SIM7600系列_AYLA_应用说明

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About Document

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1. Introduction

1.1 Purpose of the document

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

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

1.2 Related documents

[1] SIM7600 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;

2. AYLA Introduction

AYLA is a cloud network service. It can provide a series of solutions about cloud module information transmission and device management.

3. AT Commands for AYLA

Command	Description
AT+ADA	At command of ayla

3.1 AT+ADA="start" / "stop" Start / Stop the APCA service

AT+ADA="start" / "stop"	Start / Stop the APCA service
Start Command AT+ADA="start"	Response **OK** **+ADA: "start","done"** or **ERROR**
Stop Command AT+ADA="stop"	Response **OK** or **ERROR**
Parameter Saving Mode	-
Maximum Response Time	-
Reference	

Example

```
at+ada="start"
OK

+ADA: "start","done"

at+ada="stop"
OK
```

NOTE

●

3.2 AT+ADA="enable"/"disable" Enable/Disable the ADA connection

AT+ADA="enable"/"disable" Enable/Disable the ADA connection	
Enable Command **AT+ADA="enable"**	Response **OK** **+ADA: "enable","RDY"** or **ADA: "enable","err",<error code>,"<error string>: <explanation>"** **ERROR**
Disable Command **AT+ADA="disable"**	Response **OK** **+ADA: "disable","ok"** or **ADA: "disable","err",<error code>,"<error string>: <explanation>"** **ERROR**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< error code >	1: missing 2: busy 3: unknown 4: usage 5: len err 6: invalid 7: err 8: not supported 9: cmd id

< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur

Example

```
AT+ADA="enable"
OK

+ADA: "enable","RDY"
AT+ADA="disable"
OK

+ADA: "disable","ok"
```

3.3 AT+ADA="status" Get the ADA connection status

AT+ADA="status" Get the ADA connection status	
Read Command AT+ADA="status"	Response **OK** **+ADA: "status", <status code>**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< status code >	0: No error – connected 3: Non-specific error - the agent is not available for a non-specific issue 8: Busy - still connected, but the agent is temporarily not available to process more requests 15: Not connected – disabled 1:connected on line
<reason>	0:no reason 1:conf error 2:time error (time is not synchronized)

	3:net error

Example

```
AT+ADA="status"
+ADA: "status",0

ok
```

3.4 AT+ADA="l" Listen to the ADS

AT+ADA="l" Listen to the ADS	
Write Command **AT+ADA="l"**	Response **OK** **+ADA: "l",<status>**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< status >	string, indicate the connection status to the ADS "up": connect to the ADS; "down": loss connection to the ADS

Example

```
AT+ADA="l"
OK

+ADA: "l","up"
```

3.5 AT+ADA="g"/"s" Get/Send a property

AT+ADA="g"/"s" Get/Send a property

Read Command **AT+ADA="g","<name>"**	Response **OK** **+ADA:"g",<status>,"<name>","<type>","<value>"** or **+ADA: "g","err",<error code>,"<error string>: <explanation>"** **ERROR**
Write Command **AT+ADA="s","<name>","<type>","<value>"**	Response **OK** **+ADA: "s", "<name>", "status", <status code>** or **ADA: "g","err",<error code>,"<error string>: <explanation>"** **ERROR**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< name >	string, property name
< status >	string, result status "ok": success; "err": fail;
< type >	b: Boolean; i: Integer; d: Decimal; s: String; m: meta data
< value >	depends on different property type, max len=1024
< error code >	1: missing 2: busy 3: unknown 4: usage 5: len err 6: invalid 7: err 8: not supported

	9: cmd id
< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur
< type >	For AT+ADA="s" command b: Boolean; i: Integer; d: Decimal; s,st,ss,sn: String, s—used for short string, st—the first part of data, ss—the following part of data, sn—the last part of data; m: meta data
< status code >	0: No error; 1: type is not found; 4: bad syntax; 5: property name is too long; 6: value is invalid; 7: failed to send metadata

Example

```
AT+ADA="g", "Blue_LED"
OK

+ADA: "g","ok","Blue_LED","b",1

AT+ADA="s", "Blue_LED", "b", "0"
OK

+ADA: "s","Blue_LED","status",0
```

Send a long string property

```
AT+ADA="s","cmd","st","abcdefg"
OK

AT+ADA="s","cmd","ss","hijklmn"
OK

AT+ADA="s","cmd","sn","1234567890"
OK

+ADA: "s","cmd","status",0
```

3.6 AT+ADA="cg"/"cs" Get/Set local persist configration

AT+ADA="cg"/"cs" Get/Set local persist configration	
Read Command **AT+ADA="cg","<name>"**	Response **+ADA: "cg","<name>",<value>** **OK** or **+ADA: "cg","<name>","no change"** **OK** or **ADA: "cg","err",<error code>,"<error string>: <explanation>"** **ERROR**
Write Command **AT+ADA="cs","<name>",<value>**	Response **OK**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< name >	string, persist keyword oem/id : OEM id oem/model : OEM model oem/keyid : OEM provision key id oem/hwid : OEM hardware id oem/secret : OEM secret id oem/template_version : OEM template version server/region : Server region such as "CN"/"US" id/dev_id : Device dsn id/key : Device public key
< value >	depends on different persist type, max len=1024
< error code >	1: missing 2: busy 3: unknown 4: usage 5: len err

	6: invalid 7: err 8: not supported 9: cmd id
< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur

Example

```
AT+ADA="cs",          "oem/template_version",
"1.0-pwb"
OK

AT+ADA="cg", "oem/template_version"
OK

AT+ADA="cg", "abc"
ADA:    "cs","err",8,"not    supported:    config
name"

ERROR

AT+ADA="cs","id/key","st","<first public key>"
OK
AT+ADA="cs","id/key","ss","<following   public
key>"
OK
AT+ADA="cs","id/key","ss","<following   public
key>"
OK
AT+ADA="cs","id/key","sn","<last public key>"
OK
```

NOTE

- Only work after starting the ADA;

3.7 AT+ADA="sign" Calculating the signature

AT+ADA="sign" Calculating the signature	
Write Command **AT+ADA="sign",["st"]/["ss"]/["sn"],"<code>"**	Response **OK** or **+ADA: "sign","err",<error code>,"<error string>: <explanation>"** **ERROR**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

<code>	For AT+ADA="sign","st","<code>" The first part of private key.
<code>	For AT+ADA="sign","ss","<code>" The following part of private key.
<code>	For AT+ADA="sign","sn","<code>" The last part of private key.
< error code >	1: missing 2: busy 3: unknown 4: usage 5: len err 6: invalid 7: err 8: not supported 9: cmd id
< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur

Example

```
AT+ADA="sign","st","MIIEpQIBAAKCAQEAmukH7jHMh68OulRSnBij73vu7sQX31IVd6Ukx+Nnk6MisAaB"
OK
AT+ADA="sign","ss","C1t0XNWOwlScG0FuevhcFbvgBxeryQ9+wBXoCiDTVDI7IKXuQcaAZwq5U325K5VU"
OK
```

```
AT+ADA="sign","sn","pcov9Q9jyDQkEd71upNtAEoyFm5aOKUUBY+OXeOOdjpWDBSjdOJn93c=
"
OK
```

