



# A7600 Series\_ MQTT(S)\_Application Note

LTE Module

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# About Document

## Version History

Revision	Date	Chapter	Description
V1.00	2020-06-19	All	New version

## Scope

This document applies to the following products

Name	Type	Size(mm)	Comments
A7600XX-XXXX	LTE	30.0*30.0*2.5	N/A
A7620	CAT1/LTE	24.0*24.0*2.5	N/A
A7670X	CAT1/LTE	24.0*24.0*2.5	N/A
A5360E	CAT4/WCDMA	30.0*30.0*2.5	N/A

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# 1 Introduction

## 1.1 Purpose of the document

Based on module AT command manual, this document will introduce MQTTS application process.

Developers could understand and develop application quickly and efficiently based on this document.

## 1.2 Related documents

[1] A7600 Series\_AT Command Manual

## 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;

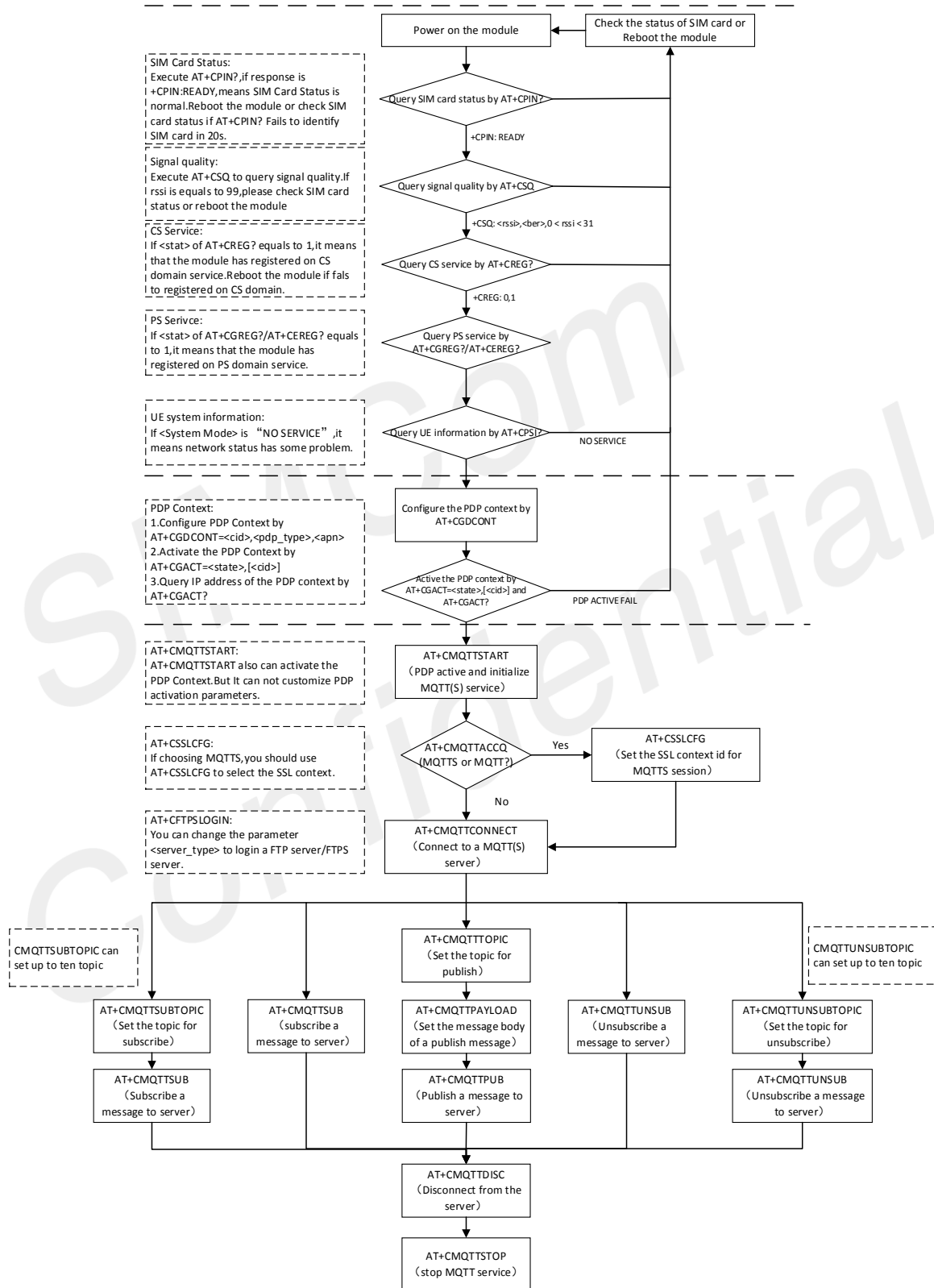
Other Conventions:

