

EC200U&EG915U Series

QuecLocator Application Note

LTE Standard Module Series

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About the Document

Revision History

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1 Introduction

This document is an application note for all AT commands related to QuecLocator® on Quectel LTE Standard EC200U series and EG915U series modules.

QuecLocator® is an efficient location technology developed by Quectel. It enhances and complements stand-alone GNSS performance by integrating information of mobile network cells and that of Wi-Fi access points (APs) particularly in challenging environments, such as in urban canyons, indoor areas, enclosed park houses or when GNSS signals are jammed or intermittent. For more details, visit https://iot.quectel.com/doc_getStart.html#QuecLocator.

2 QuecLocator® 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 confirm whether a token has already been configured when you use the service for the first time; if not, please input one. Auth token configuration steps are presented in the figure below.

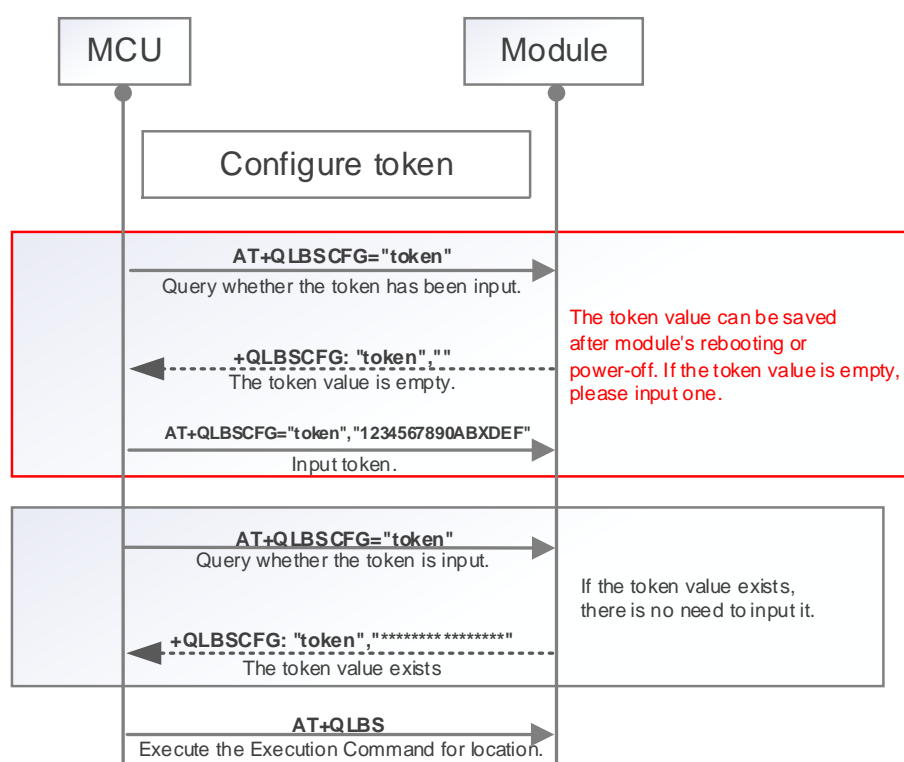


Figure 1: QuecLocator® Auth Token Configuration

NOTE

Please contact Quectel Technical Supports to apply for the token value.

3 Application Note

3.1. AT Command Introduction

3.1.1. 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 its previous value or the default settings, 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 1: 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.

3.2. Declaration of AT Command Examples

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

3.3. Description of QuecLocator[®] Related AT Commands

3.3.1. AT+QLBSCFG Configure Parameters for QuecLocator[®]

AT+QLBSCFG Configure Parameters for QuecLocator [®]	
Test Command AT+QLBSCFG=?	Response +QLBSCFG: "asynch", (list of supported <asynch_mode>s) +QLBSCFG: "timeout", (range of supported <time>s) +QLBSCFG: "server", <server_name>s) +QLBSCFG: "token", <token_value>s) +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: "contextid", (range of supported <contextID>s) OK
Read Command AT+QLBSCFG?	Response +QLBSCFG: "asynch", <asynch_mode> +QLBSCFG: "timeout", <time> +QLBSCFG: "server", <server_name> +QLBSCFG: "token", <token_value> +QLBSCFG: "timeupdate", <update_mode> +QLBSCFG: "withtime", <time_mode> +QLBSCFG: "latorder", <order_mode> +QLBSCFG: "contextid", <contextID> OK
Write Command AT+QLBSCFG="asynch", <asynch_mode>]	Response If the optional parameter is omitted, query the current setting: +QLBSCFG: "asynch", <asynch_mode>

