EC200T&UC200T

FOTA User Guide

LTE Standard/UMTS/HSPA+ Module Series

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

Quectel Wireless Solutions Co., Ltd.

7th Floor, Hongye Building, No.1801 Hongmei Road, Xuhui District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

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

http://www.quectel.com/support/sales.htm

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

http://www.quectel.com/support/technical.htm

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About the Document

History

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1.0	2019-06-14	Fitz XU/ Taya FANG	Initial

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1 Introduction

Quectel EC200T&UC200T modules support FOTA (Firmware Upgrade Over-The-Air) function, which allows customers to upgrade the firmware over the air. With this function, the firmware can be upgraded to a new version and also reverted to the old version.

2 Firmware Upgrade Procedure via FOTA

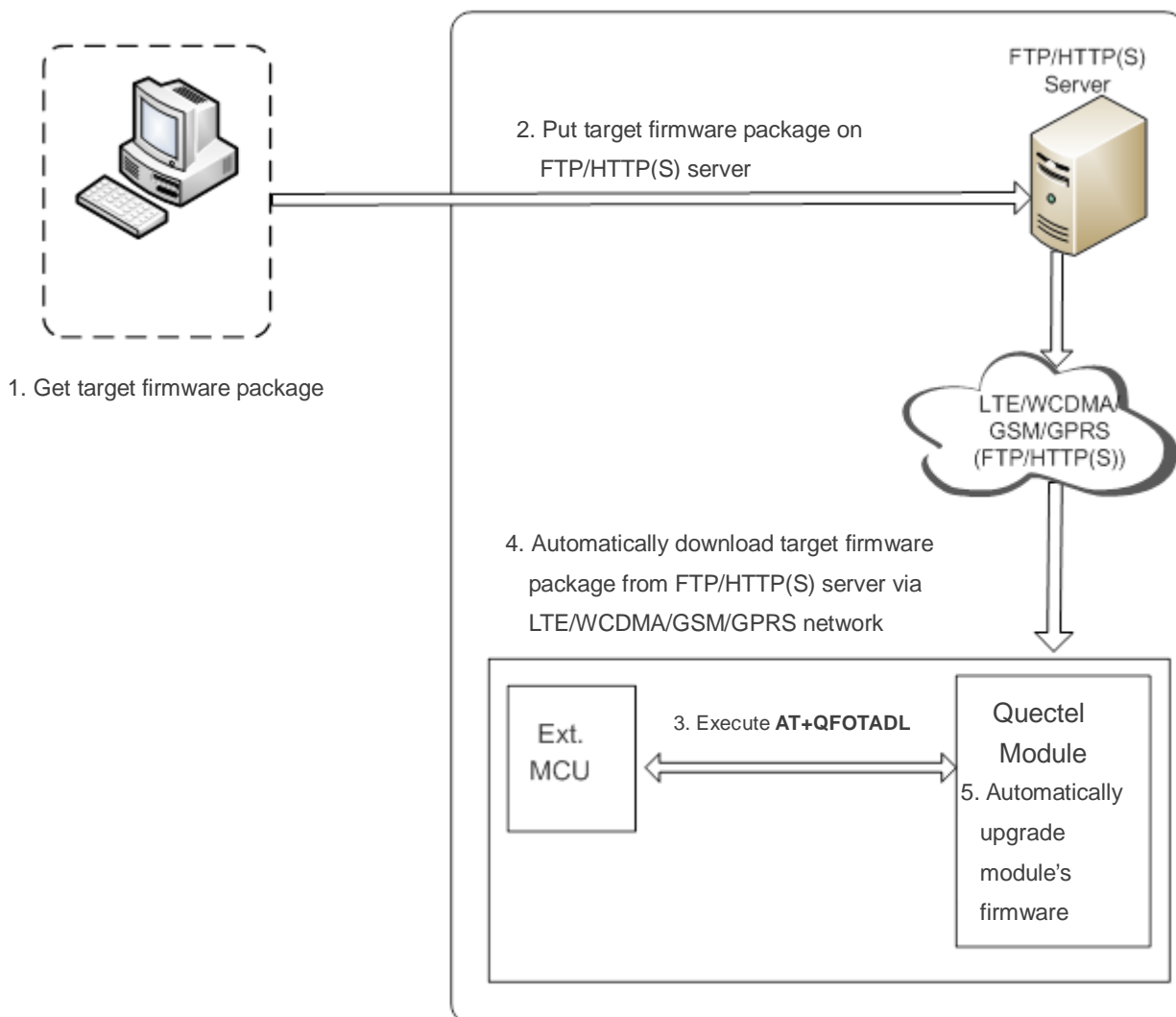The following chart illustrates the firmware upgrade procedure via FOTA.

Figure 1: Firmware Upgrade Procedure via FOTA

As shown in the above figure, customers only need to perform the following steps to upgrade the firmware.

