

EC2x&EG25-G BT

Application Note

LTE Standard Module Series

Rev. EC2x&EG25-G_BT_Application_Note_V1.0

Date: 2020-03-13

Status: Released



Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local office. For more information, please visit:

<http://www.quectel.com/support/sales.htm>

For technical support, or to report documentation errors, please visit:

<http://www.quectel.com/support/technical.htm>

Or email to: support@quectel.com

GENERAL NOTES

QUECTEL OFFERS THE INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

COPYRIGHT

THE INFORMATION CONTAINED HERE IS PROPRIETARY TECHNICAL INFORMATION OF QUECTEL WIRELESS SOLUTIONS CO., LTD. TRANSMITTING, REPRODUCTION, DISSEMINATION AND EDITING OF THIS DOCUMENT AS WELL AS UTILIZATION OF THE CONTENT ARE FORBIDDEN WITHOUT PERMISSION. OFFENDERS WILL BE HELD LIABLE FOR PAYMENT OF DAMAGES. ALL RIGHTS ARE RESERVED IN THE EVENT OF A PATENT GRANT OR REGISTRATION OF A UTILITY MODEL OR DESIGN.

Copyright © Quectel Wireless Solutions Co., Ltd. 2020. All rights reserved.

About the Document

Revision History

| Version | Date | Author | Description |
|---------|------------|--------------------------|-------------|
| 1.0 | 2020-03-13 | Rami ZHANG/ Henry FAN | Initial |

Contents

| | |
|---|-----------|
| About the Document..... | 2 |
| Contents..... | 3 |
| Table Index..... | 5 |
| 1 Introduction | 6 |
| 2 Description of BT AT Commands | 7 |
| 2.1. General BT AT Commands | 7 |
| 2.1.1. AT+QBTPWR Turn on/off BT | 7 |
| 2.2. Description of BLE AT Commands..... | 8 |
| 2.2.1. General BLE AT Commands..... | 8 |
| 2.2.1.1. AT+QBTLEADDR Read Local Address of BLE Device | 8 |
| 2.2.1.2. AT+QBTNAME Set the Local Name of BT Device..... | 9 |
| 2.2.2. AT Commands of BLE GATT Service | 10 |
| 2.2.2.1. AT+QBTGATREG Register to a GATT Service..... | 10 |
| 2.2.2.2. AT+QBTGATSS Add/Remove a Service..... | 11 |
| 2.2.2.3. AT+QBTGATSC Add/Remove a Characteristic to an Existing Service | 12 |
| 2.2.2.4. AT+QBTGATSD Add/Remove a Descriptor to an Existing Characteristic..... | 13 |
| 2.2.2.5. AT+QBTGATDBALC Request to Allocate the Database..... | 14 |
| 2.2.2.6. AT+QBTGATDBDEALC Request to De-allocate Database..... | 15 |
| 2.2.2.7. AT+QBTGATSIND Send an Indication..... | 15 |
| 2.2.2.8. AT+QBTGATSNOD Send a Notification..... | 16 |
| 2.2.2.9. AT+QBTGATADV Set Advertising Parameters | 17 |
| 2.2.2.10. AT+QBTGATRRSP Read Data | 18 |
| 2.2.2.11. AT+QBTGATWRSP Send Response to the Write Data..... | 18 |
| 2.2.2.12. AT+QBTGATSA Active Database Service | 19 |
| 2.2.2.13. AT+QBTGATDA Add Database..... | 20 |
| 2.2.2.14. AT+QBTGATDISC Disconnect Server Actively..... | 21 |
| 2.2.2.15. AT+QBTGATPER Start Peripheral Mode | 21 |
| 2.3. Description of SPP AT Commands | 22 |
| 2.3.1. AT+QBTSPPACT Activate or Deactivate SPP Device..... | 22 |
| 2.3.2. AT+QBTSPPDIC Disconnect from the SPP Device..... | 22 |
| 2.3.3. AT+QBTSPPWRS Write Message to Remote Device..... | 23 |
| 3 Description of URCs | 25 |
| 3.1. BLE Related URCs | 25 |
| 3.1.1. +QBTGATSCON Notify the GATT Connection | 25 |
| 3.1.2. +QBTGATSDCON Notify the GATT Disconnection | 25 |
| 3.1.3. +QBTGATSRRSP Notify Client to Read GATT Service Data..... | 26 |
| 3.1.4. +QBTGATSWRSP Notify Client to Write GATT Service Data | 26 |
| 3.2. SPP Related URCs..... | 27 |
| 3.2.1. +QBTSPPDATIND Report Data..... | 27 |
| 3.2.2. +QBTSPPCONNECT Notify SPP Connection | 27 |

