Application Manual For Module Access to AWS IoT Platform

— 潘先强(Herbert Pan) —

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—、Forward

Currently, some customers will connect to Amazon AWS platform through MQTT protocol based on Quectel module; This document is aimed at the Quectel's module access to the AWS platform and the use of MQTT application so that customers or other-relevant can understand docking methods and processes on the platform and module in a quick and high-effective way.

二、Login to AWS

AWS Platform: https://aws.amazon.com/?nc1=h_ls

By the applied login account, click "Sigin In to the Console" to login and enter the home page of the console, as shown below;



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AWS control console: https://us-east-1.console.aws.amazon.com/console/home?region=us-east-1



Click "Services \rightarrow Internet of Things \rightarrow IoT Core" to enter the home page of AWS IoT, as shown below.





三、AWS IoT Platform Settings

3.1 Device Data Endpoint

As shown below, you can access the Settings page through "Settings" in the control panel on the left side of the AWS IoT page, view the device data endpoint to be accessed and select a security policy (note that the security policy is associated with the cipher suites, so you need to select the cipher suite and security policy supported by the module).

aws Services Q Search	[Alt+S]	⑦ Ø N. Virginia ▼ Herbert ▼
G IoT Core		
 All devices Greengrass devices 	AWS InT > Settings	
LPWAN devices Software packages New	Settings Info	
 Remote actions Message routing Retained messages 	Device data endpoint Info Your devices can use your account's device data endpoint to connect to AWS.	G
 Security Fleet Hub 	Each of your things has a REST API available at this endpoint. MQTT clients and AWS IoT Device SDKs 🗹 also use t	his endpoint.
Device software	Endpoint	access to endpoint
Billing groups	Select security policy Info To customize your TLS settings, such as TLS versions and supported cipher suites, choose a security policy.	
Feature spotlight	IoTSecurityPolicy_TLS13_1_2_2022_10	TLS policy and cipher suites
Documentation 🗹	Compare security policies 🗹	
Tell us what you think	Domain configurations Info	Create domain configuration
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3.2 AWS IOT Policies

As shown below, to enter the policy configuration page through "Manage \rightarrow Security \rightarrow Policies" in the control panel

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on the left side of the AWS IoT page, click "Create Policy", and configure related policy attributes. In the policy statement,

set Policy Effect to Allow, Policy Action to * (all AWS IoT operations), and Policy Resource to *.

aws	Services	Q Search	[Alt+S]	D & 0	() N.	. Virginia 🔻	Herbert 🔻
loT Core							
							Ġ
Maria	_		AWS 101 > Security > Policies				
Manage			AWS INT policies (0) here		Creat		
All devi	ices		AWS INT POLICIES (0) Into AWS INT POLICIES (0) Into	ries are separate and different from IAN	Loolicies AWS In		
Greengi b L Dividali	jrass devices		apply only to AWS IoT data plane operations.	cies are separate and different normal	policies. Aws to	1 poncies	
▶ LPWAN	a devices		Q Find policies		< 1	> @	
Softwar	are packages	New					
Remote	e actions		Policy name			•	
Messag	je routing						
Retaine	ed messages	;	No policies				
Security	y		You don't have any AWS IOT policies in	i us-east-1.			
Intro	0		Create				
Cert	tificates	_	1				
Poli	icies						
Cert	tificate autho	orities					
Role	e aliases						
Auth	horizers						
Audi	lit						
Dete	ect		▼ 				
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aws	Services	Q Search	[Alt+S]	2 2 0	O N. Vir	rginia 🔻 🛛 H	erbert 🔻
loT Core							
			AWS INT A Security A Policies A Greate policy				
Manago			AWS101 / Security / Policies / Create policy				
Manage	isos		Create policy Info				
All devi	ices		AWS IoT Core policies allow you to manage access to the AWS IoT Core data plane operation	ons.			
	I dovisos						
■ LPWAN	a devices		Policy properties				
Soltwa	ire packages	New	AWS IoT Core supports named policies so that many identities can reference the same policy documer	nt.			
Remote	e actions						
Message	je routing		Policy name				
Retaine	ed messages	•	smartKits_policy				
 Security 	У		A policy name is an alphanumeric string that can also contain period (.), comma (,), hyphen(-), underso	core (_), plus sign (+), equal sign (=), and	at sign (@) chara	acters, but no	
Intro	0		spaces.				
Cert	tificates		h Tarr - optional				
Poli	icies		- Taga - Optional				
Cert	tificate autho	orities					
Role	e aliases		Policy statements Policy examples				
Auth	horizers						
Audi	lit						
▶ Dete	ect		Policy document Info	- Web Consistent for an its officiency	Builder	JSON	-
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😱 IoT Core				
	smartkits_policy			
	A policy name is an alp spaces.	nanumeric string that can also contain period (.), comma (,), h	iyphen(-), underscore (_), plus sign (+), equal si	gn (=), and at sign (@) characters, but no
Manage				
All devices	Tags - optional			
Greengrass devices				
LPWAN devices				
Software packages New	Policy statements	Policy examples		
Remote actions		_		
Message routing	Delieu de sumo			
Retained messages		it into	natains actions, resources, and an effect that a	ante er denier the actions by the propurer
Security	All All Short policy cont	and one of more policy statements, each policy statement to	intains actions, resources, and an effect that g	and of defies the actions by the resources.
Intro	Deliny offect	Doliny action	Delinu resource	
Certificates				
Policies	Allow	•		Remove
Certificate authorities	Add new staten	lent		
Role aliases				1
Authorizers				
Audit				Cancel
Detect	-			
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aws Services Q S	Search	[Alt+S]	 2	⑦ ② N. Virginia ▼ Herbert ▼
Sar Ior Core				
	 Successfully created pol 	icy smartKits_policy.		View policy X
Manage				
All devices	AWS IOT > Security	> Policies		
Greengrass devices				
LPWAN devices	AWS IoT polici	2S (1) Info		Delete Create policy
Software packages New	AWS IOT policies allow to AWS IOT data plane	you to control access to the AWS IoT Core data plane operation operations.	ons. AWS IoT policies are separate and differer	t from IAM policies. AWS IoT policies apply only
Remote actions				
Message routing	Q Find policies			< 1 > @
Retained messages	Policy nam	e		▼]
Security				
Intro	smartKits p	<u>iolicy</u>		
Certificates				
Policies				
Certificate authorities				
Role aliases				
Authorizers				
Audit				
Detect	•			
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aws ::: Services Q S	Search	[Alt+S]	Δ	⑦ ③ N. Virginia ▼ Herbert ▼
		[most		
Gara IoT Core				
	 Successfully created pol 	icy smartKits_policy.		View policy 🗙
Manage				
All devices	AWS IOT > Security	Policies > smartKits_policy		
Greengrass devices	smartKits r			
LPWAN devices	sindi tixits_p			Edit active version
Software packages New				
Remote actions	Details			
Message routing				
Potained messages	Policy ARN	Active version	Created	Last updated
Socurity	arn:aws:iot:us-e	ast-1:72696 1	November 09, 2023, 10:13:14	November 09, 2023, 10:13:14
• Security	9521832:policy/sma	artKits_polic	(UTC+08:00)	(UTC+08:00)
intro	У			
Certificates				
Policies	Versions Tare	ets Noncompliance Tags		
Certificate authorities				
Role aliases				
Authorizers	Active version:	1 Info		Builder JSON
Audit				
Detect	Policy effect	Policy action	Policy reso	

