

# **BG95&BG77&BG600L Series**

## **QuecLocator Application Note**

**LPWA Module Series**

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# About the Document

## Revision History

Version	Date	Author	Description
-	2020-12-01	Sherlock ZHAO	Creation of the document
1.0	2021-02-19	Sherlock ZHAO	First official release
1.1	2022-08-04	Water WANG	<ol style="list-style-type: none"><li>1. Updated the description for &lt;singlecell_mode&gt; of AT+QLBSCFG="singlecell" (Chapter 3.3.2).</li><li>2. Added a note for &lt;response_time&gt; of AT+QLBSCFG="timeout" (Chapter 3.3.2).</li></ol>

## Contents

About the Document.....	3
Contents.....	4
Table Index.....	5
<b>1 Introduction .....</b>	<b>6</b>
1.1. Applicable Modules.....	6
<b>2 QuecLocator® Authentication.....</b>	<b>7</b>
<b>3 QuecLocator® Related AT Commands.....</b>	<b>8</b>
3.1. AT Command Syntax .....	8
3.1.1. Definitions.....	8
3.1.2. AT Command Syntax .....	8
3.2. Declaration of AT Command Examples .....	9
3.3. Description of QuecLocator® Related AT Commands .....	9
3.3.1. AT+QWIFI Turn On/Off Wi-Fi .....	9
3.3.2. AT+QLBSCFG Configure Parameters of QuecLocator .....	10
3.3.3. AT+QLBS Get Location Information by QuecLocator .....	16
<b>4 Example .....</b>	<b>19</b>
<b>5 Summary of Error Codes .....</b>	<b>20</b>
<b>6 Appendix References .....</b>	<b>21</b>

## Table Index

Table 1: Applicable Modules.....	6
Table 2: Type of AT Commands .....	8
Table 3: Summary of Error Codes.....	20
Table 4: Terms and Abbreviations .....	21

# 1 Introduction

QuecLocator<sup>®</sup> is an efficient positioning technology developed by Quectel. By integrating the cellular network information, it boosts the stand-alone GNSS performance in environments with weak or no signal, such as urban canyons, indoors, garages, areas under overpasses and other places with blocked or intermittent GNSS signal. For more information about QuecLocator<sup>®</sup>, please visit [https://iot.quectel.com/doc\\_getStart.html#QuecLocator](https://iot.quectel.com/doc_getStart.html#QuecLocator).

This document is an application note for all AT commands related to QuecLocator<sup>®</sup> on Quectel BG95 series, BG77 and BG600L-M3 modules.

## 1.1. Applicable Modules

Among all the modules listed below, only BG95-MF currently has a built-in Wi-Fi chip that can actively search for nearby access points for Wi-Fi positioning but is unable to establish Wi-Fi connection. For the modules without such a Wi-Fi chip, you have to manually input MAC addresses to use Wi-Fi positioning.

**Table 1: Applicable Modules**

Module Series	Model	Description
<b>BG95</b>	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
<b>BG77</b>	BG77	Cat M1/Cat NB2
<b>BG600L</b>	BG600L-M3	Cat M1/Cat NB2/EGPRS

## 2 QuecLocator<sup>®</sup> Authentication

To use the QuecLocator service, an authorization token is needed for identity authentication. The auth token remains valid after module rebooting or power-off. It is needed to execute **AT+QLBSCFG="token"** to query whether a token has been input when you use the service for the first time; if not, please input one. The detailed steps are illustrated in the figure below.

