Format

Type	Command	Response
Set	AT+NWBLEROLE=<ble_role><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWBLEROLE?<CR>	<CR><LF>+NWBLEROLE: <ble_role><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<ble_role> Mode. The value is an integer ranging from 0 to 1.
0: Slave (default)
1: Master

Example

```
AT+NWBLEADV=1           Set the mode to Master.
OK

AT+NWBLEADV?           Query the mode.
+NWBLEADV: 1
OK
```

2.2 AT+NWBLEADV–Setting the BLE Advertising Parameters

To set the BLE advertising parameters.

The real advertising interval is equal to (min/max) x 0.625 ms, and the advertising interval ranges from 20 ms to 10.28s.

The advertising packets are transmitted on the fixed 37, 38, 39 channels.

The advertising parameters must be set when advertising is disabled.

Format

Type	Command	Response
Set	AT+NWBLEADV=<min>,<max><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWBLEADV?<CR>	<CR><LF>+NWBLEADV: <min>,<max><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NWBLEADV=?<CR>	<CR><LF>+NWBLEADV: (range of supported <min>value), (range of supported <max>value) <CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <min> Minimum advertising interval. The value is an integer ranging from 32 to 16384.
- <max> Maximum advertising interval. The value is an integer ranging from 32 to 16384.

Example

```

AT+NWBLEADV=100,5000           Set the advertising parameters.
OK
AT+NWBLEADV?
+NWBLEADV: 100,5000           Read the current advertising parameters.
OK
AT+NWBLEADV=?                 READ parameter list
+NWBLEADV: (32-16384),(32-16384)
OK
    
```

2.3 AT+NWBLEADVEN–Enabling BLE Advertising

To enable BLE advertising.

After the slave BLE device is enabled, advertising is enabled by default. When the device is connected, advertising is automatically disabled.

Advertising cannot be enabled or disabled in Master mode.

Format

Type	Command	Response
Set	AT+NWBLEADVEN=<enable><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWBLEADVEN?<CR>	<CR><LF>+NWBLEADVEN: <enable><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NWBLEADVEN=?<CR>	<CR><LF>+NWBLEADVEN: (range of supported <enable>value) <CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <enable> The value is an integer ranging from 0 to 1.
0: Disable BLE advertising.

1: Enable BLE advertising.

Example

```

AT+NWBLEADVEN=1          Enable BLE advertising.
OK
AT+NWBLEADVEN?
+NWBLEADVEN: 1          Read the current advertising status.

OK

AT+NWBLEADVEN=?          READ parameter list
+NWBLEADVEN: (0-1)

OK
    
```

2.4 + NWURCBLESTAT–Reporting the BLE Status in Unsolicited Manner

To report the current BLE status.

Format

Type	Response
Unsolicited report	<CR><LF>+NWURCBLESTAT: <status>[,<mac>]<CR><LF>

Timeout

N/A.

Parameter

<status> 0: connection close
 1: successful
 <mac> MAC address of the connected device

Example

```

+NWURCBLESTAT: 1,2A:02:0A:72:C8:53    The BLE connection is set up successfully.
+NWURCBLESTAT: 0                      The BLE connection is closed successfully.
    
```

3 Commands for BLE Peripheral Devices

3.1 AT+NWBLEPREG—Registering an Application (Currently Not Supported)

To register an application.

The BLE peripheral device must be first scanned before a connection request can be initiated based on the MAC address of this BLE peripheral device.

This connection is a direct connection.