<p>Write Command</p> <p>AT+QLBSCFG="timeout",<time>]</p>	<p>OK</p> <p>If the optional parameter is specified, configure the command execution mode of AT+QLBS:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <err></p> <hr/> <p>Response</p> <p>If the optional parameter is omitted, query the current setting:</p> <p>+QLBSCFG: "timeout",<time></p> <p>OK</p> <p>If the optional parameter is specified, configure the maximum waiting time:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <err></p>
<p>Write Command</p> <p>Configure the domain/IP address and port of the server ¹⁾</p> <p>AT+QLBSCFG="server",<server_name>]</p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:</p> <p>+QLBSCFG: "server",<server_name></p> <p>OK</p> <p>If the optional parameter is specified, configure the domain/IP address and port of the server:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <err></p>
<p>Write Command</p> <p>AT+QLBSCFG="token",<token_value>]</p>	<p>Response</p> <p>If the optional parameter is omitted, and the <token_value> has been set, query the token value:</p> <p>+QLBSCFG: "token", "*****"</p> <p>OK</p>

<p>Write Command</p> <p>AT+QLBSCFG="timeupdate"[,<update_mode>]</p>	<p>If the optional parameter is omitted, and the <token_value> has not been set:</p> <p>+QLBSCFG: "token", ""</p> <p>OK</p> <p>If the optional parameter is specified, configure the token value:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <err></p>
<p>Write Command</p> <p>AT+QLBSCFG="withtime"[,<time_mode>]</p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:</p> <p>+QLBSCFG: "withtime", <time_mode></p> <p>OK</p> <p>If the optional parameter is specified, configure whether to update the time to RTC:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <err></p>
<p>Write Command</p> <p>AT+QLBSCFG="latorder"[,<orde</p>	<p>Response</p> <p>If the optional parameter is omitted, query the current setting:</p>

r_mode>]	+QLBSCFG: "latorder",<order_mode> OK If the optional parameter is specified, configure the latitude and longitude output order of the location results: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err>
Write Command AT+QLBSCFG="contextid",<contextid>]	Response If the optional parameter is omitted, query the current setting: +QLBSCFG: "contextid",<contextid> OK If the optional parameter is specified, configure the PDP context ID: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <err>
Maximum Response Time	300 ms
Characteristics	The commands take effect immediately. The configurations will not be saved except those of <asynch_mode> and <token_value> .

Parameter

<asynch_mode>	Integer type. Command executing mode of AT+QLBS . In different modes, the response of the command is different. 0 Synchronous mode 1 Asynchronous mode
<time>	Integer type. The maximum waiting time for data from the server. If no data come from the server within this interval, the command times out and error code 702 is returned. Range: 10–120. Default value: 60. Unit: second.
<server_name>	String type. Domain/IP address and server port. You can define your own servers as well. Format: "domain/IP address:port" (e.g. "www.queclocator.com:80"). Server port range: 1–65535.

	Default server: "www.queclocator.com:80".
<token_value>	String type. The identification token value required for the server. The maximum length is 127 bytes.
<update_mode>	Integer type. Whether to update the time, which is acquired by accessing the server of QuecLocator, to RTC. 0 Do not update the time to RTC 1 Update the time to RTC
<time_mode>	Integer type. Whether to output the time when use AT+QLBS . 0 Do not output the time 1 Output the time
<order_mode>	Integer type. Configure the latitude and longitude output order of the location results. 0 Longitude output is in the front, latitude output is in the back, the output is: +QLBS: <loc_result>,<longitude>,<latitude>[,<time>] 1 Latitude output is in the front, longitude output is in the back, the output is: +QLBS: <loc_result>,<latitude>,<longitude>[,<time>]
<contextID>	Integer type. PDP context ID. Range: 1–7. Default value: 1.
<err>	Error code. See Chapter 5 for details.

NOTE

- 1) Usually, server domain/IP address and port do not need to be configured.
Default address: www.queclocator.com. Default port: 80. When necessary, server domain/IP address and port can be configured with **AT+QLBSCFG="server"**.
- <asynch_mode>** and **<token_value>** values are saved automatically but other values are lost after rebooting.
- If you need to get the time from the server of QuecLocator, **AT+QLBSCFG="withtime"** can be used at first when the module is powered on.
- If it is necessary to update current ME time, **AT+QLBSCFG="timeupdate",1** needs to be executed before executing **AT+QLBS**.
- The **<token_value>** is used for server authentication and it should be obtained from Quectel in advance.