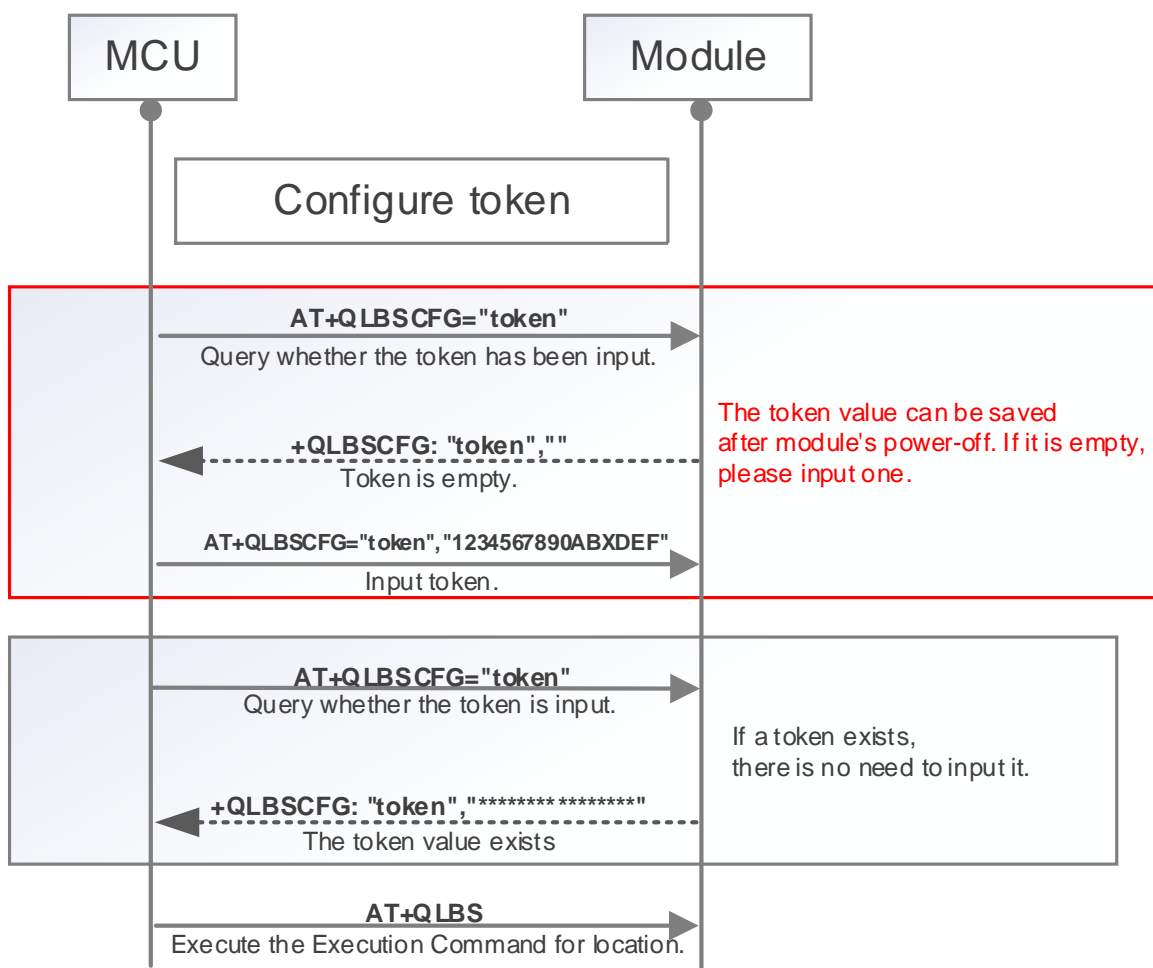


Figure 1: QuecLocator<sup>®</sup> Auth Token Configuration

**NOTE**

Please contact Quectel Technical Support to request the token value.



# 3 QuecLocator<sup>®</sup> Related AT Commands

## 3.1. AT Command Syntax

### 3.1.1. Definitions

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

### 3.1.2. 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.

**Table 2: Type of AT Commands**

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

### 3.2. Declaration of AT Command Examples

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

### 3.3. Description of QuecLocator® Related AT Commands

#### 3.3.1. AT+QWIFI Turn On/Off Wi-Fi

This command turns on/off the Wi-Fi function of the BG95-MF module and searches for nearby access points (APs). From the response of **AT+QWIFI=2**, you can get an idea about whether Wi-Fi positioning can function in the hybrid positioning. This command applies only to the module BG95-MF.

