



SIM800 Series_MQTT _Application Note

GPRS Module

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About Document

Version History

Version	Date	Owner	What is new
1.00	2017-10-11	Dingfen.Zhu	Original
1.01	2019-12-10	Xiaohui.Wu	Chapter 2.2, Add AT+SAZURECONF Chapter 3.2, Add MQTT Connecting to Azure IoT
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Scope

This document presents the AT command of MQTT operation and application examples. This document can apply to SIM800 series modules with MQTT function.

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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] SIM800 Series_AT Command Manual

1.3 Conventions and abbreviations

Abbreviations	Description
GPRS	General Packet Radio Service
PDP	Packet Data Protocol
MQTT	Message Queuing Telemetry Transport

2 MQTT Introduction

MQTT (Message Queue Telemetry Transport) is a messaging protocol based on the publish/subscribe paradigm under the ISO standard (ISO/IEC PRF 20922).

The MQTT protocol is a protocol designed for the communication of remote sensors and control devices with limited computing power and working on low-bandwidth, unreliable networks. It has the following main features:

- 1) Use the publish/subscribe message mode to provide one-to-many message publishing and uncouple application.
- 2) Message transmission blocked by the payload content.
- 3) Provide network connectivity using TCP/IP.
- 4) There are three types of message publishing service quality:

- “At most once”, the message is completely dependent on the underlying TCP/IP network.

Message loss or duplication can occur. This level can be used in the following situations, environmental sensor data, loss of a read record does not matter, because there will be a second transmission in the near future.

- “At least once” to ensure that the message arrives, but message duplication may occur.
- “Only once” to ensure that the message arrives once. This level can be used in situations where

repeated or missing messages can result in incorrect results.

- 5) Small transmission, low overhead (fixed length header is 2 bytes), protocol exchange is minimized to reduce network traffic.

3 AT Commands for MQTT

SIM800 series modules provide MQTT AT command is as follows:

AT Command	Description
AT+SMCONF	Set MQTT Parameter
AT+SAZURECONF	Set Azure IoT Parameter
AT+SMCONN	MQTT Connection
AT+SMSUB	Subscribe Packet
AT+SMUNSUB	Unsubscribe Packet
AT+SMPUB	Publish Packet
AT+SMSTATE	Inquire MQTT Connection Status
AT+SMDISC	Disconnect MQTT
AT+SMSSL	Set MQTT to Use SSL Function
AT+SMPUBLISH	Received Data

3.1 AT+SMCONF Set MQTT Parameter

AT+SMCONF Set MQTT Parameter	
Test Command AT+SMCONF=?	Response +SMCONF: "MQTTParamTag","MQTTParamValue" OK
Read Command AT+SMCONF?	Response +SMCONF: <MQTTParamTag>,<MQTTParamValue> OK.
Write Command AT+SMCONF=<MQTTParamTag>,<MQTTParamValue>	Response OK or +CME ERROR: <err> Parameters <MQTTParamTag> MQTT Parameter "CID" Bearer profile identifier "URL" MQTT Server URL "serve:tcpPort"

	<p>"server": FQDN or IP-address</p> <p>"tcpPort": default value is 1883</p> <p>"CLIENTID" Client connection id</p> <p>"KEEPALIVE" Hold connect time.default:60,Rang:60~180</p> <p>"CLEANSS" Clean session flag, default:0, Rang (0-1)</p> <p>"USERNAME" User name. default null</p> <p>"PASSWORD" Password, default null</p> <p>"TIMEOUT" MQTT response timeout value</p>
	<MQTTarmValue> MQTT Parameter value
Reference	Note

