

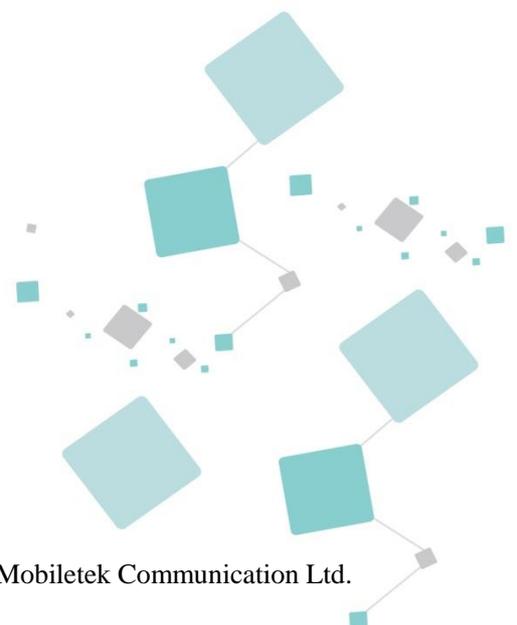
LYNO

L620 MQTT Application Note for AWS IoT Core

NB-IoT Module Series

Version: V1.0

Date: 2019-11-11



Shanghai Mobiletek Communication Ltd.

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Revision History

Date	Version	Description of change	Author
2019-11-11	V1.0	Initial.	George

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1 Introduction

1.1 Overview

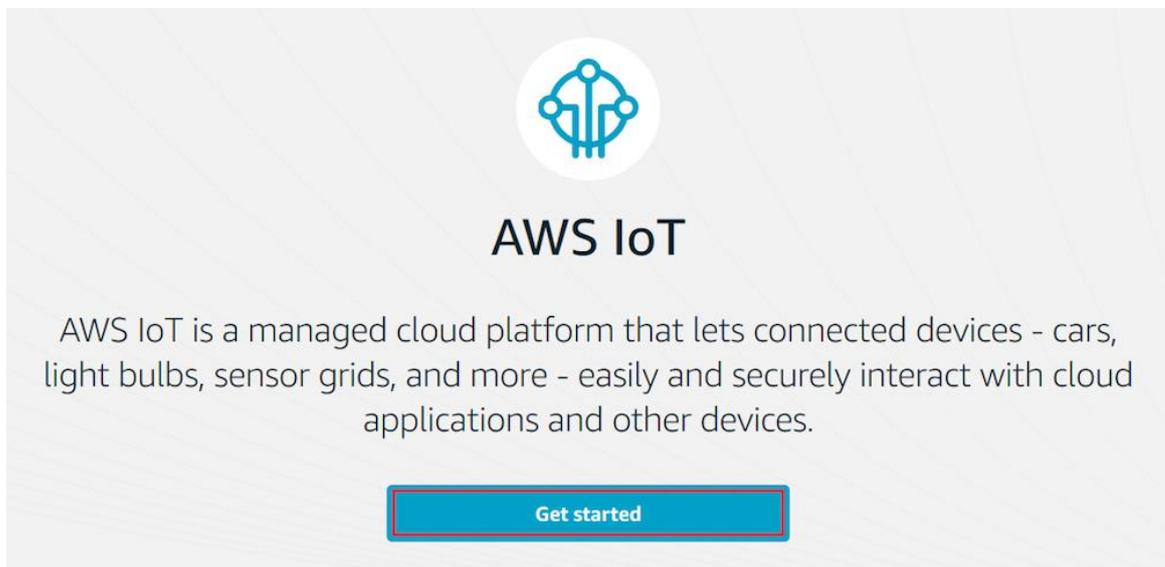
This document mainly introduces MQTT Application Note for AWS IoT Core of L620.

2 Sign in to the AWS IoT Console

If you do not have an AWS account, create one.

To create an AWS account:

1. Open the AWS home page and choose Create an AWS Account.
2. Follow the online instructions. Part of the sign-up procedure involves receiving a phone call and entering a PIN using your phone's keypad.
3. Sign in to the AWS Management Console and open the AWS IoT console.
4. On the Welcome page, choose Get started.