Format

Type	Command	Response
Set	AT+NWBLEPREG=<op>,<uuid> <CR>	<CR><LF>OK<CR><LF>
Query	AT+NWBLEPREG?<CR>	<CR><LF>+NWBLEPREG: <num><CR><LF> <CR><LF><app_id>:<CR><LF> <CR><LF><attr_num>,<uuid>,<is_pri><CR><L> <CR><LF>OK<CR><LF>
Test	AT+NWBLEPREG=?<CR>	<CR><LF>+NWBLEPREG: <op>,<uuid><CR><LF> <CR><LF>OK<CR><LF>
Unsolicited report	<CR><LF>+NWBLEPREG: <app_id><CR><LF>	

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<op> Register or deregister
 0: Deregister
 1: Register

<uuid>	Created UUID
<num>	Number of applications
<app_id>	Application ID
<attr_num>	Service corresponding to each application ID
<uuid>	Service UUID, which identifies a service
<is_pri>	Whether the service is a primary service

Example

```

AT+NWBLEPREG=1,"0x9999"      Register the application 0x9999. The registration is successful,
OK                             and the application ID is 0.
+NWBLEPREG:0

AT+NWBLEPREG?                Two applications exist:
+NWBLEPREG: 2                 Services under the first application:
1:                             The UUID of the first service is 0x1808 (glucose), and it is a
0,0x1808,1                    primary service.
1,0x1806,0                     The UUID of the second service is 0x1806 (time update), and it
2:                             is a non-primary service.
0,0x1813,1                     Services under the second application:
1,0x180f,0                     ...

OK
AT+NWBLEPREG=?                READ parameter list
+NWBLEPREG: <op>,<uuid>

OK
    
```

3.2 AT+NWBLEPSRV—Creating a Service

To create a service.

Bluetooth must be disabled before you create a service.

The settings by this command are not saved after the module is powered off.

Format

Type	Command	Response
Set	AT+NWBLEPSRV=<app_id >,<uuid>,<num>,<p><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+NWBLEPSRV=?<CR>	<CR><LF>+NWBLEPSRV: <app>,<uuid>,<num>,<p><CR><LF> <CR><LF>OK<CR><LF>

Unsolicited report <CR><LF>+NWBLEPSRV: <srv_id><CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <app_id> ID of the application to which the service will be added. The application must already be created. You can use the NWBLEREG?READ command to read the ID of an application.
Currently, application registration is not supported, and app_id must be set to 0.
- <uuid> UUID of the created service. (Different UUIDs represent different services. For details, see Appendix 1.)
- <num> Number of characteristics to be added. The value is an integer ranging from 1 to 5. Currently, you can create up to two services, and add up to five characteristics to each service.
- <p> Whether the service is a primary service. (You must create a primary service under each application.) The value is an integer ranging from 0 to 1.

Example

```
AT+NWBLEPSRV=0,"0x1808",2,1          Create the service 0x1808 (glucose) under the
OK                                     No.0 application. Add two characteristics to
+NWBLEPSRV: 1                         this service. The service is a primary service.
AT+NWBLEPSRV=?                         READ parameter list
+NWBLEPSRV: <0>,<uuid>,<1-5>,<0-1>
OK
```

3.3 AT+NWBLEPCRT–Adding a Characteristic to a Service

To add a characteristic.

The settings by this command are saved after the module is powered off.

Format

Type	Command	Response
Set	AT+NWBLEPCRT=<app_id>,<srv_id>,<u uid>,<slt>,<per>,<cp><CR>	<CR><LF>OK<CR><LF> Or

		<CR><LF>ERROR<CR><LF>
Test	AT+NWBLEPCRT=?<CR>	<CR><LF>+NWBLEPCRT: <app>,<srv>,<uuid>,<slt>,<per>,<cp><CR><LF> <CR><LF>OK<CR><LF>
Unsolicited report	<CR><LF>+NWBLEPCRT: <cr_id><CR><LF>	

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<app_id>	ID of the application to which the characteristic will be added. The application ID is uploaded by NWBLEREG. Currently, application registration is not supported, and app_id must be set to 0.
<srv_id>	ID of the service to which the characteristic will be added. The service ID is uploaded by NWBLEPSRV.
<uuid>	UUID of the characteristic
<slt>	Whether to select the description. The value is an integer ranging from 0 to 1. 0: Not to select the description 1: Select the description.
<per>	Read/write permission. The value is an integer ranging from 0 to 2. 0: Read only 1: Write only 2: Read-write
<cp>	Property of the characteristic. The value is an integer ranging from 0 to 4. 0: Write 1: Read 2: Notify 3: Display 4: All the above