3.2 AT+SAZURECONF Set Azure IoT Parameter

AT+SAZURECONF Set Azure IoT Parameter	
Test Command AT+SAZURECONF=?	<p>Response</p> <p>+SAZURECONF: "url","deviceld","deviceKey",<expiry_time></p> <p>OK</p>
Write Command AT+SAZURECONF=<URL>,<Deviceld>,<DeviceKey>,<Expiry_time>	<p>Response</p> <p>OK</p> <p>or</p> <p>+CME ERROR: <err></p> <p>Parameters</p> <p><URL> Azure IoT HostName</p> <p>"serve:tcpPort"</p> <p>"server": HostName</p> <p>"tcpPort": 8883</p> <p><Deviceld> The Id of the Azure IoT Device.</p> <p><DeviceKey> The "PrimaryKey" of the Azure IoT Device.</p> <p><expiry_time> Expiration time,Rang:0~3600*24*365(second).</p>
Reference	Note

3.3 AT+CMCONN MQTT Connection

AT+CMCONN MQTT Connection	
Test Command	Response

AT+SMCONN=?	OK
Execution Command AT+SMCONN	Response OK or +CME ERROR: <err>
Reference	Note

3.4 AT+SMSUB Subscribe Packet

AT+SMSUB Subscribe Packet	
Test Command AT+SMSUB=?	Response +SMSUB: "topic",<qos> OK
Write Command AT+SMSUB=<topic>,<qos>	Response OK or +CME ERROR: <err> Unsolicited Result Code +SMSUB: <packet_id>,<status> Parameters <div> <topic> Topic name <qos> Qos level, rang: 0~1 <packet_id> Packet id <status> Subscribe status <div> 0 Success 1 TimeOut 2 Other Error </div> </div>
Reference	Note

3.5 AT+SMPUB Publish Packet

AT+SMPUB Publish Packet	
Test Command AT+SMPUB=?	Response +SMPUB: "topic",<qos>,"message"

	OK
Write Command AT+SMPUB=<topic>,<qos>,<retain>,<message>	Response OK or +CME ERROR: <err> Unsolicited Result Code +SMPUB: <packet_id>,<status> Parameters <topic> Topic name <qos> Qos level, rang: 0~1 <retain> Retain flag, default 0, range (0-1) <message> Message content, , range: 0~1024 <packet_id> Packet id <status> Publish status 0 Success 1 TimeOut 2 Other Error
Reference	Note

3.6 AT+SMUNSUB Unsubsrcibe Packet

AT+SMUNSUB Unsubsrcibe Packet	
Test Command AT+SMUNSUB=?	Response +SMUNSUB: "topic" OK
Write Command AT+SMUNSUB=<topic>	Response OK or +CME ERROR: <err> Unsolicited Result Code +SMUNSUB: <packet_id>,<status> Parameters <topic> Topic name <packet_id> Packet id <status> Unsubscribe status 0 Success 1 Time Out 2 Other Error

Reference	Note
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3.7 AT+SMSTATE Inquire MQTT Connection Status

AT+SMSTATE Inquire MQTT Connection Status	
Test Command AT+SMSTATE=?	Response OK
Write Command AT+SMSTATE?	Response +SMSTATE: <status> OK Parameters <status> 0 Disconnect status 1 Connect status
Reference	Note

3.8 AT+SMDISC Disconnect MQTT

AT+SMDISC Disconnect MQTT	
Test Command AT+SMDISC=?	Response OK
Write Command AT+SMDISC?	Response OK or +CME ERROR: <err>
Reference	Note

3.9 AT+SMDISC Disconnect MQTT

AT+SMSSL Set MQTT to Use SSL Function	
Test Command AT+SMSSL=?	Response +SMSSL: <Enable>

	OK
Read Command AT+SMSSL?	Response +SMSSL: <Enable>
	OK
Write Command AT+SMSSL=<Enable>	Response OK or +CME ERROR: <err> Parameters <Enable> 0 Disable SSL function 1 Enable SSL function
Reference	Note

3.10 SMPUBLISH Received Data

SMPUBLISH Received Data	
	Unsolicited Result Code +SMPUBLISH: <packet_id>,"topic",<msgLen>,"message"
	Parameters <div> <div><packet_id></div> <div>Packet id</div> </div> <div> <div><topic></div> <div>Topic name</div> </div> <div> <div><messageLen></div> <div>Message length</div> </div> <div> <div><message></div> <div>message content</div> </div>
Reference	Note

4 MQTT Examples

4.1 Standard MQTT

The following table provides some using method of the MQTT function.