3.3 Add Tings

Go to the Add/create things by "Manage \rightarrow All devices \rightarrow Things" in the control panel on the left side of the AWS IoT page, click "Create things", and create a single thing or multiple things according to actual requirements; Take the following example of smartKit001, and then fill in and select the specified things properties (optional); to select other configurations based on actual application requirements, as shown below.

aws	Services	Q Search	[Alt+S]	D	Ş	00	N. Virginia 🔻	Herbert 🔻
Gr loT (Core							
Test Dev MQ Dev Manag	vice Advisor QTT test client vice Location N ge devices Things		AWS LOT > Manage > Things Things (0) Info C Advanced search Run aggregation and record of your physical device in the cloud. A physical device needs a thing record in order to work with AWS IoT. Q. Filter things by: name, type, group, billing, or searchable attribute. Name Things	ations	Edit	Delete	Create thing	() ()
 Gree LP\ Sof Rer Mer Ret 	Thing groups Thing types Fleet metrics eengrass device WAN devices ftware package note actions ssage routing tained message	s s <u>New</u>	No things No things to display in this Region Create things					
▼ Sec	urity		0 things selected					^
E Clouds	Shell Feedbac	k Q Search	© 2023, Amazon Wel [Alt+S]	b Services, Inc. o	or its affil	liates. Privacy	Terms Cook N. Virginia ▼	ie preferences Herbert ▼
Ξ	AWS IOT > Create A thing resour resource in th	Manage > Thin things Inf rce is a digital rep e registry to use	ngs > Create things fo presentation of a physical device or logical entity in AWS IoT. Your device or entity needs a thing AWS IoT features such as Device Shadows, events, jobs, and device management features.					
	Number Creat LoT. Creat Creat Creat Creat Creat Creat	r of things to te single thing te a thing resource to te many things te a task that create ect to AWS IoT.	to register a device. Provision the certificate and policy necessary to allow the device to connect to AWS					
	Shall Feedbard	ł.	Cancel Next	h Sanitas las	or ite offi	listor Driver	Tormo Cont	in proformerso
en ciouu.	silen recubac		S 2025, Aniazon We	a services, inc. u		indees. Invacy	COOK	e-preferences

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aws	Services	Q Search	[Alt+S]	N. Virginia 🔻	Herbert 🔻
	IoT Core				
=	AWS IOT >	Manage > Things >	Create things > Create single thing		١
	Step 1 Specify thing	Specify thing properties Info			
	Step 2 - optiona	1	A thing resource is a digital representation of a physical device or logical entity in AWS IoT. Your device or entity needs a thing resource in the registry to use AWS IoT features such as Device Shadows, events, jobs, and device management features.		
	Configure dev	vice certificate	Thing properties Info		
	Step 3 - optiona	l			
	Attach policie	s to certificate	Thing name		
			smartKit001 Enter a unique name containing only: letters, numbers, hyphens, colons, or underscores. A thing name can't contain any spaces.		
			Additional configurations		
			 Thing type - optional 		
			Searchable thing attributes - optional		
			Thing groups - optional		
> C	oudShell Feedback	k	© 2023, Amazon Web Services, Inc. or its affiliates. Privacy	Terms Cooki	e preferences

Select whether to add "Device Shadow" according to the actual application requirements. To facilitate subsequent

debugging, currently select "Unnamed Shadow (Classic)";

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GP Io	l Core							
=			 Thing groups - optional Billing group - optional 					3
			Packages and versions - optional					
			Device Shadow Info Device Shadows allow connected devices to sync states with AWS. You can also get, update, or d shadow using either HTTPs or MQTT topics.	elete the state inf	ormation of	this thing's		
			No shadow Named shadow Create multiple shadows with different names to manage access to properties, and logically your devices properties.	group				
			• Unnamed shadow (classic) A thing can have only one unnamed shadow.					
			Edit shadow statement - optional			-		
					Cancel	Next		_
>_ Clou	dShell Feedbac	k	© 2023, Amazon V	Web Services, Inc.	or its affiliate	is. Privacy	Terms	Cookie preferences

You need to configure the device certificate based on the different mode of certificate. Let's take "Auto-Generate a New

certificate(recommended)" as an example.