3.8 AT+ADA="setup_mode" Enable/Disable the setup mode

AT+ADA="setup_mode"	Enable/Disable the setup mode
Enable Command **AT+ADA="setup_mode","enable","<pass phrase>"**	Response **OK** or **ADA: "setup_mode","err",<error code>,"<error string>: <explanation>"** **ERROR**
Disable Command **AT+ADA="setup_mode","disable"**	Response **OK** or **ADA: "setup_mode","err",<error code>,"<error string>: <explanation>"** **ERROR**
Show Command **AT+ADA="setup_mode","show"**	Response **ADA: "setup_mode" <status>** **OK**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< pass phrase> >	string, The password
< status >	string, enable or disable.
< error code >	1: missing 2: busy 3: unknown 4: usage

	5: len err 6: invalid 7: err 8: not supported 9: cmd id
< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur

Example

```
AT+ADA="setup_mode","enable","secretkey"
OK

AT+ADA="setup_mode","disable"
OK

AT+ADA="setup_mode","show"
ADA: "setup_mode" enable

OK
```

3.9 AT+ADA="version" Show the version of the ADA

AT+ADA="version" Show the version of the ADA	
Show Command AT+ADA="version",["fota"]	Response **ADA: <fota version> <APCA version> <ADA version> <build version>** **OK**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< fota >	string, show the version of the module maker.
< fota version >	string, the version of the module maker

< APCA version >	string, the version of the APCA.
< ADA version >	string, the version of the ADA
< build version >	string, the version of the source code.

Example

```
AT+ADA="version"
ADA:            APCA-1.0            ADA-2.4.1
BUILD-5ee6ca5+.0672191+

OK

AT+ADA="version","fota"
ADA:    LE11B01SIM7600M11_NA_OTA_191012
B01V06      MDM9x07_AP_M_AT_V1.05_180525
APCA-1.0 ADA-2.4.1 BUILD-5ee6ca5+.0672191+

OK
```

3.10 AT+ADA="reset" Restore factory configuration

AT+ADA="reset" Restore factory configuration	
Show Command **AT+ADA="reset"**	Response **OK** or **ADA: "reset","err",<error code>,"<error string>: <explanation>"** **ERROR**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< error code >	1: missing 2: busy 3: unknown 4: usage 5: len err

	6: invalid 7: err 8: not supported 9: cmd id
< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur

Example

```
AT+ADA="reset"

OK
```

3.11 ADA :"ota","notify" Asynchronous Notification of the OTA

ADA :"ota","notify" Asynchronous Notification of the OTA	
	Response **ADA: "ota","notify",<type>,<id>,[<size>,<ver>]**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< type >	This is "host" or "module".
< id >	Short string specifying the ID of the OTA command to tie together the download and status commands.
< size >	Length of the image in bytes for the host OTA only.
< ver >	Version of the image from the cloud for the host OTA only

Example

```
Notification of the Host OTA

+ADA:  "ota","notify","host","idh1",150224,"ver
1.3"
```

Notification of the Module OTA

+ADA: "ota","notify","module","idm1"

3.12 AT+ADA="ota","dl" Downloading the Host Image

AT+ADA="ota","dl" Downloading the Host Image	
OTA Command **AT+ADA="ota","dl",<type>,<id>[,<size>]**	Response **OK** Async Response **+ADA: "ota","part",<id>,<data-base-64>** or **ADA: "ota","err",<error code>,"<error string>: <explanation>"** **ERROR**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< type >	This is "host" or "module".
< id >	Short string specifying the ID of the OTA command to tie together the download and status commands.
< size >	Length of the image in bytes for the host OTA only
< data-base-64>	Data in format base64.
< error code >	1: missing 2: busy 3: unknown 4: usage 5: len err 6: invalid 7: err 8: not supported 9: cmd id
< error string >	string, such as string invalid corresponding to error code 6
< explanation >	string, explain which error occur

Example

Downloading the Host OTA image of specified len

```
AT+ADA="ota","dl","host","idh1",128
OK

+ADA:
"ota","part","idh1","qHMvOsl52J8oad6w3Ll1J
tdcrk6jC+ij5iXVyW"
+ADA:
"ota","part","idh1","sh7w/J0pnFwT5fKFA6Ga
TW2g3rmClYuMKUZkTDU"
+ADA:
"ota","part","idh1","OKd58QLo6mh0uYDtQPc
dNiQb+Kj7Tt4n9MOz7Gg"
+ADA:
"ota","part","idh1","aUBykInk4qZtOa+vlplYck
nvC8oxmFtmgj8cqRu"
+ADA:
"ota","ok","idh1","JdqD2RqArBzr4gs="

AT+ADA="ota","dl","host","idh1",60
OK

+ADA:
"ota","part","idh1","eADOsl52J8oad6w3Ll2Ylt
yk6jC+ij5iXVyW"
+ADA:
"ota","ok","idh1","HyuO2RqArBzr4gs="
```

When all host image is download finish, the following async message is sent to host MCU

```
+ADA:"ota","dl","host","idh1","finish"
```

Downloading while Host OTA image in one download

```
AT+ADA="ota","dl","host","idh1"
OK

+ADA:
"ota","part","idh1","qHMvOsl52J8oad6w3Ll1J
tdcrk6jC+ij5iXVyW"
+ADA:
"ota","part","idh1","sh7w/J0pnFwT5fKFA6Ga
TW2g3rmClYuMKUZkTDU"
```

```
+ADA:
"ota","part","idh1","OKd58QLo6mh0uYDtQPc
dNiQb+Kj7Tt4n9MOz7Gg"
+ADA:
"ota","part","idh1","aUBykInk4qZtOa+vlplYck
nvC8oxmFtmgj8cqRu"
+ADA:
"ota","part","idh1","HIFUlLo6mh0uYDtQPcdNi
Qb+Kj7Tt4n9MOz7Gg"
…
…
…
+ADA:
"ota","ok","idh1","JdqD2RqArBzr4gs="
```

Downloading of the module OTA image

```
AT+ADA="ota","dl","module","idm1"
OK
```

NOTE

- Notice that the 128 bytes in example below of the image is downloaded first to, for example, check the header or in order to allow other commands to run during the download. Random data, which was 128 bytes before base-64 encoding, is shown

3.13 AT+ADA="ota","apply" Finishing the Module OTA Download

AT+ADA="ota","apply"	Finishing the Module OTA Download
Control Command AT+ADA="ota","apply" ,<type>,<id>	Response **OK**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< type >	Only support "module".
< id >	Short string specifying the ID of the OTA command to tie together the download and status commands.
< explanation >	string, explain which error occur

Example

Start a module OTA download:

```
AT+ADA="ota","dl","module","idm1"

OK
```

Send a notification when a module OTA download is complete:

```
+ADA: “ota","notify","module","idml","ready"
```

Have the MCU indicate that the module may apply the OTA and reboot:

```
AT+ADA="ota","apply","module","idm1"

OK
```

NOTE

- This command indicates that the module has completed the OTA download and is ready to apply the image.

3.14 AT+ADA="ota","mcu_mode" Set the mcu mode of Module OTA

AT+ADA="ota","mcu_mode" Set the mcu mode of Module OTA	
Control Command **AT+ADA="ota","mcu_mode","module",<id>,[<mode_value>]**	Response **OK**
Parameter Saving Mode	NO_SAVE
Maximum Response Time	-
Reference	

Defined Values

< id >	Short string specifying the ID of the OTA command to tie together the download and status commands.
< mode_value >	1 or 0. If mcu mode is set to 1, module will notify mcu when module OTA receive module OTA notify, then module wait host mcu's AT cmd to start module OTA download. If mcu mode is set to 0,module will download without notification .Default mcu mode value is 1.

