# BG95&BG77&BG600L Series
# QCFGEXT AT Commands Manual

**LPWA Module Series**

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# About the Document

## Revision History

| Version | Date | Author | Description |
|---|---|---|---|
| 1.0 | 2020-08-15 | Mac ZHU | Initial |
| 1.1 | 2021-06-30 | Matt YE/ Sherlock ZHAO | 1. Deleted BG95-N1 from applicable modules (Chapter 1.1)<br>2. Updated AT+QCFGEXT="nipds" (Chapter 2.1.1.3)<br>3. Added AT+QCFGEXT="pwm" (Chapter 2.1.2.5)<br>4. Added AT+QCFGEXT="usbnet" (Chapter 2.1.2.6)<br>5. Deleted AT+QCFGEXT="attm2mfeat" |

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## Table Index

# 1 Introduction

This document describes the **AT+QCFGEXT** command supported on BG95 series, BG77 and BG600L-M3 modules.

## 1.1. Applicable Modules

**Table 1: Applicable Modules**

| Module Series | Model | Description |
| --- | --- | --- |
| **BG95** | BG95-M1 | Cat M1 only |
| | BG95-M2 | Cat M1/Cat NB2 |
| | BG95-M3 | Cat M1/Cat NB2/EGPRS |
| | BG95-M4 | Cat M1/Cat NB2, 450 MHz Supported |
| | BG95-M5 | Cat M1/Cat NB2/EGPRS, Power Class 3 |
| | BG95-M6 | Cat M1/Cat NB2, Power Class 3 |
| | BG95-MF | Cat M1/Cat NB2, Wi-Fi Positioning |
| **BG77** | BG77 | Cat M1/Cat NB2 |
| **BG600L** | BG600L-M3 | Cat M1/Cat NB2/EGPRS |

## 1.2. Definitions

- **<CR>**      Carriage return character.
- **<LF>**      Line feed character.
- **<...>**      Parameter name. Angle brackets do not appear on the command line.
- **[...]**      Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on the command line. When an optional parameter is not given in a command, the new value equals to its previous value or the default settings, unless otherwise specified.

● **<u>Underline</u>**    Default setting of a parameter.

## 1.3. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

**AT+QCFGEXT** implemented by BG95 series, BG77 and BG600L-M3 modules is in "Extended" syntax, as illustrated below.

● **Extended Syntax**

These commands can be operated in several modes, as shown in the following table:

**Table 2: Types of AT Commands**

| Command Type | Syntax | Description |
|---|---|---|
| Test Command | **AT+<cmd>=?** | Test the existence of corresponding Write Command and return information about the type, value, or range of its parameter. |
| Read Command | **AT+<cmd>?** | Check the current parameter value of a corresponding Write Command. |
| Write Command | **AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]** | Set user-definable parameter value. |
| Execution Command | **AT+<cmd>** | Return a specific information parameter or perform a specific action. |

Multiple commands can be placed on a single line using a semi-colon (**;**) between commands. In such cases, only the first command should have **AT** prefix. Commands can be in upper or lower case.

Spaces should be ignored when you enter AT commands, except in the following cases:

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

On input, at least a carriage return is required. A newline character is ignored so it is permissible to use

carriage return/line feed pairs on the input.

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.

## 1.4. AT Command Responses

When the AT command processor has finished processing a line, it will output **OK**, **ERROR** or **+CME ERROR: <err>** to indicate that it is ready to accept a new command. Solicited information responses are sent before the final **OK**, **ERROR** or **+CME ERROR: <err>**.

Responses will be in the format of:

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

Or

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

## 1.5. Declaration of AT Command Examples

The AT command examples in this document are provided to help you familiarize with AT commands and learn how to use them. The examples, however, should not be taken as Quectel's recommendation or suggestions about how you should design a program flow or what status you should set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there exists a correlation among these examples and that they should be executed in a given sequence.