MQTT(Message Queuing Telemetry Transport);

SSL(Secure Sockets Layer);

PDP(Packet Data Protocol);

## 1.4 The process of Using MQTT(S) AT Command



## 1.5 Error Handling

For more details, please refer to A7600 Series\_AT Command Manual.

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## 2 AT Commands for MQTT(S)

### 2.1 Overview of AT Commands for MQTT(S)

Command	Description
<b>AT+CMQTTSTART</b>	Start MQTT service
<b>AT+CMQTTSTOP</b>	Stop MQTT service
<b>AT+CMQTTACCQ</b>	Acquire a client
<b>AT+CMQTTREL</b>	Release a client
<b>AT+CMQTTSSLCFG</b>	Set the SSL context (only for SSL/TLS MQTT)
<b>AT+CMQTTWILLTOPIC</b>	Input the topic of will message
<b>AT+CMQTTWILLMSG</b>	Input the will message
<b>AT+CMQTTCONNECT</b>	Connect to MQTT server
<b>AT+CMQTTDISC</b>	Disconnect from server
<b>AT+CMQTTTOPIC</b>	Input the topic of publish message
<b>AT+CMQTTPAYLOAD</b>	Input the publish message
<b>AT+CMQTTPUB</b>	Publish a message to server
<b>AT+CMQTTSUBTOPIC</b>	Input the topic of subscribe message
<b>AT+CMQTTSUB</b>	Subscribe a message to server
<b>AT+CMQTTUNSUBTOPIC</b>	Input the topic of unsubscribe message
<b>AT+CMQTTUNSUB</b>	Unsubscribe a message to server
<b>AT+CMQTTCFG</b>	Configure the MQTT Context

For detail information, please refer to "A7600 Series\_AT Command Manual".



## 3 MQTT Examples

Before all FTP(S) related operations, we should ensure the following:  
Ensure network is available:

**AT+CSQ**

+CSQ: 23,0

OK

**AT+CREG?**

+CREG: 0,1

OK

**AT+CGREG?**

+CGREG: 0,1

OK

**AT+CPSI?**

+CPSI:

