SIM7080 Series_MQTT(S)_Application Note

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About Document

Document Information

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Revision	Date	Owner	Status / Comments
1.00	Sept 2, 2019	Zhiyuan.tang	First Release
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Related Documents

[1] SIM7080 Series AT Command Manual V1.02

This document applies to the following products:

Name	Type	Size (mm)	Comments
SIM7080G	CAT-M/NB	17.6*15.7 *2.3	N/A
SIM7070G/SIM7070E	CAT-M/NB/EGPRS	24*24*2.4	N/A
SIM7070G-NG	NB/EGPRS	24*24*2.4	N/A
SIM7090G	CAT-M/NB	14.8*12.8*2.0	N/A

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Contents

1 Purpose of this 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.

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). It works on the TCP/IP protocol suite and is a publish/subscribe messaging protocol designed for remote devices with poor hardware performance and poor network conditions.

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 the application;

2) Message transmission for shielding the payload content;

3) Provide network connection using TCP/IP;

4) There are three types of message publishing service quality:

- "At most once," message publishing relies entirely 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 of the head is 2 bytes), protocol exchange is minimized to reduce network traffic;

6) Use the Last Will and Testament features to notify the parties about the mechanism of client abort.

3 AT Commands for MQTT(S)

Command	Description
AT+SMCONF	Set MQTT Parameter
AT+CSSLCFG	SSL Configure
AT+SMSSL	Select SSL Configure
AT+SMCONN	MQTT Connection
AT+SMPUB	Send Packet
AT+SMSUB	Subscribe Packet
AT+SMUNSUB	Unsubscribe Packet
AT+SMSTATE	Inquire MQTT Connection Status
AT+SMPUBHEX	Set SMPUB Data Format to Hex
AT+SMDISC	Disconnection MQTT
+SMSUB	MQTT Receive Subscribe Data

For detail information, please refer to "SIM7080 Series_AT Command Manual".

4 Bearer Configuration

Usually module will register PS service automatically.

4.1 PDN Auto-activation

AT Command	Response	Description
AT+CPIN?	+CPIN: READY OK	Check SIM card status
AT+CSQ	+CSQ: 27,99 OK	Check RF signal
AT+CGATT?	+CGATT: 1 OK	Check PS service. 1 indicates PS has attached.
AT+COPS?	+COPS: 0,0,"CHN-CT",9 OK	Query Network information, operator and network mode 9, NB-IOT network
AT+CGNAPN	+CGNAPN: 1,"ctnb"	Query CAT-M or NB-IOT network after the successful registration of APN

	OK	
AT+CNACT=0,1	OK	Activating network bearing
	+APP PDP: 0,ACTIVE	

5 MQTT(S) Samples

5.1 MQTT Function

AT Command	Response	Description
AT+CNACT=0,1	OK	Open wireless connection parameter 0 is PDP Index, parameter 1 means active.
	+APP PDP: 0,ACTIVE	
AT+CNACT?	+CNACT: 0,1,"10.94.36.44"	Get local IP
	+CNACT: 1,0,"0.0.0.0"	
	+CNACT: 2,0,"0.0.0.0"	
	+CNACT: 3,0,"0.0.0.0"	
	OK	
AT+SMCONF="URL",117.131.85.139,6000	OK	Set up server URL
AT+SMCONF="KEEPTIME",60	OK	Set MQTT time to connect server
AT+SMCONN	OK	
AT+SMSUB="information",1	OK	Subscription packet
AT+SMPUB="information",5,1,1	OK	Send packet, 5 is packet length.
>hello	+SMSUB: "information","hello"	Get data on server
AT+SMUNSUB="information"	OK	Unsubscription packet
AT+SMDISC	OK	Disconnect MQTT
AT+CNACT=0,0	OK	Disconnect wireless
	+APP PDP: 0,DEACTIVE	

5.2 MQTTS Function

AT Command	Response	Description
AT+CNACT=0,1	OK	Open wireless connection parameter 0 is PDP Index, parameter 1 means active.
	+APP PDP: 0,ACTIVE	
AT+CNACT?	+CNACT: 0,1,"10.94.36.44"	Get local IP
	+CNACT: 1,0,"0.0.0.0"	
	+CNACT: 2,0,"0.0.0.0"	