<b>AT+QWIFI Turn On/Off Wi-Fi</b>	
Test Command <b>AT+QWIFI=?</b>	Response <b>+QWIFI:</b> (range of supported <b>&lt;mode&gt;</b> s)  <b>OK</b>
Read Command <b>AT+QWIFI?</b>	Response <b>+QWIFI:</b> <b>&lt;status&gt;</b>  <b>OK</b>
Write Command <b>AT+QWIFI=&lt;mode&gt;</b>	Response If <b>&lt;mode&gt;</b> is 0 or 1, turn on/off Wi-Fi: <b>OK</b>  If <b>&lt;mode&gt;</b> is 2, scan for information of APs nearby: <b>[+QWIFI: (&lt;SSID&gt;,&lt;rssi&gt;,&lt;AP_MAC&gt;)]</b> <b>[...]</b>  <b>OK</b>  If there is any error: <b>ERROR</b>
Maximum Response Time	/
Characteristics	The command takes effect immediately. The configurations are not saved.

**Parameter**

<b>&lt;status&gt;</b>	Integer type. Wi-Fi state. 0 Off 1 On
<b>&lt;mode&gt;</b>	Integer type. Wi-Fi operating mode. 0 Turn off Wi-Fi 1 Turn on Wi-Fi 2 Search for nearby Wi-Fi APs
<b>&lt;SSID&gt;</b>	String type. Service set identifier. Maximum length: 32 bytes.
<b>&lt;rssi&gt;</b>	Integer type. Received signal strength indicator.
<b>&lt;AP_MAC&gt;</b>	String type. The MAC address of a nearby Wi-Fi AP. 6 bytes in hexadecimal separated by ":".

**Example**

```

AT+QWIFI=1 //Turn on Wi-Fi
OK
AT+QWIFI=2 //Search for nearby Wi-Fi APs
+QWIFI: ("Quectel-Hf",-84,"44:00:4d:d4:24:00")
+QWIFI: ("Quectel-Customer",-86,"44:00:4d:d4:24:01")
+QWIFI: ("Quectel-Customer",-87,"1c:20:db:8d:d5:81")
+QWIFI: ("Quectel-Hf",-87,"1c:20:db:8d:d5:80")

OK
AT+QWIFI=0 //Turn off Wi-Fi
OK
    
```

**3.3.2. AT+QLBSCFG Configure Parameters of QuecLocator**

**AT+QLBSCFG Configure Parameters of QuecLocator**

Test Command	Response
AT+QLBSCFG=?	+QLBSCFG: "asynch",(list of supported <asynch_mode>s) +QLBSCFG: "timeout",(range of supported <response_time>s) +QLBSCFG: "server",<server_name> +QLBSCFG: "token",<token_value> +QLBSCFG: "timeupdate",(list of supported <update_mode>s) +QLBSCFG: "withtime",(list of supported <time_mode>s) +QLBSCFG: "latorder",(list of supported <order_mode>s) +QLBSCFG: "scanband",(list of supported <scan_mode>s),(list of supported <scan_band>s) +QLBSCFG: "singlecell",(list of supported <singlecell_mode>s) +QLBSCFG: "wifiloc",(list of supported <wifiloc_mode>s)

	<p><b>OK</b></p>
<p>Read Command <b>AT+QLBSCFG?</b></p>	<p>Response</p> <p>+QLBSCFG: "asynch",&lt;asynch_mode&gt;          +QLBSCFG: "timeout",&lt;response_time&gt;          +QLBSCFG: "server",&lt;server_name&gt;          +QLBSCFG: "token",&lt;token_value&gt;          +QLBSCFG: "timeupdate",&lt;update_mode&gt;          +QLBSCFG: "withtime",&lt;time_mode&gt;          +QLBSCFG: "latorder",&lt;order_mode&gt;          +QLBSCFG: "scanband",&lt;scan_mode&gt;[,&lt;scan_band&gt;]          +QLBSCFG: "singlecell",&lt;singlecell_mode&gt;          +QLBSCFG: "wifiloc",&lt;wifiloc_mode&gt;</p> <p><b>OK</b></p>
<p>Write Command <b>AT+QLBSCFG="asynch" [&lt;asynch_mode&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:          +QLBSCFG: "asynch",&lt;asynch_mode&gt;</p> <p><b>OK</b></p> <p>If the optional parameter is specified, configure the execution mode of <b>AT+QLBS</b>:</p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:          +CME ERROR: &lt;err&gt;</p>
<p>Write Command <b>AT+QLBSCFG="timeout" [&lt;response_time&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:          +QLBSCFG: "timeout",&lt;response_time&gt;</p> <p><b>OK</b></p> <p>If the optional parameter is specified, configure the maximum response time of <b>AT+QLBS</b>:</p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:          +CME ERROR: &lt;err&gt;</p>
<p>Write Command <b>AT+QLBSCFG="server" [&lt;server_name&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:          +QLBSCFG: "server",&lt;server_name&gt;</p> <p><b>OK</b></p>