# 2 Description of AT+QCFGEXT Commands

## 2.1. AT+QCFGEXT  Extended Configuration Settings

The **AT+QCFGEXT** Write Commands query and configure various extended settings of the module. The following Test Command shows the various extended settings of the module.

| AT+QCFGEXT  Extended Configuration Settings | |
|---|---|
| Test Command<br>**AT+QCFGEXT=?** | Response<br>**+QCFGEXT: "addgeo",<geoid>,<mode>,<shape>,<lat1>,<lon 1>,<lat2>[,<lon2>[,<lat3>,<lon3>[,<lat4>,<lon4>]]]**<br>**+QCFGEXT: "deletegeo",<geoid>**<br>**+QCFGEXT: "querygeo",<geoid>**<br>**+QCFGEXT: "nipdcfg"[,<type>[,<apn>[,<username>,<passwor d>]]]**<br>**+QCFGEXT: "nipd"[,<mode>[,<timeout>]]**<br>**+QCFGEXT: "nipds"[,<mode>,<data>[,<data_length>[,<rai_fla g>]]]**<br>**+QCFGEXT: "nipdr"[,<read_length>[,<read_mode>]]**<br>**+QCFGEXT: "dump"[,(**list of supported **<value>**s**)]**<br>**+QCFGEXT: "quecopen"[,(**list of supported **<value>**s**)]**<br>**+QCFGEXT: "disusb",(**list of supported **<value>**s**)**<br>**+QCFGEXT: "usb/event"**<br>**+QCFGEXT: "fota_apn",<iptype>,<apn>[,<username>,<passwo rd>]**<br>**+QCFGEXT: "dnsc_timeout"[,(**range of supported **<timeout>**s**)]**<br>**+QCFGEXT: "pwm",<pin>[,(**list of supported **<state>**s**)[,(**range of supported **<duty_cycle>**s**),(**range of supported **<frequency>**s**)]]**<br>**+QCFGEXT: "usbnet"[,(**list of supported **<mode>**s**)]**<br><br>**OK** |

### 2.1.1. PS Related AT Commands

#### 2.1.1.1. AT+QCFGEXT="nipdcfg" Configure NIDD Connection

This command configures an NIDD connection or queries the current setting.

| AT+QCFGEXT="nipdcfg" Configure NIDD Connection | |
| --- | --- |
| Write Command<br>**AT+QCFGEXT="nipdcfg"[,<type>[,<apn>[,<username>,<password>]]]** | Response<br>If the optional parameters are omitted, query the current setting:<br>**+QCFGEXT: "nipdcfg",<type>,<apn>**<br><br>**OK**<br><br>If any of the optional parameters is specified, configure the NIDD connection:<br>**OK**<br><br>If there is any error:<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

#### Parameter

| | |
| --- | --- |
| **<type>** | Integer type. Non-IP outgoing data type. |
| | 0    MO Non-IP data type. |
| | 1    MO Exception Non-IP data type. |
| **<apn>** | String type. Access point name. |
| **<username>** | String type. Username of the selected APN. |
| **<password>** | String type. Password of the selected APN. |

#### 2.1.1.2. AT+QCFGEXT="nipd" Open or Close NIDD Connection

This command opens or closes an NIDD connection.

| AT+QCFGEXT="nipd" Open or Close NIDD Connection | |
| --- | --- |
| Write Command<br>**AT+QCFGEXT="nipd",<mode>[,<time** | Response<br>If **<mode>**=0, close an NIDD connection: |

| out>] | **OK** |
|---|---|
| | If **<mode>**=1, open an NIDD connection: **OK** |
| | **+QIND: "nipd","open",<errcode>** |
| | If there is an error related to ME functionality: **+CME ERROR: <errcode>** |
| | If there is any other error: **ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will not be saved. |

## Parameter

| <mode> | Integer type. Close or open an NIDD connection. |
|---|---|
| | 0    Close an NIDD connection. |
| | 1    Open an NIDD connection. |
| <timeout> | Integer type. The timeout value when opening an NIDD connection. This parameter is valid only when **<mode>**=1. Range: 30–90. Default value: 30. Unit: s. |
| <errcode> | Integer type. Error code. See *Chapter 3* for details. |

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**NOTE**

NIDD function is disabled by default. **AT+QCFG="nccconf",115** (see *document [1]* for details) can be used to enable the function.

