SIM7070_SIM7080_SIM7090 Series_CoAP _Application Note

LPWA Module

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About Document

Version History

Version	Date	Owner	What is new
V1.00	2019.9.2	Wenjie.Lai	First Release
V1.01	2020.2.26	Wenjie.Lai	Added product types
V1.02	2020.7.8	Wenjie.Lai	All

Scope

This document applies to the following products

Name	Type	Size(mm)	Comments
SIM7080G	CAT-M/NB	17.6*15.7*2.3	N/A
SIM7070G/SIM7070E	CAT-M/NB/GPRS	24*24*2.4	N/A
SIM7070G-NG	NB/GPRS	24*24*2.4	N/A
SIM7090G	CAT-M/NB	14.8*12.8*2.0	N/A

Contents

1 Introduction

1.1 Purpose of the document

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

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

1.2 Related documents

[1] SIM7070_SIM7080_SIM7090 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);

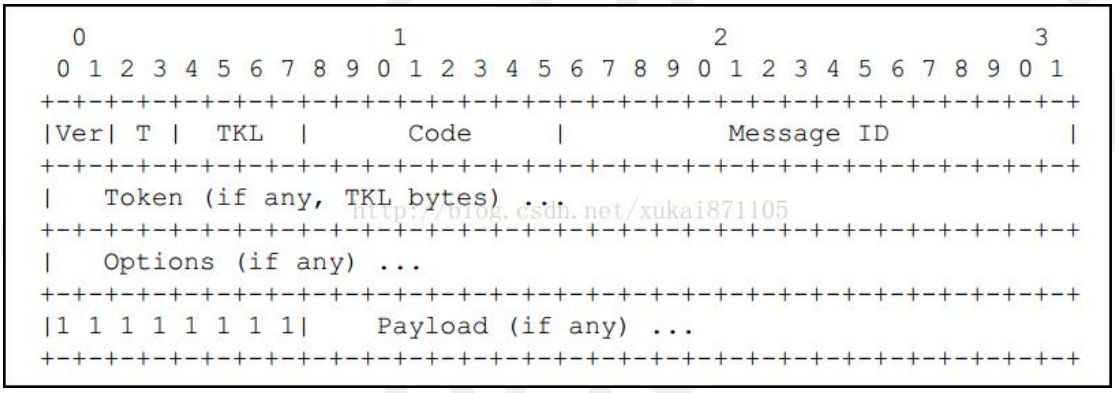
In application, controlling device controls the GSM engine by sending AT Command via its serial interface. The controlling device at the other end of the serial line is referred to as following term:

- TE (Terminal Equipment);
- DTE (Data Terminal Equipment) or plainly "the application" which is running on an embedded system;

2 CoAP Introduction

In the IoT application, there is a network between the device and the device, and they need to communicate with each other. However, because IoT devices are usually resource-constrained, limited CPU capacity, limited RAM, limited flash, and limited network bandwidth, the CoAP (Constrained Application Protocol) protocol borrows the HTTP protocol mechanism and simplifies for such special scenarios. The protocol Packet format. The communication between IoT devices is succinctly realized.

In order to allow small devices to access the Internet, the CoAP protocol was designed. CoAP is an application layer protocol, which runs on the UDP protocol instead of running on TCP like HTTP. The CoAP protocol is very small, and the smallest data packet is only 4 bytes.



2.1 CoAP protocol features

1. Based on message model, four message types are defined, and the message is the data communication carrier, and the data communication between devices is realized by exchanging network messages.

2. The operation of the CoAP Server cloud device resource is completed by the request and response mechanism. Similar to HTTP, the device can operate the server resource through four request methods (GET, PUT, POST, DELETE). The request and response packets are placed in the CoAP message for transmission.

3. Message-based two-way communication (M2M), both the CoAP Client and the CoAP server can send requests to each other independently. Both parties can be in the client or server role.

4. The protocol packet is lightweight and has a minimum length of only 4B.

5. Support reliable transmission, data retransmission, block transmission. Ensure that data arrives reliably

6. Support IP multicast, which can send requests to multiple devices at the same time (such as CoAP client search for CoAP Server)

7. Non-long connection communication for low power IoT scenarios.

3 AT Commands for CoAP

Command	Description
AT+CCOAPPDPID	Select PDP Index for CoAP
AT+CCOAPINIT	Create CoAP object
AT+CCOAPURL	Configure CoAP URL
AT+CCOAPPARA	Assembling CoAP data Packet
AT+CCOAPACTION	Operate CoAP object
AT+CCOAPHEAD	Read head of CoAP packet
AT+CCOAPREAD	Read data of CoAP Packet
AT+CCOAPTERM	Delete CoAP object

For detail information, please refer to “SIM7070_SIM7080_SIM7090 Series_AT Command Manual ”.

