EC25&EC21 DFOTA User Guide

LTE Module Series

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About the Document

History

Revision	Date	Author	Description
1.0	2016-09-26	Ramos ZHANG	Initial

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1 Introduction

Quectel EC25 and EC21 modules support DFOTA (Delta Firmware Upgrade Over the Air) function, which allows customer to upgrade the firmware of the module over the air. It can upgrade the firmware to a new version, and upgrade back to the old version as well.

Before firmware upgrading, customer only need to prepare the firmware package which contains only the differences between the old and new firmware versions. This reduces the amount of data transmitted and accelerates the speed of firmware upgrade.

2 Firmware Upgrade Procedure via DFOTA

The following chart illustrates the firmware upgrade procedure via DFOTA.
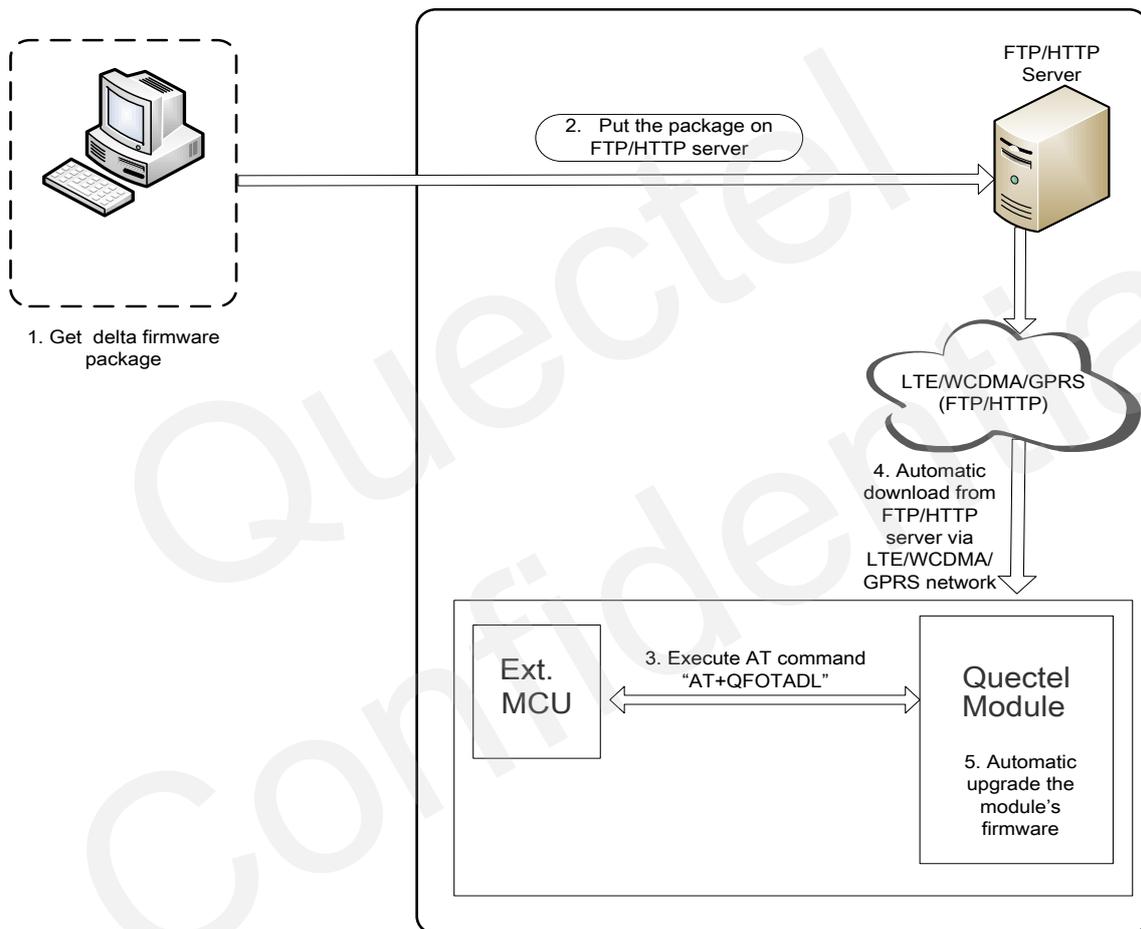

Figure 1: Firmware Upgrade Procedure via DFOTA

As shown in the above figure, customer only needs to perform the following steps to upgrade the firmware.

Step 1: Get the delta firmware package from Quectel.
Step 2: Put the delta firmware on FTP/HTTP server.
Step 3: Execute **AT+QFOTADL** command. Then the module will automatically download the package

from FTP/HTTP server via LTE/WCDMA/GPRS network (**Step 4**) and finally automatically upgrade the module's firmware (**Step 5**).