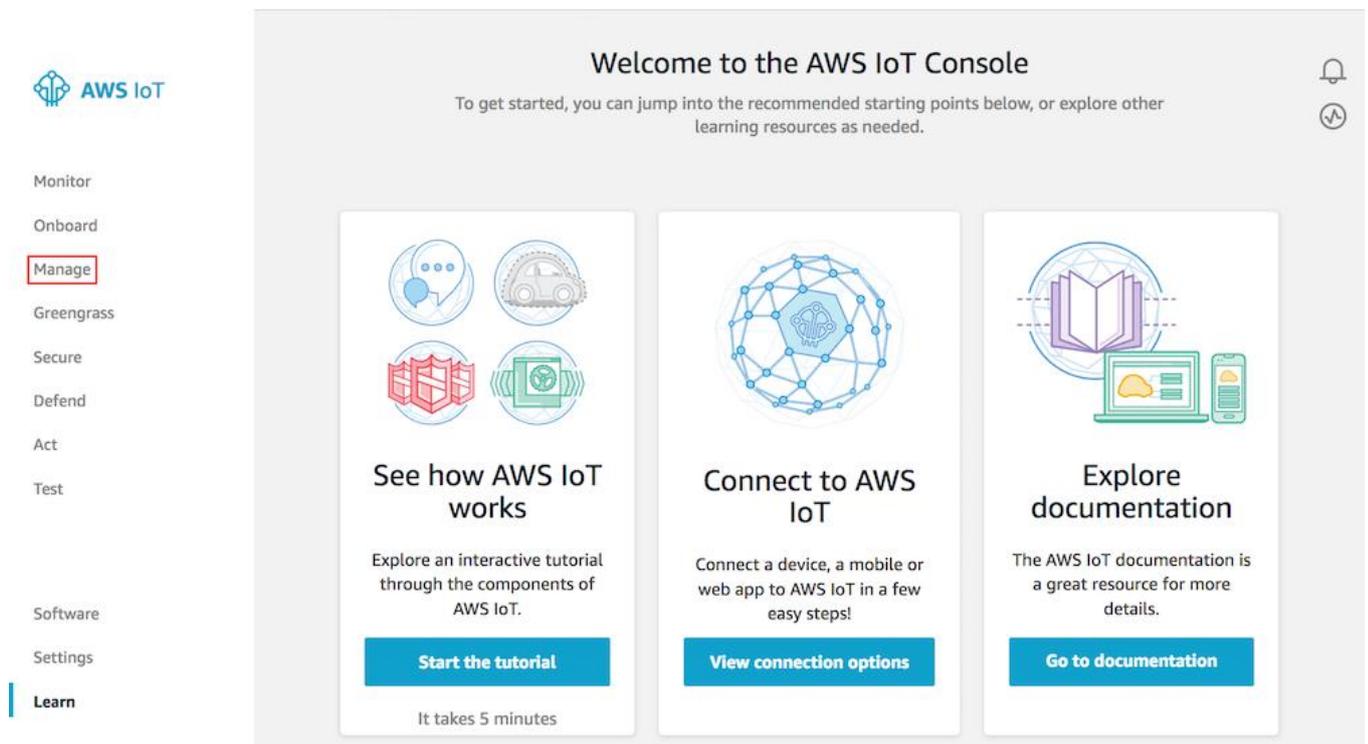
If this is your first time using the AWS IoT console, you see the Welcome to the AWS IoT Console page.

3 Register a Device in the Registry

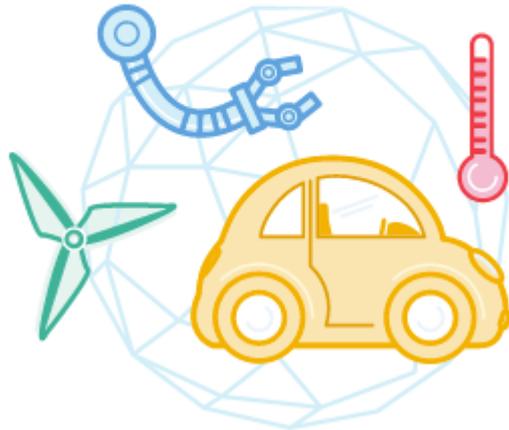
Devices connected to AWS IoT are represented by *IoT things* in the AWS IoT registry. The registry allows you to keep a record of all of the devices that are registered to your AWS IoT account.

To register your device in the registry

- On the Welcome to the AWS IoT Console page, in the navigation pane, choose Manage.



- On the You don't have any things yet page, choose Register a thing.



You don't have any things yet

A thing is the representation of a device in the cloud.

[Learn more](#)

[Register a thing](#)

- On the Creating AWS IoT things page, choose Create a single thing.

Creating AWS IoT things

An IoT thing is a representation and record of your physical device in the cloud. Any physical device needs a thing record in order to work with AWS IoT. [Learn more.](#)

Register a single AWS IoT thing

Create a thing in your registry

Create a single thing

Bulk register many AWS IoT things

Create things in your registry for a large number of devices already using AWS IoT, or register devices so they are ready to connect to AWS IoT.

Create many things

Cancel

Create a single thing

- On the Create a thing page, in the Name field, enter a name for your thing, such as MylotThing. Choose Next.

Note

We do not recommend using personally identifiable information in your thing name.

CREATE A THING

Add your device to the thing registry

STEP 1/3

This step creates an entry in the thing registry and a thing shadow for your device.