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### 2.1.1.3.  AT+QCFGEXT="nipds"  Send MO Non-IP Data

This command sends MO Non-IP data to a server.

| AT+QCFGEXT="nipds"  Send MO Non-IP Data | |
|---|---|
| Write Command **AT+QCFGEXT="nipds",<mode>,<data>[,<data_length>[,<rai_flag>]]** | Response **OK** |
| | If there is an error related to ME functionality: **+CME ERROR: <errcode>** |

| | If there is any other error:<br>**ERROR** |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

**Parameter**

| | |
|---|---|
| **\<mode\>** | Integer type. Input format for **\<data\>**.<br>0    ASCII format string.<br>1    Hex format string. |
| **\<data\>** | ASCII format string or hex format string. The data to be sent. |
| **\<data_length\>** | Integer type. The length of the data to be sent. Range: 1–1358 for ASCII format; 1–679 for hex format. Unit: byte.<br>If this parameter is omitted, **\<data\>** can be of any length within 1358 bytes of ASCII format, or within 679 bytes of hex format. |
| **\<rai_flag\>** | Integer type. Whether to enable RAI flag when sending data to network side.<br>0    Disable.<br>1    Enable. |
| **\<errcode\>** | Integer type. Error code. See **Chapter 3** for details. |

### 2.1.1.4. AT+QCFGEXT="nipdr"  Retrieve MT Non-IP Data

This command retrieves the data reported by the URC **+QIND: "nipd","recv"**.

| AT+QCFGEXT="nipdr"  Retrieve MT Non-IP Data | |
|---|---|
| Write Command<br>**AT+QCFGEXT="nipdr"[,\<read_length\>[<br>,\<read_mode\>]]** | Response<br>**+QCFGEXT: "nipdr",\<read_actual_length\>,\<data\>**<br><br>**OK**<br><br>If there is no data that can be retrieved:<br>**+QCFGEXT: "nipdr",0**<br><br>**OK**<br><br>If there is an error related to ME functionality:<br>**+CME ERROR: \<errcode\>**<br><br>If there is any other error:<br>**ERROR** |

| Write Command<br>When **\<read_length\>** is 0, query the read status of the retrieved data:<br>**AT+QCFGEXT="nipdr",0** | Response<br>If the connection has existed:<br>**+QCFGEXT: "nipdr",\<total_receive_length\>,\<have_read_length\>,\<unread_length\>**<br><br>**OK**<br><br>If there is an error related to ME functionality:<br>**+CME ERROR: \<errcode\>**<br><br>If there is any other error:<br>**ERROR** |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | / |

**Parameter**

| | |
|---|---|
| **\<read_length\>** | Integer type. The length of the data to be retrieved. Retrieve all available data if this parameter is omitted. Unit: byte. |
| **\<read_mode\>** | Integer type. Displayed format for **\<data\>**. This parameter is valid only when **\<read_length\>** is not 0.<br><u>0</u>    String type.<br>1    Hex type. |
| **\<read_actual_length\>** | Integer type. The actual length of retrieved data. Unit: byte. |
| **\<data\>** | String type or hex type. Retrieved data. |
| **\<total_receive_length\>** | Integer type. The total length of received data. Unit: byte. |
| **\<have_read_length\>** | Integer type. The length of retrieved data. Unit: byte. |
| **\<unread_length\>** | Integer type. The length of unread data. Unit: byte. |
| **\<errcode\>** | Integer type. Error code. See *Chapter 3* for details. |

### 2.1.1.5. AT+QCFGEXT="fota_apn" Configure IP Family and APN for DFOTA

This command configures the IP family and APN for DFOTA or queries the current setting.