Step 1: Get the target firmware package from Quectel.
Step 2: Put the target firmware package on FTP/HTTP(S) server.
Step 3: Execute **AT+QFOTADL**. Then the module will automatically download the target firmware package from FTP/HTTP(S) server via LTE/WCDMA/GSM/GPRS network (**Step 4**) and finally automatically upgrade the module's firmware (**Step 5**).

2.1. Get Target Firmware Package

Before upgrading, customers need to check the current firmware version (the old version) by executing **ATI** command, and also to know about the target firmware version (the new version).

2.2. Put Target Firmware Package on FTP/HTTP(S) Server

When using FOTA function, customers need to set up an FTP/HTTP(S) server by themselves since Quectel does not provide such a server, then put the target firmware package on the server, and record the FTP/HTTP(S) path. The module will get the target firmware package from the path after executing corresponding AT command.

2.3. Execute AT Command to Upgrade the Firmware

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

3 Description of FOTA AT Commands

AT+QFOTADL command enables automatic firmware upgrade for module via FOTA. After executing the command, the module will automatically download the target firmware package from FTP/HTTP(S) server. After the package is successfully downloaded, the module will automatically upgrade the firmware and then reboot.

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

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

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

AT+QFOTADL=<ftpURL> Upgrade Firmware When Target 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>** If there is any error, response: **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. User name for authentication. The max size is 50 bytes.
\<password\>	String type. Password for authentication. The max size is 50 bytes.
\<serverURL\>	String type. IP address or domain name of FTP server. The max size is 50 bytes.
\<port\>	Integer type. Port of FTP server. The default value is 21, and the range is 1 ~65535.
\<file_path\>	String type. File name on FTP server. The max size is 50 bytes. Currently only root path is supported.
\<ftp_err\>	Integer type. FTP error code. 0 indicates successful upgrade. Please refer to *Chapter 4* for details.
\<percent\>	Integer type. Upgrade progress presented in percentage.
\<err\>	Integer type. 0 indicates successful upgrade, while any other value indicates an error. Please refer to *Chapter 4* for details.

Example

//Upgrade firmware when the target firmware package is stored on an FTP server.

//The FTP server address is "ftp://test:test@124.74.41.170:21/EC200TCNTCNMAR02A02M16.bin".

//Execute **AT+QFOTADL** to enable automatic firmware upgrade via FOTA, and then the module will start to download the target firmware package and upgrade firmware automatically.

AT+QFOTADL="ftp://test:test@124.74.41.170:21/EC200TCNTCNMAR02A02M16.bin"
OK
+QIND: "FOTA","FTPSTART"
+QIND: "FOTA","FTPEND",0　　　　　//Finish downloading the package from FTP server.

+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 Target

Firmware Package is Stored on HTTP(S) Server

If the target firmware package is stored on an HTTP(S) server, **AT+QFOTADL=<httpRUL>** should be executed to enable automatic firmware upgrade via FOTA. Then the module will download the package from the HTTP(S) server over the air and upgrade the firmware automatically.

AT+QFOTADL=<httpURL> Upgrade Firmware When Target Firmware Package is Stored on HTTP(S) 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>** If there is any error, response: **ERROR**

Parameter

<httpURL>	String format. The max length is 255 bytes. It should be started with "http://" or "https://". For example: "http://<http_server_URL>:<http_port>/<http_file_path>".
<http_server_URL>	String type. IP address or domain name of HTTP(S) server.
<http_port>	Integer type. Port of HTTP(S) server. The default value is 80, and the range is 1~65535.
<http_file_path>	String type. File name on HTTP(S) server.
<http_err>	Integer type. HTTP(S) error code. 0 indicates successful upgrade. Please refer to *Chapter 4* for details.
<percent>	Integer type. Upgrade progress presented in percentage.
<err>	Integer type. 0 indicates successful upgrade, while any other value indicates an error. Please refer to *Chapter 4* for details.

Example

//Upgrade firmware when the target firmware package is stored on an HTTP(S) server.

//The HTTP(S) server address is "http://www.quectel.com:100/EC200TCNTCNMAR02A02M16.bin".

//Execute **AT+QFOTADL** to enable automatic firmware upgrade via FOTA, and then the module will start