Example

AT+NWBLEPCRT=0,1,"0x9999",0,2,4	Add the characteristic 0x9999 to the service 0x1808 under the application ID 0. Do not select the description.
OK	
+NWBLEPCRT: 0	Configure the read-write permission. The characteristic properties include Read, Write, Notify, and Display.
AT+NWBLEPCRT=?	READ parameter list
+NWBLEPCRT: <0>,<1-2>,<uuid>,<0-1>,<0-2>,<0-4>	
OK	

3.4 AT+NWBLEPSTR—Starting a Service

To start a service.

Bluetooth must be disabled before you start a service.

Format

Type	Command	Response
Set	AT+NWBLEPSTR=<app_id>,<srv_id><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+NWBLEPSTR=?<CR>	<CR><LF>+NWBLEPSTR: <app_id>,<srv_id><CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <app_id> ID of the application to which the service will be added. The application must already be created. This ID is uploaded by NWBLEPREG. Currently, application registration is not supported, and app_id must be set to 0.
- <srv_id> UUID of the service to be started. The service UUID is uploaded by NWBLEPSRV.

Example

```
AT+NWBLEPSTR=0,1           Start the service 0x1808 (glucose) under the No.0 application.
OK
AT+NWBLEPSTR=?             READ parameter list
+NWBLEPSTR: <0>,<1-2>
OK
```

3.5 AT+NWBLEPSEND—Sending Data

To send data to the central device.



- Srv_id of the service with the UUID 0xFEE0 is 0. Crt_id of the characteristic with the UUID 0xFEE1 is 0.
- Whether the data is sent successfully is determined by whether the characteristic has the permissions to read and write notifications and instructions.
- MTU currently can only be set to 200.

Format

Type	Command	Response
Set	<p>AT+NWBLEPSEND=<srv_id>,<crt_id>,<op>,<mode>,<len><CR></p> <p>After the response ">" is returned, enter the data to be sent.</p>	<p><CR><LF>><CR><LF></p> <p><Enter the data></p> <p>If the connection is already set up, and the send buffer is not full, the response is as follows:</p> <p><CR><LF>OK<CR><LF></p> <p>If the connection is not set up or is abnormally closed, or if the parameters are incorrect, or if the send buffer is full, the response is as follows:</p> <p><CR><LF>ERROR<CR><LF></p>
Test	AT+NWBLEPSEND=?<CR>	<p><CR><LF>+NWBLEPSEND:</p> <p><srv_id>,<crt_id>,<op>,<mode>,<len><CR><LF></p> <p><CR><LF>OK<CR><LF></p>
Unsolicited report	<CR><LF>+NWBLEPSEND: <state><CR><LF>	

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <srv_id> ID of the service to which the data will be send. The service must already be created. This ID is uploaded by NWBLEPSRV.
- <crt_id> ID of the characteristic to which the data will be sent. This ID is uploaded by NWBLEPSRV.
- <op> The value is an integer ranging from 0 to 1.
0: Send notifications.
1: Send instructions.

<mode> The value is an integer ranging from 0 to 1.
 Send mode. 0: Send data in HEX format; 1: Send data in ASCII format.

<len> Data length. The value is an integer ranging from 1 to 1024.

<state> 0: Failed to send
 1: Sent successfully

Example

```
AT+NWBLEPSEND=0,0,0,1,5                    Send a notification to the No.0 characteristic
>hello                                        under the No.0 application. The notification
OK                                             content is "hello". The notification is sent
+NWBLEPSEND:1                                successfully.
AT+NWBLEPSEND=?                             READ parameter list
+NWBLEPSEND: <0-2>,<0-4>,<0-1>,<0-1>,<1-1024>
OK
```

3.6 +NLWDATARECV–Receiving Data

To receive data. Data is reported to the AT channel in unsolicited manner.