LTE,Online,460-00,0x333C,39589680,308,EUT

RAN-BAND3,1350,5,0,0,54,0,22

OK

//In WCDMA/GSW,you need to continue to  
execute the following instructions

**AT+CGDCONT=cid,"ip","APN"**

OK

**AT+CGACT=1,cid**

OK

**AT+CGACT?**

+CGACT: 1,1

OK

### 3.1 Access to MQTT server not SSL/TLS

Following commands shows how to communicate with a MQTT server.

```
// start MQTT service, activate PDP context
AT+CMQTTSTART
OK

+CMQTTSTART: 0
// Acquire one client which will connect to a MQTT server not SSL/TLS
AT+CMQTTACCQ=0,"client test0"
OK
// Set the will topic for the CONNECT message
AT+CMQTTWILLTOPIC=0,10
>

OK
// Set the will message for the CONNECT message
AT+CMQTTWILLMSG=0,6,1
>

OK
// Connect to a MQTT server
AT+CMQTTCONNECT=0,"tcp://test.mosquitto.org:1883",60,1
OK

+CMQTTCONNECT: 0,0
// Subscribe one topic from the server
AT+CMQTTSUB=0,9,1
>

OK

+CMQTTSUB: 0,0
// Set the topic for the PUBLISH message
AT+CMQTTTOPIC=0,9
>

OK
// Set the payload for the PUBLISH message
AT+CMQTTPAYLOAD=0,60
>

OK
// Publish a message
AT+CMQTTTPUB=0,1,60
OK
```

**+CMQTTPUB: 0,0**

//receive publish message from server

**+CMQTTRXSTART: 0,9,60**

**+CMQTTRXTOPIC: 0,9**

simcommsg

**+CMQTTRXPAYLOAD: 0,60**

012345678901234567890123456789012345678

901234567890123456789

**+CMQTTRXEND: 0**

// Set one topic for the SUBSCRIBE message

**AT+CMQTTSUBTOPIC=0,9,1**

>

OK

// Subscribe a message

**AT+CMQTTSUB=0**

OK

**+CMQTTSUB: 0,0**

// Unsubscribe one topic from the server

**AT+CMQTTUNSUB=0,9,0**

>

OK

**+CMQTTUNSUB: 0,0**

// Disconnect from server

**AT+CMQTTDISC=0,120**

OK

**+CMQTTDISC: 0,0**

//Release the client

**AT+CMQTTREL=0**

OK

//stop MQTT Service

**AT+CMQTTSTOP**

OK

**+CMQTTSTOP: 0**

## 3.2 Connect to SSL/TLS MQTT server (not verify server)

Following commands shows how to access to a MQTT server without verifying the server. It needs to configure the authentication mode to 0, and then it will connect to the server successfully.

```
// start MQTT service, activate PDP context
AT+CMQTTSTART
OK

+CMQTTSTART: 0
// Acquire one client which will connect to a SSL/TLS MQTT server
AT+CMQTTACCQ=0,"client test0",1
OK
// Set the will topic for the CONNECT message
AT+CMQTTWILLTOPIC=0,10
>

OK
// Set the will message for the CONNECT message
AT+CMQTTWILLMSG=0,6,1
>

OK
// Connect to a MQTT server
AT+CMQTTCONNECT=0,"tcp://test.mosquitto.org:8883",60,1
OK

+CMQTTCONNECT: 0,0
// Set the topic for the PUBLISH message
AT+CMQTTTOPIC=0,13
>

OK
// Set the payload for the PUBLISH message
AT+CMQTTPAYLOAD=0,60
>

OK
// Publish a message
AT+CMQTTPUB=0,1,60
OK

+CMQTTPUB: 0,0
```

```
// Set one topic for the SUBSCRIBE message
```

```
AT+CMQTTSUBTOPIC=0,9,1
```

```
>
```

```
OK
```

```
// Subscribe a message
```

```
AT+CMQTTSUB=0
```

```
OK
```

```
+CMQTTSUB: 0,0
```

```
// Subscribe one topic from the server
```

```
AT+CMQTTSUB=0,9,1
```

```
>
```

```
OK
```

```
+CMQTTSUB: 0,0
```

```
// Unsubscribe one topic from the server
```

```
AT+CMQTTUNSUB=0,9,0
```

```
>
```

```
OK
```

```
+CMQTTUNSUB: 0,0
```

```
// Disconnect from server
```

```
AT+CMQTTDISC=0,120
```

```
OK
```

```
+CMQTTDISC: 0,0
```

```
//Release the client
```

```
AT+CMQTTREL=0
```

```
OK
```

```
//stop MQTT Service
```

```
AT+CMQTTSTOP
```

```
OK
```

```
+CMQTTSTOP: 0
```