| **AT+QCFGEXT="fota_apn" Configure IP Family and APN for DFOTA** | |
|---|---|
| Write Command<br>**AT+QCFGEXT="fota_apn"[,\<iptype\>,\<apn\>[,\<username\>,\<password\>]]** | Response<br>If the optional parameters are omitted, query the current setting:<br>**+QCFGEXT: "fota_apn",\<iptype\>,\<apn\>[,\<username\>,\<password\>]** |

| | OK |
|---|---|
| | If any of the optional parameters is specified, set the IP family and APN for DFOTA: **OK** |
| | If there is any error: **ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately. The configurations will be saved automatically. |

**Parameter**

| | |
|---|---|
| **<iptype>** | Integer type. IP family. |
| | 0     IPv4 address family |
| | 1     IPv6 address family |
| | 2     IPv4 and IPv6 address family |
| **<apn>** | String type. Access point name. |
| **<username>** | String type. Username of the selected APN. |
| **<password>** | String type. Password of the selected APN. |

### 2.1.1.6. AT+QCFGEXT="dnsc_timeout"  Configure DNS Session Timeout

This command configures the timeout value for DNS session or queries the current setting.

| AT+QCFGEXT="dnsc_timeout"  Configure DNS Session Timeout | |
|---|---|
| Write Command<br>**AT+QCFGEXT="dnsc_timeout"[,<timeout>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QCFGEXT: "dnsc_timeout",<timeout>**<br><br>**OK**<br><br>If the optional parameter is specified, set the DNS session timeout value:<br>**OK**<br><br>If there is any error:<br>**ERROR** |
| Maximum Response Time | 300 ms |

| Characteristics | The command takes effect immediately. |
|---|---|
| | The configuration will be saved automatically. |

**Parameter**

| **<timeout>** | Integer type. Timeout value for DNS session. Range: 2–300. Default value: 60. |
|---|---|
| | Unit: second. |

### 2.1.2. Platform Related AT Commands

#### 2.1.2.1. AT+QCFGEXT="dump" Enable/Disable Dump Mode

This command configures whether to enable dump mode or queries the current setting.

| AT+QCFGEXT="dump" Enable/Disable Dump Mode | |
|---|---|
| Write Command<br>**AT+QCFGEXT="dump"[,<value>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QCFGEXT: "dump",<value>**<br><br>**OK**<br><br>If the optional parameter is specified, set whether to enable dump mode:<br>**OK**<br><br>If there is any error:<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after rebooting.<br>The configuration will be saved automatically. |

**Parameter**

| **<value>** | Integer type. Enable/disable dump mode. |
|---|---|
| | 0    Disable |
| | 1    Enable |

### 2.1.2.2. AT+QCFGEXT="quecopen" Enable/Disable QuecOpen Function

This command configures whether to enable your application to load the QuecOpen function or queries the current setting.

| AT+QCFGEXT="quecopen" Enable/Disable QuecOpen Function | |
|---|---|
| Write Command<br>**AT+QCFGEXT="quecopen"[,<value>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QCFGEXT: "quecopen",<value>**<br><br>**OK**<br><br>If the optional parameter is specified, set whether to enable QuecOpen function:<br>**OK**<br><br>If there is any error:<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect after rebooting.<br>The configuration will be saved automatically. |

#### Parameter

| | |
|---|---|
| **<value>** | Integer type. Enable/disable QuecOpen function. |
| | <u>0</u>   Enable |
| | 1   Disable |

### 2.1.2.3. AT+QCFGEXT="disusb" Enable/Disable USB Function

This command configures whether to enable USB function or queries the current setting.

| AT+QCFGEXT="disusb" Enable/Disable USB Function | |
|---|---|
| Write Command<br>**AT+QCFGEXT="disusb"[,<value>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QCFGEXT: "disusb",<value>**<br><br>**OK** |

| | If the optional parameter is specified, set whether to enable USB function:<br>**OK**<br><br>If there is any error:<br>**ERROR** |
|---|---|
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will be saved automatically. |

