

AG35 DFOTA User Guide

LTE Module Series

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About the Document

History

Revision	Date	Author	Description
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1 Introduction

Quectel AG35 module supports DFOTA (Delta Firmware Upgrade Over the Air) function, which allows customers 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, customers 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.

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2 Firmware Upgrade Procedure via DFOTA

The following chart illustrates the firmware upgrade procedure via DFOTA.

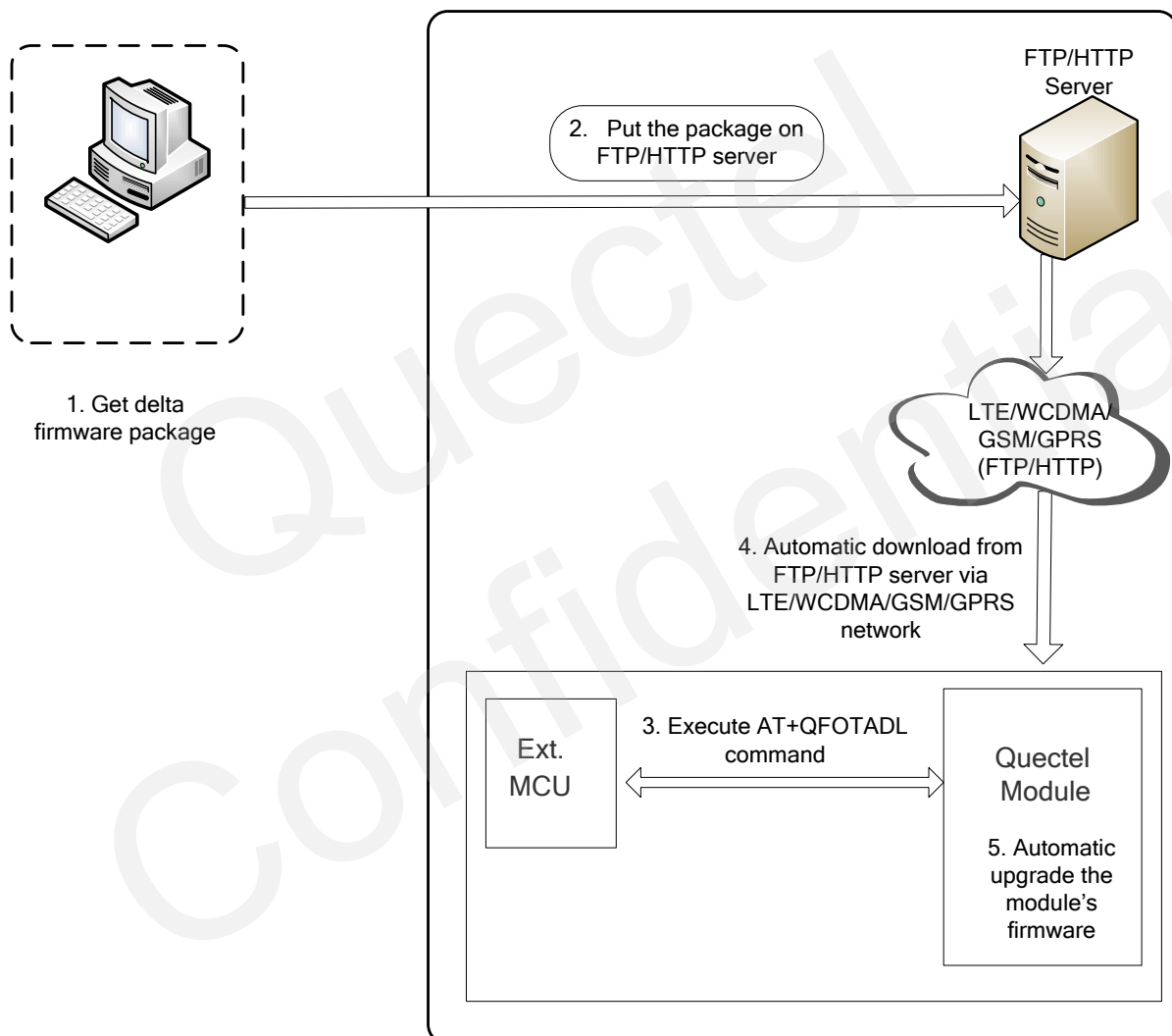


Figure 1: Firmware Upgrade Procedure via DFOTA

As shown in the above figure, customers only need 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/GSM/GPRS network (**Step 4**) and finally automatically upgrade the module's firmware (**Step 5**).

2.1. Get Delta Firmware Package

Before upgrading, customers need to check the current firmware version (the old version) by executing **ATI** command, and also need to know the target firmware version (the new version). Then the two firmware versions should be provided for Quectel or the module supplier, to get the delta firmware package.

2.2. Put Delta Package on FTP/HTTP Server

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

2.3. Execute AT Command to Upgrade the Firmware

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

3 Description of DFOTA AT Commands

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.

In recovery mode the module checks the upgrade package first. If there is something wrong with the package the URC will report an error code (502, 505 or 510), and this will retry maximally three times consecutively if the process is unsuccessful. After the upgrade package passes check and the firmware upgrade is successful, the module will reboot and enter into normal mode. If upgrade fails it will enter into recovery mode and retry to upgrade for consecutively five times. If upgrade is still unsuccessful after consecutively five retries, the module will stop firmware upgrade and restore to the old version.