| | | |
|----------|--|-----------|
| 3.2.3. | +QBTSPDISCONNECT Notify SPP Disconnection..... | 27 |
| 4 | Example | 29 |
| 4.1. | BLE Communication | 29 |
| 4.2. | SPP Activation..... | 30 |
| 5 | Appendix A References..... | 31 |

Table Index

| | |
|---|----|
| Table 1: Types of AT Commands and Responses | 7 |
| Table 2: Terms and Abbreviations | 31 |

1 Introduction

Bluetooth (BT) is a wireless technology standard used for exchanging data between fixed and mobile devices over short distances using short-wavelength UHF radio waves in the industrial, scientific and medical radio bands. This document will focus on the implementation of the BLE and SPP ¹⁾ functions in the Bluetooth protocol stack on Quectel modules.

Bluetooth Low Energy (Bluetooth LE or BLE) is a wireless personal area network technology designed and marketed by the Bluetooth Special Interest Group aimed at novel applications in the healthcare, fitness, beacons, security, and home entertainment industries. Compared to Classic Bluetooth, Bluetooth Low Energy is intended to provide considerably reduced power consumption.

The development of classic Bluetooth is based on SPP protocol, which intends to establish a transmission channel between the local Bluetooth device and the remote Bluetooth device to realize data interaction and cost while maintaining a similar communication range.

This document mainly introduces BT function of the Quectel LTE standard modules that can be used in combination with Quectel FC20 series & FC21 modules so as to realize device interconnection through current wireless technology with the lowest power consumption. The applicable LTE standard modules are:

- EC2x ²⁾: EC25, EC21, EC20 R2.1
- EG25-G

NOTES

1. ¹⁾ SPP function is still under development.
2. ²⁾ BT function on EC2x modules is still under development.

2 Description of BT AT Commands

Table 1: Types of AT Commands and Responses

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

NOTES

1. <...>: Parameter name. Angle brackets do not appear on the command line. The parameter value indicated by "_" is the default one.
2. [...]: Optional parameter. Square brackets do not appear on the command line. When an optional parameter is omitted, the default value will be used unless otherwise specified.

2.1. General BT AT Commands

2.1.1. AT+QBTPWR Turn on/off BT

This command turns on or turns off BT.

| AT+QBTPWR Turn on/off BT | |
|-----------------------------|--|
| Test Command AT+QBTPWR=? | Response +QBTPWR: (list of supported <enable>s) OK |
| Read Command AT+QBTPWR? | Response +QBTPWR: <enable> OK |
| Write Command | Response |

| | |
|-----------------------|--|
| AT+QBTPWR=<enable> | OK |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

| | |
|----------|--------------------------------|
| <enable> | Integer type. Turns on/off BT. |
| 0 | Turn off |
| 1 | Turn on |

Example

```
AT+QBTPWR=1 //Turn on BT.
OK
```

2.2. Description of BLE AT Commands

2.2.1. General BLE AT Commands

2.2.1.1. AT+QBTLEADDR Read Local Address of BLE Device

| AT+QBTLEADDR Read Local Address of BLE Device | |
|---|--|
| Test Command AT+QBTLEADDR=? | Response OK |
| Read Command AT+QBTLEADDR? | Response +QBTLEADDR: <BLE_addr> OK |
| Maximum Response Time | 10s |
| Characteristics | / |

Parameter

| | |
|------------|---|
| <BLE_addr> | String type. Local address of BLE device. e.g.: "A662616202C3". |
|------------|---|

Example

```
AT+QBTLEADDR?  
+QBTLEADDR: "A662616202C3"  
  
OK
```

2.2.1.2.AT+QBTNAME Set the Local Name of BT Device

This command is used to set or read the local name of BT device.

| AT+QBTNAME Set the Local Name of BT Device | |
|--|--|
| Test Command AT+QBTNAME=? | Response OK |
| Read Command AT+QBTNAME? | Response +QBTNAME: <device_name> OK |
| Write Command AT+QBTNAME=<device_name> | Response OK |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

<device_name> String type. The local name of the BT device.