3.3.2. AT+QLBS Get Location Information by QuecLocator®

AT+QLBS Get Location Information by QuecLocator®	
Test Command AT+QLBS=?	Response OK
Write Command AT+QLBS[=<mode>]	Response If the module is in synchronous mode and positioning succeeded: +QLBS: <loc_result>,<latitude>,<longitude>[,<time>]

	<p>OK</p> <p>If the module is in synchronous mode and positioning failed: +QLBS: <loc_result></p> <p>ERROR</p> <p>If the module is in asynchronous mode and positioning succeeded:</p> <p>OK</p> <p>+QLBS: <loc_result>,<latitude>,<longitude>[,<time>]</p> <p>If the module is in asynchronous mode and positioning failed:</p> <p>OK</p> <p>+QLBS: <loc_result></p> <p>If there is any error: +CME ERROR: <err> Or ERROR</p>
<p>Write Command</p> <p>Get location with Wi-Fi information ¹⁾</p> <p>AT+QLBS=<MAC_num>,<AP_MAC1>,<RSSI1>,<AP_MAC2>,<RSSI2>[,<AP_MAC3>,<RSSI3>[,...]]</p>	<p>Response</p> <p>If the module is in synchronous mode and positioning succeeded: +QLBS: <loc_result>,<latitude>,<longitude>[,<time>]</p> <p>OK</p> <p>If the module is in synchronous mode and positioning failed: +QLBS: <loc_result></p> <p>ERROR</p> <p>If the module is in asynchronous mode and positioning succeeded:</p> <p>OK</p> <p>+QLBS: <loc_result>,<latitude>,<longitude>[,<time>]</p> <p>If the module is in asynchronous mode and positioning failed:</p> <p>OK</p>

	+QLBS: <loc_result> If there is any error: +CME ERROR: <err> Or ERROR
Maximum Response Time	Depends on the <time> in AT+QLBSCFG="timeout" .
Characteristics	This command takes effect immediately. The configurations will not be saved.

Parameter

<mode>	Integer type. Positioning mode 0 Automatically acquire base station information to realize positioning 1 Automatically acquire Wi-Fi MAC addresses to realize positioning
<latitude>	Float type. Location information latitude. This value is accurate to six decimal places. Range: -90.000000–90.000000.
<longitude>	Float type. Location information longitude. This value is accurate to six decimal places. Range: -180.000000–180.000000.
<loc_result>	Integer type. Positioning result. If positioning succeeds, it is 0. If positioning fails, it is <err> . See Chapter 5 for error code descriptions of <err> .
<time>	String type. Time returned from the server, e.g., "21/09/26,13:33:10".
<MAC_num>	Integer type. Number of inputted Wi-Fi MAC addresses. Range: 2–6.
<AP_MAC>	String type. MAC addresses of nearby Wi-Fi hotspots.
<RSSI>	Integer type. Received signal strength indication. Range: -180–180. Unit: dBm.
<err>	Error code. See Chapter 5 for details.

NOTE

¹⁾ QuecLocator supports Wi-Fi-assisted positioning. When the module does not support scanning of the surrounding Wi-Fi information, the Wi-Fi information can be inputted manually with the relevant AT command.

4 Examples

//Activate network first, then configure and get location as explained below.

AT+QLBSCFG="token"

//Query the token value required for authentication of Quectel location server; if it is empty, you need to input it, otherwise, there is no need to input it.

+QLBSCFG: "token", ""

OK

AT+QLBSCFG="token", "1234567890ABCDEF"

//Input the token value required for authentication of Quectel location server.

OK

AT+QLBSCFG="token"

//Query the token value required for authentication of Quectel location server.

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

OK

AT+QLBSCFG="latorder", 1

//Configure the location output format to latitude information first and longitude information second.

OK

AT+QLBS

//Automatically acquire base station information to realize positioning.

+QLBS: 0,31.847649,117.200134

OK

AT+QLBS=0

//Automatically acquire base station information to realize positioning.

+QLBS: 0,31.847649,117.200134

OK

AT+QLBS=1

//Automatically acquire Wi-Fi MAC addresses to realize positioning.

+QLBS: 0,31.847649,117.200134

OK

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

//Manually input MAC addresses to fix a position.

+QLBS: 0,31.846893,117.198166

//Position fixed.

OK

AT+QLBSCFG="asynch",1

//Configure to execute **AT+QLBS** in asynchronous mode.

OK

AT+QLBS

//Get the location information through triangulation.

OK

//Other AT commands can be executed after **OK** is returned.

+QLBS: 0,31.847132,117.198341

5 Summary of Error Codes

Table 2: Summary of Error Codes

Code of <err>	Meaning
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 any HTTP error code is returned, see **document [1]**.

6 Appendix References

Table 3: Related Documents

Document Name
[1] Quectel_EC200U&EG915U_Series_HTTP(S)_Application_Note

Table 4: Terms and Abbreviations

Abbreviation	Description
AP	Access Point
GNSS	Global Navigation Satellite System
HTTP(S)	Hyper Text Transfer Protocol (Secure)
IMEI	International Mobile Equipment Identity
IP	Internet Protocol
LTE	Long-Term Evolution
MAC	Medium Access Control
ME	Mobile Equipment
PDP	Packet Data Protocol
RSSI	Received Signal Strength Indicator
RTC	Real-Time Clock
TA	Terminal Adapter
Wi-Fi	Wireless Fidelity