Format

Type	Command
Unsolicited report	<CR><LF>+NWURCBLEPRECV: <srv_id>,<crt_id>,<len>,<data><CR><LF>

Parameter

<data> Data content

<len> Data length

<srv_id> ID of the service

<crt_id> ID of the characteristic

Example

```
+NWURCBLEPRECV: 0,0,3,123                 Receive data. The data content is "123" in ASCII format.
+NWURCBLEPRECV: 0,0,5,3132333435         Display data in HEX format.
```

3.7 AT+NWBLEPWRITE–Writing Data

To write data to a characteristic.

Format

Type	Command	Response
Set	AT+NWBLEPWRITE=<srv_id>,<crt_id> ,<mode>, <data><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+NWBLEPWRITE=?<CR>	<CR><LF>+NWBLEPWRITE: <srv_id>,<crt_id>,<mode>,<data><CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <srv_id> ID of the service. The value is an integer ranging from 0 to 2.
- <crt_id> ID of the characteristic. The value is an integer ranging from 0 to 4.
- <mode> Data format. The value is an integer ranging from 0 to 1.
0: HEX
1: ASCII
- <data> Data content

Example

```
AT+NWBLEPWRITE=1,0,0,33363636      Send a notification to the No.0 characteristic under the
OK                                  No.0 application. The notification content is "hello".
                                     The notification is sent successfully.

AT+NWBLEPWRITE=?                  READ parameter list
+NWBLEPWRITE: <0-2>,<0-4>,<0-1>,<data>
OK
```

3.8 AT+NWBLEPWRITE–Setting the Format of Received Data

To set the format of received data.

Format

Type	Command	Response
Set	AT+NWBLERCVMODE=<mode><CR>	<CR><LF>OK<CR><LF>
Query	AT+NWBLERCVMODE?	<CR><LF>NWBLERCVMODE: <mode><CR><LF> <CR><LF>OK<CR><LF>
Test	AT+NWBLERCVMODE=?<CR>	<CR><LF>+NWBLERCVMODE: <mode><CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<mode> The value is an integer ranging from 0 to 1.
 0: HEX
 1: ASCII (default)

Example

```
AT+NWBLERCVMODE=1           Set the format of received data.
OK
AT+NWBLERCVMODE=?          READ parameter list
+NWBLERCVMODE: <0-1>
OK
```

3.9 AT+NWBLEDISCON—Querying or Closing the BLE Connection

To query the current connection information, and close the connection with the remote BLE device with the specified MAC address.

Format

Type	Command	Response
Execute	AT+NWBLEDISCON<CR>	<CR><LF>OK<CR><LF>

		Or <CR><LF>ERROR<CR><LF>
		<CR><LF>+NWBLEDISCON:<CR><LF>
		<CR><LF><index>,<name>,<mac><CR><LF>
		<CR><LF><index>,<name>,<mac><CR><LF>
Query	AT+NWBLEDISCON?	...
		<CR><LF><index>,<name>,<mac><CR><LF>
		...
		<CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<index>	Index of the remote device
<name>	Name of the remote device
<mac>	MAC address of the remote device, which must be the MAC address in the READ list.

Example

```

AT+NWBLEDISCON           Close the connection with the device.
OK
AT+NWBLEDISCON?         Read the current connection list.
+NWBLEDISCON:
1,65:7F:49:B2:21:6D
OK

```

3.10 AT+NWBLESVRM—Removing the Specified Service

To remove the specified service.

BLE must be disabled before you remove a service.