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() ()	l Core							
≡	Step 1 Step 2 - optional Configure device certificate	Configure device certificate – optional Info A device requires a certificate to connect to AWS IoT. You can choose how to register a certificate for your device can create and register a certificate for your device later. Your device won't be able to connect to AWS IoT unti certificate with an appropriate policy.	ice now, or you il it has an active	е				
	Step 3 - <i>optional</i> Attach policies to certificate	Device certificate						
		• Auto-generate a new certificate (recommended) Generate a certificate, public key, and private key using AWS IoT's certificate authority.						
		Use my certificate Use a certificate signed by your own certificate authority.						
		O Upload CSR Register your CA and use your own certificates on one or many devices.						
		 Skip creating a certificate at this time You can create a certificate for this thing and attach a policy to the certificate at a later time. 						
		Cancel Previous	5 Next					
	dShell Feedback	@ 2023 Amazon V	Vob Services Inc. o	or its offi	liatos	Drivacy 1	Terms Cook	io proforoncos

Attach a policy to the current thing, select the policy created above, and obtain the relevant certificate; As shown below;

aws	Services	Q Search	[Alt+S]	D & 0	Ø N. Virginia ▼ Herbert ▼
G IoT	Core				
=	■ AWS IoT > Manage > Things > Constrained on the second secon		Create things > Create single thing Attach policies to certificate - option AWS IOT policies grant or deny access to AWS IoT resources. Attaching the device.	Onal Info Ig policies to the device certificate applies this acc	ess to
	Step 3 - optional	s to certificate	Policies (1/1) Select up to 10 policies to attach to this certificate. Q. Filter policies Image: Name	C Create policy	0
			smartKits_policy		
				Cancel Previous Create	thing
>. Cloud	dShell Feedback	:		© 2023, Amazon Web Services, Inc. or its affiliates.	Privacy Terms Cookie preferences

On the "Download Certificates and Keys" page, download the CA certificate and key files automatically generated by

the platform and save it.

xxxxxxxx-certificate.pem for clientcert (Client Certificate File) ;

xxxxxxxxx-private.pem for clientkey (Client Key File) ;

AmazonRootCA1.pem for cacert (CA File)

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Download certificates and keys	▷ 🗘 ? ۞ N. Virginia ▼ Herbert ▼
Download certificate and key files to install on your device so that it can connect to AWS.	
Device certificate You can activate the certificate now, or later. The certificate must be active for a device to connect to AWS IoT.	icate applies this access to
Device certificate Deactivate certificate Deactivate certificate Deactivate certificate	for clientcert Create policy 🔀
Key files The key files are unique to this certificate and can't be downloaded after you leave this page. Download them now and save them in a secure place.	< 1 > ⊚
A This is the only time you can download the key files for this certificate.	
Public key file f16eaf2d66444e31b7e6d2bfa0c76f-public.pem.key	
Private key file f16eaf2d66444e31b7e6d2ba0c76f-private.pem.key	for clientkey
Done Key files The key files are unique to this certificate and can't be downloaded after you leave this page. Download them now and save them in a secure place.	es, Inc. or its affiliates. Privacy Terms Cookie preferences D
A This is the only time you can download the key files for this certificate.	
Public key file f16eaf2d66444e31b7e6d2bfa0c76f-public.pem.key	
Private key file Download f16eaf2d66444e31b7e6d2ba0c76f-private.pem.key	
Root CA certificates Download the root CA certificate file that corresponds to the type of data endpoint and cipher suite you're using. You can also download the root CA certificates later.	Create policy
Amazon trust services endpoint RSA 2048 bit key: Amazon Root CA 1	for cacert
Amazon trust services endpoint ECC 256 bit key: Amazon Root CA 3	
If you don't see the root CA certificate that you need here, AWS IoT supports additional root CA certificates. These root CA certificates and others are available in our developer guides. Learn more 🛛	s Create thing
Done	es, Inc. or its affiliates. Privacy Terms Cookie preferences

You can click "smartKit001" to view the thing details;

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	[Alt+S] D 4 0 0	N. Virginia 🔻 Herbert 🔻
🞧 IoT Core		
AWS IoT $\qquad imes$	✓ You successfully created thing smartKit001.	View thing X
Monitor	⊘ You successfully created certificate f16eaf2d66444e31b7e6d2b3280f00b57aa8f82658c40ccbc8ba10b3bfa0c76f.	View certificate 🛛 🗙
Monitor	AWS INT > Manage > Things	
Connect	TTTETOT / THINKE / THINGS	
Connect one device	Things (1) Info C Advanced search Run aggregations Edit Delete	Create things
Connect many devices	An IoT thing is a representation and record of your physical device in the cloud. A physical device needs a thing record in order to work with AWS IoT.	
	Q Filter things by: name, type, group, billing, or searchable attribute.	< 1 > 💿
Test Device Advisor	Name	Thing type
MQTT test client	smartKit001	_
Device Location New		-
	/	
Manage		
All devices		
Things	v	
Lining groups		
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CloudShell Feedback CouldShell Feedback CouldShe	Constraints and the secure tunnel Create secure tunnel	y Terms Cookie preferences N. Virginia ♥ Herbert ♥ Edit Delete
CloudShell Feedback Image: Services Q Image: Services Q Image: Services Q AWS IoT X Monitor	© 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] AWS IoT > Manage > Things > smartKit001 SmartKit001 Info Thing details	y Terms Cookie preferences N. Virginia ▼ Herbert ▼ Edit Delete
CloudShell Feedback Connect	© 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] AWS IOT > Manage > Things > smartKit001 smartKit001 Info Thing details	y Terms Cookie preferences N. Virginia ▼ Herbert ▼ Edit Delete
CloudShell Feedback CloudShell Feedback Core Connect Connect one device Connect many devices Connect many devices	© 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+S] AWS IoI > Manage > Things > smartKit001 smartKit001 Info Thing details Name Type	y Terms Cookie preferences N. Virginia Herbert Edit Delete
CloudShell Feedback If Services Q IoT Core AWS IoT AWS IoT X Monitor Connect Connect one device Connect many devices	@ 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] D A O O AWS IoT > Manage > Things > smartKit001 SmartKit001 Info Create secure tunnel Thing details Name Type -	y Terms Cookie preferences N. Virginia Herbert Edit Delete
CloudShell Feedback aWS iii Services Q Search aWS IoT Core AWS loT × Monitor Connect Connect one device Connect many devices Toot	© 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] AWS IoI > Manage > Things > smartKit001 SmartKit001 Info Create secure tunnel Thing details Name smartKit001 ARN Billing group	y Terms Cookie preferences N. Virginia ▼ Herbert ▼ Edit Delete
CloudShell Feedback WS III Services Q Search IoT Core AWS IoT X Monitor Connect Connect one device Connect many devices Test Device Advisor	@ 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] D A O O AWS IoI > Manage > Things > smartKit001 SmartKit001 Info Create secure tunnel Thing details Type - ARN Billing group amiawsiotus-east-1:726969521832:thing/smartKit001 - - -	y Terms Cookie preferences N. Virginia ▼ Herbert ▼ Edit Delete
CloudShell Feedback aWS ## Services Q Search aWS IoT Core AWS IoT X Monitor Connect Connect one device Connect many devices Test Device Advisor MQTT test client	© 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] D A O O AWSS IoT > Manage > Things > smartKit001 Create secure tunnel Create secure tunnel Thing details Type - - ARN - Billing group - arn:aws:iot:us-east-1:726969521832:thing/smartKit001 - -	y Terms Cookie preferences N. Virginia Herbert Edit Delete
CloudShell Feedback WS III Services IoT Core AWS IoT X Monitor Connect Connect one device Connect one device Connect many devices Test Device Advisor MQTT test client Device Location	@ 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] D A O O AWSS IoT > Manage > Things > smartKit001 SmartKit001 Info Create secure tunnel Thing details Type - - ARN - Billing group - arm:aws:iot:us-east-1:726969521832:thing/smartKit001 - - Attributes Certificates Thing groups Device Shadows Activity Packages and versions	y Terms Cookie preferences N. Virginia Herbert Edit Delete Jobs Alarm >
CloudShell Feedback Int Core AWS IoT AWS IoT Monitor Connect Connect one device Connect many devices Test Device Advisor MQTT test client Device Location Nanage	@ 2023, Amazon Web Services, Inc. or its affiliates. Privac [Alt+5] Image > Things > smartKit001 SmartKit001 info Create secure tunnel Thing details Type smartKit001 - ARN Billing group an:awsiotus-east-1:726969521832:thing/smartKit001 - Attributes Certificates Thing groups Device Shadows Activity Packages and versions -	y Terms Cookie preferences N. Virginia Herbert Edit Delete Jobs Alarm
CloudShell Feedback WS Iff Services Q Search IoT Core AWS IoT X Monitor Connect Connect one device Connect one devices Test Device Advisor MQTT test client Device Location New Manage V	AWS IoT > Manage > Things > smartKit001 SmartKit001 info Thing details Name smartKit001 ARN Image > 100000000000000000000000000000000000	y Terms Cookie preferences N. Virginia Herbert Edit Delete Jobs Alarm > Create Shadow
CloudShell Feedback If Services Search If Services Search If Services Search AWS IoT X Monitor X Connect Connect one device Connect many devices Test Device Advisor MQTT test client Device Location Nanage All devices Things	Q2023, Amazon Web Services, Inc. or its affiliates Privac [Alt+5] Image Image	y Terms Cookie preferences N. Virginia Herbert Edit Delete Jobs Alarm > Create Shadow