Example

Set the mcu mode of module OTA download to 0:

```
AT+ADA="ota","mcu_mode","module","idm1",0

OK
```

Show current mcu mode of module OTA download:

```
AT+ADA="ota","mcu_mode","module","idm1"

OK
ADA: "ota","mcu_mode","module","idm1",0
```

NOTE

- This command indicates that the module has completed the OTA download and is ready to apply the image.

4. Samples

4.1 Generate config by AT command and run ayla device agent

```
//Example of Send/Get property

AT+CGDCONT=6, "IP","3gnet"                    //Set apn for channel 6.(value depends on different sim card)
OK
AT+CAPNET=6,1                                 // dial-up Internet
OK
+CAPNET: 6,1
AT+CHTPSERV="ADD","www.baidu.com",80,1         // Make time synchronized
OK
AT+CHTPUPDATE
OK
+CHTPUPDATE: 0
AT+ADA= "start "                              Start ada service
OK
AT+ADA="cs","id/dev_id","<DSN>"               Set dsn
OK
AT+ADA="cs","id/key","st","<first public key>"
OK
AT+ADA="cs","id/key","ss","<following public key>"
OK
AT+ADA="cs","id/key","ss","<following public key>"
OK
AT+ADA="cs","id/key","sn","<last public key>"
OK
AT+ADA="cs","oem/id","<OEM id>"               Set oem
OK
AT+ADA="cs","oem/model","<model>"             Set model
OK
AT+ADA="cs","server/region","CN"              Set region("CN"/"US")
OK
AT+ADA="cs","oem/secret","<oem secret>"       Set oem secret
```

OK	
AT+ADA="setup_mode","disable"	Disable setup mode
OK	
AT+ADA= "enable"	Enable the ADA connections
OK	
+ADA: "enable","RDY"	
AT+ADA="l"	Listen to the ADS
OK	
+ADA: "l","up"	
AT+ADA="cs", "oem/template_version", "1.0-pwb"	Set template version (shuold be same as template version on Ayla dashboard)
OK	
AT+ADA="s", "Blue_LED", "b", "1"	Send a property
OK	
+ADA: "s", "Blue_LED", "status", 0	
AT+ADA="g", "Blue_LED"	Get a property value
OK	
+ADA: "g", 0, "Blue_LED", "b", "1"	

4.2 Generate config by In Field Provison and run ayla device agent

//Example of Send/Get property	
AT+CGDCONT=6, "IP","3gnet"	//Set apn for channel 6.(value depends on different sim card)
OK	
AT+CAPNET=6,1	// dial-up Internet
OK	
+CAPNET: 6,1	
AT+CHTPSERV="ADD","www.baidu.com",80,1	// Make time synchronized
OK	
AT+CHTPUPDATE	
OK	
+CHTPUPDATE: 0	
AT+ADA= "start"	Start ada service
OK	
AT+ADA="cs","oem/id","ffa10123"	Set oem id
OK	
AT+ADA="cs","oem/model","ledevb"	Set model
OK	
AT+ADA="cs","oem/keyid","OAGHAWp9TXUB	Set provision key id

```
IDxE"
OK
AT+ADA="cs","oem/region","CN"                    Set region("CN"/"US")
OK
AT+ADA="cs","oem/hwid","myhwid1"                 Set hardware id
OK

AT+ADA="sign", "st", "<The first part of         Set privatekey
provision private key>"                          (max length is 2048bytes)
OK
AT+ADA="sign","ss","<The following part of
provision private key>"
OK
AT+ADA="sign","sn","<The last part of private
key>"
OK
AT+ADA= "enable"                                 Enable the ADA connections
OK
+ADA: "enable","RDY"
AT+ADA="l"                                       Listen to the ADS
OK
+ADA: "l","up"
```

4.3 The Module OTA

```
//Example of Send/Get property

AT+CGDCONT=6, "IP","3gnet"                       //Set apn for channel 6.(value depends on
OK                                               different sim card)
AT+CAPNET=6,1                                    // dial-up Internet
OK
+CAPNET: 6,1
AT+CHTPSERV="ADD","www.baidu.com",80,1           // Make time synchronized
OK
AT+CHTPUPDATE
OK
+CHTPUPDATE: 0
AT+ADA= "start"                                  Start the ADA service
OK
AT+ADA= "enable"                                 Enable the ADA connections
OK
```

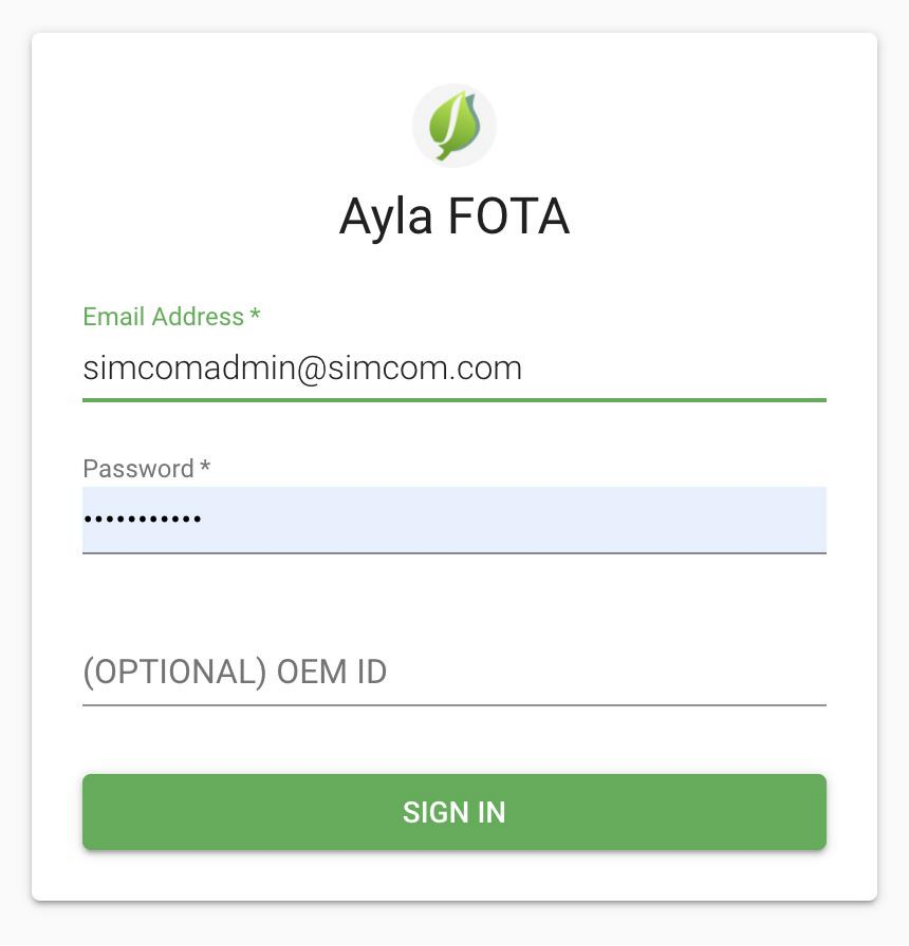
+ADA: "enable","RDY"	
AT+ADA="l"	Listen to the ADS
OK	Recieve the host OTA notification
+ADA: "l","up"	
+ADA: "ota","notify","module","idm1"	Download the host OTA image
AT+ADA="ota","dl","module","idm1",12800	
OK	
+ADA: "ota","notify","module","idml","ready"	Module OTA download is complete
AT+ADA="ota","apply","module","idm1"	
OK	Indicate that the host may apply the OTA and reboot
AT+CGDCONT=6, "IP","3gnet"	
OK	Host MCU need to dial up internet and start then enable the ADA service after Module reboot
AT+CAPNET=6,1	
OK	
+CAPNET: 6,1	
AT+ADA="start"	
AT+ADA="l"	
AT+ADA="enable"	
+ADA: "ota","notify","module","idml","done"	Module OTA done
AT+ADA="version","fota"	
+ADA: LE11B01SIM7600M11_NA_OTA_191012 B01V06 MDM9x07_AP_M_AT_V1.05_180525 APCA-1.0 ADA-2.4.1 BUILD-a88da1c.132a03a	Verify the module version after reboot
OK	