2.1. Get Delta Firmware Package

Before upgrading, customer needs to check the current firmware version (the old version) by executing **ATI** command. Customer also needs to know the target firmware version (the new version). Then customer needs to provide the two firmware version information for Quectel or customer's module supplier to get the delta firmware package.

2.2. Put Delta Package on FTP/HTTP Server

When using the DFOTA function, customer need to setup a FTP/HTTP server by customer himself, for Quectel does not provide a FTP/HTTP server. Then put the delta package on the server, and record the FTP/HTTP path. The module will get the delta package from this path after executing corresponding AT command.

2.3. Execute AT Command to Upgrade the Firmware

After putting the delta firmware package on a FTP/HTTP server, customer needs to execute **AT+QFOTADL** command. Then the module will download the firmware package from FTP/HTTP server over the air and upgrade the firmware automatically. For details, please refer to **Chapter 3**.

3 Description of AT Command

AT+QFOTADL command enables automatic firmware upgrade for module via DFOTA. After executing the command, the module will automatically download the package from FTP/HTTP server. After the package download is finished, the module will reboot automatically and then enter into recovery mode for firmware upgrade. If the firmware upgrade is successful, the module will reboot and enter into normal mode, otherwise it will enter into recovery mode and retry to upgrade for consecutively five times.

AT+QFOTADL Upgrade Firmware via DOFTA	
Test Command **AT+QFOTADL=?**	Response **OK**

3.1. AT+QFOTADL=<ftpurl>   Upgrade Firmware When Firmware Package is Stored on FTP Server

If the delta package is stored on a FTP server, customer can execute **AT+QFOTADL=<ftpurl>** command. Then the module will download the firmware package from FTP server over the air and upgrade the firmware automatically.

AT+QFOTADL=<ftpurl> Upgrade Firmware When Firmware Package is Stored on FTP Server	
Write Command **AT+QFOTADL=<ftpurl>**	Response **OK** **+QIND: "FOTA","FTPSTART"** **+QIND: "FOTA","FTPEND",<ftp_err>** **+QIND: "FOTA","START"** **+QIND: "FOTA","UPDATING",<percent>** **+QIND: "FOTA","UPDATING",<percent>** **...** **+QIND: "FOTA","END",<err>** Or **ERROR**

Parameter

<ftpurl>	String format, max length is 255 bytes. It should be started with "FTP://", for example: "FTP://<user_name>:<password>@<serverURL>:<port>/<file_path>"
<username>	String type, the user name for authentication. The maximum size of the parameter is 50 bytes
<password>	String type, the password for authentication. The maximum size of the parameter is 50 bytes
<serverURL>	String type, the IP address or domain name of the FTP server. The maximum size of the parameter is 50 bytes
<port>	Integer type, the port of the FTP server. The default value is 21. The range is 1-65535
<file_path>	String type, the file name in FTP server. The maximum size of the parameter is 50 bytes
<ftp_err>	Integer type, indicates the FTP error code. 0 means OK
<percent>	Integer type, indicates the upgrade progress percentage
<err>	Integer type, 0 means OK, or else ERROR

Example

//Upgrade firmware via FTP server.

//The FTP server address is "ftp://test:test@124.74.41.170:21/Jun/update-v12-to-v13.zip".

//Execute command **AT+QFOTADL**, start to download the package and upgrade module's firmware.

AT+QFOTADL="ftp://test:test@124.74.41.170:21/Jun/update-v12-to-v13.zip"
OK
+QIND: "FOTA","FTPSTART"
+QIND: "FOTA","FTPEND",0   //Finish downloading the package from FTP server.

//Module will be rebooted and USB port will be re-initialized. If the current port is USB port, MCU should close and reopen it.

+QIND: "FOTA","START"
+QIND: "FOTA","UPDATING", 1
+QIND: "FOTA","UPDATING", 2
...
+QIND: "FOTA","UPDATING", 100
+QIND: "FOTA","END",0   //Finish upgrading the firmware.

3.2. AT+QFOTADL=<httpurl>　Upgrade Firmware When Firmware Package is Stored on HTTP Server

If the delta package is stored on a HTTP server, customer can execute **AT+QFOTADL=<httpurl>** command. Then the module will download the firmware package from HTTP server over the air and upgrade the firmware automatically.