Example

```
AT+QBTNAME?  
+QBTNAME: "MYBTDEVICE"  
  
OK
```

2.2.2. AT Commands of BLE GATT Service

2.2.2.1. AT+QBTGATREG Register to a GATT Service

| AT+QBTGATREG Register to a GATT Service | |
|---|---|
| Test Command AT+QBTGATREG=? | Response +QBTGATREG: (list of supported <op>s),<GATT_ID> OK |
| Read Command AT+QBTGATREG? | Response [+QBTGATREG: <GATT_ID> ...] OK |
| Write Command AT+QBTGATREG=<op>[,<GATT_ID>] | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|------------------------|--|
| <op> | Integer type. Whether to register to the GATT service. 0 Deregister from the GATT service. 1 Register to the GATT service. When the parameter is set to 1, <GATT_ID> should be ignored. |
| <GATT_ID> | Integer type. GATT ID. |

Example

```

AT+QBTGATREG=1           //Register to a GATT service.
+QBTGATREG: 1,131106

OK
AT+QBTGATREG?           //Query the registered GATT ID.
+QBTGATREG: 131106

OK
AT+QBTGATREG=0,131106    //Deregister a GATT service.
OK

```

2.2.2.2.AT+QBTGATSS Add/Remove a Service

| AT+QBTGATSS Add/Remove a Service | |
|--|---|
| Test Command AT+QBTGATSS=? | Response +QBTGATSS: (list of supported <op>s),<GATT_ID>,<serv_ID>,<serv_UUID>,<primary> OK |
| Write Command AT+QBTGATSS=<op>,<GATT_ID>,<serv_ID>[,<serv_UUID>,<primary>] | Response If <op> is set to 0, parameters <serv_UUID> and <primary> should be omitted, remove the service: OK Or ERROR If <op> is set to 1, parameters <serv_UUID> and <primary> should be entered, add the service: OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-------------|---|
| <op> | Integer type. Whether to remove a service. 0 Remove a service. 1 Add a service. |
| <GATT_ID> | Integer type. GATT ID. |
| <serv_ID> | Integer type. Service ID. |
| <serv_UUID> | Integer type. Service UUID. |
| <primary> | Integer type. Whether the service is primary. 0 Not primary service. 1 Primary service. |

Example

```

AT+QBTGATSS=1,131106,1,6154,1 //Add a service.
OK
AT+QBTGATSS=0,131106,1 //Delete a service.
OK

```

2.2.2.3.AT+QBTGATSC Add/Remove a Characteristic to an Existing Service

| AT+QBTGATSC Add/Remove a Characteristic to an Existing Service | |
|---|---|
| Test Command AT+QBTGATSC=? | Response +QBTGATSC: (list of supported <op>s),<GATT_ID>,<serv_ID>,<character_ID>,<serv_UUID>,<value_length>,<prop>,<attrvalue_flag>,<value> OK |
| Write Command AT+QBTGATSC=<op>,<GATT_ID>,<serv_ID>,<character_ID>[,<serv_UUID>,<value_length>,<prop>,<attrvalue_flag>,<value>] | Response If <op> is set to 0, parameters <serv_UUID>,<value_length>,<prop>,<attrvalue_flag> and <value> should be omitted, remove the characteristic: OK Or ERROR If <op> is set to 1, parameters <serv_UUID>,<value_length>,<prop>,<attrvalue_flag> and <value> should be entered, add the characteristics: OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-------------------------------|--|
| <op> | Integer type. Whether to remove a characteristic. 0 Remove a characteristic 1 Add a characteristic |
| <GATT_ID> | Integer type. GATT ID. |
| <serv_ID> | Integer type. Service ID. |
| <serv_UUID> | Integer type. Characteristic UUID. |
| <character_ID> | Integer type. Characteristic ID. |
| <prop> | Integer type. Characteristic properties. Different values represent different properties. |
| <value_length> | Integer type. The length of the characteristic. Unit: byte. |
| <attrvalue_flag> | Integer type. Attribute value flags. Defines how the characteristic value can be accessed. |
| <value> | String type. Characteristic value. |