5. ADA User Guide

5.1 Fota 管理网站操作

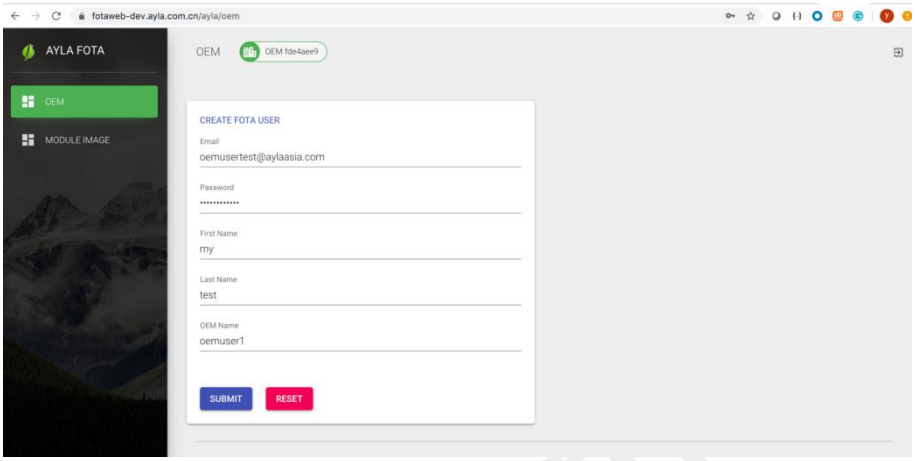
5.1.1 登陆 Module maker 管理账号

网页地址：https://fotaweb-dev.ayla.com.cn/login，使用 Simcom 的 module maker 管理账号登陆，如下图：

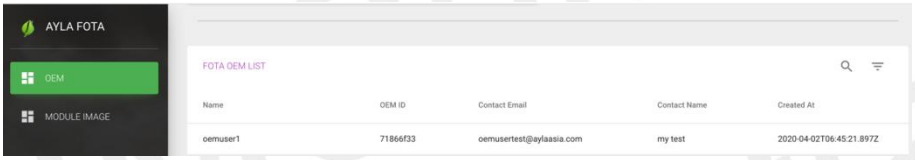


5.1.2 创建 OEM 账户

使用 simcom 的 module maker 账号登陆成功后，可以在 OEM 栏位下，为 OEM 创建账户。输入 OEM 用户的 email（如 oemusertest@aylaasia.com），OEM 用户名称等信息后点击 submit，如下图：.



创建成功的 OEM 用户如下



其中 OEM ID 栏位 71866f33 是该 OEM 用户的标识，需要记录下来提供给 OEM 用户

5.1.3 上传 module image

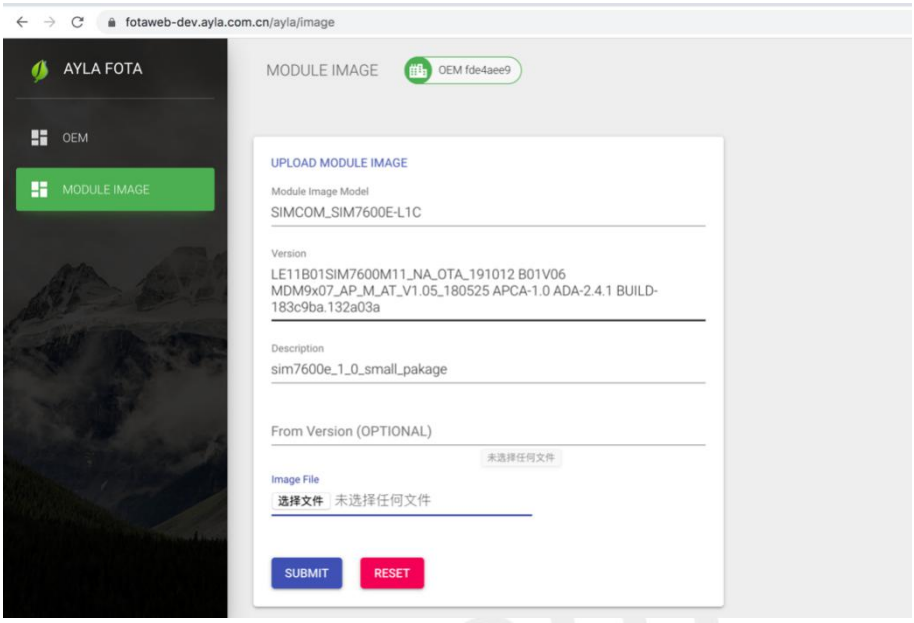
使用 simcom 的 module maker 账号，可以在 MODULE IMAGE 栏位下，上传 module image。输入示例如下：

1) Module Image Model 栏位
   输入“SIMCOM_SIM7600E-L1C”
   说明：联系 Module Maker 管理员得到 Module Model 信息。

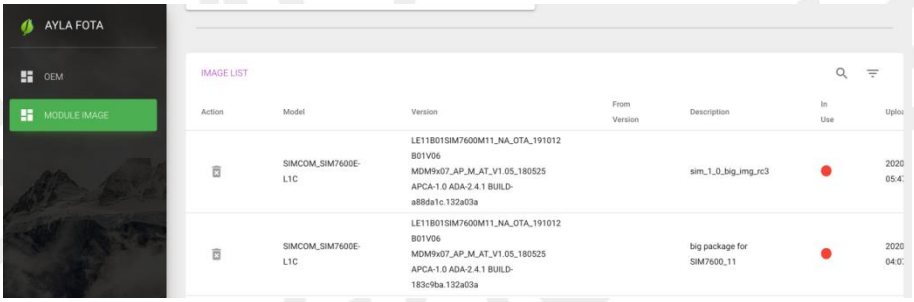
2) Version 栏位
   输入目标 version 的信息“ LE11B01SIM7600M11_NA_OTA_191012 B01V06 MDM9x07_AP_M_AT_V1.05_180525 APCA-1.0 ADA-2.4.1 BUILD-183c9ba.132a03a”。
   说明：该 Version 必须与目标 Firmware 的 Version 一致，可在 Firmware 上通过 AT+ADA="start", AT+ADA="version","fota", AT+ADA="stop"等命令查询得到，或者联系 Module Maker 管理员得到 version 信息。

