SIM7000 Series_MQTT_Application Note

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About Document

Document Information

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Revision	Date	Owner	Status / Comments
1.00	Sept 28, 2018	Xiaobao.qu	First Release
1.01	Jan 23,2019	Xiaobao.qu	Added Connecting Ali Cloud Function

Related Documents

[1] SIM7000 Series AT Command Manual V1.04

This document applies to the following products:

Name	Type	Size (mm)	Comments
SIM7000E/C/A/G	Cat-M1(/NB1/ GSM)	24*24	N/A
SIM7000E-N	NB1	24*24	N/A
SIM7000C-N			

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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 AT Commands for MQTT

2.1 Overview

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

2.2   Detailed Descriptions of Commands

2.2.1 AT+SMCONF   Set MQTTParameter

AT+SMCONF Set MQTT Parameter	
Test Command **AT+SMCONF=?**	Response **+SMCONF: "MQTTParamTag","MQTTParamValue range"** **OK**

Read Command **AT+SMCONF?**	Response **+SMCONF: <MQTTParamTag>,<MQTTParamValue>** **OK**
Write Command **AT+SMCONF=<MQTTP aramTag>,<MQTTPara mValue>**	Response **OK** or **ERROR**

	Parameters
	<MQTTParamTag>
	 "CLIENTID" Client connection id
	 "URL" (indispensable parameter) server URL address
	  "server domain",["tcpPort"]
	  "server": Host or IP
	  "tcpPort": Port default is 1883
	 "KEEPTIME" Hold connect time. default is 60s
	 "CLEANSS" Session clean in. Default is 0.
	  Range of values:(0-1).
	 "USERNAME" User name. default null
	 "PASSWORD" Password. default null
	 "QOS" Send packet QOS level. range of values（0~2）
	 "TOPIC" Publish topic name
	 "MESSAGE" Publish message details
	 "RETAIN" Retain identification. Default is 0.
	  Range of values:(0-1)
	<MQTTParamValue> MQTT Parameter value. Type and supported content depend on related **<MQTTParamTag>**.

Example	AT+SMCONF="CLIENTID","id" OK AT+SMCONF="KEEPTIME",60 OK AT+SMCONF="URL","test.mosquitto.org","1883" OK AT+SMCONF="CLEANSS",1 OK AT+SMCONF="QOS",1 OK AT+SMCONF="TOPIC","will topic" OK AT+SMCONF="MESSAGE","will message" OK AT+SMCONF="RETAIN",1 OK

2.2.2 AT+CSSLCFG   SSL Configure

AT+CSSLCFG SSL Configure	
Write command **AT+CSSLCFG="convert", <ssltype>,<cname>,[<ke yname>[,<passkey>]]**	Response **OK** If failed: **+CME ERROR: <err>**

	Parameters
	<ssltype>
	    1 QAPI_NET_SSL_CERTIFICATE_E
	    2 QAPI_NET_SSL_CA_LIST_E
	    3 QAPI_NET_SSL_PSK_TABLE_E
	<cname> String type(string should be included in quotation marks): name of cert file
	<keyname> String type(string should be included in quotation marks):name of key file
	<passkey> String type (string should be included in quotation marks):value of passkey

Parameter Saving Mode	-
Max Response Time	-
Reference	-

2.2.3 AT+SMSSL   Select SSL Configure

AT+SMSSL Select SSL Configure	
Read Command **AT+SMSSL?**	Response **+SMSSL: <index>,<ca list>,<cert name>** **OK**
Write Command **AT+SMSSL=<index>,<c a list>,<cert name>**	Response **OK** or **ERROR**
	Parameters **<index>** SSL status, range: 0-6 **<ca list>** CA_LIST file name, length 20 byte **<cert name>** CERT_NAME file name, length 20 byte
Example	AT+SMSSL=1,calist,certname OK

2.2.4 AT+SMCONN   MQTT Connection

AT+SMCONN MQTT Connection	
Execution Command **AT+SMCONN**	Response **OK** or **ERROR**
Example	AT+SMCONN OK

2.2.5 AT+SMPUB   Send Packet

AT+SMPUB Send Packet	
Test Command **AT+SMPUB=?**	Response **+SMPUB: <topic>,<content length>,(0-2),(0-1)** **OK**
Write Command **AT+SMPUB=<topic>,<content length>,<qos>,<retain>**	Response **OK** or **ERROR**
	Parameters **<topic>** Subscribe packet **<qos>** Send packet QOS level, range: 0~2 **<content length>** Message length, range: 0~512 **<retain>** Server hold message range: 0~1
Example	AT+SMPUB="001",10,1, 1 OK

2.2.6 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 **ERROR**

	Parameters
	\<topic\> Subscribe packet
	\<qos\> Send packet qos level, range: 0~2
Example	AT+SMSUB="001",1
	OK

2.2.7 AT+SMUNSUB   Unsubscribe Packet

AT+SMUNSUB Unsubscribe Packet	
Read Command **AT+SMUNSUB=?**	Response **+SMUNSUB: "topic"** **OK**
Write Command **AT+SMUNSUB=\<topic\>**	Response **OK** or **ERROR**
	Parameters **\<topic\>** Subscribe subject
Example	AT+SMUNSUB="001" OK