	<p>If the optional parameter is specified, configure the domain/IP address and port of the server that provides the positioning service:  <b>OK</b></p> <p>If there is an error related to ME functionality:  <b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command  <b>AT+QLBSCFG="token"[,&lt;token_value&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, and the <b>&lt;token_value&gt;</b> has been configured, query the current setting:  <b>+QLBSCFG: "token", "*****"</b></p> <p><b>OK</b></p> <p>If the optional parameter is omitted, and the <b>&lt;token_value&gt;</b> has not been configured, query the current setting:  <b>+QLBSCFG: "token", ""</b></p> <p><b>OK</b></p> <p>If the optional parameter is specified, configure the token value for server authentication:  <b>OK</b></p> <p>If there is an error related to ME functionality:  <b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command  <b>AT+QLBSCFG="timeupdate"[,&lt;update_mode&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:  <b>+QLBSCFG: "timeupdate",&lt;update_mode&gt;</b></p> <p><b>OK</b></p> <p>If the optional parameter is specified, configure whether to update to the RTC the time acquired at accessing the server that provides the positioning service:  <b>OK</b></p> <p>If there is an error related to ME functionality:  <b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command  <b>AT+QLBSCFG="withtime"[,&lt;time_mode&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:  <b>+QLBSCFG: "withtime",&lt;time_mode&gt;</b></p> <p><b>OK</b></p>

	<p>If the optional parameter is specified, configure whether to output <b>&lt;time&gt;</b> in the response of <b>AT+QLBS</b>:</p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command <b>AT+QLBSCFG="latorder"[,&lt;order_mode&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:</p> <p><b>+QLBSCFG: "latorder",&lt;order_mode&gt;</b></p> <p><b>OK</b></p> <p>If the optional parameter is specified, configure the output order of latitude and longitude of the location fixed:</p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command <b>AT+QLBSCFG="scanband"[,&lt;scan_mode&gt;,&lt;scan_band&gt;]</b></p>	<p>Response</p> <p>If the optional parameters are omitted, query the current settings:</p> <p><b>+QLBSCFG: "scanband",&lt;scan_mode&gt;,&lt;scan_band&gt;]</b></p> <p><b>OK</b></p> <p>If any of the optional parameters is specified, configure the scan mode and the eMTC frequency band to be scanned. <b>&lt;scan_band&gt;</b> can be specified only when <b>&lt;scan_mode&gt;=1</b>:</p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>
<p>Write Command <b>AT+QLBSCFG="singlecell"[,&lt;singlecell_mode&gt;]</b></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:</p> <p><b>+QLBSCFG: "singlecell",&lt;singlecell_mode&gt;</b></p> <p><b>OK</b></p> <p>If the optional parameter is specified, enable or disable single base station position (positioning based on cell ID with algorithm):</p> <p><b>OK</b></p> <p>If there is an error related to ME functionality:</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>

Write Command <b>AT+QLBSCFG="wifiloc",&lt;wifiloc_mode&gt;]</b>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting: <b>+QLBSCFG: "wifiloc",&lt;wifiloc_mode&gt;</b></p> <p><b>OK</b></p> <p>If the optional parameter is specified, enable <sup>1)</sup> or disable the hybrid positioning mode (Cellular + Wi-Fi): <b>OK</b></p> <p>If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b></p>
Maximum Response Time	300 ms
Characteristics	<p>The commands take effect immediately.</p> <p>The configurations are not saved except those of <b>&lt;asynch_mode&gt;</b> and <b>&lt;token_value&gt;</b>.</p>

