

# QuecLocator

# Application Note

**GSM/GPRS Module Series**

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# About the Document

## History

| Revision | Date       | Author  | Description  |
|----------|------------|---------|--|
| 3.0      | 2013-03-11 | Kim JIN | Initial  |
| 3.1      | 2013-03-23 | Kim JIN | Modified return values of AT+QCELLLOC.                   |
| 3.2      | 2013-05-14 | Kim JIN | Modified the application scope for QuecLocator function. |
| 3.3      | 2013-06-07 | Kim JIN | Modified the functional description of QuecLocator.      |
| 3.4      | 2015-04-08 | Kim JIN | Added applicable modules.                                |

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# 1 Introduction

QuecLocator is the abbreviation of Quectel's cellular positioning technology, which can enhance and complement stand-alone GNSS performance in conjunction with information from mobile network cells particularly in challenging signal environments, such as urban canyon, indoors, in enclosed park houses or when GNSS jamming signals are present.

This document gives you a detailed introduction to QuecLocator and describes how to enable this functionality via AT Command.

This document is applicable to all Quectel GSM modules.

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## 2 Cellular Location

Global Navigation Satellite System (GNSS) has been widely used because of its accurate and stable positioning capability. But it is not always possible in the challenging signal environments, such as when GNSS receiver works indoors, in urban canyon, under the elevated bridge or GNSS signal is influenced by jamming.

Wireless cells are widely available in urban and rural environments, which can enable QuecLocator service to estimate the position on the basis of surrounding mobile network information. The QuecLocator, combined with the technology of cellular location, can be supported where GSM network coverage is available.



QuecLocator allows Quectel wireless modules to provide positioning service only with cell base station. QuecLocator can work alone with no need for a GNSS receiver. So if GNSS signals are blocked or influenced by jamming, (such as within tunnels, buildings or metallic containers,) Quectel modules with QuecLocator technology can also provide rough location information.

### Benefits of QuecLocator

The advantages of using QuecLocator are the following:

- Indoor positioning: GNSS signal is not available indoors or in other enclosed places. QuecLocator can provide position information in these situations.
- For some specific application, an estimated position is enough. Then a GNSS module can be retrenched.
- Convenient to use: QuecLocator can be used wherever the base station service is available. With the cells' information, the current location can be easily displayed via QuecLocator.
- Broad application scope: QuecLocator is based on the density of network cells. It can work where GNSS is not available. When a GNSS jamming device is used, QuecLocator can also offer the location service.

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# 3 Commands Description

## 3.1. AT+QCELLLOC Get Current Location

This AT command is used to get the current location through QuecLocator.

| AT+QCELLLOC Get Current Location                |  |
|---|--|
| <b>Test Command</b><br>AT+QCELLLOC=?            | <b>Response</b><br>+QCELLLOC: 1<br><br>OK  |
| <b>Write Command</b><br>AT+QCELLLOC=<locMethod> | <b>Response</b><br>+QCELLLOC: <longitude>,<latitude><br><br>OK<br><br>else response<br>ERROR |
| <b>Reference</b>                                |  |

### Parameter

|                          |  |
|--------------------------|--|
| <b>&lt;locMethod&gt;</b> | Location method.<br>1 Get current location by the cell's information.  |
| <b>&lt;longitude&gt;</b> | The longitude of the location information. This value should be accurate to six after the decimal point, and the range is <-180.000000 to 180.000000>. |
| <b>&lt;latitude&gt;</b>  | The latitude of the location information. This value should be accurate to six after the decimal point, and the range is <-90.000000 to 90.000000>.    |

#### NOTE

There will be around 200 bytes of upstream data every time using this function to get location. And the received data from server are around 200 bytes.



## Example

QuecLocator function needs GPRS support. So the GPRS context should be activated prior to using it to get the current location.

```
AT+QIFGCNT=0 // Choose the context 0 to activate GPRS/CSD context.
OK

AT+QICSGP=1,"CMNET" // Choose GPRS mode and set the APN as "CMNET"
OK // when the operator is the China Mobile.

AT+QIREGAPP // Register to the TCP/IP stack
OK

AT+QIACT // Activate PDP context
OK

AT+QCELLLOC=1 // Use method 1 to get the current location
+QCELLLOC: 117.199997,31.842600
OK
```

## 4 Appendix A Reference

**Table 1: Related Documents**

| SN  | Document name                                   | Remark  |
|-----|---|---|
| [1] | Vehicle location by a signal attenuation method | Figel W., Shepherd N., Trammel W., IEEE Transactions on Vehicular Technology, Nov. 1969, Vol. 18, No. 3, pp. 105-109. |
| [2] | Database correlation method for GSM location    | H. Laitinen, J. Lähteenmäki and T. Nordström, IEEE VTC 2001 Spring Conference, Rhodes, May 2001                       |

**Table 2: Terms and Abbreviations**

| Abbreviation | Description                        |
|--------------|------------------------------------|
| GNSS         | Global Navigation Satellite System |