//Example of Standard MQTT.

AT+SAPBR=3,1,"Contype","GPRS"	// Configure bearer profile 1
OK	
AT+SAPBR=3,1,"APN","CMNET"	
OK	
AT+SAPBR=1,1	// To open a GPRS context
OK	
AT+SAPBR=2,1	// To query the GPRS context
+SAPBR: 1,1,"10.89.193.1"	
OK	
AT+SMCONF="URL","117.131.85.139:6000"	// Set parameters for MQTT
OK	
AT+SMCONF="CLEANSS",1	
OK	
AT+SMCONN	// MQTT Connection
OK	
AT+SMSUB="Topic1",1	// Subscribe topic
OK	
+SMSUB: 1,0	// Subscribe response
AT+SMUNSUB="Topic1"	// Unsubscribe topic
OK	
+SMUNSUB: 2,0	// Unsubscribe response
AT+SMPUB="Topic1",1,0,"hello world"	// Publish message
OK	
+SMPUB: 3,0	// Publish response
+SMPUBLISH: 1,"Topic1",11,"hello world"	// Received published data
AT+SMDISC	// Disconnect MQTT
OK	

AT+SAPBR=0,1
OK

//To close a GPRS context.

4.2 MQTT Connecting to Azure IoT

The following table provides the example of MQTT Connecting to Azure IoT.

//Example of MQTT Connecting to Azure IoT.

AT+CLTS=1

OK

AT&W

OK

AT+CFUN=0

OK

AT+CFUN=1

+CPIN: READY

OK

AT+CCLK?

// Get local Time

+CCLK: "19/09/04,16:05:01+32"

OK

AT+SAPBR=3,1,"Contype","GPRS"

// Configure bearer profile 1

OK

AT+SAPBR=3,1,"APN","CMNET"

OK

AT+SAPBR=1,1

// To open a GPRS context

OK

AT+SAPBR=2,1

// To query the GPRS context

+SAPBR: 1,1,"10.156.5.253"

OK

AT+FSCREATE=C:\USER\HENRY_SSL.CRT

// Import the Azure Root Certificate File

OK

**AT+FSWRITE=C:\USER\HENRY_SSL.CRT,0,
947,10>**

OK

**AT+SSLSETROOT="C:\USER\HENRY_SSL.C
RT",947**

OK

AT+SSLOPT=0,0

```

OK
AT+SSLOPT=1,1
OK
AT+SMSSL=1                                // Set MQTT to Use SSL Function
OK
AT+SAZURECONF="9AMIoTHub-HW.azure        // Set parameters for Azure IoT
e-devices.cn:8883","simcomdevice","n1Aoq  <DeviceID> is simcomdevice.
KmG6ltXWtNX1HL4zPAih/ug50D7P4rCv6p
c/3c=",86400
OK
AT+SMCONN                                // MQTT Connection
OK
AT+SMSUB="devices/simcomdevice/message   // Subscribe topic (The format of the subscribe
s/devicebound/#",1                       topic is as below,
OK                                         "devices/deviceID/messages/devicebound/#")

+SMSUB: 1,0                               // Subscribe response

+SMTPUBLISH:                             // Receive the message from the Azure IoT
3,"devices/simcomdevice/messa
ges/devicebound/%24.mid=17a3c1ba-9aed-437
a-9923-4426ba711167&%24.to=%2Fdevices%2F
simcomdevice%2Fmessag",6,"123213"
AT+SMPUB="devices/simcomdevice/messages // Publish message (The format of the publish
/events/",1,0," hello world"            topic is as
OK                                         below,"devices/deviceID/messages/events/")

+SMTPUB: 2,0                               // Disconnect MQTT
AT+SMDISC
OK
AT+SAPBR=0,1                             // To close a GPRS context.
OK

```