AT+QFOTADL Upgrade Firmware via DOFTA

Test Command AT+QFOTADL=?	Response OK
-------------------------------------	-----------------------

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

If the delta firmware package is stored on an FTP server, **AT+QFOTADL=<ftpURL>** should be executed to enable automatic firmware upgrade via DFOTA. Then the module will download the delta package from the FTP server over the air and upgrade firmware automatically.

AT+QFOTADL=<ftpURL> Upgrade Firmware When Delta 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. The 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 on FTP server. The maximum size of the parameter is 50 bytes.
<ftp_err>	Integer type. The FTP error code. 0 means upgraded successfully. Please refer to Chapter 4 for more details.
<percent>	Integer type. The upgrade progress in percentage.
<err>	Integer type. 0 means upgraded successfully. Any other value means an error. Please refer to Chapter 4 for more details.

Example

```
//Upgrade firmware when delta firmware package is stored on an FTP server.

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

//Execute AT+QFOTADL command to enable automatic firmware upgrade via DFOTA, and then the
module will start to download the delta package and upgrade firmware automatically.

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 delta package from the FTP server.

//The module will reboot and the 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 Delta Package is Stored on HTTP Server

If the delta firmware package is stored on an HTTP server, **AT+QFOTADL=<httpURL>** command should be executed to enable automatic firmware upgrade via DFOTA. Then the module will download the delta package from the HTTP server over the air and upgrade firmware automatically.

AT+QFOTADL=<httpURL> Upgrade Firmware When Delta Package is Stored on HTTP Server

<p>Write Command</p> <p>AT+QFOTADL=<httpURL></p>	<p>Response</p> <p>OK</p> <p>+QIND: "FOTA","HTTPSTART"</p> <p>+QIND: "FOTA","HTTPPEND",<http_err></p> <p>+QIND: "FOTA","START"</p> <p>+QIND: "FOTA","UPDATING",<percent></p> <p>+QIND: "FOTA","UPDATING",<percent></p> <p>...</p> <p>+QIND: "FOTA","END",<err></p> <p>Or</p> <p>ERROR</p>
---	---

Parameter

<httpURL>	String format. The 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 on HTTP server.
<http_err>	Integer type. The HTTP error code. 0 means upgraded successfully. Please refer to Chapter 4 for more details.
<percent>	Integer type. The upgrade progress in percentage.
<err>	Integer type. 0 means upgraded successfully. Any other value means an error. Please refer to Chapter 4 for more details.

Example

```
//Upgrade firmware when delta firmware package is stored on an HTTP server.

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

//Execute AT+QFOTADL command to enable automatic firmware upgrade via DFOTA, and then the
module will start to download the delta package and upgrade firmware automatically.

AT+QFOTADL="http://www.quectel.com:100/update.zip"
OK
+QIND: "FOTA","HTTPSTART"
+QIND: "FOTA","HTTPPEND",0           //Finish downloading the delta package from the HTTP server.

//The module will reboot and the 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 Delta Package is Stored in Local File System

If the delta firmware package has already been stored in the module's file system, **AT+QFOTADL=<file_name>** command should be executed to enable automatic firmware upgrade via DFOTA. Then the module will download the delta package from the local file system over the air and upgrade firmware automatically.

AT+QFOTADL=<file_name> Upgrade Firmware When Delta Package is Stored on Local File System

Write Command	Response
AT+QFOTADL=<file_name>	OK
	+QIND: "FOTA","START"
	+QIND: "FOTA","UPDATING",<percent>
	+QIND: "FOTA","UPDATING",<percent>
	...
	+QIND: "FOTA","END",<err>

Or
ERROR

Parameter

<file_name>	String type. The max length is 128 bytes. It should be started with "/data/ufs/" in UFS.
<percent>	Integer type. The upgrade progress in percentage.
<err>	Integer type. 0 means upgraded successfully. Any other value means an error. Please refer to Chapter 4 for more details.

Example

//Upgrade firmware when delta firmware package is stored in 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 Error Codes

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

Table 1: Summary of <ftp_err>, <http_err> and <err> Codes

<ftp_err>	Meaning
0	FTP download operation successful
601	FTP unknown error
<http_err>	Meaning
0	HTTP download operation successful
701	HTTP unknown error
<err>	Meaning
0	DFOTA upgrade successful
502	The upgrade process exit with some unpredictable error, or the upgrade package is incorrect. System will check for three times consecutively.
505	Upgrade package check failed. The module will reboot and retry to check and upgrade for consecutively three times.
510	The patch do not match the source file in the module. Customers need to check the upgrade package if it is wrong.
511	The file system have no enough space for upgrade
520-530 540-546	Firmware upgrade failed. The module will reboot and retry to upgrade until it is upgraded successfully

5 Appendix A References

Table 2: Related Documents

SN	Document Name	Remark
[1]	Quectel_AG35_AT_Commands_Manual	AG35 AT Commands Manual

Table 3: 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
UFS	User File System
WCDMA	Wideband Code Division Multiple Access