3) Description 栏位
   输入 module image 说明，如“sim7600e_1_0_small_pakage”。

4) Image File
   选择 module image 上传，如“update_ota_sim_1_0_small.zip”，如下图：

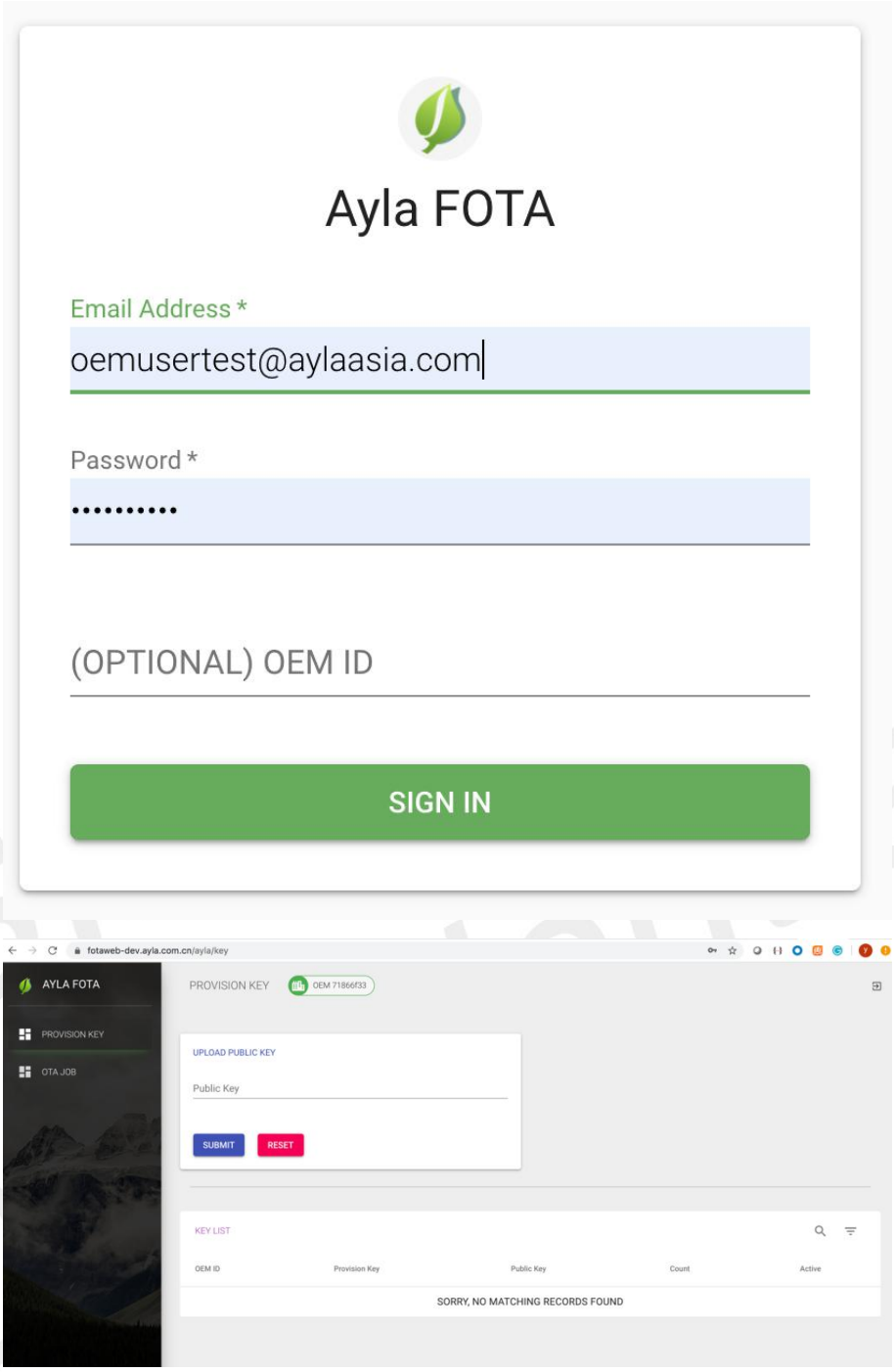


上传后的 module image 显示在 module list 下：



5.1.4 OEM 用户登陆账号

网页地址：https://fotaweb-dev.ayla.com.cn/login ，使用 OEM 用户账号（在 4.2.2 创建的 oemusertest@aylaasia.com）密码登陆，如下图



5.1.5 OEM 用户准备公钥私钥

OEM 用户需准备公钥私钥密码对，公钥用于在 OEM fota 页面生成 provision key，私钥用于设备端签名。每个 provision key 下会预留一组 DSN，用于分配给 OEM device。

使用如下命令准备公钥私钥对：

```
openssl genrsa -out rsa_private_key_2048.pem 2048
openssl pkcs8 -in rsa_private_key_2048.pem -out rsa_private_key_2048_pkcs8.pem -nocrypt -topk8
openssl rsa -in rsa_private_key_2048.pem -out rsa_public_key_2048.pem -pubout
```

公钥在文件rsa_public_key_2048.pem中，私钥在文件rsa_private_key_2048_pkcs8.pem中。公钥示例如下：

-----BEGIN PUBLIC KEY----- MIIBIjANBgkqhkiG9w0BAQEFAAOCAQ8AMIIBCgKCAQEAmukH7jHMh68OuIRSnBij
73vu7sQX31IVd6Ukx+Nnk6MisAaBC1t0XNWOwIScG0FuevhcFbvgBxeryQ9+wBXo
CiDTVDl7IKXuQcaAZwq5U325K5VUFV5Pu6hFVHap0B2DBeAjE8RBJQ7XmJBOmk20
xu/oyXA8CPCbXebFM89kZXqTJ6WGfmF0j4gL1eECOuGRbG4orUogJwcbLfkdHRt9
mhxaHvRWRhvcAcFuj/YNGgn4KenflYl0hoXVgL65hLO1R58REnFnGtMBjPwJPgVH
sQ+YFxjjyhaERERnbr2ZiyT2zw/LjJazt35lI2JEwTzkfQshD5/S4BXaDc5vreze kQIDAQAB -----END PUBLIC KEY-----

