



R7072_MQTT_Application Note

LPWA Module

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About Document

Version History

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Contents

About Document.....	3
Version History.....	3
Contents.....	4
1 Introduction.....	5
1.1 Purpose of the document.....	5
1.2 Related documents.....	5
1.3 Conventions and abbreviations.....	5
2 MQTT Introduction.....	6
2.1 Characteristic.....	6
2.2 Request Method.....	6
3 AT Commands for MQTT.....	8
3.1 AT Commands for MQTT.....	8
3.2 AT Commands for Aliyun MQTT.....	8
4 Bearer Configuration.....	9
4.1 PDN activation.....	9
5 MQTT Samples.....	11
5.1 MQTT Function.....	11
5.1.1 MQTT example.....	11
5.1.2 Aliyun MQTT example.....	12

1 Introduction

1.1 Purpose of the document

Based on module AT command manual, this document will introduce MQTT application process. Developers could understand and develop application quickly and efficiently based on this document.

1.2 Related documents

[1] R7070 Series_ AT Command Manual V1.00

1.3 Conventions and abbreviations

In this document, the GSM engines are referred to as following term:

ME (Mobile Equipment);

MS (Mobile Station);

TA (Terminal Adapter);

DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board);

In application, controlling device controls the GSM engine by sending AT Command via its serial interface.

The controlling device at the other end of the serial line is referred to as following term:

TE (Terminal Equipment);

DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

2 MQTT Introduction

MQTT (Message Queuing Telemetry Transport) is a lightweight broker-based publish/subscribe messaging protocol. It is a machine-to-machine (M2M)/"Internet of Things" connectivity protocol. It was designed as an extremely lightweight publish/subscribe messaging transport. It is useful for connections with remote locations where a small code footprint is required and/or network bandwidth is at a premium.

2.1 Characteristic

- Support client/server mode;
 - ✧ The publish/subscribe message pattern to provide one-to-many message distribution and decoupling of applications
 - ✧ A messaging transport that is agnostic to the content of the payload
 - ✧ The use of TCP/IP to provide basic network connectivity
 - ✧ Three qualities of service for message delivery
 - ✧ A small transport overhead (the fixed-length header is just 2 bytes), and protocol exchanges minimised to reduce network traffic
 - ✧ A mechanism to notify interested parties to an abnormal disconnection of a client using the Last Will and Testament feature

2.2 Request Method

According to the MQTT standard, MQTT provides a variety of request methods. CONNECT, SUBSCRIBE, PUBLISH, UNSUBSCRIBE, DISCONNECT, PINGREQ

No	Method	Description
1	CONNECT	When a TCP/IP socket connection is established from a client to a server, a protocol level session must be created using a CONNECT flow.
2	SUBSCRIBE	The SUBSCRIBE message allows a client to register an interest in one or more topic names with the server. Messages published to these topics are delivered from the server to the client as PUBLISH messages. The SUBSCRIBE message also specifies the QoS level at which the subscriber wants to receive published messages.
3	PUBLISH	A PUBLISH message is sent by a client to a server for distribution to interested subscribers. Each PUBLISH message is associated with a topic name (also known as the Subject or Channel). This is a hierarchical name space that defines taxonomy of information sources for which subscribers can register an interest. A message that is published to a specific topic name is delivered to

		connected subscribers for that topic.
4	UNSUBSCRIBE	An UNSUBSCRIBE message is sent by the client to the server to unsubscribe from named topics.
5	DISCONNECT	The DISCONNECT message is sent from the client to the server to indicate that it is about to close its TCP/IP connection. This allows for a clean disconnection, rather than just dropping the line.