Name

Apply a type to this thing

Using a thing type simplifies device management by providing consistent registry data for things that share a type. Types provide things with a common set of attributes, which describe the identity and capabilities of your device, and a description.

Thing Type

Add this thing to a group

Adding your thing to a group allows you to manage devices remotely using jobs.

Thing Group

Set searchable thing attributes (optional)

Enter a value for one or more of these attributes so that you can search for your things in the registry.

Attribute key	Value	
<input type="text" value="Provide an attribute key, e.g. Manufacturer"/>	<input type="text" value="Provide an attribute value, e.g. Acme-Corporation"/>	<input type="button" value="Clear"/>
<input type="button" value="Add another"/>		

Show thing shadow ▾

- On the Add a certificate for your thing page, choose Create certificate. This generates an X.509 certificate and key pair.

CREATE A THING

Add a certificate for your thing

STEP
2/3

A certificate is used to authenticate your device's connection to AWS IoT.

One-click certificate creation (recommended)

This will generate a certificate, public key, and private key using AWS IoT's certificate authority.

[Create certificate](#)

Create with CSR

Upload your own certificate signing request (CSR) based on a private key you own.

[Create with CSR](#)

Use my certificate

Register your CA certificate and use your own certificates for one or many devices.

[Get started](#)

Skip certificate and create thing

You will need to add a certificate to your thing later before your device can connect to AWS IoT.

[Create thing without certificate](#)

- On the Certificate created! Page , download your public and private keys, certificate, and root certificate authority (CA):
 - a. Choose Download for your certificate.
 - b. Choose Download for your private key.
 - c. Choose Download for the Amazon root CA. A new webpage is displayed. Choose RSA 2048 bit key: Amazon Root CA 1. This opens another webpage with the text of the root CA certificate. Copy this text and paste it into a file named Amazon_Root_CA_1.pem.

Most web browsers save downloaded files into a Downloads directory. You copy these files to a different directory when you run the sample applications. Choose Activate to activate the X.509 certificate, and then choose Attach a policy.

Certificate created!

Download these files and save them in a safe place. Certificates can be retrieved at any time, but the private and public keys cannot be retrieved after you close this page.

In order to connect a device, you need to download the following:

A certificate for this thing	c3c4ff2375.cert.pem	Download
A public key	c3c4ff2375.public.key	Download
A private key	c3c4ff2375.private.key	Download

You also need to download a root CA for AWS IoT:

A root CA for AWS IoT [Download](#)

[Activate](#)

Cancel [Done](#) [Attach a policy](#)

- On the Add a policy for your thing page, choose Register Thing.

After you register your thing, create and attach a new policy to the certificate.

CREATE A THING STEP 3/3

Add a policy for your thing

Select a policy to attach to this certificate:

MylotPolicy [View](#)

0 policies selected [Register Thing](#)

- On the AWS IoT console, in the navigation pane, choose Secure, and then choose Policies.

Choose Create.



You don't have any policies yet

AWS IoT policies give things permission to access AWS IoT resources (like other things, MQTT topics, or thing shadows).

[Learn more](#)

[Create a policy](#)

- On the Create a policy page:
 - a. Enter a Name for the policy, such as MylotPolicy.
 - b. For Action, enter `iot:*`. For Resource ARN, enter `*`.
 - c. Under Effect, choose Allow, and then choose Create.

This policy allows your device to perform all AWS IoT actions on all AWS IoT resources.

Important

These settings are overly permissive. In a production environment narrow the scope of the permissions to that which are required by your device. For more information, see [Authorization](#).

Create a policy

Create a policy to define a set of authorized actions. You can authorize actions on one or more resources (things, topics, topic filters). To learn more about IoT policies go to the [AWS IoT Policies documentation page](#).

