Fibocom

PERFECT WIRELESS EXPERIENCE

MTC

Application Guide_LBS

V1.4

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Contact Information

Website: https://www.fibocom.com

Address: 10/F-14/F, Block A, Building 6, Shenzhen International Innovation Valley, Dashi First Road, Xili Community, Xili Subdistrict, Nanshan District, Shenzhen

Tel: 0755-26733555

Contents

Applicable Model

No.	Applicable Model	Description
1	L716 Series	Only support GTGIS command type is 6（amap map）
2	NL668 Series	Only support GTGIS command type is 6（amap map）
3	MC66x Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
4	MG66x Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
5	LE Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
6	LC116 Series	Only support GTGIS command type is 6（amap map）
7	MC116 Series	Only support GTGIS command type is 6（amap map）
8	MG110 Series	Only support GTGIS command type is 6（amap map）
9	L610 Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
10	LC610N Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
11	LG610 Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
12	MC610 Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
13	MC615 Series	Extended support for GTGIS command type=7 (7: wifiscan, wifiscan localization based on amap map)
14	FG132 Series	support GTGIS command type is 5（google map）and type is 6（amap map）

Change History

V1.4 (2025-03-12)	Delete the MA510 product
V1.3 (2024-11-15)	The LE13x/LE17x/LE27x/LE23x/LE25x/LE37x series in the applicable models should be uniformly modified to the LE series.
V1.2 (2024-11-06)	Modify applicable models and add LE25x and LE37x series
V1.1 (2024-08-16)	Add application model
V1.0 (2024-01-28)	Initial version

1 Overview

1.1 Principle of Concept

Location based service (LBS) refers to a service based on geographic location data. A mobile terminal using a wireless communication network (or satellite positioning system) leverages the LBS, based on a spatial database, to obtain the user's geographic location coordinate information and integrate it with other information to provide users with desired location-related value-added services. LBS includes base station positioning and Wi-Fi positioning.

1.1.1 Base Station Positioning

The current location of the device is obtained by obtaining the information about the cell where the device is currently located through the mobile network. When the device location is updated, the device will report the current location information to the current serving cell, and the accuracy of Cell ID positioning varies with the coverage of the cell, ranging from tens of meters to hundreds of meters. Cell ID is by far the easiest way to position. As long as the base station ID accessed by the mobile phone and the coordinates of the base station are obtained through the background service, the general location of the mobile phone can be obtained.

- Disadvantage: The mobile base station cells are intensive in cities and the positioning error ranges from tens to hundreds of meters, while the positioning error greatly increases in rural and mountainous areas due to long distance between base stations.
- Advantage: After the user device is registered to a mobile network supporting LBS, the longitude and latitude information can be received from the map server even when only the data of the serving cell is available.

1.1.2 Wi-Fi Positioning

Each wireless AP has a globally unique MAC address, and generally, the wireless AP is fixed for a period of time. When the user device’s Wi-Fi is enabled, the user device can scan and collect the AP signals surrounding it. Regardless of the signal encryption status, connection status, and signal strength, the MAC addresses broadcast by the APs can be obtained. The MAC addresses, signal strength and hotspot names are sent to the map location server via HTTP. The server retrieves the geographic location of the APs, calculates the geographic location of the APs based on the geographic location and signal strength, and returns the location information to the user device.

- Disadvantage: As limited by the coverage of surrounding hotspots, the map server needs to get sufficient accurate hotspot information to send. The map server will not send longitude and latitude information if the MAC information is inaccurate. Wi-Fi positioning cannot be achieved without hotspot coverage. When the module is moving, the hotspot scanned is also moving, which also affects the Wi-Fi positioning accuracy. In addition, the power consumption is increased greatly.
- Advantage: The positioning is more accurate than LBS, and the accuracy of hotspot coverage and real physical position is higher, with an error ranging from several meters to tens of meters.

2 User Guide

2.1 Preconditions

- The module is powered on and registers with the network successfully, and the dial-up is successful.
- For Wi-Fi positioning, the Wi-Fi antenna needs to be inserted, and there is coverage of surrounding hotspots.
- Use the AT+GTKEY="key" command to set the key value for GIS requests. The key needs to be obtained by contacting the location service provider. If the key is incorrect, using GTGIS to obtain information will fail.

2.2 Related AT Commands

2.2.1 AT+COPS? Used to Get Network Registration Status.

```
AT+COPS?

+COPS: 0,0,"CHINA MOBILE",7      ❶


OK
```

❶Register the module with the mobile LTE network.

2.2.2 AT+CEREG? Used to Query Current LTE Network.

Registration Status

This command is used to query the LTE network attachment status of the current module. If the network returns 1, the registration is successful.

AT command test example:

```
AT+CEREG?

+CEREG: 0,1           ❶


OK
```

❶The module is registered with the network.

2.2.3 AT+MIPCALL=1 Used for Internal Dial-up.

This command is used for dial-up.

```
AT+MIPCALL=1       ❶

OK


+MIPCALL: 10.170.25.237       ❷
```

❶Perform dial-up internally.

❷The dial-up is successful. The IP address is returned.

2.2.4 AT+GTKEY=”key” Set the key value obtained from the service provider.

2.2.5 AT+GTGIS=<type> Obtain location information

2.2.5.1 AT+GTGIS=6 Used for Base Station Positioning On Amap Map.

This command amap map base station positioning,it is an asynchronous command, which is returned directly, and the positioning result is reported asynchronously and proactively.

```
AT+GTGIS=6 ❶

OK


+GTGIS: "108.8345559,34.2065207"

+GTGIS: "Near Software R&D Base Phase 2 of New Xi'an Software City, Tiangu 8 Road, Yanta District, Xi'an, Shaanxi Province"❷
```

❶Enable the base station positioning.

❷The device is positioned successfully, and the positioning information is returned.

2.2.5.2 AT+GTGIS=7 Used for Wi-Fi Positioning On Amap Map.

This command amap map Wi-Fi positioning,it is an asynchronous command, which is returned directly, and the positioning result is reported asynchronously and proactively.

```
AT+GTGIS=7     ❶

OK


+GTGIS: "108.8348923,34.2068321"

+GTGIS: "Near Software R&D Base Phase 2 of New Xi'an Software City, Tiangu 8 Road,
```

```
Yanta District, Xi'an, Shaanxi Province"❷
```

❶Enable Wi-Fi positioning.

❷The device is positioned successfully, and the positioning information is returned.

3 Precautions

- When LTE and GNSS are working, the Wi-Fi Scan function will be abnormal. LTE, GNSS, and Wi-Fi Scan share RF resources. Since the priority of Wi-Fi Scan is relatively low, Wi-Fi Scan can be interrupted when the module makes calls or uses data services. The Wi-Fi Scan cannot be performed when the modem side is in data service connection state or network search state.
- Wi-Fi positioning only supported base amap map.