### 3.3 Access to SSL/TLS MQTT server (only verify the server)

Following commands shows how to access to a SSL/TLS MQTT server with verifying the server. It needs to configure the authentication mode to 1 and the right server root CA, and then it will connect to the server

successfully.

```
// Set the SSL version of the first SSL context
AT+CSSLCFG="sslversion",0,4
OK
// Set the authentication mode(verify server) of the first SSL context
AT+CSSLCFG="authmode",0,1
OK
// Set the server root CA of the first SSL context
AT+CSSLCFG="cacert",0,"server_ca.pem"
OK
// start MQTT service, activate PDP context
AT+CMQTTSTART
OK

+CMQTTSTART: 0
// Acquire one client which will connect to a SSL/TLS MQTT server
AT+CMQTTACCQ=0,"client test0",1
OK
// Set the first SSL context to be used in the SSL connection
AT+CMQTTSSLCFG=0,0
OK
// Set the will topic for the CONNECT message
AT+CMQTTWILLTOPIC=0,10
>

OK
// Set the will message for the CONNECT message
AT+CMQTTWILLMSG=0,6,1
>

OK
// Connect to a MQTT server, input the right server and port
AT+CMQTTCONNECT=0,"tcp://mqttp_server:port",60,1
OK

+CMQTTCONNECT: 0,0
// Set the topic for the PUBLISH message
AT+CMQTTTOPIC=0,13
>

OK
// Set the payload for the PUBLISH message
AT+CMQTTPAYLOAD=0,60
```

```
>

OK
// Publish a message
AT+CMQTTPUB=0,1,60
OK

+CMQTTPUB: 0,0
// Set one topic for the SUBSCRIBE message
AT+CMQTTSUBTOPIC=0,9,1
>

OK
// Subscribe a message
AT+CMQTTSUB=0
OK

+CMQTTSUB: 0,0
// Subscribe one topic from the server
AT+CMQTTSUB=0,9,1
>

OK

+CMQTTSUB: 0,0
// Unsubscribe one topic from the server
AT+CMQTTUNSUB=0,9,0
>

OK

+CMQTTUNSUB: 0,0
// Disconnect from server
AT+CMQTTDISC=0,120
OK

+CMQTTDISC: 0,0
//Release the client
AT+CMQTTREL=0
OK
//stop MQTT Service
AT+CMQTTSTOP
OK

+CMQTTSTOP: 0
```

### 3.4 Access to SSL/TLS MQTT server (verify server and client)

Following commands shows how to access to a SSL/TLS MQTT server with verifying the server and client. It needs to configure the authentication mode to 2, the right server root CA, the right client certificate and key, and then it will connect to the server successfully.

```
// Set the SSL version of the first SSL context
AT+CSSLCFG="sslversion",0,4
OK
// Set the authentication mode(verify server and client) of the first SSL context
AT+CSSLCFG="authmode",0,2
OK
// Set the server root CA of the first SSL context
AT+CSSLCFG="cacert",0,"ca_cert.pem"
OK
// Set the client certificate of the first SSL context
AT+CSSLCFG="clientcert",0,"cert.pem"
OK
// Set the client key of the first SSL context
AT+CSSLCFG="clientkey",0,"key_cert.pem"
OK
// start MQTT service, activate PDP context
AT+CMQTTSTART
OK

+CMQTTSTART: 0
// Acquire one client which will connect to a SSL/TLS MQTT server
AT+CMQTTACCQ=0,"client test0",1
OK
// Set the first SSL context to be used in the SSL connection
AT+CMQTTSSLCFG=0,0
OK
// Set the will topic for the CONNECT message
AT+CMQTTWILLTOPIC=0,10
>

OK
// Set the will message for the CONNECT message
AT+CMQTTWILLMSG=0,6,1
>

OK
```



```
// Connect to a MQTT server
AT+CMQTTCONNECT=0,"tcp://hooleeping.com:8883",60,1
OK

+CMQTTCONNECT: 0,0
// Set the topic for the PUBLISH message
AT+CMQTTTOPIC=0,13
>

OK
// Set the payload for the PUBLISH message
AT+CMQTTPAYLOAD=0,60
>

OK
// Publish a message
AT+CMQTT PUB=0,1,60
OK

+CMQTT PUB: 0,0
// Set one topic for the SUBSCRIBE message
AT+CMQTT SUBTOPIC=0,9,1
>

OK
// Subscribe a message
AT+CMQTT SUB=0
OK

+CMQTT SUB: 0,0
// Subscribe one topic from the server
AT+CMQTT SUB=0,9,1
>

OK

+CMQTT SUB: 0,0
// Unsubscribe one topic from the server
AT+CMQTT UNSUB=0,9,0
>

OK

+CMQTT UNSUB: 0,0
// Disconnect from server
```

```
AT+CMQTTDISC=0,120
```

```
OK
```

```
+CMQTTDISC: 0,0
```

```
//Release the client
```

```
AT+CMQTTREL=0
```

```
OK
```

```
//stop MQTT Service
```

```
AT+CMQTTSTOP
```

```
OK
```

```
+CMQTTSTOP: 0
```