## Parameter

| | |
|---|---|
| **<value>** | Integer type. Enable/Disable USB function.<br><u>0</u>    Disable<br>1    Enable |

### 2.1.2.4. AT+QCFGEXT="usb/event" Get USB Event

This command gets a USB event.

| AT+QCFGEXT="usb/event"  Get USB Event | |
|---|---|
| Write Command<br>**AT+QCFGEXT="usb/event"** | Response<br>**+QCFGEXT: "usb/event",<event>**<br><br>**OK**<br><br>If there is any error:<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

## Parameter

| | |
|---|---|
| **<event>** | Integer type. USB event.<br>0    USB CONNECT<br>1    USB DISCONNECT<br>2    USB SUSPEND<br>3    USB RESUME<br>4    USB RESUME COMPLETED<br>5    USB REMOTE WAKEUP |

| 6 | USB CONFIGURED |
|---|---|
| 7 | USB UNCONFIGURED |
| 8 | USB RESET |
| 9 | USB SPEED CHANGE |

### 2.1.2.5.  AT+QCFGEXT="pwm"  Configure PWM Function

This command configures PWM function or queries the current setting.

| AT+QCFGEXT="pwm"  Configure PWM Function | |
|---|---|
| Write Command<br>**AT+QCFGEXT="pwm",<pin>[,<state>[,<duty_cycle>,<frequency>]]** | Response<br>If the optional parameters are omitted, query the current setting:<br>**+QCFGEXT: "pwm",<pin>,<state>,<duty_cycle>,<frequency>**<br><br>**OK**<br><br>If any of the optional parameters is specified, configure the PWM function multiplexed from the corresponding GPIO:<br>**OK**<br><br>If there is any error:<br>**ERROR** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

**Parameter**

| | |
|---|---|
| **<pin>** | Integer type. Select the PWM function multiplexed from the corresponding GPIO.<br>0   BG95 Series: Pin 66, BG77: Pin 33 |
| **<state>** | Integer type. Enable/Disable PWM function.<br>0    Disable<br>1    Enable |
| **<duty_cycle>** | Integer type. Set the percentage of PWM duty cycle. Range: 1–99. It is valid only when **<state>**=1. |
| **<frequency>** | Integer type. Set the frequency of PWM. Range: 293–600000. Unit: Hz. It is valid only when **<state>**=1. |

## Example

| | |
|---|---|
| **AT+QCFGEXT="pwm",0,1,10,1000** | //Set duty cycle = 10 % and frequency = 1000 Hz. |
| **OK** | //PWM turned on successfully. |
| **AT+QCFGEXT="pwm",0** | //Query the current setting. |
| **+QCFGEXT: "pwm",0,1,10,1000** | |
| | |
| **OK** | |
| **AT+QCFGEXT="pwm",0,1,10,2000** | //Modify the frequency to 2000 Hz. The duty cycle remains unchanged |
| **OK** | |
| **AT+QCFGEXT="pwm",0,1,30,2000** | //Modify the duty cycle to 30 %. The frequency remains unchanged. |
| **OK** | |
| **AT+QCFGEXT="pwm",0,0** | //Turn off PWM. |
| **OK** | |

### 2.1.2.6. AT+QCFGEXT="usbnet"  Configure USB Composition

This command switches different combinations of USB enumerations through configuring USB composition ID.

| AT+QCFGEXT="usbnet"  Configure USB composition | |
|---|---|
| Write Command<br>**AT+QCFGEXT="usbnet"[,<mode>]** | Response<br>If the optional parameter is omitted, query the current setting:<br>**+QCFGEXT: "usbnet",<mode>**<br><br>**OK**<br><br>If the optional parameter is specified, a corresponding feature will be enabled:<br>**OK**<br><br>If there is any error:<br>**ERROR** |

| Maximum Response Time | 300 ms |
|---|---|
| Characteristics | The command takes effect after rebooting.<br>The configuration will be saved automatically. |