Name

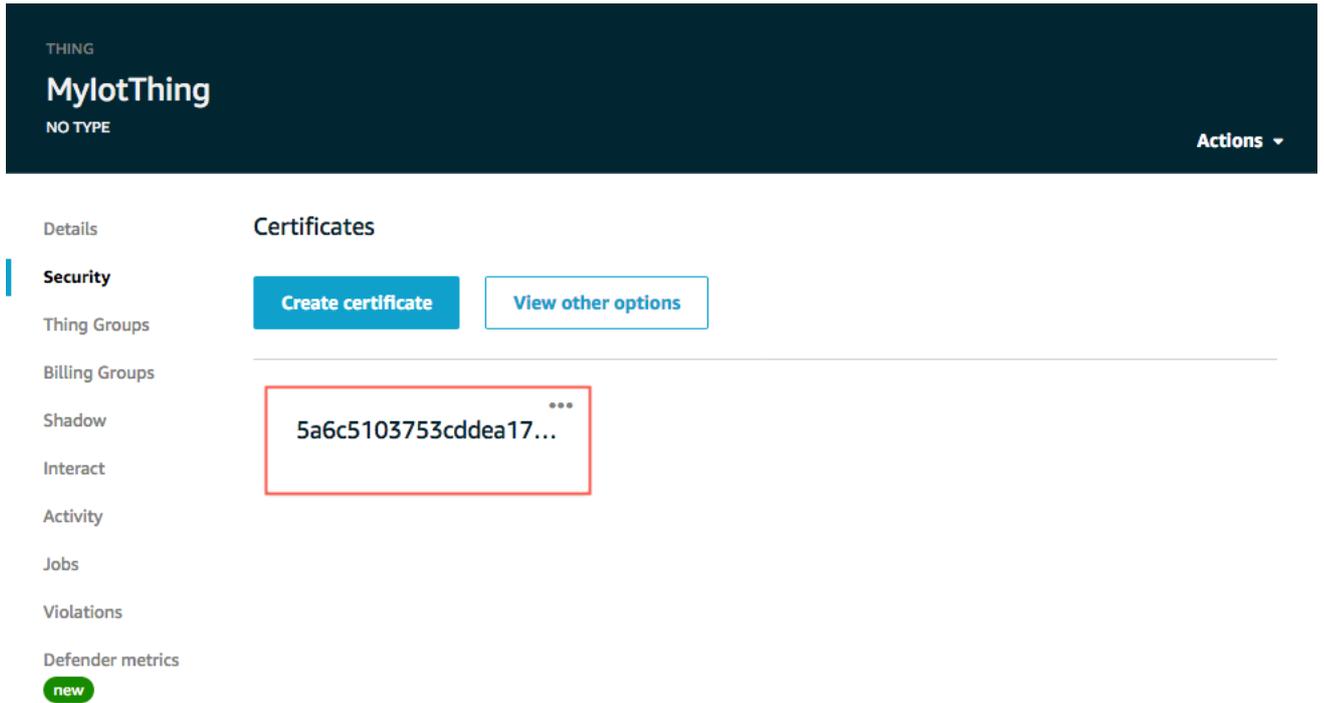
Add statements

Policy statements define the types of actions that can be performed by a resource.

Advanced mode

Action
<input type="text" value="iot:*"/>
Resource ARN
<input type="text" value="*"/>
Effect
<input checked="" type="checkbox"/> Allow <input type="checkbox"/> Deny
<input type="button" value="Remove"/>

- Choose Manage, and then choose your AWS IoT thing.