2.2.8 AT+SMSTATE   Inquire MQTT Connection Status

AT+SMSTATE Inquire MQTT Connection Status	
Read Command **AT+SMSTATE?**	Response **+SMSTATE: \<status\>** **OK**
	Parameters **\<status\>** 　　　0　Expression MQTT disconnect state 　　　1　Expression MQTT on-line state
Example	AT+SMSTATE? +SMSTATE: 1 OK

2.2.9 AT+SMPUBHEX   Set SMPUB Data Format to Hex

AT+SMPUBHEX Set SMPUB Data Format to Hex	
Test Command **AT+SMPUBHEX=?**	Response **+SMPUBHEX: (0-1)** **OK**
Read Command **AT+ SMPUBHEX?**	Response **+SMPUBHEX: <status>** **OK**
	PARAMETERS **<status>** 　　　0　　SMPUB data format is normal 　　　1　　SMPUB data format is hex
Write Command **AT+SMPUBHEX=<status>**	Response **OK** or **ERROR**
	Parameters **<status>**　SMPUB format status, range: 0~1
Example	AT+SMPUBHEX=1 OK

2.2.10 AT+SMDISC   Disconnect MQTT

AT+SMDISC Disconnect MQTT	
Execution Command **AT+SMDISC**	Response **OK** or **ERROR**
Example	AT+SMDISC OK

3 Bearer Configuration

Usually module will register PS service automatically.

3.1 PDN Auto-activation

AT Command	Response	Description
AT+CPIN?	+CPIN: READY OK	Check SIM card status
AT+CSQ	+CSQ: 20,0 OK	Check RF signal
AT+CGREG?	+CGREG: 0,1 OK	Check PS service
AT+COPS?	+COPS: 0,0,"460 01",9 OK	Query Network information, operator and network mode 9, NB-IOT network
AT+CGNAPN	+CGNAPN: 1,"ctnb" OK	Query CAT-M or NB-IOT network after the successful registration of APN

3.2 MQTT Function

AT Command	Response	Description
AT+CNACT=1,"cmnet"	OK +APP PDP: ACTIVE	Open wireless connection parameter CMNET is APN, this parameter needs to set different APN values according to different cards
AT+CNACT?	+CNACT: 1,"10.181.182.177" OK	Get local IP
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="update",1	OK	Subscription packet
AT+SMPUB="update","5",1,1 >hello	OK +SMSUB: "update","hello"	Send packet Get data on server
AT+SMUNSUB="update"	OK	Unsubscription packet
AT+SMDISC	OK	Disconnect MQTT
AT+CNACT=0	OK +APP PDP: DEACTIVE	Disconnect wireless

3.3 MQTTS Function

AT Command	Response	Description
AT+CNACT=1,"cmnet"	OK	Open wireless connection parameter CMNET is APN, this parameter needs to set different APN values according to different cards
	+APP PDP: ACTIVE	
AT+CNACT?	+CNACT: 1,"10.181.182.177"	Get local IP
	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+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,myclient .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="update",1	OK	Subscription packet
AT+SMPUB="update","5",1,1	OK	Send packet
>hello	+SMSUB: "update","hello"	Get data on server
AT+SMUNSUB="update"	OK	Unsubscription packet
AT+SMDISC	OK	Disconnect MQTT
AT+CNACT=0	OK	Disconnect wireless
	+APP PDP: DEACTIVE	

3.4　Connecting Ali Cloud Function

3.4.1　MQTT Connecting Ali Cloud Function

AT Command	Response	Description
AT+CNACT=1,"cmnet"	OK +APP PDP: ACTIVE	Open wireless connection parameter CMNET is APN, this parameter needs to set different APN values according to different cards
AT+CNACT?	+CNACT: 1,"10.181.182.177" OK	Get local IP
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 7000C is device Name
AT+SMCONF=password,56bf1f37de9ce2591f5699eea1117a43dae9bd11	OK	The password is generated by SHA1 algorithm
AT+SMCONF=clientid,"a1kUAJknr0y.7000C|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 7000C is deviceName
AT+SMCONN	OK	Connect ok

3.4.2　MQTTS Connecting Ali Cloud Function

AT Command	Response	Description
AT+CNACT=1,"cmnet"	OK +APP PDP: ACTIVE	Open wireless connection parameter CMNET is APN, this parameter needs to set different APN values according to different cards

Command	Response	Description
AT+CNACT?	+CNACT: 1,"10.181.182.177" OK	Get local IP
AT+CSSLCFG=convert,2,aliiot_ca.pem	OK	Convert aliiot_ca.pem Note: Import certificates, please refer to CFSWFILE command
AT+CSSLCFG=convert,1,simcom.cert.pem,simcom.private.key	OK	Convert cert file
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 7000C is deviceName
AT+SMCONF=password,56bf1f37de9ce2591f5699eea1117a43dae9bd11	OK	The password is generated by SHA1 algorithm
AT+SMCONF=clientid,"a1kUAJknr0y.7000C|securemode=3,timestamp=2524608000000,signmethod=hmacsha1,gw=0|"	OK	The format of client id is: productKey.deviceName|securemode=3,signmethod=hmacsha1,gw=0| a1kUAJknr0y is product_key 7000C is deviceName
AT+SMSSL=2,aliiot_ca.pem,simcom.cert.pem	OK	Configure SSL connect index
AT+SMCONN	OK	Connect ok

Contact

SIMCom Wireless Solutions Co.,Ltd

Address: Building B, No.633 Jinzhong Road, Changning District, Shanghai P.R.China 200335

Zip Code: 200335

Tel: +86-21-31575126

Support: support@simcom.com