Format

Type	Command	Response
Set	AT+NWBLESVRM=<app_id>,<srv_id><CR>	<CR><LF>OK<CR><LF> Or

		<CR><LF>ERROR<CR><LF>
Test	AT+NWBLESVRM=?<CR>	<CR><LF>+NWBLESVRM: <app_id>,<srv_id><CR><LF> <CR><LF>OK<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <app_id> ID of the application (returned in the unsolicited report after the application is successfully created)
Currently, application registration is not supported, and app_id must be set to 0.
- <srv_id> ID of the service (returned in the unsolicited after the service is successfully created)

Example

```
AT+NWBLESVRM=0,1          Remove the No.1 service under the No.0 application.
OK
                           READ parameter list

AT+NWBLESVRM=?
+NWBLESVRM: <0>,<1-2>
OK
```

3.11 AT+NWBLECRTRM—Removing the Specified Characteristic

To remove the specified characteristic.

Format

Type	Command	Response
Set	AT+NWBLECRTRM=<app_id>,<srv_id>,<crtr_id><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+NWBLECRTRM=?<CR>	<CR><LF>+NWBLECRTRM: <app_id>,<srv_id>,<crtr_id><CR><LF>

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

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<app_id>	ID of the application (returned in the unsolicited report after the application is successfully created)
<srv_id>	ID of the service (report returned in the unsolicited after the service is successfully created)
<chr_id>	ID of the characteristic (returned in the unsolicited after the characteristic is successfully created)

Example

```
AT+NWBLECRTRM=0,0,0          Remove the No.0 characteristic of the No.0 service under the
OK                             No.0 application.
                               READ parameter list

AT+NWBLESRVRM=?
+NWBLESRVRM: <0>,<1-2>,<0-4>
OK
```

3.12 AT+NWIBEACON—Setting the iBeacon Parameters

To set the iBeacon parameters.

Advertising must be disabled first before you set the iBeacon parameters.

If you restart Bluetooth, iBeacon is disabled.

Format

Type	Command	Response
Set	AT+NWIBEACON=<uuid>,<major>,<minor><CR>	<CR><LF>OK<CR><LF>
Test	AT+NWIBEACON=?<CR>	<CR><LF>+NWIBEACON: <uuid>,<major>,<minor><CR><LF> <CR><LF>OK<CR><LF>
Query	AT+NWIBEACON?<CR>	<CR><LF>+NWIBEACON:

```
<uuid>,<major>,<minor><CR><LF>  
<CR><LF>OK<CR><LF>
```

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<uuid> The value of UUID is a 16-byte string in hexadecimal format.
<major> The value of major is a 2-byte string in hexadecimal format.
<minor> The value of minor is a 2-byte string in hexadecimal format.

Example

```
AT+NWIBEACON=B9007F30F5F8466EAF925556B57FE55,1    Set the iBeacon parameters.  
234,0001  
OK  
  
                                                  READ parameter list  
  
AT+NWIBEACON=?  
+NWIBEACON: <uuid>,<major>,<minor>  
OK  
AT+NWIBEACON?  
                                                  Query the iBeacon parameters.  
+NWIBEACON:  
B9007F30F5F8466EAF925556B57FE55,1234,0001  
OK
```


4 Commands for BLE Central Devices

4.1 AT+NWBLESCAN–Scanning Peripheral BLE Devices by the Local BLE Device

To scan peripheral BLE devices.

If the name of the scanned BLE device is in Chinese, garble characters may be displayed.

The number of scanned devices is associated with the signal strength of the local BLE device.

Format

Type	Command	Response
Set	AT+NWBLESCAN=<scan_time ><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Unsolicited report	+NWURCBLESCAN	<CR><LF>+NWURCBLESCAN:<CR><LF> <CR><LF><name>,<mac>,<addr_type><CR><LF> ...

Timeout

The command times out if the module does not respond in 15 ms.