### Parameter

<b>&lt;asynch_mode&gt;</b>	<p>Integer type. Execution mode of <b>AT+QLBS</b>. The response of <b>AT+QLBS</b> varies in format to different modes.</p> <p><u>0</u> Synchronous mode 1 Asynchronous mode</p>
<b>&lt;response_time&gt;</b>	<p>Integer type. The maximum response time of <b>AT+QLBS</b>. If there is no response from the server within <b>&lt;response_time&gt;</b>, <b>AT+QLBS</b> times out.</p> <p>Range: 10–120. Default: 60. Unit: second.</p>
<b>&lt;server_name&gt;</b>	<p>String type. The domain/IP address and the port of the server. The format is "domain/IP address:port" (e.g. "www.queclocator.com:80"). The range of the port is 1–65535. The default server is "www.queclocator.com:80".</p>
<b>&lt;token_value&gt;</b>	<p>String type. Authentication token value. Length: 16 bytes.</p>
<b>&lt;update_mode&gt;</b>	<p>Integer type. Whether to update to the RTC the time acquired at accessing the server that provides the positioning service.</p> <p><u>0</u> Do not update the time to RTC 1 Update the time to RTC</p>
<b>&lt;time_mode&gt;</b>	<p>Integer type. Whether to output <b>&lt;time&gt;</b> in the response of <b>AT+QLBS</b>.</p> <p><u>0</u> Do not output time 1 Output time</p>
<b>&lt;order_mode&gt;</b>	<p>Integer type. Set the output order of latitude and longitude of the location fixed.</p> <p><u>0</u> Longitude output before latitude like this: <b>+QLBS: &lt;loc_result&gt;,&lt;longitude&gt;,&lt;latitude&gt;[,&lt;time&gt;]</b></p> <p><u>1</u> Latitude output before longitude like this: <b>+QLBS: &lt;loc_result&gt;,&lt;latitude&gt;,&lt;longitude&gt;[,&lt;time&gt;]</b></p> <p>See <b>Chapter 3.3.3</b> for details of the parameters.</p>

<b>&lt;scan_mode&gt;</b>	Integer type. Scan mode. <u>0</u> Scan the current attached band 1 Scan full bands or a fixed band
<b>&lt;scan_band&gt;</b>	A hexadecimal value that specifies the eMTC frequency band to be scanned. For example, if it is set to 0x40000000, the band LTE B31 will be scanned. This parameter can be configured only when <b>&lt;scan_mode&gt;=1</b> . 0x1 (BAND_PREF_LTE_BAND1) LTE B1 0x2 (BAND_PREF_LTE_BAND2) LTE B2 0x4 (BAND_PREF_LTE_BAND3) LTE B3 0x8 (BAND_PREF_LTE_BAND4) LTE B4 0x10 (BAND_PREF_LTE_BAND5) LTE B5 0x80 (BAND_PREF_LTE_BAND8) LTE B8 0x800 (BAND_PREF_LTE_BAND12) LTE B12 0x1000 (BAND_PREF_LTE_BAND13) LTE B13 0x20000 (BAND_PREF_LTE_BAND18) LTE B18 0x40000 (BAND_PREF_LTE_BAND19) LTE B19 0x80000 (BAND_PREF_LTE_BAND20) LTE B20 0x1000000 (BAND_PREF_LTE_BAND25) LTE B25 0x2000000 (BAND_PREF_LTE_BAND26) LTE B26 0x4000000 (BAND_PREF_LTE_BAND27) LTE B27 0x8000000 (BAND_PREF_LTE_BAND28) LTE B28 0x40000000 (BAND_PREF_LTE_BAND31) LTE B31 0x200000000000000000 (BAND_PREF_LTE_BAND66) LTE B66 0x800000000000000000 (BAND_PREF_LTE_BAND72) LTE B72 0x1000000000000000000 (BAND_PREF_LTE_BAND73) LTE B73 0x10000000000000000000 (BAND_PREF_LTE_BAND85) LTE B85
<b>&lt;singlecell_mode&gt;</b>	Integer type. Enable or disable single base station position (Triangulation position is used by default). <u>0</u> Disable 1 Enable
<b>&lt;wifiloc_mode&gt;</b>	Integer type. Enable or disable hybrid positioning (Cellular + Wi-Fi): <u>0</u> Disable 1 Enable

**NOTE**

1. Usually, the parameter **<server\_name>** does not need to be configured. Its default address with port is www.queclocator.com:80. If needed, the server domain/IP address and port can be changed with **AT+QLBSCFG="server"**.
2. In LTE Cat M1 network, **AT+QLBS** only supports asynchronous mode.
3. The **<token\_value>** is used for server authentication and should be requested from Quectel in advance.
4. The **<scan\_mode>** is only used in LTE Cat M1 network. The default band is the one that the module has attached to. If **<scan\_mode>=1**, **AT+QLBS** is executed to scan full bands and you need to wait



for more than 1 minute for the URC response.