**Parameter**

| | | |
|---|---|---|
| **<mode>** | String type. | |
| | "rmnet" | RmNet interface mode. This interface can accept QMI message. Corresponds to RmNet USB combination:<br>USB DM + NMEA + Modem + RmNet. |
| | "ecm" | ECM interface mode. The host can connect to the module via USB and use the module as a CDC-Ethernet. Corresponds to ECM USB combination: USB DM + NMEA + Modem + ECM. |
| | "modem" | Modem interface mode. A second modem port will be additionally enabled for use. Corresponds to Modem USB combination:<br>USB DM + NMEA + Modem + Modem. |

## 2.1.3. GNSS Related AT Commands

### 2.1.3.1. AT+QCFGEXT="addgeo" Add a Geofence

This command adds a geofence or queries the current setting.

| AT+QCFGEXT="addgeo" Add a Geofence | |
|---|---|
| Write Command<br>**AT+QCFGEXT="addgeo"[,<geoid>[,<mode>,<shape>,<lat1>,<lon1>,<lat2>[,<lon2>[,<lat3>,<lon3>[,<lat4>,<lon4>]]]]]** | Response<br>If the optional parameters are omitted, query the current setting of all geofences that have been added:<br>**[+QCFGEXT: "addgeo",<geoid>,<mode>,<shape>,<lat1>,<lon1>,<lat2>[,<lon2>[,<lat3>,<lon3>[,<lat4>,<lon4>]]]**<br>…<br>**+QCFGEXT: "addgeo",<geoid>,<mode>,<shape>,<lat1>,<lon1>,<lat2>[,<lon2>[,<lat3>,<lon3>[,<lat4>,<lon4>]]]]**<br><br>**OK**<br><br>If all parameters after **<geoid>** are omitted, query the current setting of the specified geofence:<br>**+QCFGEXT: "addgeo",<geoid>,<mode>,<shape>,<lat1>,<lon1>,<lat2>[,<lon2>[,<lat3>,<lon3>[,<lat4>,<lon4>]]]**<br><br>**OK** |

| | |
|---|---|
| | If **<shape>**=0, add a circular geofence and the parameters after **<lat2>** must be omitted: **OK**<br><br>If **<shape>**=1, add a circular geofence and the parameters after **<lon2>** must be omitted: **OK**<br><br>If **<shape>**=2, add a triangle geofence and the parameters after **<lon3>** must be omitted: **OK**<br><br>If **<shape>**=3, add a quadrangle geofence and all parameters must be specified: **OK**<br><br>If there is any error related to ME functionality: **+CME ERROR: <errcode>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configurations will not be saved. |

**Parameter**

| | |
|---|---|
| **<geoid>** | Integer type. Geofence ID. Range: 0–9. |
| **<mode>** | Integer type. URC report mode. |
| | 0　Disable URC to be reported when the module enters or leaves the geofence. |
| | 1　Enable URC to be reported when the module enters the geofence. |
| | 2　Enable URC to be reported when the module leaves the geofence. |
| | 3　Enable URC to be reported when the module enters or leaves the geofence. |
| | For details about the URC, please refer to ***Chapter 2.2.1***. |
| **<shape>** | Integer type. Geofence shape. |
| | 0　Circle with center and radius. |
| | 1　Circle with center and one point on the circle. |
| | 2　Triangle. |
| | 3　Quadrangle. |
| **<lat1>** | The latitude of a point which is defined as the center of the geofence circular region or the first point. Unit: degree. Format: ±dd.dddddd. Range: -90.000000 to 90.000000. |
| **<lon1>** | The longitude of a point which is defined as the center of the geofence circular region or the first point. Unit: degree. Format: ±ddd.dddddd. Range: -180.000000 to 180.000000. |
| **<lat2>** | When **<shape>** is 0, this parameter is a radius. Range: 0–6000000. Unit: meter. |
| | When **<shape>** is other values, this parameter is the latitude of the point on the circle or |