THING
MylotThing
NO TYPE Actions ▾

Details

Security

Thing Groups

Billing Groups

Shadow

Interact

Activity

Jobs

Violations

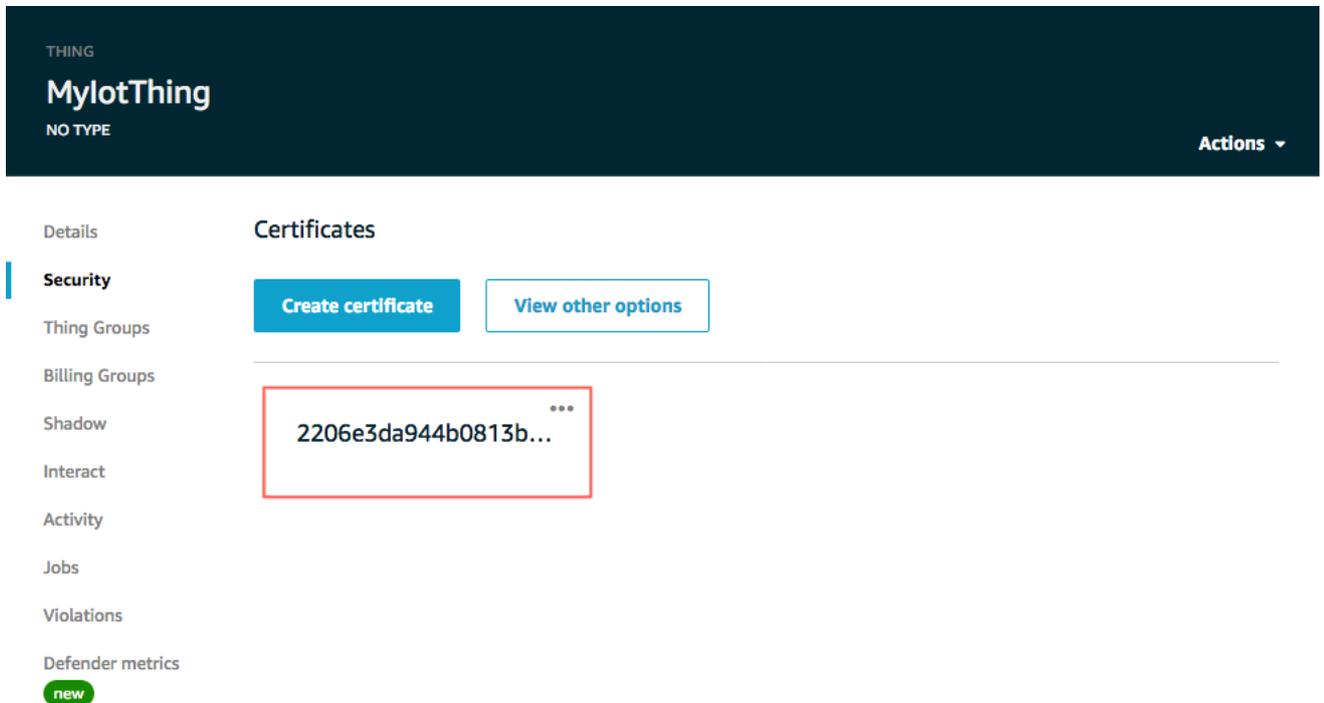
Defender metrics new

Certificates

Create certificate View other options

5a6c5103753cddea17...

- Choose Security.



THING
MylotThing
NO TYPE Actions ▾

Details

Security

Thing Groups

Billing Groups

Shadow

Interact

Activity

Jobs

Violations

Defender metrics new

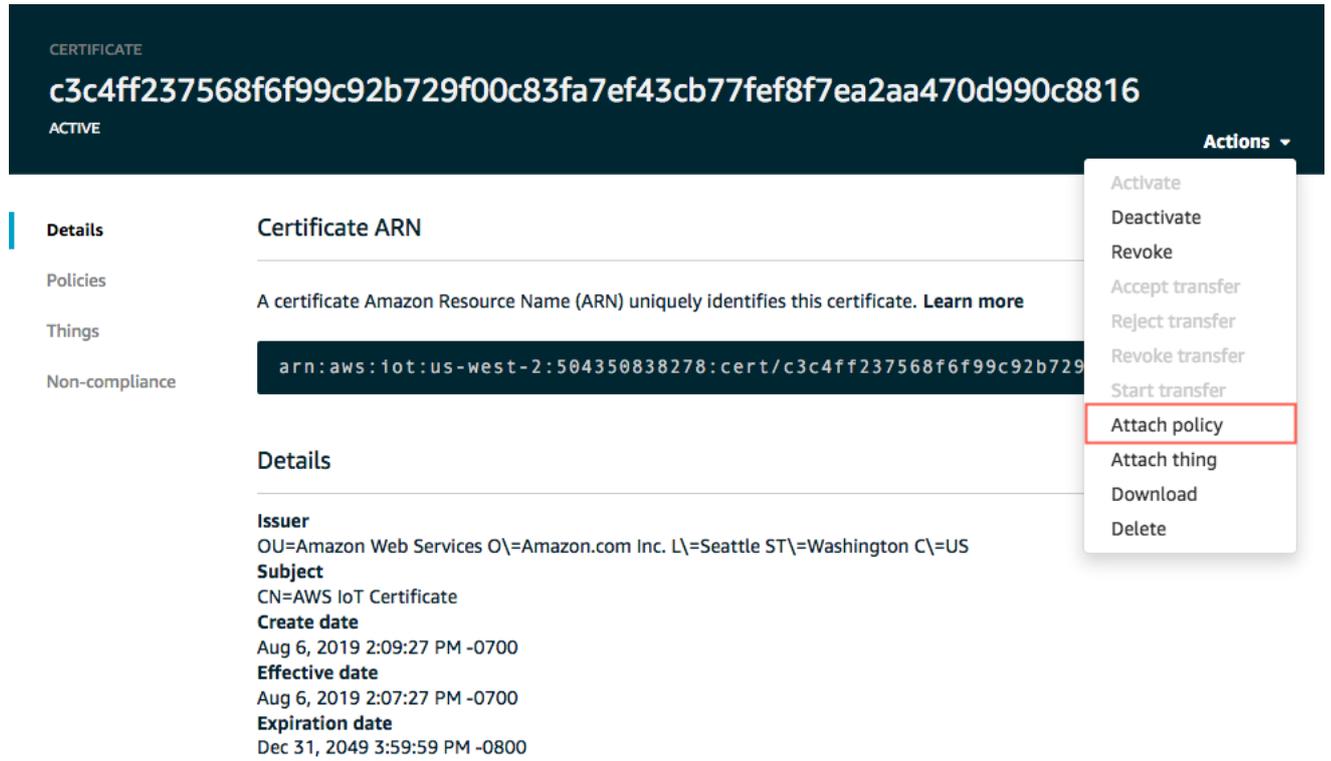
Certificates

Create certificate View other options

2206e3da944b0813b...

- Choose your certificate.

- In the certificate detail page, choose Actions, and then choose Attach policy.