Example

```
AT+QBTGATSC=1,131106,1,1,10793,7,18,16,"quectel" //Add a characteristic.
OK
AT+QBTGATSC=0,131106,1,1 //Remove a characteristic.
OK
```

2.2.2.4.AT+QBTGATSD Add/Remove a Descriptor to an Existing Characteristic

| AT+QBTGATSD Add/Remove a Descriptor to an Existing Characteristic | |
|---|--|
| Test Command AT+QBTGATSD=? | Response +QBTGATSD: (list of supported <op>s),<GATT_ID>,<serv_ID>,<character_ID>,<desc_ID>,<serv_UUID>,<value_length>,<prop>,<attrvalue_flag>,<value> OK |
| Write Command AT+QBTGATSD=<op>,<GATT_ID>,<serv_ID>,<character_ID>,<desc_ID>[,<serv_UUID>,<value_length>,<prop>,<attrvalue_flag>,<value>] | Response If <op> is set to 0, parameters <serv_UUID>,<value_length>,<prop>,<attrvalue_flag> and <value> should be omitted, remove the descriptor: OK Or ERROR If <op> is set to 1, parameters <serv_UUID>,<value_length>,<prop>,<attrvalue_flag> and <value> should be entered, add the descriptor: OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------------------------|--|
| <op> | Integer type. Whether to remove a descriptor. 0 Remove a descriptor 1 Add a descriptor |
| <GATT_ID> | Integer type. GATT ID. |
| <serv_ID> | Integer type. Service ID. |
| <character_ID> | Integer type. Characteristic ID. |

| | |
|------------------|--|
| <desc_ID> | Integer type. Descriptor ID. |
| <prop> | Integer type. Descriptor properties. Different values represent different properties. |
| <serv_UUID> | Integer type. Characteristic UUID. |
| <value_length> | Integer type. The length of the descriptor. Unit: byte. |
| <attrvalue_flag> | Integer type. Attribute value flags. Defines how the characteristic value can be accessed. |
| <value> | String type. Descriptor value. |

Example

```

AT+QBTGATSD=1,131106,1,1,1,10498,7,2,0,"quectel" //Add a descriptor.
OK
AT+QBTGATSD=0,131106,1,1,1 //Remove a descriptor.
OK

```

2.2.2.5.AT+QBTGATDBALC Request to Allocate the Database

| AT+ QBTGATDDBALC Request to Allocate the Database | |
|---|---|
| Test Command AT+QBTGATDBALC=? | Response +QBTGATDBALC: <GATT_ID>,<num_of_attrhandle>,<preferred_StartHandle> OK |
| Write Command Allocate the database AT+QBTGATDBALC=<GATT_ID>,<num_of_attrhandle>,<preferred_start_handle> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-------------------------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <num_of_attrhandle> | Integer type. Number of attribute handles. |
| <preferred_StartHandle> | Integer type. StartHandle the application prefers. 0 indicates no preference. |

Example

```
AT+QBTGATDBALC=131106,200,0 //Allocate the database.
OK
```

2.2.2.6.AT+QBTGATDBDEALC Request to De-allocate Database

| AT+QBTGATDBDEALC Request to De-allocate Database | |
|--|--|
| Test Command AT+QBTGATDBDEALC=? | Response +QBTGATDBDEALC: <GATT_ID> OK |
| Write Command AT+QBTGATDBDEALC=<GATT_ID> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

<GATT_ID> Integer type. GATT ID.