to download the target firmware package and upgrade firmware automatically.

```
AT+QFOTADL="http://www.quectel.com:100/EC200TCNTCNMAR02A02M16.bin"
OK
+QIND: "FOTA","HTTPSTART"
+QIND: "FOTA","HTTPEND",0          //Finish downloading the package from HTTP(S) server.
+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:<length>> Upgrade Firmware When Target Firmware Package is Stored on PC

If the target firmware package has already been stored on PC, **AT+QFOTADL=<FILE:<length>>** should be executed to start firmware upgrade. The module will wait to receive the firmware package from PC through the serial port tool and then upgrade the firmware automatically.

Before sending **AT+QFOTADL=<FILE:<length>>**, customers need to set hardware flow control. If not, the speed of firmware package sending on the host should be limited (for NOR Flash module, the speed should be limited to 15kB/s), and each time at least 32 bytes should be sent.

If customers use physical UART, the following steps should be performed to upgrade firmware:

Step 1: Open the serial port tool, choose physical UART and set hardware flow control.
Step 2: Send **AT+IFC=2,2.**
Step 3: Select the target firmware package.
Step 4: Send **AT+QFOTADL="FILE:<length>".**
Step 5: Send the target firmware package.

If customers use Quectel USB AT port, the following steps should be performed to upgrade firmware:

Step 1: Open the serial port tool, choose Quectel USB AT port and set hardware flow control.
Step 2: Send **AT+QCFG="usbifc",2,2.**
Step 3: Select the target firmware package.
Step 4: Send **AT+QFOTADL="FILE:<length>".**
Step 5: Send the target firmware package.

AT+QFOTADL=<file_name> Upgrade Firmware When Target Firmware Package is Stored on PC	
Write Command **AT+QFOTADL=<FILE:<length>>**	Response **OK** **+QIND: "FOTA","FILESTART"** **+QIND: "FOTA","FILEEND",<file_err>** **+QIND: "FOTA","START"** **+QIND: "FOTA","UPDATING",<percent>** **+QIND: "FOTA","UPDATING",<percent>** **...** **+QIND: "FOTA","END",<err>** If there is any error, response: **ERROR**

Parameter

<length>	Integer type. Length of the target firmware package.
<file_err>	Integer type. File error code. 0 indicates successful upgrade. Please refer to *Chapter 4* for details.
<percent>	Integer type. Upgrade progress presented in percentage.
<err>	Integer type. 0 indicates successful upgrade, while any other value indicates an error. Please refer to *Chapter 4* for details.

NOTE

It is recommended to set hardware flow control.

Example

```
//Upgrade firmware when firmware package is stored on PC.
AT+QCFG="USBIFC",2,2          //Open hardware flow control.
OK
AT+QCFG="USBIFC"?
+QCFG: "usbifc",2,2

OK
AT+QFOTADL="FILE:4884688"     //The length of firmware package is 4884688 bytes.
OK

+QIND: "FOTA","FILESTART"
```

//Wait for PC to send firmware package through the serial port tool to module.

+QIND: "FOTA","FILEEND", 0

+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>, <file_err> and <err> are described as follows.

4.1. Summary of <ftp_err> Codes

Detailed information about <ftp_err> is listed as follows.

Table 1: Summary of <ftp_err> Codes

<ftp_err>	Meaning
0	FTP download operation successful
601	FTP unknown error
602	FTP service blocked
603	FTP service busy
604	DNS parse failed
605	Network error
606	Control connection closed
607	Data connection closed
608	Socket closed by peer
609	Timeout error
610	Invalid parameter
611	Failed to open file
612	File position invalid

613	File error
614	Service not available, closing control connection
615	Failed to open data connection
616	Connection closed, transfer aborted
617	Requested file action not taken
618	Requested action aborted: local error in processing
619	Requested action not taken: insufficient system storage
620	Syntax error, command unrecognized
621	Syntax error in parameters or arguments
622	Command not implemented
623	Bad sequence of commands
624	Command parameter not implemented
625	Failed to login FTP
626	Need account for storing files
627	Requested action not taken
628	Requested action aborted: page type unknown
629	Requested file action aborted
630	Requested file name invalid

4.2. Summary of <http_err> Codes

Detailed information about <http_err> is listed as follows.

Table 2: Summary of <http_err> Codes

<http_err>	Meaning
0	HTTP(S) download operation successful
701	HTTP(S) unknown error
702	HTTP(S) timeout
703	HTTP(S) busy
704	HTTP(S) UART busy
705	HTTP(S) does not get/post request
706	HTTP(S) network busy
707	HTTP(S) network open failed
708	HTTP(S) network not configured
709	HTTP(S) network deactivated
710	HTTP(S) network error
711	HTTP(S) URL error
712	HTTP(S) URL empty
713	HTTP(S) IP address error
714	HTTP(S) DNS error
715	HTTP(S) socket creation error
716	HTTP(S) socket connection error
717	HTTP(S) socket read error
718	HTTP(S) socket write error
719	HTTP(S) socket closed

720	HTTP(S) data encode error
721	HTTP(S) data decode error
722	HTTP(S) read timeout
723	HTTP(S) response failed
724	Incoming call busy
725	Voice call busy
726	Input timeout
727	Wait data timeout
728	Wait HTTP(S) response timeout
729	Memory allocation failed
730	Invalid parameter

4.3. Summary of <file_err> Codes

Detailed information about <file_err> is listed as follows.

Table 3: Summary of <file_err> Codes

<http_err>	Meaning
0	File download operation successful
500	File download error

4.4. Summary of <err> Codes

Detailed information about <err> is listed as follows.

Table 4: Summary of <err> Codes

<http_err>	Meaning
0	FOTA upgrade successful
504	FOTA upgrade failed
506	FOTA firmware MD5 check error

5 Appendix A References

Table 5: Terms and Abbreviations

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