4 Bearer Configuration

Usually module will register PS service automatically.

4.1 PDN Auto-activation

```
//Example of PDN Auto-activation.

AT+CPIN?                          //Check SIM card status
+CPIN:READY

OK
AT+CSQ                            //Check RF signal
+CSQ: 20,0

OK
AT+CGATT?                         //Check PS service. 1 indicates PS has attached.
+CGATT: 1

OK
AT+COPS?                          //Query Network information, operator and network.
+COPS: 0,0,"CHN-CT",9             //Mode 9 means NB-IOT network.

OK
AT+CGNAPN                         //Query the APN delivered by the network after the CAT-M or NB-IOT network is successfully registered.
+CGNAPN: 1,"ctnb"                 //"ctnb" is APN delivered by the CAT-M or NB-IOT network. APN is empty under the GSM network.

OK
AT+CNCFG=0,1,"ctnb"               //Before activation please use AT+CNCFG to set APN\user name\password if needed.

OK
AT+CNACT=0,1                      //Activate network, Activate 0th PDP.
OK

+APP PDP: 0,ACTIVE
```

AT+CNACT?	//Get local IP
+CNACT: 0,1,"10.94.36.44" **+CNACT: 1,0,"0.0.0.0"** **+CNACT: 2,0,"0.0.0.0"** **+CNACT: 3,0,"0.0.0.0"**	
OK	

4.2 APN Manual Configuration

If not attached automatically, could configure correct APN setting.

//Example of APN Manual configuration.	
AT+CFUN=0	//Disable RF
+CPIN: NOT READY **OK**	
AT+CGDCONT=1,"IP","ctnb"	//Set the APN manually. Some operators need to set APN first when registering the network.
OK	
AT+CFUN=1	//Enable RF
OK **+CPIN: READY**	
AT+CGATT?	//Check PS service. 1 indicates PS has attached.
+CGATT: 1 **OK**	
AT+CGNAPN	//Query the APN delivered by the network after the CAT-M or NB-IOT network is successfully registered.
+CGNAPN: 1,"ctnb"	//"ctnb" is APN delivered by the CAT-M or NB-IOT network. APN is empty under the GSM network.
OK	
AT+CNCFG=0,1,"ctnb"	//Before activation please use AT+CNCFG to set APN\user name\password if needed.
OK	
AT+CNACT=0,1	//Activate network, Activate 0th PDP.
OK	

```
+APP PDP: 0,ACTIVE
AT+CNACT?                                   //Get local IP
+CNACT: 0,1,"10.94.36.44"
+CNACT: 1,0,"0.0.0.0"
+CNACT: 2,0,"0.0.0.0"
+CNACT: 3,0,"0.0.0.0"

OK
```

5 CoAP Examples

//CoAP Examples	
AT+CNACT=0,1	// Activating network bearing
OK	
+APP PDP: 0,ACTIVE	
AT+CCOAPINIT	//Create CoAP object
OK	
AT+CCOAPURL="coap://117.131.85.139:6011"	//Configure CoAP URL
OK	
AT+CCOAPPARA="CODE",1,uri-path,0,"home/query",uri-query,0,"address=1",payload,0,"hello world"	//Assembling CoAP data packet
OK	
AT+CCOAPACTION	//Send data, Message id is 1
+CCOAPACTION: 0,1	//Received data, Message id is 1, data length is14 bytes, data payload is 9 bytes.
OK	
+CCOAPRECV: 1,14,9	
AT+CCOAPACTION=4	//Get receive queen.
+CCOAPACTION: 4,1,1	//The current receive queue has a total of 1 data packet, and the first packet id is 1.
OK	
AT+CCOAPHEAD=1,1	//Read the packet header with message id of 1 and print it parsed.
+CCOAPHEAD: 1,1,2,0,4.04,1,,,,,,0,,,,,,,,,,	
OK	
AT+CCOAPREAD=1	//Read the receive packet payload with message id of 1
+CCOAPREAD: 9,Not Found	//The total byte length is 9 and the content is Not Found.
OK	
AT+CCOAPTERM	//Delete CoAP Object
OK	
AT+CNACT=0,0	// Deactivating network bearing
OK	

```
+APP PDP: 0,DEACTIVE
```