5. When you configure `<scan_band>`, make sure that the specified band is supported by the current operator of the module. Otherwise, the module cannot get cell information of the band.
6. <sup>1)</sup> `AT+QLBSCFG="wifiloc"` is applicable to the BG95-MF module only.
7. If `<wifiloc_mode>` is configured to 1, the module performs hybrid positioning. If no Wi-Fi AP information is found, the module performs cellular positioning.
8. The B31, B72 and B73 bands are only supported by the BG95-M4 module.
9. The maximum response time specified by executing `AT+QLBSCFG="timeout",<response_time>` refers to the longest waiting time from the establishment of a TCP connection to the server response, excluding the network searching time (If the Cat M network full-band search is configured with `AT+QLBSCFG="scanband"`, the network searching time is nearly 1 minute).

### 3.3.3. AT+QLBS Get Location Information by QuecLocator

#### AT+QLBS Get Location Information by QuecLocator

Test Command	Response
<code>AT+QLBS=?</code>	<b>OK</b>
Execution Command <code>AT+QLBS</code>	<p>Response</p> <p>If the module is in synchronous (<code>&lt;asynch_mode&gt;=0</code>) mode and the positioning succeeds:</p> <p><b>+QLBS: &lt;loc_result&gt;,&lt;latitude&gt;,&lt;longitude&gt;[,&lt;time&gt;]</b></p> <p><b>OK</b></p> <p>If the module is in synchronous mode and the positioning fails:</p> <p><b>+QLBS: &lt;loc_result&gt;</b></p> <p><b>OK</b></p> <p>If the module is in asynchronous mode (<code>&lt;asynch_mode&gt;=1</code>) and the positioning succeeds:</p> <p><b>OK</b></p> <p><b>+QLBS: &lt;loc_result&gt;,&lt;latitude&gt;,&lt;longitude&gt;[,&lt;time&gt;]</b></p> <p>If the module is in asynchronous mode and the positioning fails:</p> <p><b>OK</b></p> <p><b>+QLBS: &lt;loc_result&gt;</b></p> <p>If there is an error related to ME functionality:</p> <p><b>+CME ERROR: &lt;err&gt;</b></p>

Write Command <sup>1)</sup> <b>AT+QLBS=&lt;MAC_num&gt;,&lt;AP_M                  AC1&gt;,&lt;rss1&gt;,&lt;AP_MAC2&gt;,&lt;rss1                  2&gt;[,...]</b>	Response If the module is in synchronous mode and the positioning succeeds: <b>+QLBS: &lt;loc_result&gt;,&lt;latitude&gt;,&lt;longitude&gt;[,&lt;time&gt;]</b>  <b>OK</b>  If the module is in synchronous mode and the positioning fails: <b>+QLBS: &lt;loc_result&gt;</b>  <b>OK</b>  If the module is in asynchronous mode and the positioning succeeds: <b>OK</b>  <b>+QLBS: &lt;loc_result&gt;,&lt;latitude&gt;,&lt;longitude&gt;[,&lt;time&gt;]</b>  If the module is in asynchronous mode and the positioning fails: <b>OK</b>  <b>+QLBS: &lt;loc_result&gt;</b>  If there is an error related to ME functionality: <b>+CME ERROR: &lt;err&gt;</b>
Maximum Response Time	Depends on <b>&lt;response_time&gt;</b> in <b>AT+QLBSCFG="timeout",&lt;response_time&gt;</b> .
Characteristics	The command takes effect immediately. The configurations are not saved.