CERTIFICATE
c3c4ff237568f6f99c92b729f00c83fa7ef43cb77fef8f7ea2aa470d990c8816
ACTIVE Actions ▾

Details Certificate ARN

Policies A certificate Amazon Resource Name (ARN) uniquely identifies this certificate. [Learn more](#)

Things `arn:aws:iot:us-west-2:504350838278:cert/c3c4ff237568f6f99c92b729`

Non-compliance

Details

Issuer
OU=Amazon Web Services O\=Amazon.com Inc. L\=Seattle ST\=Washington C\=US

Subject
CN=AWS IoT Certificate

Create date
Aug 6, 2019 2:09:27 PM -0700

Effective date
Aug 6, 2019 2:07:27 PM -0700

Expiration date
Dec 31, 2049 3:59:59 PM -0800

- Choose the policy you created (MylotPolicy), and then choose Attach.

Attach policies to certificate(s)

Policies will be attached to the following certificate(s):

c3c4ff237568f6f99c92b729f00c83fa7ef43cb77fef8f7ea2aa470d990c8816

Choose one or more policies

<input type="text" value="Search policies"/>	
<input checked="" type="checkbox"/> My_IoT_Policy	View

1 policy selected

Cancel

Attach

4 L620 module connect to AWS IOT

The L620 AT commands of certificate files only support hex code, customers need to changed to hex mode at first.

4.1 AT Command Introduce

L620 AT commands introduction have include in the AT Command file of < L620_AT Command User Guide_V2.19.pdf> and newer versions, like this commands:

11 MQTT

11.1 AT+EMQCERT –Install MQTT certification

11.1.1 Format

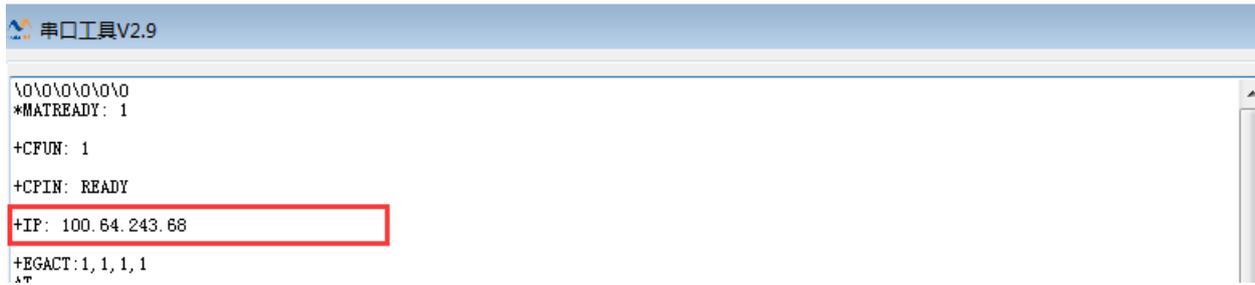
Command	Response
AT+EMQCERT=<type>,<flag>,<totalsize>,<current size>,<cert>	+EMQCONF: to be continued OK Or ERROR

11.1.2 Field

Parameters	Description
<type>	Integer, MQTT certification's type, 0 ca_cert, 1 client_cert, 2 client_key.
<flag >	Integer, MQTT certification's flag, 1 more command; 0 the end.
<totalsize >	Integer, MQTT certification's total size.
<currentsize >	Integer, MQTT certification's current size.
< cert >	String, MQTT certification, should be HEX string.

4.2 Connected to Server

At first, need check the Network status is OK, the L620 is self-activated PDP service . Customers can judge the network status by reporting whether the IP is reported.



