

# EG9x DFOTA User Guide

**LTE Module Series**

Rev. EG9x\_DFOTA\_User\_Guide\_V1.0

Date: 2017-03-17



**Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:**

**Quectel Wireless Solutions Co., Ltd.**

Office 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233

Tel: +86 21 5108 6236

Email: [info@quectel.com](mailto:info@quectel.com)

**Or our local office. For more information, please visit:**

<http://www.quectel.com/support/salesupport.aspx>

**For technical support, or to report documentation errors, please visit:**

<http://www.quectel.com/support/techsupport.aspx>

Or email to: [Support@quectel.com](mailto:Support@quectel.com)

**GENERAL NOTES**

QUECTEL OFFERS THE INFORMATION AS A SERVICE TO ITS CUSTOMERS. THE INFORMATION PROVIDED IS BASED UPON CUSTOMERS' REQUIREMENTS. QUECTEL MAKES EVERY EFFORT TO ENSURE THE QUALITY OF THE INFORMATION IT MAKES AVAILABLE. QUECTEL DOES NOT MAKE ANY WARRANTY AS TO THE INFORMATION CONTAINED HEREIN, AND DOES NOT ACCEPT ANY LIABILITY FOR ANY INJURY, LOSS OR DAMAGE OF ANY KIND INCURRED BY USE OF OR RELIANCE UPON THE INFORMATION. ALL INFORMATION SUPPLIED HEREIN IS SUBJECT TO CHANGE WITHOUT PRIOR NOTICE.

**COPYRIGHT**

THE INFORMATION CONTAINED HERE IS PROPRIETARY TECHNICAL INFORMATION OF QUECTEL CO., LTD. TRANSMITTING, REPRODUCTION, DISSEMINATION AND EDITING OF THIS DOCUMENT AS WELL AS UTILIZATION OF THE CONTENT ARE FORBIDDEN WITHOUT PERMISSION. OFFENDERS WILL BE HELD LIABLE FOR PAYMENT OF DAMAGES. ALL RIGHTS ARE RESERVED IN THE EVENT OF A PATENT GRANT OR REGISTRATION OF A UTILITY MODEL OR DESIGN.

***Copyright © Quectel Wireless Solutions Co., Ltd. 2017. All rights reserved.***

# About the Document

## History

Revision	Date	Author	Description
1.0	2017-03-17	Becking BAI/ Sophie ZHU/ Ramos ZHANG	Initial

Quectel  
Confidential

## Contents

About the Document.....	2
Contents .....	3
Table Index.....	4
<b>1 Introduction .....</b>	<b>5</b>
<b>2 Firmware Upgrade Procedure via DFOTA.....</b>	<b>6</b>
2.1. Get Delta Firmware Package.....	7
2.2. Put Delta Package on FTP/HTTP Server .....	7
2.3. Execute AT Command to Upgrade the Firmware .....	7
<b>3 Description of DFOTA AT Commands.....</b>	<b>8</b>
3.1. AT+QFOTADL=<ftpURL> Upgrade Firmware When Delta Package is Stored on FTP Server .....	8
3.2. AT+QFOTADL=<httpURL> Upgrade Firmware When Delta Package is Stored on HTTP Server .....	10
3.3. AT+QFOTADL=<file_name> Upgrade Firmware When Delta Package is Stored in Local File System .....	11
<b>4 Summary of FTP Error Codes .....</b>	<b>13</b>
<b>5 Summary of HTTP Error Codes.....</b>	<b>14</b>
<b>6 Summary of &lt;err&gt; Codes .....</b>	<b>15</b>
<b>7 Appendix A References.....</b>	<b>16</b>

## Table Index

TABLE 1: SUMMARY OF FTP ERROR CODES .....	13
TABLE 2: SUMMARY OF HTTP ERROR CODES .....	14
TABLE 3: SUMMARY OF <ERR> CODES .....	15
TABLE 4: RELATED DOCUMENT .....	16
TABLE 5: TERMS AND ABBREVIATIONS.....	16

Quectel  
Confidential

# 1 Introduction

Quectel EG9x modules support 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.

This document is applicable to Quectel EG9x modules, mainly including EG95 and EG91.