Example

```
AT+QBTGATDBDEALC=131106
OK
```

2.2.2.7.AT+QBTGATSIND Send an Indication

| AT+QBTGATSIND Send an Indication | |
|--|---|
| Test Command AT+QBTGATSIND=? | Response +QBTGATSIND: <GATT_ID>,<conn_ID>,<attr_handle>,<value_length>,<value> OK |
| Write Command AT+QBTGATSIND=<GATT_ID>,<conn | Response OK |

| | |
|---|---|
| <_ID>,<attr_handle>,<value_length>,<value> | Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------------------------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <attr_handle> | Integer type. Handle of attribute. |
| <value_length> | Integer type. The length of the indication. Unit: byte. |
| <value> | String type. Content of the indication. |

Example

```
AT+QBTGATSIND=131106,1048576,14,4,"1111" //Send an indication.
OK
```

2.2.2.8.AT+QBTGATSNOD Send a Notification

| AT+QBTGATSNOD Send a Notification | |
|--|---|
| Test Command AT+QBTGATSNOD=? | Response +QBTGATSNOD: <GATT_ID>,<conn_ID>,<attr_handle>,<value_length>,<value> OK |
| Write Command AT+QBTGATSNOD=<GATT_ID>,<conn_ID>,<attr_handle>,<value_length>,<value> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|----------------------------|------------------------------------|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <attr_handle> | Integer type. Handle of attribute. |

| | |
|----------------|---|
| <value_length> | Integer type. The length of the notification. Unit: byte. |
| <value> | String type. Content of the notification |

Example

```
AT+QBTGATSNOD=131106,1048576,14,4,"1111" //Send a notification.
OK
```

2.2.2.9.AT+QBTGATADV Set Advertising Parameters

| AT+QBTGATADV Set Advertising Parameters | |
|---|---|
| Test Command AT+QBTGATADV=? | Response +QBTGATADV: <GATT_ID>,<min_interval>,<max_interval> OK |
| Write Command AT+QBTGATADV=<GATT_ID>,<min_interval>,<max_interval> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|----------------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <min_interval> | Integer type. Minimum advertising intervals. The value should not be greater than that of <max_interval>. |
| <max_interval> | Integer type. Maximum advertising intervals. The range is 2-65534. |

Example

```
AT+QBTGATADV=131106,800,2000
OK
```

2.2.2.10.AT+QBTGATRRSP Read Data

| AT+QBTGATRRSP Read Data | |
|---|---|
| Test Command AT+QBTGATRRSP=? | Response +QBTGATRRSP: <GATT_ID>,<conn_ID>,<attr_handle>,(list of supported <result>s),<value_length>,<value> OK |
| Write Command AT+QBTGATRRSP=<GATT_ID>,<conn_ID>,<attr_handle>,<result>,<value_length>,<value> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | / |

Parameter

| | |
|-----------------------------|--|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <attr_handle> | Integer type. Handle of attribute. |
| <value_length> | Integer type. The length of return value. Unit: byte. |
| <value> | Integer type. Parameter response. |
| <result> | Integer type. Indicate whether the operation is successful. 0 Succeed 1 Fail |

Example

```
AT+QBTGATRRSP=131106,10000,6549,0,7,"quectel"
OK
```

2.2.2.11.AT+QBTGATWRSP Send Response to the Write Data

| AT+QBTGATWRSP Send Response to the Written Data | |
|---|--|
| Test Command AT+QBTGATWRSP=? | Response +QBTGATWRSP: <GATT_ID>,<conn_ID>,<attr_handle>,(list of supported <result>s) OK |

| | |
|--|---|
| Write Command AT+QBTGATWRSP=<GATT_ID>,<conn_ID>,<attr_handle>,<result> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | / |

Parameter

| | |
|----------------------------|--|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <attr_handle> | Integer type. Handle of attribute. The range is 0-65535. |
| <result> | Integer type. Indicate whether the operation is successful. 0 Succeed 1 Fail |

Example

```
AT+QBTGATWRSP=131106,10000,6594,0
OK
```

2.2.2.12.AT+QBTGATSA Active Database Service

| AT+QBTGATSA Active Database Service | |
|--|---|
| Test Command AT+QBTGATSA=? | Response +QBTGATSA: <GATT_ID>,<serv_ID>,<active> OK |
| Write Command AT+QBTGATSA=<GATT_ID>,<serv_ID>,<active> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <serv_ID> | Integer type. Service ID. |
| <active> | Integer type. Whether to activate database service. |
| | 0 Do not activate database service |
| | 1 Activate database service |

Example

```
AT+QBTGATSA=131106,1,1
OK
```

2.2.2.13.AT+QBTGATDA Add Database

| AT+QBTGATDA Add Database | |
|---|--|
| Test Command AT+QBTGATDA=? | Response +QBTGATDA: <GATT_ID> OK |
| Write Command AT+QBTGATDA=<GATT_ID> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

| | |
|-----------|------------------------|
| <GATT_ID> | Integer type. GATT ID. |
|-----------|------------------------|