	+CNACT: 3,0,"0.0.0.0"	
	OK	
AT+CFSINIT	OK	Init FS AT command
AT+CFSWFILE=3,"ca.crt",0,2110, 1000	DOWNLOAD	After download, sent certificate file through the serial port.
	OK	2110 is certificate size. Send CA file success
AT+CFSWFILE=3,"myclient.crt",0 ,2110,1000	DOWNLOAD	Send cert file success
	OK	
AT+CFSWFILE=3,"myclient.key", 0,2110,1000	DOWNLOAD	Send key file success
	OK	
AT+CFSTERM	OK	Free data buffer
AT+SMCONF="URL",117.131.85 .139,6001	OK	Set up server URL
AT+SMCONF="KEEPTIME",60	OK	Set MQTT time to connect server
AT+CSSLCFG="CONVERT",2,"ca. crt"	OK	rootCA.pem is CA certificate
AT+CSSLCFG="CONVERT",1,"my client.crt","myclient.key"	OK	cert.pem is certificate, key.pem is key of cert.pem
AT+SMSSL=1,"ca.crt","myclient. crt"	OK	Set CA certificate and cert certificate name
AT+SMCONN	OK	
AT+SMSUB="information",1	OK	Subscription packet
AT+SMPUB="information",5,1,1 >hello	OK	Send packet, 5 is packet length.
	+SMSUB: "information","hello"	Get data on server
AT+SMUNSUB="information"	OK	Unsubscription packet
AT+SMDISC	OK	Disconnect MQTT
AT+CNACT=0,0	OK	Disconnect wireless
	+APP PDP: 0,DEACTIVE	

5.3 Connecting Ali Cloud Function

5.3.1 MQTT Connecting Ali Cloud Function

AT Command	Response	Description
AT+CNACT=0,1	OK	Open wireless connection parameter 0 is PDP Index, parameter 1 means active.
	+APP PDP: 0,ACTIVE	

AT+CNACT?	+CNACT: 0,1,"10.94.36.44"	Get local IP
	+CNACT: 1,0,"0.0.0.0"	
	+CNACT: 2,0,"0.0.0.0"	
	+CNACT: 3,0,"0.0.0.0"	
	OK	
AT+SMCONF="URL","a1kUAJknr0y.iot-as-mqtt.cn-shanghai.aliyuncs.com",1883	OK	The format of domain name is : productKey.iot-as-mqtt.cn-shanghai.aliyuncs.com Note: a1kUAJknr0y is product_key
AT+SMCONF="USERNAME","7000C&a1kUAJknr0y"	OK	The format of username is: deviceName&productKey Note: a1kUAJknr0y is product_key 7080 is device Name
AT+SMCONF="PASSWORD","56bf1f37de9ce2591f5699eea1117a43dae9bd11"	OK	The password is generated by SHA1 algorithm
AT+SMCONF="CLIENTID","a1kUAJknr0y.7080|securemode=3,timestamp=2524608000000,signmethod=hmacsha1,gw=0|"	OK	The format of client id is: productKey.deviceName|securemode=3, signmethod=hmacsha1,gw=0| Note: a1kUAJknr0y is product_key 7080 is deviceName
AT+SMCONN	OK	Connect ok

5.3.2 MQTTS Connecting Ali Cloud Function

AT Command	Response	Description
AT+CNACT=0,1	OK	Open wireless connection parameter 0 is PDP Index, parameter 1 means active.
	+APP PDP: 0,ACTIVE	
AT+CNACT?	+CNACT: 0,1,"10.94.36.44"	Get local IP
	+CNACT: 1,0,"0.0.0.0"	
	+CNACT: 2,0,"0.0.0.0"	
	+CNACT: 3,0,"0.0.0.0"	
	OK	
AT+CSSLCFG="CONVERT",2,"aliiot_ca.pem"	OK	Convert aliiot_ca.pem Note: Import certificates, please refer to CFSWFILE command

AT+CSSLCFG="CONVERT",1,"sim com.cert.pem","simcom.private .key"	OK	Convert cert file
AT+SMCONF="URL","a1kUAJknr 0y.iot-as-mqtt.cn-shanghai.aliyu ncs.com",1883	OK	The format of domain name is : productKey.iot-as-mqtt.cn-shanghai.aliy uncs.com Note: a1kUAJknr0y is product_key
AT+SMCONF="USERNAME","70 80&a1kUAJknr0y"	OK	The format of username is: deviceName&productKey Note: a1kUAJknr0y is product_key 7080 is deviceName
AT+SMCONF="PASSWORD","56 bf1f37de9ce2591f5699eea1117 a43dae9bd11"	OK	The password is generated by SHA1 algorithm
AT+SMCONF="CLIENTID","a1kU AJknr0y.7080|securemode=3,ti mestamp=2524608000000,sign method=hmacsha1,gw=0|"	OK	The format of client id is: productKey.deviceName|securemode=3, signmethod=hmacsha1,gw=0| a1kUAJknr0y is product_key 7080 is deviceName
AT+SMSSL=2,"aliiot_ca.pem","si mcom.cert.pem"	OK	Configure SSL connect index
AT+SMCONN	OK	Connect ok

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