3.4 Add Ting Groups(Options)

As shown in the figure below, you can enter the thing groups configuration page through "Manage \rightarrow All Devices \rightarrow thing Groups" in the control panel on the left side of the AWS IoT, click "Create thing Group", then to select the thing group type, fill in the corresponding the name of thing group, and configure other options according to requirements, and then to click "Create thing Group".

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🐼 loT Core		
Connect many devices	AWS IoT > Manage > Thing groups	
Test	Thing groups (0) Info C Advanced search Run aggre	gations Edit Delete Create thing group
Device Advisor MOTT test client	device fleet. You can create both static and dynamic thing groups.	
Device Location New	Q Filter thing groups	< 1 > ©
	Name	▲
Manage		
All devices	No thing groups	in us part 1
Things	Create thing groups	ill us-edst-1.
Thing types	1	
Fleet metrics		
Greengrass devices		
LPWAN devices		
Software packages <u>New</u> Remote actions		
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aws Services Q Search	[Alt+S]	▶ 🔶 ⑦ Ø N. Virginia ▼ Herbert ▼
🚱 loT Core		
≡ AWS IOT > Manage > Th	ing.groups > Create thing group	
Create thing g		
Thing groups help you organi	ize devices in a way that makes sense to you. You can create static thing groups and dynamic	
thing groups.		
Thing group type		
 Create static thing g Create a group of thing 	roup resources that you select. After you create it, you can add and remove things to and from the group.	
Create dynamic thin Create a group of thing	ig group resources that are selected automatically by the query that you specify. Things that match the query are	
added to the group and	things that don't are removed automatically.	
	Cancel Next	
	/	
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	▶ 创建物品组 > 创建静态物品组	
创建整本物口组	3	
创建一组相关设备。创建组后,	1 信息 ,您可以添加和移除表示这些设备的物品资源。	
物品组属性		
父组 – 可选		
选择现有物品组	▼	
物品组名称		
IoT_Devices 総入唯一的文称 印刷会、空四	教主 法宝拉 国县职下创任 施品纪全种不能和今次族	
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IoT_Devices		
++/, L =====		
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GP IoT (Core										
=	Parent gr	oup - optional									
	Choose e	existing thing group	•								
	Thing are	אשבת מוני									
	IoT_Dev	rices									
	Enter a uni	que name containing only: let	ters, numbers, hyphens, co	ons, or underscores. A thing	group name car	't contain any spaces.					
	Descriptio	on - optional									
	loT_Dev	ices									
	You can use	nal configurations e these configurations to add o	details to help you organize	e, manage and search your th	ing groups.						
	Attrib	outes - optional									
	Tags -	- optional									
					Cancel	Create thing group					
	Shell Feedba	rk			cancel	© 2023 Ama	zon Web Services Inc	or its affiliates	Privacy	Terms C	nokie preferences

Click on the created thing group to view the details, as shown below;

aws Services Q Search	[Alt+S]	D & 0	Ø N. Virginia ▼ Herbert ▼
GP IoT Core			
AWS IoT ×	⊘ You successfully created thing group IoT_Devices.		View thing group 🗙
Monitor	AWS IoT > Manage > Thing groups		
Connect Connect one device Connect many devices	C Advanced search Run aggregations Thing groups help you organize thing resources to find and perform actions on subsets of your device fleet. You can create both static and dynamic thing groups. Q. Filter thing groups	Edit Delete	Create thing group < 1 > ③
Test Device Advisor MQTT test client Device Location New	Name IoT Devices check the thing group details		_
Manage All devices Things Thing aroups			
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aws Services Q Search		[Alt+S]] 🔶 🕐 😨 N. Virginia 🔻 Herbert 🔻			
GP IoT Core						
Connect	AWS loT > Manage > Thing groups > loT_D	evices				
Connect one device	IOT_Devices Info					
Connect many devices	Thing group details					
Test	News	Description of the second	Data supptied			
Device Advisor	IoT Devices	-	November 09, 2023, 11:16:08 (UTC+08:00)			
MQTT test client	lot_bened					
Device Location New	ARN	Description	Туре			
		IoT_Devices	Static			
Manage	1:726969521832:thinggroup/IoT_Devices					
All devices						
Things	Attributes Child groups Things	Policies Jobs Security profiles	Tags			
Thing groups	I					
Thing types						
Fleet metrics	Attributes (0) Info					
► Greengrass devices -	Attributes store metadata about the thing group. Attrib	utes can be used to filter lists of thing groups.				
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By the configuration item in the thing group details, you can associate the above created "Policies" and "Things", as