Example

```
AT+QBTGATDA=131106
OK
```

2.2.2.14.AT+QBTGATDISC Disconnect Server Actively

| AT+QBTGATDISC Disconnect Server Actively | |
|---|---|
| Test Command AT+QBTGATDISC=? | Response +QBTGATDISC: <GATT_ID>,<conn_ID> OK |
| Write Command AT+QBTGATDISC=<GATT_ID>,<conn_ID> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|------------------------|------------------------------|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |

Example

```
AT+QBTGATDISC=131106,10000
OK
```

2.2.2.15.AT+QBTGATPER Start Peripheral Mode

| AT+QBTGATPER Start Peripheral Mode | |
|--|--|
| Test Command AT+QBTGATPER=? | Response +QBTGATPER: <GATT_ID> OK |
| Write Command AT+QBTGATPER=<GATT_ID> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

<GATT_ID> Integer type. GATT ID.

2.3. Description of SPP AT Commands

2.3.1. AT+QBTSPPACKT Activate or Deactivate SPP Device

| AT+QBTSPPACKT Activate or Deactivate SPP Device | |
|--|--|
| Test Command AT+QBTSPPACKT=? | Response +QBTSPPACKT: (list of supported <activate>s) OK |
| Write Command AT+QBTSPPACKT=<activate> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

<activate> Integer type. Indicate to activate or deactivate the SPP device.
0 Deactivate
1 Activate

Example

```
AT+QBTSPPACKT=1
OK
```

2.3.2. AT+QBTSPPDIC Disconnect from the SPP Device

| AT+QBTSPPDIC Disconnect from the SPP Device | |
|--|---|
| Test Command AT+QBTSPPDIC=? | Response +QBTSPPDIC: (list of supported <discon>s) OK |

| | |
|---|--|
| Write Command AT+QBTSPPDIC=<discon> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configuration will not be saved. |

Parameter

| | |
|-----------------------|---|
| <discon> | Integer type. Indicate to disconnect from the SPP device. |
| 1 | Disconnect |

Example

```
AT+QBTSPPDIC=1
OK
```

2.3.3. AT+QBTSPPWRS Write Message to Remote Device

| AT+QBTSPPWRS Write Message to Remote Device | |
|---|--|
| Test Command AT+QBTSPPWRS=? | Response +QBTSPPWRS: <value_length>,<value> OK |
| Write Command AT+QBTSPPWRS=<value_length>,<value> | Response OK Or ERROR |
| Maximum Response Time | 10s |
| Characteristics | The AT command takes effect immediately. The configurations will not be saved. |

Parameter

| | |
|-----------------------------|-------------------------------|
| <value> | String type. Message payload. |
| <value_length> | Integer type. Payload length. |

Example

```
AT+QBTSPWRS=7,"quectel"
```

```
OK
```

3 Description of URCs

3.1. BLE Related URCs

3.1.1. +QBTGATSCON Notify the GATT Connection

+QBTGATSCON Notify the GATT Connection

+QBTGATSCON=<GATT_ID>,<conn_ID>,<address>,<mtu>

Parameter

| | |
|-----------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <address> | String type. Connecting device address. |
| <mtu> | Integer type. The maximum transmission unit to announce to a remote device during connection establishment. |

Example

+QBTGATSCON: 131106,1000,"69b4:67:55370a",23

3.1.2. +QBTGATSDCON Notify the GATT Disconnection

+QBTGATSDCON Notify the GATT Disconnection

+QBTGATSDCON=<GATT_ID>,<conn_ID>,<address>

Parameter

| | |
|-----------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <address> | String type. Device address that is disconnected. |

Example

```
+QBTGATSDCON: 131106,0,"69b4:67:55370a"
```

3.1.3. +QBTGATSRRSP Notify Client to Read GATT Service Data

+QBTGATSRRSP Notify Client to Read GATT Service Data

```
+QBTGATSRRSP=<GATT_ID>,conn_ID>,<attr_handle>
```