1. If the IP address is reported, then the customers can install the certificate files by AT+EMQCERT.

ca_cer(The first parameter is 0):

```
*MATREADY: 1
+CFUN: 1
+CPIN: READY
+IP: 100.64.243.68
+EGACT:1,1,1,1
AT
+EMQCERT=0,1,2412,800,2d2d2d2d2d4424547494e2043455254494649434154452d2d2d2d2d0a4d4949445154434341696d674177494241674954426d79
667a356d2f6a416f3534764234696b506d6c6a5a62796a414e42676b71686b694739773042415173460d0a414441354d517377435159445651514745774a56
557a45504d41304741315545436884d4751573168656d39754d526b77467759445651514445784242625746360d0a62323467556d397664434244515341784d
423458445445314d4455794e6a41774d4441774d466f5844544d344d4445784e7a1774d4441774d466f774f54454c0d0a4d416b474131554542684d435656
4d78447a414e42674e5642416f54426b467459587076626a455a4d4263474131554541784d5151573168656d397549464a760d0a62335167513045674d5443
43415349774451594a4b6f5a496876634e4151454242514144676745504144434341516f4367674542414c4a346748484b654e586a0d0a6361394867464230
6657375931346832394a6c6f3931676859506c3068414576724149746874466751
+EMQCENF: to be continued

OK
AT
+EMQCERT=0,1,2412,800,33704f737154514e726f42766f3362534d6746467a5a4d0a394f36494938632b367a663174526e345357697733746535646a67
64595a366b2f6f49327065564b5675524634666e3974426236644e71636d7a55354c2f71770d0a4946414762487251674c4b6d2b612f7352786d5055446748
334b4b484f566a34757457702b55686e4d4a62756c48686562346db55634177686d6168525761360d0a564f756a77354835534e7a2f306567774c58307464
4841313134676b393537455757363763346358386a4a474b4c68442b726364717371303870386b4469314c0d0a39334663586db6e2f36705543797a694b726c
4134623976374c5749627863636564f63334476649443579484939592f5143422f494944456745772b4f79516d0d0a6b575375624a724971673043417745
4141614e434d45417744775944565230544151482f42415577417745422f7a414f42674e56485138424166364542414d430d0a41595977485159445652304f
42425945464951597a495530374c774d6c4a517543466d637837495154676f494d
+EMQCENF: to be continued

OK
AT
+EMQCERT=0,1,2412,800,413047435371475349623344514542437755410d0a4134494241514359386a6461515a436847735632555367674e694d4f727559
6f753672346c4b35497044422f472f776b6a557530794b475839726278656e44490d0a5535504d43436a6a6d43585049365435336948546649554a72553661
645472434332714a65485a455278686c624931426a6a742f6d73763074616451317755730d0a4e2b6744533633705961414362765879384d5779375675333
507155584865654536562f55713256387669544f39364c5846764b576c4a62594b3855393076760d0a6f2f7566514a56744d565438517450485268386a7264
6b50534843613258563463644679517a5231626c645a77874a634a6d41707a794d5a466f3649513658550d0a354d73492b794d52512b68444b584a696f616c
6458676a556b4b3634324d345577744256386f6232784a4e4464325a68774c6e6f5164655865474144626b70790d0a7271585266626f516e6f5a7347347135
5754503436385351767647350d0a2d2d2d2d2d454e442043455254494649434154
+EMQCENF: to be continued

OK
AT+EMQCERT=0,0,2412,12,452d2d2d2d2d
OK
--
```

client_cert (The first parameter is 1):


```

***
AT+EMQCERT=1,0,2448,48,2d2d2d454e442043455254494649434154452d2d2d2d0a
OK
AT
+EMQCERT=2,1,3350,800,2d2d2d2d2d4424547494e205253412050524956415445204b45592d2d2d2d0a4d4949456f77494241414b434151454179313557
592f5a73792b36784167516850336c366d66342b4e39524b484c6f68515a4a467047596a4f30435a597073410a4b4a74696c486a6f306d6851524a71625572
517869666a4b552f734f514651376b3842333458637341697a7548364a596b644249474c756485533164305a4a40a43386c7735507145792f30535855304b
426530812f4c724e6f523043466c4d33446a612f717336596d482b635a7754574b4b4f46b89794c6a634d2b77557089730a77722b6a536b7a6f1694882594a
5d7a5475596c4252534c304a70746c71488f68344b384a597859474f67676f57434861354e4dbb6537486e895974574345360a7a382b5570567a7964894b6e
77744f784d39782f3071655548384b46792f656435344f4f4c3065644958777365425a706d494c686ef476e426c454b4b776466310a47453975724f7837382b
8868386153422b7a2f7542456f682f364a6a48755079536a723251514944415141
+EMQCONF: to be continued

OK
AT
+EMQCERT=2,1,3350,800,42416f494241474a5979375270766a466379394c710a786c3159314e5a566f8963446a5a85593132354c5730786d624646434b79
734e52436c66413278454444683859357a5ab43557448268594837326876643350610a69446b716b5937435039454a673170652b7a4141706d7a336885374d
35707272665772637a724364436331514a43706b6b4231506a595a386a2b5a33446352590a463737783544796f7a68695a3342766874654e504f7a65503971
54646d753131534b485862704c4c685378396971746f724764744b4a54506b4d544b4153685a0a443474504e314a3537574a3159796c426367656e2b66d742f
5b6f44526a5873593345745941556a4232352b4a446b6c6268706a854b47796c613267746b584a2f0a324f583350506a51485077306d703261776558686ef4f
5c542b51483532694e7951307a71415261754a783679756958676e6a6f317239677236456378524253550a6351505646734543675945412b34366d3348347a
7269476d496a33514b6851645951475245563352386c4f5733517863776d795055
+EMQCONF: to be continued

OK
AT
+EMQCERT=2,1,3350,800,384f70624b38554e3361780a707536366f46344e5752745232456a4a6c476f4e793135392f544b6d666b43465074895659743075
33363733566b46635142504b6e54706e508a714a3375868300a53796b48353245823839666c30542f496a6b414a657666736861525144525746894a4b774352
5870753431776d5939714470553974706b43675945417a7658510a4e642b67514db44932744e424d6e457633706c6f34666f654c6a6d442f367a7479716777
446e6c714245774b4d646f768327156526743617a3257397a58356fd5a4465492f784d71626c75304e496f65627a676b68643731396b79324e424b475265
44333666486c4a716636613741394e665846784d70776a764d704f7331550a776e4b584b65384e42466a4f515468507365416a315563793352795a32505559
534d6c6144856b43875941574751446c6135796b6c6b59657a34694375634f650a36754851636a706f484264726a314e79724e436a56684337414749355151
37344341365332644134584b4d4336664277506953364562486c6e525a31447276
+EMQCONF: to be continued

OK
AT
+EMQCERT=2,1,3350,800,6c0a756d6264435772397355502b36727a733042424459596256515a57473245716d38354e444b342b6d437667674f6f636d6e38
93315975502f4657454a2f7362390a4b55325862727061684745347a425658399a6ef344f514b4267514339776c456f4e47544251486769652f535a68594a34
76587958526a674b4d4e625777634390a424c306261474f326b4f6f414361523078567364466b7a62774e4f6f36544261517a6c5064346b2b4b734d754d54
33366943576b7757751617748632b4f63340a68792b4978347875527a4b724c71725249516f32683839776f712b35424b2b6b6f6d444c7943334e51584b47
426c57384b4746796d70656565537a75367274620a635a4d716b514b4267466574653537354e43506f6b32522b6e366a523955346477466f79594465354c42
7446524c5862324c776d7259437458646755474b436e0a66563747414c7a4963476265657a356c4f4e3367535175674b74736d4a3679686e536e433345a714e
396853514f633055724f52488455384c30396362594931500a5230506a2f584843
+EMQCONF: to be continued

OK
AT
+EMQCERT=2,0,3350,150,7a305046686f6c4e472b657972613732595347466c636a615564504c5a4b554d72723163487969332f7042560a2d2d2d2d454e
44205253412050524956415445204b45592d2d2d2d0a
OK
+EMQNEW="a3hrc7nm4yky9d-ats.iot.us-west-2.amazonaws.com","8883",60000,100
+MNBIOEVENT: "EXIT PSM"

+EMQNEW: 0

OK
AT+EMQCON=0,3,"nbiot_test1",1000,1,0
OK
AT+EMQSUB=0,"topic",1
OK
    
```