shown in the following figure;

aws Services Q Search		[Alt+S]	🖸 🔶 🧿 🧔 N. Virginia 🔻 Herbert 🔻 🕯		
loT Core					
Connect	AWS IOT > Manage > Thing groups > IoT_D	evices	Edit Delete		
Connect many devices	Thing group details				
Test Device Advisor MQTT test client Device Location New	Name IoT_Devices ARN D	Parent group - Description IoT_Devices	Date created November 09, 2023, 11:16:08 (UTC+08:00) Type Static		
Manage All devices	am:aws:iot:us-east- 1:726969521832:thinggroup/IoT_Devices				
Things Thing groups	Attributes Child groups Things	Policies Jobs Security profiles	Tags		
Thing types		_			
Fleet metrics Greengrass devices	Things (0) Info You can apply permissions and apply bulk actions and o	ther functions to the things in this thing group.	C Remove things Add things		
S CloudShell Feedback		© 2023, Amazon Web Services,	Inc. or its affiliates. Privacy Terms Cookie preferences		

QUECTEL Application Manual For Module Access to AWS IoT Platform

WS Services Q Search		[Alt+5]	🗔 🔶 🕐 🎯 N. Virginia 🔻 Herbert 🔻
	Add things to thing group 101	_Devices ×	
	Things Choose the things to add to this thing group.		
	smartKit001 X	•	
	aw 269		
		Cancel Add thing	
CloudShell Feedback aws Services Q Search		© 2023, Amazon Web Servic	es, Inc. or its affiliates. Privacy Terms Cookie preferences
Gamma IoT Core			
✓ You succession	ccessfully added smartKit001 to thing group I	oT_Devices.	November 09, 2023, 11:16:08 (01C+08:00)
Connect Connect one device ARM	J	Description	Туре
▶ Connect many devices arm:	aws:iot:us-east-	IoT_Devices	Static
Test	26969521852:thinggroup/161_Devices		
Device Advisor Att MOTT test client	ributes Child groups Things	Policies Jobs Security profiles	Tags
Device Location New		F	
Manage You	ings (1) Info can apply permissions and apply bulk actions and ot	her functions to the things in this thing group.	C Remove things Add things
▼ All devices	Filter things		< 1 > ⊚
Thing groups	Name		
Thing types	smartKit001		
Greengrass devices Greenback		© 2023, Amazon Web Services.	Inc. or its affiliates. Privacy Terms Cookie preferences
aws iii Services Q Search		[Alt+S]	∑ � ⑦ ◎ N. Virginia ▼ Herbert ▼
AWS Ic	T > Manage > Thing groups > IoT_De	vices	
Connect IOT	Devices Info		Edit Delete
Connect many devices	ing group details		
Test	ng group decails		
Device Advisor IoT	ne _Devices	Parent group -	Date created November 09, 2023, 11:16:08 (UTC+08:00)
Device Location New ARM	1	Description	Type Static
Manage 1:72	aws:iot:us-east- 26969521832:thinggroup/IoT_Devices		
▼ All devices			
Things Atte	ributes Child groups Things	Policies Jobs Security profiles	Tags
Thing types	licies (0) Info		Manage policies
► Greengrass devices Polic	cies grant or deny access to the thing group and the t	things in the thing group.	Manage policies

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aws Services Q Search		[Alt+S]		🙆 N. Virginia 🔻 Herbert 🔻
	Manage policies	×		
	Name Policies grant or deny access to AWS I	oT resources. You can choose up to two policies.		
	No policies have been attached to this	s thing group.		
	ARN Add policy			
	arr:aw You can add up to 2 more policies.			
	1:7269			
		Cancel Update policies		
	Manage policies	×		
	Thins Policies grant or deny access to AWS I	oT resources. You can choose up to two policies.		
	Policy			
	Name smartKits_policy	▲	Date created	
	Q		November 09, 2023	
	ARN smartKits_policy		Type	
	amiaw			
	1:7269 Add policy	/		
		Cancel Update policies	ags	
WS		© 2023, Amazon Web Sen	vices, Inc. or its athliates.	Privacy Terms Cookie preferences
	You successfully updated the policies for thiss are			
Ct	Io1_Devices	-	November 09, 2023	, 11:16:08 (01C+08:00)
Connect one device	ARN	Description	Туре	
Connect many devices	Ð	IoT_Devices	Static	
	arn:aws:iot:us-east- 1:726969521832:thinggroup/IoT_Devices			
Test				
Device Advisor	Attributes Child groups Things	Policies Jobs Security profiles	Tags	
MQTT test client				
Device Location New	Policies (1) Info			Manage policies
Мараде	Policies grant or deny access to the thing group and the	things in the thing group.		manage policies
▼ All devices	O Eilter policies			
Things				
Thing groups	Policy name	▼ Action マ	Permission	\bigtriangledown
Thing types	smartKits_policy	*	⊘ Allowed	
Fleet metrics				
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四、MQTT Test

4.1 MQTT.fx Configuration and Access to AWS IoT

The following tests are based on the MQTT.fx tool: <u>https://softblade.de/en/download-2/;</u>

the detailed configuration as shown below;

