



# SIM7020 Series\_FOTA \_Application Note

LPWA Module

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# About Document

## Version History

| Version | Date       | Owner      | What is new   |
|---------|------------|------------|---------------|
| V1.00   | 2018.9.21  | Yong.Lu    | First Release |
| V1.01   | 2018.11.22 | Yong.Lu    | Revised       |
| V1.02   | 2020.6.10  | Wenjie.Lai | All           |

## Scope

This document applies to the following products

| Name     | Type     | Size (mm) | Comments  |
|----------|----------|-----------|---|
| SIM7020C | NB1      | 17.6*15.7 | Band 1/3/5/8  |
| SIM7020E | NB1      | 17.6*15.7 | Band 1/3/5/8/20/28                                      |
| SIM7030  | NB1      | 16*18     | Band LTE FDD 1/3/5/8                                    |
| SIM7060  | NB1+GNSS | 24*24     | Band LTE FDD 5/8  |
| SIM7020G | NB2      | 17.6*15.7 | Band 1/2/3/4/5/8/12/13/17/18/19/20/25/26/28/66/70/71/85 |
| SIM7060G | NB2+GNSS | 24*24     | Band 1/2/3/4/5/8/12/13/17/18/19/20/25/26/28/66/70/71/85 |

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# 1 Introduction

## 1.1 Purpose of the document

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

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

## 1.2 Related documents

[1] SIM7020 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 FOTA Introduction

FOTA is the abbreviation of firmware upgrade over the Air.

FOTA provides a method which allows device to update the core firmware over the air. Considering the specialty and variety of modern usage, SIMCOM refines the whole FOTA procedure. Customers can use AT interface to accomplish SIM7020 Firmware upgrade according to their own condition.

Here is general process to get the delta file from SIMCom.

- 1 Once customer requires the delta file from base line version, just contact SIMCom.
- 2 SIMCom will generate delta file based on the requirements and upload it to FOTA server. SIMCom uses third party FOTA server and maintains the server.
- 3 Customer just needs to trigger FOTA process in application level to target new version.

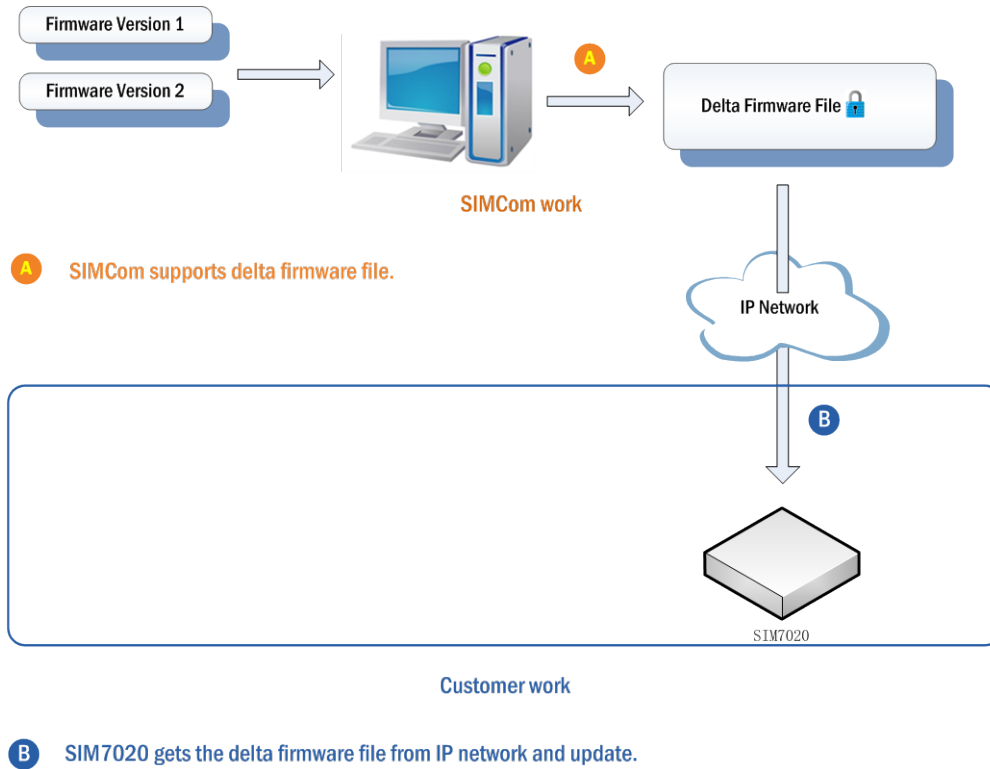
The size of the delta file (differential firmware package file between two versions) depends on the difference between the two firmware versions.

Here are two methods for upgrading firmware using delta file.

### 2.1 Update over the air

Delta file could be downloaded over cellular network. The speed is different under different network.

Broken-point Continuingly-transferring mechanism is supported during differential package transfer procedure.