| | |
|---|---|
| | the second point. Unit: degree. Format: ±dd.dddddd. Range: -90.000000 to 90.000000. If **<shape>** is 0, the parameters after **<lat2>** must be omitted. |
| **<lon2>** | The longitude of the point on the circle or the second point. Unit: degree. Format: ±ddd.dddddd. Range: -180.000000 to 180.000000. If **<shape>** is 1, the parameters after **<lon2>** must be omitted. |
| **<lat3>** | The latitude of the third point. Unit: degree. Format: ±dd.dddddd. Range: -90.000000 to 90.000000. |
| **<lon3>** | The longitude of the third point. Unit: degree. Format: ±ddd.dddddd. Range: -180.000000 to 180.000000. If **<shape>** is 2, the parameters after **<lon3>** must be omitted. |
| **<lat4>** | The latitude of the fourth point. Unit: degree. Format: ±dd.dddddd. Range: -90.000000 to 90.000000. |
| **<lon4>** | The longitude of the fourth point. Unit: degree. Format: ±ddd.dddddd. Range: -180.000000 to 180.000000. |
| **<errcode>** | Integer type. Error code. See *Chapter 3* for details. |

### 2.1.3.2. AT+QCFGEXT="deletegeo"  Delete a Geofence

This command deletes a geofence.

| AT+QCFGEXT="deletegeo"  Delete a Geofence | |
|---|---|
| Write Command<br>**AT+QCFGEXT="deletegeo",<geoid>** | Response<br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CME ERROR: <errcode>** |
| Maximum Response Time | 300 ms |
| Characteristics | The command takes effect immediately.<br>The configuration will not be saved. |

**Parameter**

| | |
|---|---|
| **<geoid>** | Integer type. Geofence ID. Range: 0–10. 10 means deleting all geofences. |
| **<errcode>** | Integer type. Error code. See *Chapter 3* for details. |

### 2.1.3.3.  AT+QCFGEXT="querygeo"  Query the Position Relative to Geofence

This command queries the position relative to a geofence.

| AT+QCFGEXT="querygeo"  Query the Position Relative to Geofence | |
| --- | --- |
| Write Command<br>**AT+QCFGEXT="querygeo",<geoid>** | Response<br>**+QCFGEXT: "querygeo",<geoid>,<pos_wrt_geofence>**<br><br>**OK**<br><br>If there is any error related to ME functionality:<br>**+CME ERROR: <errcode>** |
| Maximum Response Time | 300 ms |
| Characteristics | / |

**Parameter**

| | |
| --- | --- |
| **<geoid>** | Integer type. Geofence ID. Range: 0–9. |
| **<pos_wrt_geofence>** | Integer type. Position relative to a geofence. |
| | 0     An unknown position. |
| | 1     A position inside a geofence. |
| | 2     A position outside a geofence. |
| **<errcode>** | Integer type. Error code. See *Chapter 3* for details. |

## 2.2. Description of URCs

### 2.2.1.  +QIND: "GEOFENCE"  Indicate Entering or Leaving Geofence

| +QIND: "GEOFENCE"  Indicate Entering or Leaving Geofence | |
| --- | --- |
| **+QIND: "GEOFENCE",<geoid>,<action>,<time>,<latitude>,<longitude>,<altitude>,<course>,<speed>,<PDOP>,<HDOP>,<VDOP>** | The URC indicates entering or leaving a geofence. |

**Parameter**

| | |
| --- | --- |
| **<geoid>** | Integer type. The ID of geofence the module enters or leaves. |
| **<action>** | Integer type. The current action of the module. |