**Parameter**

<b>&lt;MAC_num&gt;</b>	Integer type. The number of Wi-Fi MAC addresses that have been input. Range: 2–6.
<b>&lt;AP_MACX&gt;</b>	String type. MAC addresses of nearby Wi-Fi APs.
<b>&lt;rss1X&gt;</b>	Integer type. Received signal strength indicator. The value should be less than zero.
<b>&lt;latitude&gt;</b>	Float type. The latitude of the location information. This value is accurate to six decimal places, and the range is from -90.000000 to 90.000000.
<b>&lt;longitude&gt;</b>	Float type. The longitude of the location information. This value is accurate to six decimal places, and the range is from -180.000000 to 180.000000.
<b>&lt;time&gt;</b>	String type. The date and time obtained from HTTP header.
<b>&lt;loc_result&gt;</b>	Integer type. Positioning result. If the positioning is successful, it returns 0. If the positioning fails, it returns <b>&lt;err&gt;</b> . See <b>Chapter 5</b> for descriptions of error codes ( <b>&lt;err&gt;</b> ).

**NOTE**

<sup>1)</sup> QuecLocator supports Wi-Fi positioning. When the module cannot search for the surrounding Wi-Fi APs, you should configure the Wi-Fi MAC address manually with this command.

# 4 Example

```

//After activating network, please refer to the following steps for making configurations and getting locations
AT+QLBSCFG="token" //Query the token value for authentication required
                    //by QuecLocator server. Now, it is empty and
                    //needs to be configured.

+QLBSCFG: "token", ""

OK
AT+QLBSCFG="token","1234567890ABCDEF" //Input the token value for authentication required
                                        //by QuecLocator server.

OK
AT+QLBSCFG="token" //Query the token value for authentication required
                   //by QuecLocator server.

+QLBSCFG: "token", "*****"

OK
AT+QLBSCFG="latorder",1 //Configure the location output format into:
                        //+QLBS: <loc_result>,<latitude>,<longitude>

OK
AT+QLBSCFG="asynch",1 //Configure to execute AT+QLBS command in
                       //asynchronous mode.

OK
AT+QLBS //Start cellular positioning.

OK

+QLBS: 0,31.847649,117.200134
AT+QLBS=5,"44:6a:2e:11:d7:d1",-30,"44:6a:2e:11:d7:c2",-39,"44:6a:2e:11:d6:e1",-
59,"44:6a:2e:11:d6:e2",-76,"44:6a:2e:11:d6:e0",-81 //Input MAC addresses manually to start Wi-Fi
                                                    //positioning.

OK

+QLBS: 0,31.846893,117.198166
AT+QLBSCFG="wifiloc",1 //Enable hybrid positioning.

OK
AT+QLBS //Start hybrid positioning.

OK

+QLBS: 0,31.846893,117.198166

```

# 5 Summary of Error Codes

**Table 3: Summary of Error Codes**

Code of <err>	Description of Error Codes
10000	Positioning fails.
10001	IMEI number is illegal.
10002	The token does not exist.
10003	The number of devices using the same token exceeds the limit.
10004	The times of positioning initiated by the same device in one day exceeds the limit.
10005	The total times of positioning using the same token exceeds the limit.
10006	The token is expired.
10007	The IMEI number is not accepted by the server.
10008	The times of positioning using the same token within one day exceeds the limit.
10009	The frequency of positioning using the same token exceeds the limit.

**NOTE**

QuecLocator uses HTTP protocol. If there is any HTTP error code returned, please refer to [Quectel\\_BG95&BG77&BG600L\\_Series\\_HTTP\(S\)\\_Application\\_Note](#) for the description of the error code.

# 6 Appendix References

**Table 4: Terms and Abbreviations**

Abbreviation	Description
AP	Access Point
eMTC	enhanced Machine Type of Communication
GNSS	Global Navigation Satellite System
GSM	Global System for Mobile Communication
HTTP	Hyper Text Transfer Protocol
IMEI	International Mobile Equipment Identity
IP	Internet Protocol
LPWA	Low-Power Wide-Area (Network)
MAC	Media Access Control
MCU	Microcontroller Unit
RTC	Real Time Clock
URC	Unsolicited Result Code
Wi-Fi	Wireless-Fidelity