Edit Connection Profiles			– 0 ×
AWS_TEST			
	Profile Na	AWS_TEST	
	Profile T	MQTT Broker	
	MQTT Broker Profile Settin	gs	
	Broker Add	ess a9ohm2zbim3d5-ats.iot.us-east-1.amazonaws.con	device data endpoint
	Broker	Port 8883	MQTT server port
	Clien	t ID smartKit001 General	the thing added
	General User Credentials	TLS/SSL LWT Proxy	
	default settings	/TLS 🗸	
	Prof	tocol TLSv1.2	
	Key Algor	ithm RSA 🔹	
	Trust all hostna	imes	
		Default CA certificate	
		CA certificate Keystore	
		Certificates from trusted Keystore	
	CA F	ile C:\AmazonRootCA1.pem	
	Client Certificate F	ile C:\f16eaf2d66444e31b7e6d2b3280f00b57aa8f82658c40ccbc	8ba10b3bfa0c76f-certificate.pem.crt
	Client Key F	ile C:\f16eaf2d66444e31b7e6d2b3280f00b57aa8f82658c40ccbc	8ba10b3bfa0c76f-private.pem.key
	Client Key Passwo	rd	
Add a test case	PEM Formatt	ed 🗸	
÷-	Revert		Cancel OK Apply
MQTT.fx Extras Help			- U X
AWS_TEST	Disconnect		MQ11.tx
Publish Subscribe Sparkplug Explorer Sparkplug Edi	itor (beta) Scripts Broker Status Log		
> aws/smartKit001/data/report/message	Publish		
User Properties Name Value			QoS 0 QoS 1 QoS 2 Retained
Right click to			
Content Type text/plain			
Davland Editor			
Open Editor			

🐵 MQTT.fx - 5.3.0 - Standard Edition			– đ ×
MQTT.fx Extras Help			Indicating successful connection
AWS_TEST	Connect Disconnect		MQTTS MQTT.fx
Publish Subscribe Sparkplug Explorer	Sparkplug Editor (beta) Scripts Bro	oker Status Log	
aws/smartKit001/data/report/message	 Publish 		00v
User Properties Name	Value		Qc50 Qc51 Qc52 Retained
	Right click to add properties.		
Content Type text/plain Payload Editor	×		

4.2 Client Publish

As shown below, "MQTT test client"based on AWS IoT platform, you can verifie and debug the connected terminal; "MQTT test Client" displays "Connected", customizing the relevant subscribed topic, MQtt.fx virtual terminal can publish messages to the topic, and the platform can view the messages published by the terminal;

aws Services	Q Search	[Alt+S] D Q Q N. Virginia ▼ Herbert ▼
loT Core		
AWS IoT	×	MQTT test client Info
Monitor		You can use the MQTT test client to monitor the MQTT messages being passed in your AWS account. Devices publish MQTT messages that are identified by topics to communicate their state to AWS IoT. AWS IoT also publishes MQTT messages to inform devices and apps of changes and events. You can subscribe to MQTT message topics and publish MQTT messages to topics by using the MQTT test client.
Connect Connect one device Connect many devi	e	► Connection details You can update the connection details by choosing Disconnect and making updates on the Establish connection to continue page.
Test Device Advisor		Subscribe to a topic Publish to a topic
MQTT test client Device Location	ew	Topic filter Info The topic filter describes the topic(s) to which you want to subscribe. The topic filter can include MQTT wildcard characters.
		aws/smartKit001/data/report/message Customize a subscribed topic
Manage All devices 		Additional configuration
Greengrass devices	· · · ·	
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🌚 MQTT.fx - 5.3.0 - Standard Edition			- 0 X
MQTT.fx Extras Help			
AWS_TEST	Connect Disconnect		
Publish Subscribe Sparkplug Explorer	Sparkplug Editor (beta) Scripts Broke	r Status Log	
aws/smartKit001/data/report/message	Publish		0(*
User Properties Name	Value		QoS 0 QoS 1 QoS 2 Retained
	Right click to add properties.		
Content Type text/plain	*		
Payload Editor Open Editor			
{"temp":18.6,"humi":65}			

aws Services	Q Search	[Alt	-S] D 🗘 Ø Ø N. Virginia ▼ Herbert ▼
G IoT Core			
AWS IoT	×	Subscriptions	aws/smartKit001/data/report/message
Monitor		aws/smartKit001/data/report/message 🛇 🗙	Pause Clear Export Edit
Connect Connect one devic Connect many dev	e ices		Message payload { "message": "Hello from AWS IoT console" } Additional configuration
Test Device Advisor 			Publish
MQTT test client Device Location	lew		 aws/smartKit001/data/report/message November 09, 2023, 11:45:16 (UTC+0800)
Manage All devices Greengrass devices	5		{ "temp": 18.6, "humi": 65 }
➢ CloudShell Feedback	k		© 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

4.3 Client Subscription

As shown below, based on the publication of "MQTT test client" to the Topic, the terminal subscribs to the defined Topic. After the test client clicks "Publish", the MQTT.fx terminal can receive the message of the subscribed Topic.

QUECTEL

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	, ipplication							
WQTT.fx - 5.3.0 - Standard Edition							-	- 0 ×
MQTT.fx Extras Help								
AWS_TEST	Connect Di	sconnect			0		• M	QTT.fx
Publish Subscribe Sparkplug Explorer	Sparkplug Editor (beta)	Scripts Broker Status	Log					
toaws/smartKit001/update/message	Subscribe					QoS 0 QoS 1	L QoS 2	Autoscroll
toaws/smartKit001/update/message Dump Messages	(JSON) Mute Unsubscribe	Topic Filter						List Table
				No content in t	able			
Topics Collector (0)	Scan Stop 😋							
					3	Reta	ined	
					Name			
		Content Type	text/plain	_				
WS III Services Q Search			[Alt+S]		۵ ¢	0 0	N. Virginia 🔻	Herbert 🔻 🕈
AWS IoT ×	► Connection de	tails					⊘ Conr	nected
Monitor	You can update the cor	nnection details by choosing	Disconnect and making update	s on the Establish connecti	ion to continue page.			- 1
Connect Connect one device	Subscribe to a	topic Publis	h to a topic					
Connect many devices	Topic name The topic name identifies t	he message. The message p	ayload will be published to this	topic with a Quality of Ser	vice (QoS) of 0.			
Test	Q toaws/smartKit00)1/update/message			×			
Device Advisor	Message payload]		
MQTT test client	{							
Device Location New	"message": "Hello fro }	om AWS IoT console"						
Manage	Additional configu	ration						
All devices	Publish							
Greengrass devices								
CloudShell Feedback			¢	© 2023, Amazon Web Servi	ices, Inc. or its affiliat	es. Privacy	Terms Coo	okie preferences