|  |  |
|---|---|
| | 1    Entering the geofence. |
| | 2    Leaving the geofence. |
| **\<time\>** | The UTC time when the module enters or leaves the geofence. |
| | Format: YYYY/MM/DD hh:mm:ss. |
| **\<latitude\>** | The latitude of the module when it enters or leaves the geofence. Unit: degree. |
| | Format: ±dd.dddddd. Range: -90.000000 to 90.000000. |
| **\<longitude\>** | The longitude of the module when it enters or leaves the geofence. Unit: degree. |
| | Format: ±ddd.dddddd. Range: -180.000000 to 180.000000. |
| **\<altitude\>** | Float type. Mean sea level altitude. Unit: meter. |
| **\<course\>** | Float type. Course over ground, relative to true north. Unit: degree. |
| **\<speed\>** | Float type. Speed over ground. Unit: m/s. |
| **\<PDOP\>** | Float type. Position dilution of precision. |
| **\<HDOP\>** | Float type. Horizontal dilution of precision. |
| **\<VDOP\>** | Float type. Vertical dilution of precision. |

### 2.2.2.  +QIND: "nipd","recv"  Indicate the Incoming Non-IP Data

After receiving the Non-IP data from the MT, the module reports the URC **+QIND: "nipd","recv"** to notify the host that there is incoming data. Then host can retrieve data via **AT+QCFGEXT="nipdr"**. Please note that if the module receives data again when the buffer is not empty, it does not report a new URC until all the received data has been retrieved via **AT+QCFGEXT="nipdr"** from the buffer. The size of the buffer is 2048 bytes. If the data received exceeds the buffer size, the subsequent data will be discarded.

| **+QIND: "nipd","recv"  Indicate the Incoming Non-IP Data** | |
|---|---|
| **+QIND: "nipd","recv"** | The URC notifies the host that there is incoming non-IP data from the network. Then the host can retrieve the data via **AT+QCFGEXT="nipdr"**. |

### 2.2.3.  +QIND: "nipd","close"  Indicate the NIDD Connection is Closed

| **+QIND: "nipd","close"   Indicate the NIDD Connection is Closed** | |
|---|---|
| **+QIND: "nipd","close"** | The URC notifies that the NIDD connection is closed accidentally. If the connection is closed normally via **AT+QCFGEXT="nipd",0**, this URC will not be reported. |

# 3 Summary of \<errcode\>

The error code **\<errcode\>** indicates an error related to mobile equipment or network. The table below describes the details about **\<errcode\>**.

**Table 3: Summary of \<errcode\>**

| \<errcode\> | Meaning |
|---|---|
| 501 | Invalid parameter |
| 517 | Geofence ID does not exist |
| 651 | Invalid parameter for NIPD |
| 652 | NIPD sending error |
| 654 | NIDD operation in process |
| 656 | NIDD connection not opened |
| 657 | NIDD connection opened already |

# 4 Appendix A References

**Table 4: Related Document**

| Document Name |
| --- |
| [1]   Quectel_BG95&BG77&BG600L_Series_QCFG_AT_Commands_Manual |
| [2]   Quectel_BG95_Series_Hardware_Design |
| [3]   Quectel_BG77_Hardware_Design |

**Table 5: Terms and Abbreviations**

| Abbreviation | Description |
| --- | --- |
| APN | Access Point Name |
| ASCII | American Standard Code for Information Interchange |
| CDC | Communication Device Class |
| CME | Command Error |
| DFOTA | Delta Firmware Update Over-The-Air |
| DNS | Domain Name Service |
| ECM | Ethernet Control Model |
| EGPRS | Enhanced General Packet Radio Service |
| GNSS | Global Navigation Satellite System |
| GPIO | General-Purpose Input/Output |
| ID | Identifier |
| IP | Internet Protocol |

| IPv4 | Internet Protocol version 4 |
|------|------------------------------|
| IPv6 | Internet Protocol version 6 |
| ME | Mobile Equipment |
| MO | Mobile Originated |
| MT | Mobile Terminated |
| NIDD | Non-IP Data Delivery |
| NIPD | Non-IP Data |
| PPP | Point-to-Point Protocol |
| PS | Packet Switched |
| PWM | Pulse Width Modulation |
| RAI | Release Assistance Indication |
| TA | Terminal Adapter |
| URC | Unsolicited Result Code |
| USB | Universal Serial Bus |
| UTC | Coordinated Universal Time |