Quectel  
Confidential

## 2 Firmware Upgrade Procedure via DFOTA

The following chart illustrates the firmware upgrade procedure via DFOTA.

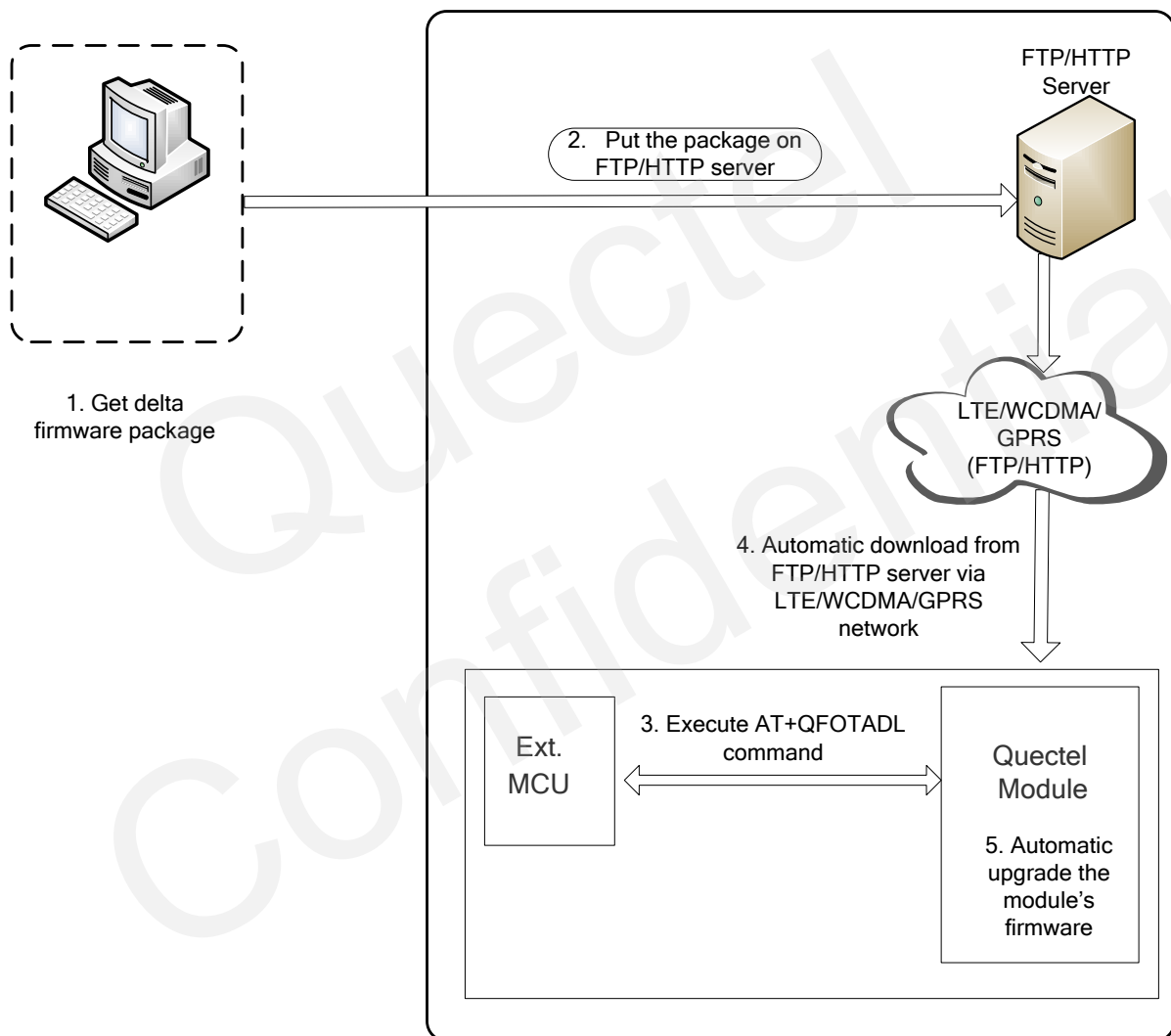


Figure 1: Firmware Upgrade Procedure via DFOTA

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/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. 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	Response
AT+QFOTADL=?	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 the firmware automatically.