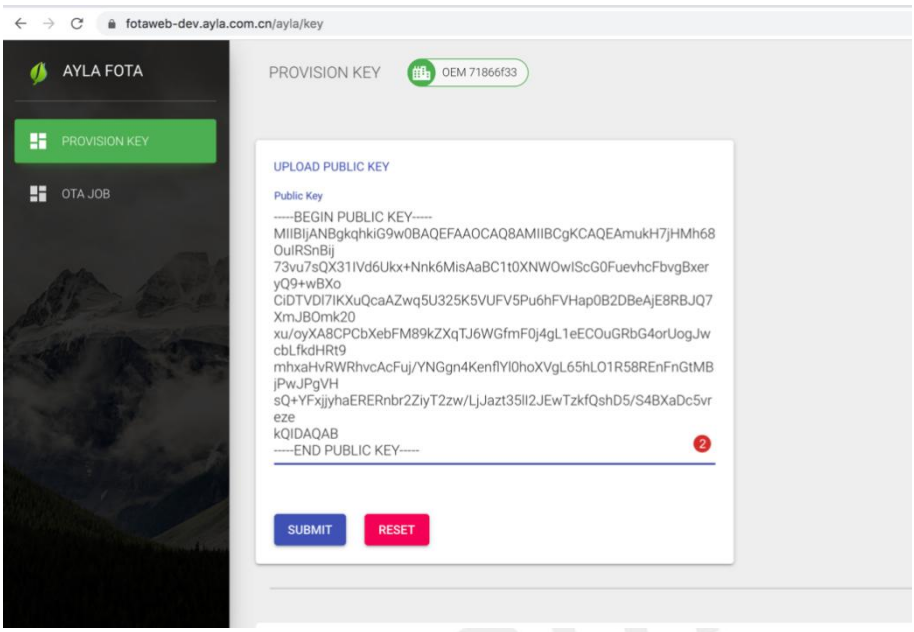
私钥示例如下：

-----BEGIN RSA PRIVATE KEY-----
MIIEpQIBAAKCAQEAmukH7jHMh68OuIRSnBij73vu7sQX31IVd6Ukx+Nnk6MisAaB
C1t0XNWOwIScG0FuevhcFbvgBxeryQ9+wBXoCiDTVDl7IKXuQcaAZwq5U325K5VU
FV5Pu6hFVHap0B2DBeAjE8RBJQ7XmJBOmk20xu/oyXA8CPCbXebFM89kZXqTJ6WG
fmF0j4gL1eECOuGRbG4orUogJwcbLfkdHRt9mhxaHvRWRhvcAcFuj/YNGgn4Kenf
lYl0hoXVgL65hLO1R58REnFnGtMBjPwJPgVHsQ+YFxjjyhaERERnbr2ZiyT2zw/L
jJazt35lI2JEwTzkfQshD5/S4BXaDc5vrezekQIDAQABAoIBAEZzRl0IntjyP0Kh
QySkfCHU/jPuUGEK5qJ0I4cYn6lgHs1pF9T/casqoHJjnM80cbdRLifgOqFfHYwi
FOXs0IuSpCmAvsN5UyLs0MaL9P7IhacRkZzqOF7Cx00DbnUshsLsTWeW8H2XA2vp
7SV1w4pZ30eFWHhEXJRW+EZ4wlL3stQttqsE1FYm9eWrKtz3niAEzZ12TIYcNBNF
I7PIf+X0AZv8EOU4tSpqwF76XO8tOYDt+Vq53gbXUng+NG9+MB805eF+dR4/T7UE
tkTHTHUYRbuj7+tqsVFajAXvi5hFO1a4NFn/Pj4eS+HFxyvnovwLNaZOl7rnOHvv
M59a4xUCgYEA+2TmjojyTLyF+9lU2+Z70ffw0ZBS5ZhZX/KI28Fco5Bn9FFjH3xf
tlnWCkCEuNBPNolIXGhSBUAiV4oDpSqjyYoMGTcVejqLdt4JUe5FVujMX2wMlURH
qH/f5cQBBEXQjUEi4iwlxXrUaqscsf68MM83BgL4DHzsojaIfZVGqTcCgYEAnb+Z
AXyFMTrDOUTrUCYvAiLF3s1uSrXFL9FB5ltbde1lRy7GCdRy9JxZwXzmGYQtanRo
6Epzv/j/Ti1rt+jECfZfwkQGEkRqtMaq833XymcLTrEHaijZ0g1rOFHnE+TSybx7
jR5pP/WyGFwIlQV9w+yCtXPPI4Yi8dizpEYQencCgYEAqW2qeXvQmWkhf8hMidv/
rVZGJmb3h6ey7JhgJoNeNRpZBW9ot8qyEwre14/+IzS5fk7txuHEDafYvVjV9hYT
xvvUBZZ7UiJs5hLlAyPr9ZP2UYVXwa4AAY8VThxYdxG6acjxgq8wUbTjvnROZaQC
H384XUPY+0mijfzk5oaZ1ecCgYEAk+k1BCnHkZNxvd8bbTmAVlZYhkLFKZQqYl2p
lt8OcRK5Jfd7hXgImceIeV4tOruvAeRJAZXd1qEYciswl27Pci/rNfImZzZzfzHQ
1SKoFYZtGcnwE+Bd7RDb+iEBtKuX4cSzbGyZb3lnFmQlP+W4ON8o6A7AqKR7W50/
Q8bWaJ0CgYEA4kpK/LlXMUihF5l4EjbcFAL3vsYfcYkOPK558cki/kriWeFbAjSN
ZwYRMI89690ppKbzrXY8XFTEqueXDT/Rr1V0VhWra4bzwLPk57JGuQfc2WiM4SmH
pcov9Q9jyDQkEd71upNtAEoyFm5aOKUUBY+OXeOOdjpWDBSjdOJn9wf= -----END RSA PRIVATE KEY-----

5.1.6 OEM 用户上传公钥生成 provision key

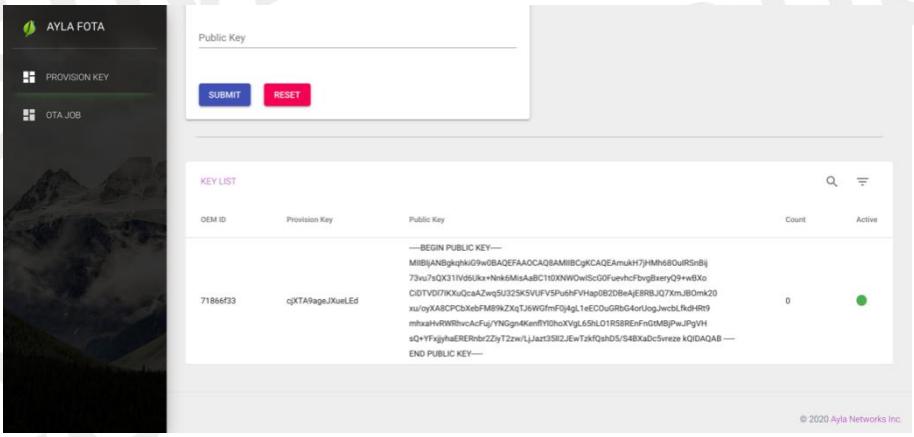
将文件 rsa_public_key_2048.pem 中的公钥拷贝，并粘贴到 UPLOAD PUBLIC KEY 框中，点击 submit，生成 provision key。

公钥内容需包含“-----BEGIN PUBLIC KEY-----”和“-----END PUBLIC KEY-----”。



5.1.7 查看 OEM 用户生成的 provision key

在 OEM 用户 PROVISION KEY 界面，查看 KEY LIST，得到生成的 Provision Key: cjXTA9ageJXueLEd，oem id 为：



5.1.8 OEM 用户确定该批设备的 model（oem model）

OEM 用户确定该批设备的 model，即一个字符串，用于表示 OEM 的一批设备。如 OEM model 设置为 myoemmodel。

5.1.9 OEM 用户依据 OEM model 向 Ayla 云端管理申请 DSN cname 解析

OEM 用户需要向 Ayla 云端管理申请 DSN cname，用以解析 Ayla 云端 Ayla Device Service 的 IP 地址。该 DSN cname 的格式为 “<oem_model>-<oem_id>-device.ayla.com.cn”，例如

“myoemmodel-71866f33-device.ayla.com.cn”。

其中 oem_model 为第八节确定的 oem model: myoemmodel，oem_id 为第二节创建 OEM 用户得到的 71866f33

5.1.10 配置 OEM 用户设备

启动 ayla 设备代理

```
at+ada="start"
OK

+ADA: "start","done"
```

配置 OEM 用户 ID

```
AT+ADA="cs","oem/id","71866f33"
OK
```

配置 OEM 用户 model

```
AT+ADA="cs","oem/model","myoemmodel"
OK
```

配置用户 provision key

```
AT+ADA="cs","oem/keyid","cjXTA9ageJXue
LEd"
OK
```

配置用户设备和硬件 ID

```
AT+ADA="cs","oem/hwid","myhwid1"
OK
```

使用私钥签名 OEM 设备

使用文件 rsa_private_key_2048_pkcs8.pem 中的私钥对设备进行签名,示例如下

```
AT+ADA="sign","st","MIIEpQIBAAKCAQEA
mukH7jHMh68OuIRSnBij73vu7sQX31IVd6Uk
x+Nnk6MisAaB"
AT+ADA="sign","ss","C1t0XNWOwlScG0Fue
vhcFbvgBxeryQ9+wBXoCiDTVDI7IKXuQcaA
Zwq5U325K5VU"
AT+ADA="sign","ss","FV5Pu6hFVHap0B2DB
eAjE8RBJQ7XmJBOmk20xu/oyXA8CPCbXeb
FM89kZXqTJ6WG"
AT+ADA="sign","ss","fmF0j4gL1eECOuGRb
G4orUogJwcbLfkdHRt9mhxaHvRWRhvcAcF
uj/YNGgn4Kenf"
AT+ADA="sign","ss","IYI0hoXVgL65hLO1R5
```