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3 AT Commands for MQTT

3.1 AT Commands for MQTT

Command	DESCRIPTION
AT+MQTTCONN	Connect to MQTT server
AT+MQTTSUBUNSUB	Subscribe/Unsubscribe a topic
AT+MQTTPUB	Public a message to server
AT+MQTTDISCONN	Disconnect from MQTT server
AT+MQTTMD	Set data mode

3.2 AT Commands for Aliyun MQTT

Command	DESCRIPTION
AT+CLOUDAUTH	Aliyun Authorization
AT+CLOUDCONN	Connect to Aliyun server
AT+CLOUDSUB	Subscribe a topic from Aliyun server
AT+CLOUDUNSUB	Unsubscribe a topic from Aliyun server
AT+CLOUDPUB	Publish a message to Aliyun server
AT+CLOUDDISCONN	Disconnect from Aliyun server

For detail information, please refer to "R7070 Series_AT Command Manual V1.00".

4 Bearer Configuration

4.1 PDN activation

AT+CPIN?

+CPIN: READY

// Check Status of SIM Card

OK

AT+CSQ

+CSQ: 27,99

// Check RF Signal

OK

AT+CEREG?

+CEREG: 0, 1, "1816", "52fa811c", 0

// Check Status of PS Service

OK

AT+COPS?

+COPS: 0,2, "46000", 0

// Check Information of Operator

OK

AT+CGDCONT=1, "IP", "CMNET"

// Set PDP context Parameters

OK

AT+CGDCONT?

+CGDCONT:1, "IP", "CMNET", "0.0.0.0", 0,0

// Check Information of PDP Context

OK

AT+CFGDUALMODE?

+CFGDUALMODE: 1,1

//

OK

AT+CFGRATPRIO=?

+CFGRATPRIO: DualModeRatPriority=[2,4](2-2G; 4-NB)

OK

AT+CFGRATPRIO=?

OK

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5 MQTT Samples

5.1 MQTT Function

5.1.1 MQTT example

```
//MQTT in ASCII mode
AT+CGACT=1                                // Activate PDP context

OK
AT+MQTTMD=0                                // Set data transport mode in ASCII

OK
AT+MQTTCONN="mq.tongxinmao.com",1883      // Connect to MQTT broker
0,"clientExample",0,1

OK
AT+MQTTSUBUNSUB="tudou",1,2                // Subscribe topic

OK
AT+MQTTPUB="tudou","tudou-message",2,1,    // Publish topic
1

OK
+MQTTPUBLISH:1,tudou,13,tudou-message
AT+MQTTSUBUNSUB="tudou",0,2                // Unsubscribe topic

OK
AT+MQTTDISCONN                             // Disconnect from MQTT broker

OK
```

```
//MQTT in HEX mode
AT+CGACT=1                                // Activate PDP context

OK
AT+MQTTMD=0                                // Set data transport mode in HEX
```

OK

AT+MQTTCONN="mq.tongxinmao.com",1883 // Connect to MQTT broker
0,"clientExample",0,1

OK

AT+MQTTSUBUNSUB="e6b58be8af95",1,2 // Subscribe topic

OK

AT+MQTTPUB="e6b58be8af95","22414243004 // Publish topic
422",2,1,1

OK

+MQTTPUBLISH:1,E6B58BE8AF95,14,224142
43004422

AT+MQTTSUBUNSUB=" e6b58be8af95",0,2 // Unsubscribe topic

OK

AT+MQTTDISCONN // Disconnect from MQTT broker

OK

5.1.2 Aliyun MQTT example

AT+CGACT=1 // Activate PDP context

OK

AT+CLOUDAUTH="CwlekguDcv3","device","Y // Set Aliyun IOT Authentication
plyrQ3CKX6WKvNb5bpFKAv254JDhCmu"

OK

AT+CLOUDSUB="/CwlekguDcv3/device/get",0 // Subscribe topic

OK

AT+CLOUDUNSUB="/CwlekguDcv3/device/ge // Unsubscribe topic
t"

OK

AT+CLOUDPUB="/CwlekguDcv3/device/gett", // Publish message
0,"3456"

OK

AT+CLOUDDISCONN // Disconnect from Aliyun IOT

OK

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