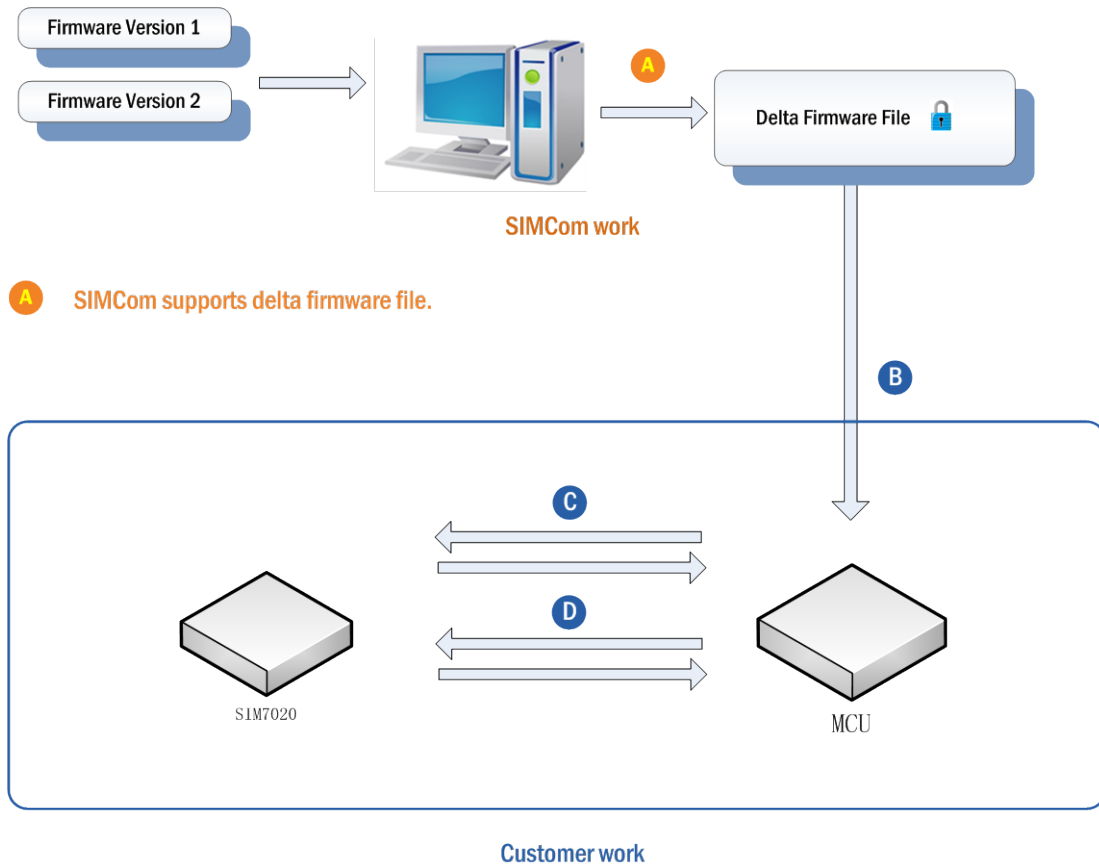
## 2.2 Update through the hardware interface

Supposed delta file will be transferred via UART or USB interface from external controller. Below is the flow diagram.

After delta file transferred to module specified memory space, external controller can trigger one AT command to start the update process. Module will reboot itself after the process is finished successfully.

### NOTE

- The module will continue upgrading the firmware after reboot once terminated accidentally in previous loop. Below is the block diagram for this method.



**A** SIMCom supports delta firmware file.

**B** MCU gets the delta firmware file from SIMCOM directly

**C** MCU writes the delta firmware file to the fixed place of SIM7020 by AT commands.

**D** MCU requires SIM7020 to update by sending AT commands.

## 2.3 Update through HTTP

There have some AT commands to download through HTTP.



## 3 FOTA Related AT commands

This chapter describes AT commands related to FOTA.

| AT Command | Description    |
|------------|----------------|
| AT+CFOTA   | FOTA Operation |
| AT+CFLE    | Flash Erase    |
| AT+CFLW    | Flash Write    |
| AT+CFLR    | Flash Read     |

For detail information, please refer to “SIM7020 Series\_AT Command Manual”.

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## 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: 27,99

OK
AT+CGREG? //Check PS service. 1 indicates PS has attached.
+CGREG:0,1

OK
AT+CGACT? //PDN active success
+CGACT:1,1

OK
AT+COPS? //Query Network information, operator and
network mode 9, NB-IOT network
+COPS:0,0,"CHN-UNICOM",9

OK
AT+CGCONTRDP //Attached PS domain and got IP address
automatically
+CGCONTRDP:
1,5,"shnbiot","10.250.0.213.255.255.255.0"

OK
```

## 4.2 APN Manual Configuration

//Example of APN Manual configuration.

