SIM7020 Series_LWM2M_Application Note

LPWA Module
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About Document

Version History

<table>
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<th>Version</th>
<th>Date</th>
<th>Owner</th>
<th>What is new</th>
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<tr>
<td>V1.00</td>
<td>2018.04.10</td>
<td>Linshu Guan</td>
<td>First Release.</td>
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<tr>
<td>V1.01</td>
<td>2018.06.07</td>
<td>Albert Meng</td>
<td>Revised</td>
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<td>V1.02</td>
<td>2019.05.10</td>
<td>Wenjie.li</td>
<td>Update bear configuration</td>
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<tr>
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<td>2020.06.10</td>
<td>Xiaohui Xu</td>
<td>All</td>
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Scope

This document applies to the following products

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<th>Name</th>
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<td>NB1</td>
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<tr>
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1 Introduction

1.1 Purpose of the document

Based on module AT command manual, this document will introduce LWM2M application process. Developers could understand and develop application quickly and efficiently based on this document.

1.2 Related documents


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 LWM2M Introduction

The full name of LWM2M is Lightweight Machine-To-Machine, which is an Internet of things protocol defined by OMA (open Mobile Alliance). It can be used on embedded devices with limited resources (including storage, power consumption, etc.).

The LWM2M protocol has the following features:
1) The protocol is based on the REST architecture.
2) The protocol delivery is achieved through the CoAP protocol.
3) The protocol defines a compact, efficient and scalable data model.

LWM2M defines three logical entities:
1) LWM2M Server.
2) LWM2M client is responsible for executing the server commands and reporting the execution results.
3) LWM2M boot server The Bootstrap server is responsible for configuring the LWM2M client.
## 3 AT Commands for LWM2M

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
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<tbody>
<tr>
<td>AT+CLMCONF</td>
<td>Configure LwM2M instance and create the connection</td>
</tr>
<tr>
<td>AT+CLMADDOBJ</td>
<td>Add LwM2M object</td>
</tr>
<tr>
<td>AT+CLMDELOBJ</td>
<td>Delete LwM2M object</td>
</tr>
<tr>
<td>AT+CLMREAD</td>
<td>Read notification and command</td>
</tr>
<tr>
<td>AT+CLMWRITE</td>
<td>Write notification and command</td>
</tr>
<tr>
<td>AT+CLMEXECUTE</td>
<td>Execute notification and command</td>
</tr>
<tr>
<td>AT+CLMNOTIFY</td>
<td>Notify data change</td>
</tr>
<tr>
<td>AT+CLMDEL</td>
<td>Delete LwM2M instance</td>
</tr>
<tr>
<td>+CLMOBSERVE</td>
<td>Indicated an observe command</td>
</tr>
<tr>
<td>+CLMPARAMETER</td>
<td>Indicated an observer's parameter</td>
</tr>
<tr>
<td>+CLMERR</td>
<td>Indicated there are some errors</td>
</tr>
</tbody>
</table>

For detail information, please refer to “SIM7020 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+CGREG?** //Check PS service
+CGREG: 0,1

OK

**AT+CGACT?** //Activated automatically.
+CGACT: 1,1

OK

**AT+COPS?** //Query Network information, operator and network mode 9, NB-IOT network
+COPS: 0,2,"46000",9

OK

**AT+CGCONTRDP** //Attached PS domain and got IP address automatically.
+CGCONTRDP: 1,5,"cmnbiot","100.80.73.123.255.255.255.0"

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*MCGDEFCONT="IP","cmnbioT"  // Set the APN manually
OK
AT+CFUN=1  //Enable RF
OK
+CPIN: READY
AT+CGREG?  //Inquiry PS service .1 indicates PS has attached.
+CGREG: 0,1
OK
AT+CGCONTRDP  //Attached PS domain and got IP address automatically
+CGCONTRDP:
1,5,"cmnbioT","100.80.73.123.255.255.255.0"
OK
```
5 LWM2M Examples

//Example of LWM2M Service.

AT+CLMCONF="182.150.27.21","5683","1222","sim7020test","IPv4",100
+CLMCONF: 0

OK

AT+CLMADDOBJ=0,5,2,8,0,1,2,3,4,5,6,7
OK

AT+CLMDELOBJ=0,5
OK

+CLMREAD: 0,5,2,1,1

AT+CLMREAD=0,5,2,1,1,"S",5,"abcde"
OK

+CLMWRITE: 0,5,2,1,1,"S",4,"abcd"

AT+CLMWRITE=0,0
OK

+CLMEXECUTE: 0,5,2,1,3,"abc"

AT+CLMEXECUTE=0,0
OK

+CLMOBSERVE: 0,0,5,2,3

+CLMPARAMETER:0,5,2,3,1,0,200,300,2,0,5,0,1

AT+CLMNOTIFY=0,5,2,3
OK

AT+CLMDEL=0
OK

//Create LWM2M connection
//If succeed, LWM2M server instance id will return.

//Create object.

//Delete object.

//Got READ message

//Read

//Got WRITE message

//Write.

//Got execute message

//Execute.

//Got OBSERVE message

//With parameters

//Notify configuration.

//Disconnect and delete instance.