Parameter

| | |
|---------------|--------------------------------------|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <attr_handle> | Integer in HEX. Handle to attribute. |

Example

```
+QBTGATSRRSP: 131106,1000,000E
```

3.1.4. +QBTGATSWRSP Notify Client to Write GATT Service Data

+QBTGATSWRSP Notify Client to Write GATT Service Data

```
+QBTGATSWRSP=<GATT_ID>,<connID>,<attr_handle>,<value>
```

Parameter

| | |
|---------------|---|
| <GATT_ID> | Integer type. GATT ID. |
| <conn_ID> | Integer type. Connection ID. |
| <attr_handle> | Integer in HEX. Handle to attribute. |
| <value> | String type. Content of the written data. |

Example

```
+QBTGATSWRSP: 131106,1000,000E,"1234"
```

3.2. SPP Related URCs

3.2.1. +QBTSPPDATIND Report Data

+QBTSPPDATIND Report Data

+QBTSPPDATIND: <value>,<value_
length>

Parameter

| | |
|----------------|-------------------------------|
| <value> | String type. Data payload. |
| <value_length> | Integer type. Payload length. |

Example

+QBTSPPDATIND: "66998855",8

3.2.2. +QBTSPPCONNECT Notify SPP Connection

+QBTSPPCONNECT Notify SPP Connection

+QBTSPPCONNECT: <queueID>,<cha
nnel>,<address>

Parameter

| | |
|-----------|--|
| <queueID> | Integer type. Identifier of the SPP instance which has been activated. |
| <channel> | Integer type. Local server number, which is a reference ID used by the CM. |
| <address> | String type. The address of the connected device. |

Example

+QBTSPPCONNECT: 32,1,"4887:64:d8b950"

3.2.3. +QBTSPPDISCONNECT Notify SPP Disconnection

+QBTSPPDISCONNECT Notify SPP Disconnection

+QBTSPPCONNECT: <queueID>,<cha
nnel>,<address>

Parameter

| | |
|------------------------|--|
| <queueID> | Integer type. Identifier of the SPP instance which has been activated. |
| <channel> | Integer type. Local server number, which is a reference ID used by the CM. |
| <address> | String type. The address of the disconnected device. |

Example

```
+QBTSPDISCONNECT: 32,1,"4887:64:d8b950"
```

4 Example

4.1. BLE Communication

A set of AT commands are provided to support basic BLE operation, including scanning, advertising, connecting and so on. Quectel FC20 series & FC21 modules supports to communicate between the applicable LTE Standard module and other BLE devices.

Here is a simple example on BLE process when the module works as a BLE server.

```
AT+QBTWPR=1
OK
AT+QBTGATREG=1                                     //Register to the GATT service.
+QBTGATREG: 1,131106

OK
AT+QBTGATDBALC=131106,200,0                         //Allocate the database.
OK
AT+QBTGATSS=1,131106,1,6154,1                       //Add a service.
OK
AT+QBTGATSC=1,131106,1,1,10793,7,18,16,"quectel"    //Add a characteristic.
OK
AT+QBTGATSD=1,131106,1,1,1,10498,7,2,0,"quectel"    //Add a descriptor.
OK
AT+QBTGATSC=1,131106,1,2,10777,7,6,32,"quectel"     //Add another characteristic.
OK
AT+QBTGATSA=131106,1,1                             //Activate the database service.
OK
AT+QBTGATDA=131106                                  //Add the database.
OK
AT+QBTGATPER=131106                                 //Start peripheral mode.
OK
```

4.2. SPP Activation

Here is a simple example on the SPP activation process when the module works as a SPP server. Quectel FC20 series & FC21 modules supports to communicate between the applicable LTE Standard module and other SPP devices.

```
AT+QBTPWR=1           //Turn on BT.  
OK  
AT+QBTSPFACT=1        //Activate SPP.  
OK
```

5 Appendix A References

Table 2: Terms and Abbreviations

| Abbreviation | Description |
|--------------|-------------------------------|
| BLE | Bluetooth Low Energy |
| BT | Bluetooth |
| CM | Connection Manager |
| GATT | Generic Attribute Profile |
| ID | Identity |
| SPP | Serial Port Profile |
| URC | Unsolicited Result Code |
| UUID | Universally Unique Identifier |