2. Connected to the server by AT+EMQNEW and AT+EMQCON.

```

UA
AT
+EMQCERT=2,1,3350,800,6c0a756d6264435772397355502b36727a733042424459596256515a57473245716d38354e444b342b6d437667674f6f636d6e38
39315975502f4657454a2f7362390a4b55325862727061684745347a425658399a6ef344f514b4267514339776c456f4e47544251486769652f535a68594a34
76587958526a674b4d4e625777634390a424c306261474f326b4f6f414361523078567364466b7a62774e4f6f36544261517a6c5064346b2b4b734d754d54
33366943576b7757751617748632b4f63340a68792b4978347875527a4b724c71725249516f32683839776f712b35424b2b6b6f6d444c7943334e51584b47
426c57384b4746796d70656565537a75367274620a635a4d716b514b4267466574653537354e43506f6b32522b6e366a523955346477466f79594465354c42
7446524c5862324c776d7259437458646755474b436e0a66563747414c7a4963476265657a356c4f4e3367535175674b74736d4a3679686e536e433345a714e
396853514f633055724f52488455384c30396362594931500a5230506a2f584843
+EMQCONF: to be continued

OK
AT
+EMQCERT=2,0,3350,150,7a305046686f6c4e472b657972613732595347466c636a615564504c5a4b554d72723163487969332f7042560a2d2d2d2d454e
44205253412050524956415445204b45592d2d2d2d0a
OK
AT+EMQNEW="a3hrc7nm4yky9d-ats.iot.us-west-2.amazonaws.com","8883",60000,100
+MNBIOEVENT: "EXIT PSM"

+EMQNEW: 0

OK
AT+EMQCON=0,3,"nbiot_test1",1000,1,0
OK
AT+EMQSUB=0,"topic",1
OK
    
```

3. After connected OK , then you can sub topic and pub data , like this:

```
AT+EMQNEW="a3hxe7nm4yky9d-ats.iot.us-west-2.amazonaws.com","8883",60000,100
*MNBIOTEVENT: "EXIT PSM"

+EMQNEW: 0

OK
AT+EMQCON=0,3,"nbiot_test1",1000,1,0
OK
AT+EMQSUB=0,"topic",1
OK
AT+EMQPUB=0,"topic",1,0,0,8,"31323334"
OK
+EMQPUB: 0,"topic",1,0,0,8,"31323334"
AT+EMQDISCON=0
OK
*MNBIOTEVENT: "ENTER PSM"
```