### 3.5 Access to MQTT server without checking UTF8 coding

Following commands shows how to communicate with a MQTT server without checking UTF8 coding.

```
// start MQTT service, activate PDP context
```

```
AT+CMQTTSTART
```

```
OK
```

```
+CMQTTSTART: 0
```

```
// Acquire one client which will connect to a MQTT server not SSL/TLS
```

```
AT+CMQTTACCQ=0,"client test0"
```

```
OK
```

```
// Configure not checking UTF8 coding
```

```
AT+CMQTTCFG="checkUTF8",0,0
```

```
OK
```

```
// Connect to a MQTT server
```

```
AT+CMQTTCONNECT=0,"tcp://198.41.30.241:1  
883",60,1
```

```
OK
```

```
+CMQTTCONNECT: 0,0
```

```
// Subscribe one topic which is not UTF8 coding string.
```

```
//The data can input by hexadecimal format.
```

```
AT+CMQTTSUB=0,9,1
```

```
>
```

```
OK
```

**+CMQTTSUB: 0,0**

// Set the topic for the PUBLISH message

**AT+CMQTTTOPIC=0,9**

>

OK

// Publish a message

**AT+CMQTTPUB=0,1,60**

OK

**+CMQTTPUB: 0,0**

//receive publish message from server

**+CMQTTRXSTART: 0,9,0**

**+CMQTTRXTOPIC: 0,9**

盼盼盼盼?

**+CMQTTRXEND: 0**

// Disconnect from server

**AT+CMQTTDISC=0,120**

OK

**+CMQTTDISC: 0,0**

//Release the client

**AT+CMQTTREL=0**

OK

//stop MQTT Service

**AT+CMQTTSTOP**

OK

**+CMQTTSTOP: 0**

## 4 Appendix

### 4.1 Summary of Error Codes

Code of <err>	Meaning
0	operation succeeded
1	failed
2	bad UTF-8 string
3	sock connect fail
4	sock create fail
5	sock close fail
6	message receive fail
7	network open fail
8	network close fail
9	network not opened
10	client index error
11	no connection
12	invalid parameter
13	not supported operation
14	client is busy
15	require connection fail
16	sock sending fail
17	timeout
18	topic is empty
19	client is used
20	client not acquired
21	client not released
22	length out of range
23	network is opened
24	packet fail
25	DNS error
26	socket is closed by server
27	connection refused: unaccepted protocol version
28	connection refused: identifier rejected
29	connection refused: server unavailable

30	connection refused: bad user name or password
31	connection refused: not authorized
32	handshake fail
33	not set certificate
34	Open session failed
35	Disconnect from server failed

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