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MQTT.fx - 5.3.0 - Standard Edition			- 0 ×
MQTT.fx Extras Help			
AWS_TEST 🔹 🔅 Connect Disconnect		MQTT 5	MQTT.fx
Publish Subscribe Sparkplug Explorer Sparkplug Editor (beta) Scripts Broker Status	Log		
toaws/smartKit001/update/message		Qos	0 QoS1 QoS2 Autoscroll 08▼
toaws/smartKit001/update/message			List Table
Dump Messages (JSON) Mute Unsubscribe 11:49:16.4	12556373 toaws/smartKit001/update/message		
Topics Collector (0) Scan Stop Core toaws/smartKit001/update	/message		
erssage": "Hello fi	om AWS IoT console"	QoS 0	
3		09-11-2023 11:49:16.42556	3373
		Name	Value
			No content in table
Content Type		_	
Payload decoded with	Plain Text Decoder		

五、Module Access to AWS IoT

5.1 Example for CAT1&CAT4 Module

The following routines for connecting to AWS IoT platform based on Quectel's CAT1&CAT4 modules are as follows:

```
>> AT+CEREG?
                                                     // Check the network registration status of the terminal
>>
>> +CEREG: 0,1
                                                      // Successful registration network
>>
>> OK
>> AT+QENG="servingcell"
                                                      // Check the network registration status of the terminal
>>
>> +QENG: "servingcell","NOCONN","LTE","FDD",460,11,690843E,314,1850,3,5,5,DF5C,-94,-11,-62,6,34
>>
>> OK
>> AT+QIACT=1
                                                     // Activate PDP
>>
>> OK
>> AT+CGPADDR=1
                                                     // Query the obtained IP address
>>
>> +CGPADDR: 1,"100.69.28.0,36.14.4.91.4.152.81.115.0.0.0.0.0.0.1"
>>
>> OK
>> AT+QPING=1,"a9ohm2zbim3d5-ats.iot.us-east-1.amazonaws.com"
                                                                           // PING the endpoint to verify the connectivity
>>
```

Application Manual For Module Access to AWS IoT Platform

>> OK >> >> +QPING: 0,"54.172.40.244",32,233,255 >> >> +QPING: 0,"54.172.40.244",32,234,255 >> >> +QPING: 0,"54.172.40.244",32,236,255 >> >> +QPING: 0,"54.172.40.244",32,243,255 >> >> +QPING: 0,4,4,0,233,243,236 3) Load the CA certificate and key files >> AT+QFLST="RAM:*" // Check whether a certificate or key file has been stored in RAM >> >> OK >> AT+QFUPL="RAM:cacert.pem",1187,10 // Upload the RootCA.pem to the RAM >> >> CONNECT >> +QFUPL: 1187,2d19 // The file size must be the same as the certificate size >> >> OK >> AT+QFUPL="RAM:client.pem",1220,10 // Upload the certificate.pem.crt to RAM >> >> CONNECT >> +QFUPL: 1220,2a // The file size must be the same as the certificate size >> >> OK >> AT+QFUPL="RAM:user_key.pem",1679,10 // Upload the private.pem.key to RAM >> >> CONNECT >> +QFUPL: 1679,6568 // The file size must be the same as the certificate size >> >> OK >> AT+QFLST="RAM:*" // Check the certificate file and size in RAM >> >> +QFLST: "RAM:cacert.pem",1187 >> +QFLST: "RAM:client.pem",1220 >> +QFLST: "RAM:user_key.pem",1679 >> >> OK >> AT+QMTCFG="recv/mode",0,0,1 // Configure receiving mode >> >> OK >> AT+QMTCFG="ssl",0,1,2 // Configure MQTT connections in SSL mode >> >> OK >> AT+QSSLCFG="cacert",2,"RAM:cacert.pem" // Configuring the CA Certificate

```
>>
>> OK
>> AT+QSSLCFG="clientcert",2,"RAM:client.pem"
                                                              // Configure the clientcert certificate
>>
>> OK
>> AT+QSSLCFG="clientkey",2,"RAM:user_key.pem"
                                                              // Configure the clientkey certificate
>>
>> OK
>> AT+QSSLCFG="seclevel",2,2
                                                               // SSL authorization mode:server authentication
>>
>> OK
>> AT+QSSLCFG="sslversion",2,4
                                                              // SSL authorized version
>>
>> OK
>> AT+QSSLCFG="ciphersuite",2,0xFFFF
                                                              // SSL cipher suite
>>
>> OK
>> AT+QSSLCFG="ignorelocaltime",2,1
                                                              // Ignore authorization time
>>
>> OK
>> AT+QMTOPEN=0,"a9ohm2zbim3d5-ats.iot.us-east-1.amazonaws.com",8883 // Open the MQTT SSL connection
>>
>> OK
>>
>> +QMTOPEN: 0,0
>> AT+QMTCONN=0,"smartKit001"
                                                                               // Initiate the MQTT server connection
>>
>> OK
>>
>> +QMTCONN: 0,0,0
>> AT+QMTSUB=0,1,"toaws/smartKit001/update/message",1
                                                                               // Subscribe to related topic
>>
>> OK
>>
>> +QMTSUB: 0,1,0,1
>> AT+QMTPUBEX=0,1,1,0,"aws/smartKit001/data/report/message",23
                                                                                 // Publish messages to related topic
>>
>>> {"temp",22.5,"humi",68}
>>
>> OK
>>
>> +QMTPUBEX: 0,1,0
>>
>> +QMTRECV: 0,0,"toaws/smartKit001/update/message",42,"{ "message": "Hello from AWS IoT console"}"
>> AT+QMTCLOSE=0
                                                                             // Initiating MQTT connection disconnected
>>
>> OK
```

QUECTEL Application Manual For Module Access to AWS IoT Platform >> >> +QMTCLOSE: 0,0 服务(又搜索) [Alt+S] 弗吉尼亚北部 🔻 aws <u>ک</u> ¢ 0 ۲ Herbert 🔻 订阅 aws/smartKit001/data/report/message 暂停 清除 导出 编辑 连接 aws/smartKit001/data/report/message 🛇 🗙 连接一台设备 消息负载 ▶ 连接多台设备 { "message": "Hello from AWS IoT console" } 测试 Device Advisor ▶ 其他配置 MQTT 测试客户端 发布 设备位置 新增功能 管理 aws/smartKit001/data/report/message
 November 07, 2023, 14:11:13 (UTC+0800) ▼ 所有设备 物品 物品组 😢 无法以指定格式显示格式。 物品类型 实例集指标