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

Write Command	Response
AT+QFOTADL=<ftpURL>	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

<b>&lt;ftpURL&gt;</b>	String format. The max length is 255 bytes. It should be started with "FTP://", for example: "FTP://<user_name>:<password>@<serverURL>:<port>/<file_path>".
<b>&lt;username&gt;</b>	String type. The user name for authentication. The maximum size of the parameter is 50 bytes.
<b>&lt;password&gt;</b>	String type. The password for authentication. The maximum size of the parameter is 50 bytes.
<b>&lt;serverURL&gt;</b>	String type. The IP address or domain name of the FTP server. The maximum size of the parameter is 50 bytes.
<b>&lt;port&gt;</b>	Integer type. The port of the FTP server. The default value is 21. The range is 1-65535.
<b>&lt;file_path&gt;</b>	String type. The file name in FTP server. The maximum size of the parameter is 50 bytes.
<b>&lt;ftp_err&gt;</b>	Integer type. The FTP error code. 0 means upgraded successfully. Please refer to <b>Chapter 4</b> for details.
<b>&lt;percent&gt;</b>	Integer type. The upgrade progress in percentage.
<b>&lt;err&gt;</b>	Integer type. 0 means upgraded successfully. Any other value means ERROR. Please refer to <b>Chapter 6</b> for 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 be rebooted 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 the firmware automatically.

#### AT+QFOTADL=<httpURL> Upgrade Firmware When Delta 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

<b>&lt;httpURL&gt;</b>	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>".
<b>&lt;http_server_URL&gt;</b>	String type. The IP address or domain name of the HTTP server.
<b>&lt;http_port&gt;</b>	Integer type. The port of the HTTP server. The default value is 80. The range is 1-65535.
<b>&lt;http_file_path&gt;</b>	String type. The file name in HTTP server.
<b>&lt;http_err&gt;</b>	Integer type. The HTTP error code. 0 means upgraded successfully. Please refer to <b>Chapter 5</b> for details.
<b>&lt;percent&gt;</b>	Integer type. The upgrade progress in percentage.
<b>&lt;err&gt;</b>	Integer type. 0 means upgraded successfully. Any other value means ERROR. Please refer to <b>Chapter 6</b> for 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","HTTPEND",0** //Finish downloading the delta package from the HTTP server.

//The module will be rebooted 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 the firmware automatically.

#### **AT+QFOTADL=<file\_name> Upgrade Firmware When Delta Package is Stored in 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. 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 ERROR. Please refer to <b>Chapter 6</b> for 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 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
502	Unpredictable error occurred during upgrading process
505	Upgrade package file check failed. The module will reboot and retry to upgrade for consecutively five times.
510	The upgrade package does not match with the source file in the module. There is a need to check the upgrade package if it is wrong.
511	The file system has no enough space for upgrading
520-530 540-546	Firmware upgrading failed. The module will reboot and retry to upgrade until the firmware is upgraded successfully.
601	FTP unknown error

## 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
502	Unpredictable error occurred during upgrading process
505	Upgrade package file check failed. The module will reboot and retry to upgrade for consecutively five times.
510	The upgrade package does not match with the source file in the module. There is a need to check the upgrade package if it is wrong.
511	The file system has no enough space for upgrading
520-530 540-546	Firmware upgrading failed. The module will reboot and retry to upgrade until the firmware is upgraded successfully.
701	HTTP unknown error

## 6 Summary of <err> Codes

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

**Table 3: Summary of <err> Codes**

<err>	Meaning
502	Unpredictable error occurred during upgrading process.
505	Upgrade package file check failed. The module will reboot and retry to upgrade for consecutively five times.
510	The upgrade package does not match with the source file in the module. There is a need to check the upgrade package if it is wrong.
511	The file system has no enough space for upgrading.
520-530 540-546	Firmware upgrading failed. The module will reboot and retry to upgrade until the firmware is upgraded successfully.



# 7 Appendix A References

**Table 4: Related Document**

SN	Document Name	Remark
[1]	Quectel_EG9x_AT_Commands_Manual	AT commands manual for EG95 and EG91

**Table 5: 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