8REnFnGtMBjPwJPgVHsQ+YFxjjyhaERERnb
r2ZiyT2zw/L"
AT+ADA="sign","ss","jJazt35ll2JEwTzkfQsh
D5/S4BXaDc5vrezekQIDAQABAoIBAEZzRl0I
ntjyP0Kh"
AT+ADA="sign","ss","QySkfCHU/jPuUGEK5
qJ0l4cYn6lgHs1pF9T/casqoHJjnM80cbdRLif
gOqFfHYwi"
AT+ADA="sign","ss","FOXs0luSpCmAvsN5
UyLs0MaL9P7lhacRkZzqOF7Cx00DbnUshsL
sTWeW8H2XA2vp"
AT+ADA="sign","ss","7SV1w4pZ30eFWHhE
XJRW+EZ4wlL3stQttqsE1FYm9eWrKtz3niAE
zZ12TlYcNBNF"
AT+ADA="sign","ss","l7Plf+X0AZv8EOU4tSp
qwF76XO8tOYDt+Vq53gbXUng+NG9+MB805
eF+dR4/T7UE"
AT+ADA="sign","ss","tkTHTHUYRbuj7+tqsV
FajAXvi5hFO1a4NFn/Pj4eS+HFxyvnovwLNa
ZOl7rnOHvv"
AT+ADA="sign","ss","M59a4xUCgYEA+2Tmj
ojyTLyF+9lU2+Z70ffw0ZBS5ZhZX/Kl28Fco5B
n9FFjH3xf"
AT+ADA="sign","ss","tlnWCkCEuNBPNoIlX
GhSBUAiV4oDpSqjyYoMGTcVejqLdt4JUe5F
VujMX2wMlURH"
AT+ADA="sign","ss","qH/f5cQBBEXQjUEi4i
wlxXrUaqscsf68MM83BgL4DHzsojalfZVGqTc
CgYEAnb+Z"
AT+ADA="sign","ss","AXyFMTrDOUTrUCYv
AiLF3s1uSrXFL9FB5ltbde1lRy7GCdRy9JxZw
XzmGYQtanRo"
AT+ADA="sign","ss","6Epzv/j/Ti1rt+jECfZfwk
QGEkRqtMaq833XymcLTrEHaijZ0g1rOFHnE
+TSybx7"
AT+ADA="sign","ss","jR5pP/WyGFwIlQV9w+
yCtXPPI4Yi8dizpEYQencCgYEAqW2qeXvQm
Wkhf8hMidv/"
AT+ADA="sign","ss","rVZGJmb3h6ey7JhgJ
oNeNRpZBW9ot8qyEwre14/+lzS5fk7txuHEDa
fYvVjV9hYT"
AT+ADA="sign","ss","xvvUBZZ7UiJs5hLlAy
Pr9ZP2UYVXwa4AAY8VThxYdxG6acjxgq8w
UbTjvnROZaQC"
AT+ADA="sign","ss","H384XUPY+0mijfzk5o
aZ1ecCgYEAk+k1BCnHkZNxvd8bbTmAVlZY

```
hkLFKZQqYl2p"
AT+ADA="sign","ss","lt8OcRK5Jfd7hXgImce
leV4tOruvAeRJAZXd1qEYciswl27Pci/rNflmZ
zZzfzHQ"
AT+ADA="sign","ss","1SKoFYZtGcnwE+Bd7
RDb+iEBtKuX4cSzbGyZb3lnFmQlP+W4ON8
o6A7AqKR7W50/"
AT+ADA="sign","ss","Q8bWaJ0CgYEA4kpK/
LlXMUihF5l4EjbcFAL3vsYfcYkOPK558cki/kri
WeFbAjSN"
AT+ADA="sign","ss","ZwYRMl89690ppKbzr
XY8XFTEqueXDT/Rr1V0VhWra4bzwLPk57JG
uQfc2WiM4SmH"
AT+ADA="sign","sn","pcov9Q9jyDQkEd71u
pNtAEoyFm5aOKUUBY+OXeOOdjpWDBSjd
OJn9wf="
OK
```

设置服务器域

```
AT+ADA="cs","server/region","CN"
OK
```

关闭设置模式

```
AT+ADA="setup_mode","disable"
OK
```

拨号联网

```
AT+CAPNET=1,1
OK
+CAPNET: 1,1
```

设备连接云端

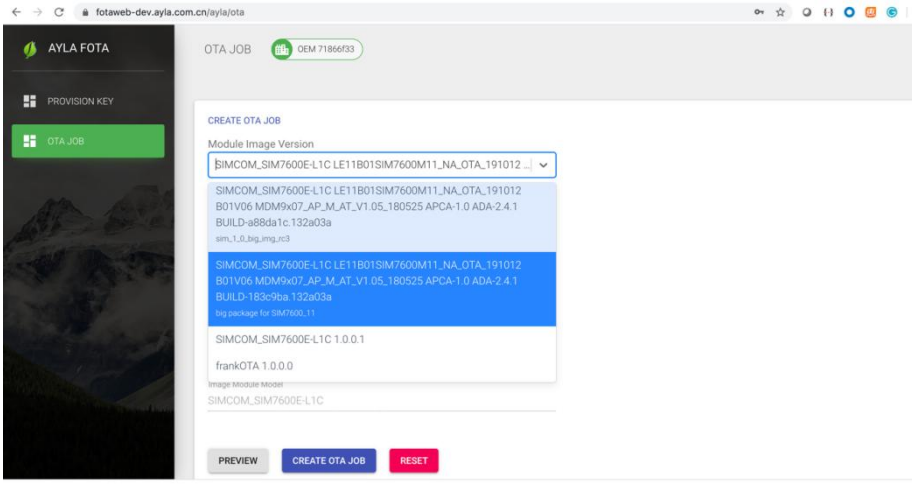
```
AT+ADA="enable"
OK
+ADA: "enable","RDY"
+ADA: "status",0
```