5.2 Example for NB-IoT Module(BC660K)

▶ Greengrass 设备

▶ LPWAN 设备 ▶ CloudShell 反馈

The following routines for connecting to AWS IoT platform based on Quectel's NB-IoT modules are as follows:

{"temp",22.5,"humi",68}

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1) Query the network status of the device and IP		
>> AT+CEREG?	// Check the network registration status of the terminal	
>>		
>> +CEREG: 0,1	// Successful registration network	
>>		
>> OK		
>> AT+CGPADDR?	// Query the obtained IP address	
>>		
>>+CGPADDR: 0,"10.5.29.72","2409:8d30:0104:02e2:17b5:74f2:a402:e8be"		
>>		
>> OK		
2) Testing AWS IoT connectivity		
>> AT+QIDNSCFG=0,"8.8.8.8","8.8.4.4"		
>>		
>> OK		
>> AT+QPING=0,"a9ohm2zbim3d5-ats.iot.us-east-1.a	amazonaws.com" // PING the endpoint to verify the connectivity	
>>		
>> OK		
>>		
>> +QPING: 0,54.163.74.32,32,336,237		
>>		
>> +QPING: 0,54.163.74.32,32,354,237		
>>		
>> +QPING: 0,54.163.74.32,32,394,237		
>>		

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>> +QPING: 0,54.163.74.32,32,431,237 >> >> +QPING: 0,4,4,0,336,431,378 >> AT+QSSLCFG=0,0,"cacert" // Upload the RootCA.pem to the FILE system >> >> > >> -----BEGIN CERTIFICATE----->> MIIDQTCCAimgAwIBAgITBmyfz5m/jAo54vB4ikPmljZbyjANBgkqhkiG9w0BAQsF >> >> rqXRfboQnoZsG4q5WTP468SQvvG5 >> ----- END CERTIFICATE----->> +QSSLCFG: 0,0,"cacert",1187 // The byte size of the indication must correspond to the byte size of the content of AmazonRootCA1.pem >> >> OK >> AT+QSSLCFG=0,0,"clientcert" // Upload the certificate.pem.crt to the FILE system >> >> > >> -----BEGIN CERTIFICATE----->> MIIDWjCCAkKgAwIBAgIVAKp/znqyrMfoSWNqhC/Ln+qsPPI4MA0GCSqGSIb3DQEB >> >> ++kMnCN/oHJzDl2jzL65XktQm99MojobbN121jZm3v34nqOuYFT6351CaA64DQ== >> ----- END CERTIFICATE----->> >> +QSSLCFG: 0,0,"clientcert",1224 // The byte size of the indication must correspond to the byte size of the content of xxx-certificate.pem.crt >> >> OK >> AT+QSSLCFG=0,0,"clientkey" // Upload the private.pem.key to the FILE system >> >> > >> -----BEGIN RSA PRIVATE KEY----->> MIIEowIBAAKCAQEA3rCImNdAS6x43he0Zn0hq7BGHrdt3ttIjYmTsCVttkcdGX3+ >> >> cnEBCR2U3DpU1qNrn0D8r8qCJjWbYJwzEbEoFaKi8zHuhLLVuuus >> -----END RSA PRIVATE KEY----->> >> +QSSLCFG: 0,0,"clientkey",1675 // The byte size of the indication must correspond to the byte size of the content of xxx-private.pem.key >> >> OK >> AT+QSSLCFG=0,0,"seclevel",2 // SSL authorization mode:server authentication >> >> OK >> AT+QMTCFG="ssl",0,1,0,0 //Enable SSL and configure SSL context/connect index >>

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```
>> OK
>> AT+QMTCFG="version",0,1
                                                    //Configure the MQTT version
>>
>> OK
>> AT+QSSLCFG=0,0
                                                    //Query and validate the results of the current configuration
>>
>> +QSSLCFG: 0,0,"seclevel",2
>> +QSSLCFG: 0,0,"sslversion",4
>> +QSSLCFG: 0,0,"dataformat",0,0
>> +QSSLCFG: 0,0,"timeout",90
>> +QSSLCFG: 0,0,"debug",0
>> +QSSLCFG: 0,0,"cacert",1187
>> +QSSLCFG: 0,0,"clientcert",1224
>> +QSSLCFG: 0,0,"clientkey",1675
>> +QSSLCFG: 0,0,"dtls",0
>> +QSSLCFG: 0,0,"dtlsversion",2
>>
>> OK
>> AT+QMTOPEN=0,"a9ohm2zbim3d5-ats.iot.us-east-1.amazonaws.com",8883 // Open the MQTT SSL connection
>>
>> OK
>>
>> +QMTOPEN: 0,0
>> AT+QMTCONN=0,"smartKit001"
                                                                              // Initiate the MQTT server connection
>>
>> OK
>>
>> +QMTCONN: 0,0,0
>> AT+QMTSUB=0,1,"toaws/smartKit001/update/message",1
                                                                              // Subscribe to related topic
>>
>> OK
>>
>> +QMTSUB: 0,1,0,1
>> AT+QMTPUB=0,1,1,0,"aws/meter001/data/report/message",23,"{"temp",22.5,"humi",68}"
// Publish messages to related topic
>>
>> OK
>>
>> +QMTPUB: 0,1,0
>>
>> +QMTRECV: 0,0,"toaws/smartKit001/update/message","{ "message": "Hello from AWS IoT console"}"
>> AT+QMTCLOSE=0
                                                                            // Initiating MQTT connection disconnected
>>
>> OK
>>
>> +QMTCLOSE: 0,0
```

六、Troubleshooting Abnormal Issues

If your device fails to connect to the AWS IoT platform, please refer to the following troubleshooting advice:

- 1) For details, see the procedure and methods in the document.
- 2) Check whether your device or module is successfully connected to the radio network.
- 3) Check whether your device or module successfully activates PDP and obtains IP address.
- 4) Please first verify whether the device data endpoint PING is successful.
- 5) Check whether the security policy, including TLS version and cipher suite, matches the module configuration parameters.
- 6) Check whether your CA certificate and key files are completely loaded into FILE.