Parameter

<scan_time>	Scan time Parameter type: integer Value range: 3-60s
<name>	Name of the remote BLE device
<mac>	MAC address of the remote BLE device
<addr_type>	Address type 0: public address

- 1: random address
- 2: RPA public address
- 3: RPA random address

Example

```
AT+NWBLESCAN=50           Scan peripheral devices for 50s, and stop scanning upon
OK                         timeout.
+NWURCBLESCAN:
Honor V10,38:37:8b:71:28:c6,0   Report the scanning result in unsolicited manner.
Shitou,5c:c3:07:16:dc:ce,0
```

4.2 AT+NWBLECCON—Setting up a BLE Connection

To set up a connection between the local BLE device with another BLE device.

Format

Type	Command	Response
Set	AT+NWBLECCON=<addr_type>, <mac><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Query	AT+NWBLECCON?<CR>	<CR><LF>+NWBLECCON:<CR><LF> <CR><LF><index>,<mac><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <addr_type> Address type
Parameter type: integer
Value range: returned by +NWURCBLESCAN
- <mac> MAC address of the BLE device
Parameter type: String
Value range: returned by +NWURCBLESCAN

<index> Index of the remote device

Example

<pre>AT+NWBLECCON=0,"58:86:ed:28:bb:5a" OK +NWURCBLESTAT: 1,58:86:ED:28:BB:5A AT+NWBLECCON? +NWBLECCON: 1,58:86:ED:28:BB:5A OK</pre>	<p>Set up a connection with the specified BLE device.</p> <p>If the connection is set up successfully, report "<status>[,<mac>]".</p> <p>Note: The unsolicited report command is +NWURCBLESTAT.</p> <p>Query the BLE connection, and display "<index>,<mac>".</p> <p>If the connection is not set up, "<index>,<mac>" is not displayed.</p>
---	---

4.3 AT+NWBLECDISCON—Closing a BLE Connection

To close a connection between the local BLE device with another BLE device.

Format

Type	Command	Response
Execute	AT+NWBLECDISCON<CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

N/A.

Example

<pre>AT+NWBLECDISCON OK</pre>	<p>Close the connection with the BLE device with the specified address.</p>
-------------------------------	---

4.4 AT+NWBLEQSRV–Discovering Services of a BLE Device

To discover services of a BLE device.

Format

Type	Command	Response
		<CR><LF>+NWBLEQSRV:<CR><LF> <CR><LF><srv_id>,<srv_uuid>,<srv_type><CR><LF>
Execute	AT+NWBLEQSRV<CR>	... <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<srv_id>	ID of the service. The value is an integer that increments from 0.
<srv_uuid>	UUID of the service
<srv_type>	Service type
	0: secondary service
	1: primary service

Example

```

AT+NWBLEQSRV           Start to discover services.
+NWBLEQSRV:           Discovered services:
0,0x1808,1             The service ID is 0, the service UUID is 0x1808, and the
1,0x1811,0             service type is 1 (Primary).
...                   The service ID is 1, the service UUID is 0x1811, and the
OK                     service type is 0 (Secondary).
    
```

4.5 AT+NWBLEQCHAR–Discovering Characteristics of a BLE Device

To discover characteristics of a BLE device.

Format

Type	Command	Response
Set	AT+NWBLEQCHAR=<srv_id><CR>	<CR><LF>+NWBLEQCHAR:<CR><LF> <CR><LF><srv_id>,<char_id>,<char_uuid>,<char_prop><CR><LF> ... <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Execute	AT+NWBLEQCHAR<CR>	<CR><LF>+NWBLEQCHAR:<CR><LF> <CR><LF><srv_id>,<char_id>,<char_uuid>,<char_prop><CR><LF> ... <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

<srv_id>	ID of the service Parameter type: integer Value range: returned by AT+NWBLEQSRV
<char_id>	ID of the service characteristic. The value is an integer that increments from 0.
<char_uuid>	UUID of the service characteristic
<char_prop>	Property of the service characteristic, including: Broadcast 0x01 Read 0x02 Write without response 0x04 Write 0x08 Notify 0x10 Indicate 0x20 Authenticated Signed Write 0x40 Extended Properties 0x80