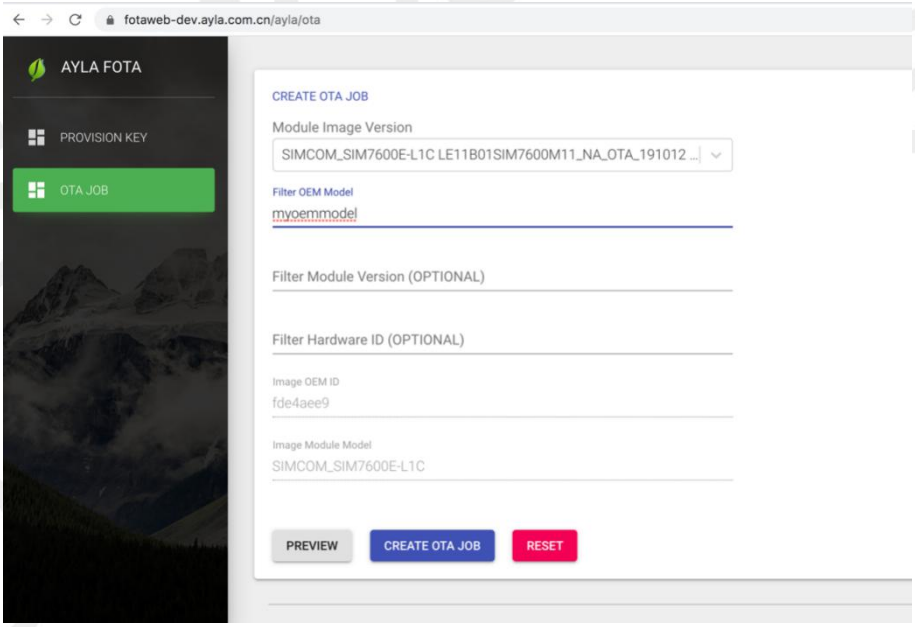
设备开始监听云端通知

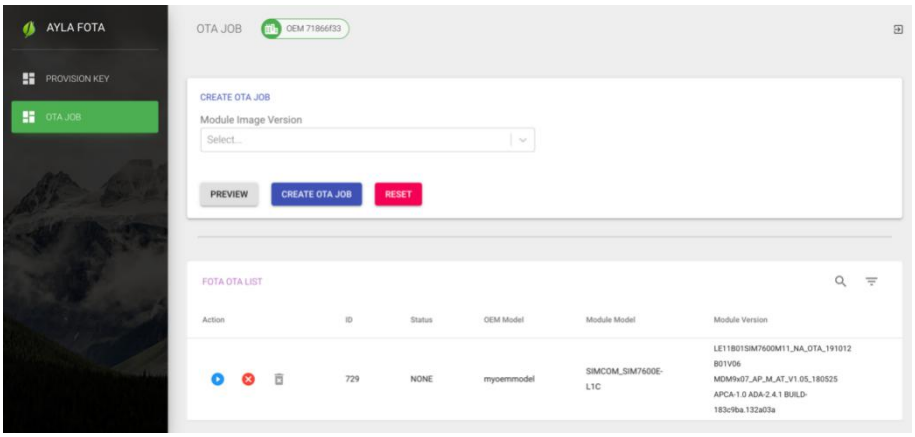
```
AT+ADA="l"
OK
+ADA: "l","up"
```

5.1.11 OEM 用户创建 OTA 任务

OEM 用户登录 fota web 页面 https://fotaweb-dev.ayla.com.cn/ayla/ota，进入 OTA 栏位，创建 OTA 任务。
首先选择 Module Maker 上传的 module image，即需要将设备升级到的目标版本。
然后在 Filter OEM Model 栏位输入 OEM model，如 myoemmodel，点击 CREATE OTA JOB：

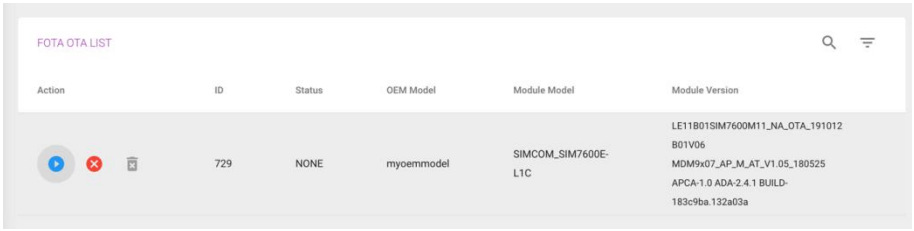




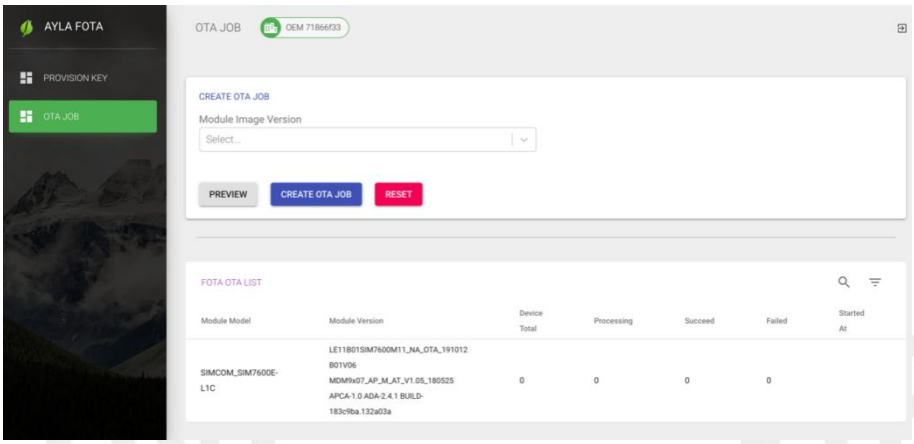


5.1.12 OEM 用户启动 OTA 任务

点击 Action 中的 start 按钮启动 OTA 任务



在 OTA job 中查看 OTA 任务当前状态，进行 OTA 的设备总数，进行中的数量，成功的数量等：



5.1.13 OEM 设备端配合 OTA 任务进行

确定 OEM 设备端当前版本和目标版本不一致（如果一致，云端 OTA 任务不会成功）

```
AT+ADA="version","fota"
ADA:  LE11B01SIM7600M11_NA_OTA_191012
B01V06    MDM9x07_AP_M_AT_V1.05_180525
APCA-1.0 ADA-2.4.1 BUILD-a88da1c.132a03a

OK
```

OEM 设备端收到 OTA 通知，会向 Host MCU 发送 AT OTA 异步通知如下

```
+ADA: "ota","notify","module","idm1"
```

Host MCU 需要发送 AT OTA 下载命令

```
AT+ADA="ota", "dl", "module", "idm1"

OK
```

OEM 设备下载 module image 完成后，向 Host MCU 发送 AT OTA 异步通知下载完成

```
+ADA:
"ota","notify","module","idm1","ready"
```

Host MCU 需要向 Module 发送 Apply AT OTA 命令

```
AT+ADA="ota", "apply", "module", "idm1"

OK
```

Apply 后，模组开始升级 firmware 并重启。模组重启后，Host Mcu 需要拨号联网并启动 Ayla 设备代理：

```
AT+ADA="start
```

```
AT+ADA="enable"
AT+ADA="l"
```

模组再次连云后，与云端确认新版本号，版本升级成功,向 Host Mcu 发送 AT 异步通知 OTA 完成

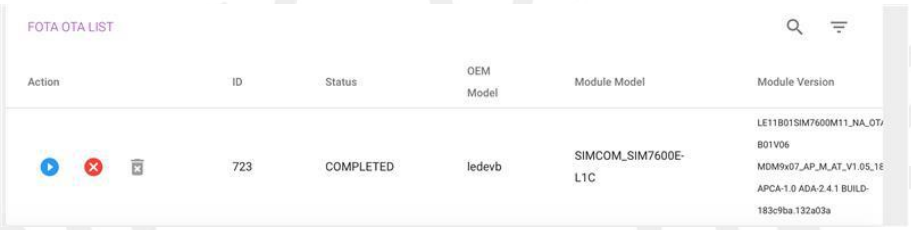
```
+ADA:
"ota","notify","module","idm1","done"
```

同时可以通过 AT 命令查询升级后的版本号,与升级目标版本一致

```
AT+ADA="version","fota"
ADA:  LE11B01SIM7600M11_NA_OTA_191012
B01V06    MDM9x07_AP_M_AT_V1.05_180525
APCA-1.0 ADA-2.4.1 BUILD-183c9ba.132a03a

OK
```

5.1.14 OEM OTA 管理页面确认 OTA 任务完成



5.2 设备端操作

设备端使用 AT 命令与 Ayla 云端服务进行交互。

具体的使用方式请参考第三章节和第四章节内容。