```
AT+CFUN=0 // Disable RF
+CPIN: NOT READY

OK
AT*MCGDEFCONT="IP","3GNET" // Set the APN manually

OK
AT+CFUN=1 // Enable RF
OK
+CPIN:READY
AT+CGREG? // Inquiry PS service
+CGREG:0,1

OK
AT+CGCONTRDP // Attached PS domain and got IP address
automatically
+CGCONTRDP:
1,5,"3GNET","10.250.0.253.255.255.0"

OK
```

## 5 FOTA Examples

### 5.1 Update over the air

#### 5.1.1 Updating successfully

```
AT+IPR=115200 //Active URC report by setting the baud rate
OK
AT+CGACT? //PDP connection
+CGACT: 1,1

OK
AT+CGMR //Check FW version
1752B05SIM7020C

OK
AT+CFOTA=1 //Download and update differentialpackage(DNS
resolution should work)
OK

+CFOTA: Start to download new package //Start to download

+CFOTA: Download completed //Download completed

+CFOTA: Start to update,please wait for reset //Module reset (the upgrade session takes around
10min)
*MATREADY: 1

+CFUN: 1

+CFOTA: Update successfully //Update successfully

+CPIN: READY

AT+CFOTA=4 //Report update result to FOTA server after restart
and network is OK.
```

```
OK
AT+CGMR //Check FW version
1752B06SIM7020C
OK
```

### 5.1.2 Updating failed

#### No update package error

```
AT+IPR=115200 //Active URC report
OK
AT+CGACT? //PDP connection
+CGACT: 1,1

OK
AT+CGMR //Check FW version
1752B05SIM7020C

OK
AT+CFOTA=1 //No update package or connecting FOTA server fail
OK
+CFOTA: No update package
```

#### Download pause error

```
AT+CFOTA=1
OK
//Download pause error
+CFOTA: Download pause
```

#### Download fail error

```
AT+CFOTA=1
OK
//Download fail error
+CFOTA: Download fail
```

#### Update fail

```
AT+CFOTA=1
OK
```

+CFOTA: Start to download new package //Start to download

+CFOTA: Download completed //Download completed

+CFOTA: Start to update, please wait for reset //Module reset

\*MATREADY: 1

+CFUN: 1

+CFOTA: Update fail //Update fail

+CPIN: READY

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## 5.2 Update through hardware interface

Below is an example to write differential firmware file into SIM7020 by using CFOTA command.

```
AT+CFLE=0,0,1 //Erase FOTA update partition, the third parameter
                value is the number of the block which needs to be
                erased. The size of the differential package here is
                313 bytes, so it is 1 block

OK
AT+IPR=115200 //Active URC report by setting the baud rate
OK
AT+CFLW=0,0,313,0,30 //Write data and enter data mode
> Upload the differential package

OK
AT+CGMR //Check FW version
1752B05SIM7020C

OK
AT+CFOTA=5,313,f1351d44d9a338c867046ebf
16ec62d1
+CFOTA: Start to update, please wait for reset //Start to update (the upgrade session takes
                                                around 10min)

OK //Restart

*MATREADY: 1

+CFUN: 1

+CFOTA: Update successfully //Update successfully

AT+CFOTA=4 //Report update result to FOTA server after restart
            and network is OK.

OK
AT+CGMR //Check FW version
1752B06SIM7020C

OK
```

## 5.3 Update through HTTP

Below is an example to write differential firmware file into SIM7020 by using HTTP command.

```
AT+CHTTPCREATE="http://117.131.85.139:526 //Create a http client instance
5"
+CHTTPCREATE: 0

OK
AT+CHTTPCON=0 //Establish the HTTP Connection
OK
AT+CHTTPTOFS=0,"/HTTP_test/test3-bin/SIM7 //Write differential firmware file
020C_V1-SIM7020C_V2-1537247570.bin" SIM7020C_V1-SIM7020C_V2-1537247570.bin
into SIM7020

OK
+CHTTPNMIH: 0,200,287,Content-Type:
application/octet-stream
Content-Length: 31047
Accept-Ranges: bytes
Server: HFS 2.3 beta
Set-Cookie: HFS_SID=0.699653631309047;
path=/;
Last-Modified: Tue, 18 Sep 2018 05:14:19 GMT
Content-Disposition: attachment;
filename="SIM7020C_V1-SIM7020C_V2-153724
7570.bin";

+CHTTPTOFSOK: 0,31047,31047
AT+CGMR //Check FW version
1752B06SIM7020C
OK
AT+IPR=115200 //Active URC report by setting the baud rate
OK
AT+CFOTA=5,31047,86060c29c18b2981f8b87d
e61c1765b7

+CFOTA: Start to update, please wait for reset //Start to update (the upgrade session takes
around 10min)

OK
Restart
```



\*MATREADY: 1

+CFUN: 1

+CFOTA: Update successfully

//Update successfully

**AT+CGMR**

//Check FW version

1752B06SIM7020C\_20180918

OK

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