Example

```

AT+NWBLEQCHAR=0      Obtain the characteristics of the service with the ID 0.
+NWBLEQCHAR:         Obtained characteristics of the specified service:
0,0,0x2906,0xff      The service ID is 0, the characteristic ID is 0, the characteristic UUID
0,1,0x2907,0xef      is 0x2906, and the service characteristic property is 0xff (supporting
...                  all properties).
                      The service ID is 0, the characteristic ID is 1, the characteristic UUID
OK                   is 0x2906, and the service characteristic property is 0xef (supporting
AT+NWBLEQCHAR        all except extended properties).
+NWBLEQCHAR:         ...
0,0,0x2906,0xff
0,1,0x2907,0xef      Obtain characteristics of all services.
1,0,0x2906,0xff      Obtained characteristics of all services:
1,1,0x2907,0xef      The service ID is 0, the characteristic ID is 0, the characteristic UUID
...                  is 0x2906, and the service characteristic property is 0xff.

OK

                      The service ID is 1, the characteristic ID is 0, the characteristic UUID
                      is 0x2906, and the service characteristic property is 0xff.
    
```

4.6 AT+NWBLECSEND–Sending Data

To send data from the master BLE device to a BLE device.

Format

Type	Command	Response
Set	AT+NWBLECSEND=<srv_id>,<char_id>,<mode>,<len><CR>	<CR><LF>><CR><LF> <CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Unsolicited report <CR><LF>+NWBLECSEND: <state><CR><LF>		

Timeout

The command times out if the module does not respond in 300 ms.

Parameter

- <srv_id> ID of the service
Parameter type: integer
Value range: returned by AT+NWBLEQSRV or AT+NWBLEQCHAR
- <char_id> ID of the service characteristic
Parameter type: integer

	Value range: returned by AT+NWBLEQCHAR
<mode>	Sending mode. The value is an integer ranging from 0 to 1. 0: Sending in HEX format 1: Sending in ASCII format (default)
<len>	Data length Parameter type: integer Value range: 1-1024
<state>	0: Failed to send 1: Sent successfully

Example

```

AT+NWBLECSEND=1,1,1,5      Set the data sending parameters.
>hello                      Enter the data to be sent after the ">" symbol.
OK                          If the connection is already set up, and the send buffer is not
Or                           full, "OK" is returned.
ERROR
+NWBLECSEND: 1              If the connection is not set up or is abnormally closed, or if the
                             parameters are incorrect, or if the sent buffer is full, "ERROR" is
                             returned.
                             Unsolicited report: Data is sent successfully
    
```

4.7 +NWURCBLECRECV–Receiving Data

To receive data on the master BLE device.

Format

Type	Command
Unsolicited report	<CR><LF>+NWURCBLECRECV: <srv_id>,<crd_id>,<len>,<data><CR><LF>

Timeout

N/A.

Parameter

<data>	Data content
<len>	Data length
<srv_id>	ID of the service
<char_id>	ID of the service characteristic

Example

```
+NWURCBLECRECV: 3,0,3,123
```

The characteristic with the service characteristic ID 0 under the service ID 3 receives data. The data length is 3, data content is "123", and the data is in ASCII format.

Note: The data is received in ASCII format by default. To change the data receiving format, use the AT+NWBLERCVMODE command.

4.8 AT+NWBLECREAD–Reading the Characteristic Data

To read the characteristic data of a slave device on the master BLE device.

Format

Type	Command	Response
Set	AT+NWBLECREAD=<srv_id>,<char_id> >,<mode><CR>	<CR><LF>OK<CR><LF> Or <CR><LF>ERROR<CR><LF>
Test	AT+NWBLECREAD=?<CR>	<CR><LF>+NWBLECREAD: <srv_id>,<chr_id>,<mode>,<data><CR><LF> <CR><LF>OK<CR><LF>
Unsolicited report	+NWURCBLECREAD: <data_len>,<data>	

Timeout

N/A.