AT+QFOTADL=<httpurl>　Upgrade Firmware When Firmware Package is Stored on HTTP Server	
Write Command **AT+QFOTADL=<httpurl>**	Response **OK** **+QIND: "FOTA","HTTPSTART"** **+QIND: "FOTA","HTTPEND",<http_err>** **+QIND: "FOTA","START"** **+QIND: "FOTA","UPDATING",<percent>** **+QIND: "FOTA","UPDATING",<percent>** **...** **+QIND: "FOTA","END",<err>** Or **ERROR**

Parameter

<httpurl>	String format, max length is 255 bytes. It should be started with "HTTP://", for example: "HTTP://<http_server_URL>:<http_port>/<http_file_path>"
<http_server_URL>	String type, the IP address or domain name of the HTTP server
<http_port>	Integer type, the port of the HTTP server. The default value is 80. The range is 1-65535
<http_file_path>	String type, the file name in HTTP server
<http_err>	Integer type, indicates the HTTP error code. 0 means OK
<percent>	Integer type, indicates the upgrade progress percentage
<err>	Integer type, 0 means OK, or else ERROR

Example

//Upgrade firmware via HTTP server.

//The HTTP server address is "http://www.quectel.com:100/update.zip".

//Execute command **AT+QFOTADL**, start to download the package and upgrade module's firmware.

AT+QFOTADL="http://www.quectel.com:100/update.zip"
OK

```
+QIND: "FOTA","HTTPSTART"
+QIND: "FOTA","HTTPEND",0          //Finish downloading the package from HTTP server.

//Module will be rebooted and USB port will be re-initialized. If the current port is USB port, MCU should
close and reopen it.


+QIND: "FOTA","START"
+QIND: "FOTA","UPDATING", 1
+QIND: "FOTA","UPDATING", 2
...
+QIND: "FOTA","UPDATING", 100
+QIND: "FOTA","END",0             //Finish upgrading the firmware.
```

3.3. AT+QFOTADL=<file_name>   Upgrade Firmware When Firmware

Package is Stored on Local File System

If the delta package has already been stored in module's file system, customer can execute **AT+QFOTADL=<file_name>** command. Then the module will download the firmware package from local file system over the air and upgrade the firmware automatically.

AT+QFOTADL=<file_name> Upgrade Firmware When Firmware Package is Stored on Local File System	
Write Command **AT+QFOTADL=<file_name>**	Response **OK** **+QIND: "FOTA","START"** **+QIND: "FOTA","UPDATING",<percent>** **+QIND: "FOTA","UPDATING",<percent>** **...** **+QIND: "FOTA","END",<err>** Or **ERROR**

Parameter

<file_name>	String type, max length is 128 bytes. It should be started with "/data/ufs/" in UFS or should be started with "/media/card/" in SD card.
<percent>	Integer type, indicates the upgrade progress percentage
<err>	Integer type, 0 means OK, or else ERROR

Example

//Upgrade firmware via local file system.

AT+QFOTADL="/data/ufs/update-v13-to-v12.zip"
OK

+QIND: "FOTA","START"
+QIND: "FOTA","UPDATING", 1
+QIND: "FOTA","UPDATING", 2
...
+QIND: "FOTA","UPDATING", 100
+QIND: "FOTA","END",0   //Finish upgrading the firmware.

4 Summary of FTP Error Codes

The error code <ftp_err> indicates an error related to mobile equipment or network. The details about <ftp_err> are described in the following table.

Table 1: Summary of FTP Error Codes

<ftp_err>	Meaning
0	Operation successful
601	Unknown error
504	Firmware upgrade failed, module will reboot and retry to upgrade for consecutively five times.
505	Upgrade package file check failed, module will reboot and retry to upgrade for consecutively five times.

5 Summary of HTTP Error Codes

The error code <http_err> indicates an error related to mobile equipment or network. The details about <http_err> are described in the following table.

Table 2: Summary of HTTP Error Codes

<http_err>	Meaning
0	Operation successful
701	HTTP unknown error
504	Firmware upgrade failed, module will reboot and retry to upgrade for consecutively five times.
505	Upgrade package file check failed, module will reboot and retry to upgrade for consecutively five times.

6 Appendix A References

Table 3: Related Documents

SN	Document Name	Remark
[1]	Quectel_EC25&EC21_AT_Commands_Manual	EC25&EC21 AT commands manual

Table 4: Terms and Abbreviations

Abbreviation	Description
DFOTA	Delta Firmware Upgrade Over the Air
FTP	File Transfer Protocol
GPRS	General Packet Radio Service
HTTP	Hyper Text Transport Protocol
LTE	Long Term Evolution
SD	Secure Digital
UFS	User File System
WCDMA	Wideband Code Division Multiple Access