Parameter

<srv_id>	ID of the service. The value is an integer ranging from 0 to 9.
<char_id>	ID of the service characteristic. The value is an integer ranging from 0 to 9.
<mode>	Data format. The value is an integer ranging from 0 to 1. 0: HEX 1: ASCII
<data_len>	Data length
<data>	Data content

Example

```

AT+NBWBLECREAD=4,0,0
OK
+NWURCBLECREAD:
245,33363636000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000
AT+NBWBLECREAD=?
+NBWBLECREAD: <0-9>,<0-9>,<0-1>
OK

```

Read The characteristic with the service
characteristic ID 0 under the service ID 4. The data
format is ASCII.

READ parameter list

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A Appendix

The table below lists the services corresponding to the UUID number specified by the standard BLE.

Specification Name	Specification Type	Assigned Number	Specification Level
Alert Notification Service	org.bluetooth.service.alert_notification	0x1811	Adopted
Automation IO	org.bluetooth.service.automation_io	0x1815	Adopted
Battery Service	org.bluetooth.service.battery_service	0x180F	Adopted
Blood Pressure	org.bluetooth.service.blood_pressure	0x1810	Adopted
Body Composition	org.bluetooth.service.body_composition	0x181B	Adopted
Bond Management	org.bluetooth.service.bond_management	0x181E	Adopted
Continuous Glucose Monitoring	org.bluetooth.service.continuous_glucose_monitoring	0x181F	Adopted
Current Time Service	org.bluetooth.service.current_time	0x1805	Adopted
Cycling Power	org.bluetooth.service.cycling_power	0x1818	Adopted
Cycling Speed and Cadence	org.bluetooth.service.cycling_speed_and_cadence	0x1816	Adopted
Device Information	org.bluetooth.service.device_information	0x180A	Adopted
Environmental Sensing	org.bluetooth.service.environmental_sensing	0x181A	Adopted
Generic Access	org.bluetooth.service.generic_access	0x1800	Adopted
Generic Attribute	org.bluetooth.service.generic_attribute	0x1801	Adopted
Glucose	org.bluetooth.service.glucose	0x1808	Adopted
Health Thermometer	org.bluetooth.service.health_thermometer	0x1809	Adopted
Heart Rate	org.bluetooth.service.heart_rate	0x180D	Adopted
HTTP Proxy	org.bluetooth.service.http_proxy	0x1823	Adopted
Human Interface Device	org.bluetooth.service.human_interface_device	0x1812	Adopted
Immediate Alert	org.bluetooth.service.immediate_alert	0x1802	Adopted
Indoor Positioning	org.bluetooth.service.indoor_positioning	0x1821	Adopted
Internet Protocol Support	org.bluetooth.service.internet_protocol_support	0x1820	Adopted

Link Loss	org.bluetooth.service.link_loss	0x1803	Adopted
Location and Navigation	org.bluetooth.service.location_and_navigation	0x1819	Adopted
Next DST Change Service	org.bluetooth.service.next_dst_change	0x1807	Adopted
Object Transfer	org.bluetooth.service.object_transfer	0x1825	Adopted
Phone Alert Status Service	org.bluetooth.service.phone_alert_status	0x180E	Adopted
Pulse Oximeter	org.bluetooth.service.pulse_oximeter	0x1822	Adopted
Reference Time Update Service	org.bluetooth.service.reference_time_update	0x1806	Adopted
Running Speed and Cadence	org.bluetooth.service.running_speed_and_cadence	0x1814	Adopted
Scan Parameters	org.bluetooth.service.scan_parameters	0x1813	Adopted
Transport Discovery	org.bluetooth.service.transport_discovery	0x1824	Adopted
Tx Power	org.bluetooth.service.tx_power	0x1804	Adopted
User Data	org.bluetooth.service.user_data	0x181C	Adopted
Weight Scale	org.bluetooth.service.weight_scale	0x181D	Adopted