

LTE<E-A QFlash

Linux&Android User Guide

LTE/LTE-A Module Series

Rev. LTE<E-A_QFlash_Linux&Android_User_Guide_V2.0

Date: 2019-05-05

Status: Released



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>

Or email to: 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 WIRELESS SOLUTIONS 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. 2019. All rights reserved.

About the Document

History

Revision	Date	Author	Description
1.0	2017-05-17	Hunter LV	Initial
2.0	2019-05-05	Lee LI	Numerous updates has been made to this document and thus it is recommended to read it in its entirety.

Contents

About the Document	2
Contents	3
Figure Index	4
1 Introduction	5
1.1. Applicable Modules	5
2 Introduction on Port	6
3 Operating Parameters of QFlash.....	7
4 Upgrade Firmware through QFlash	8
4.1. Upgrade Firmware by Method 0 (Sahara + Fastboot)	8
4.2. Upgrade Firmware by Method 1 (Streaming).....	10
4.3. Upgrade Firmware by Method 2 (AT Command + Fastboot).....	11
4.4. Upgrade Firmware by Method 3 (Firehose).....	12

Figure Index

FIGURE 1: UPGRADING PROCESS (METHOD 0)	9
FIGURE 2: FIRMWARE IS UPGRADED SUCCESSFULLY (METHOD 0)	9
FIGURE 3: UPGRADING PROCESS (METHOD 1)	10
FIGURE 4: FIRMWARE IS UPGRADED SUCCESSFULLY (METHOD 1)	10
FIGURE 5: UPGRADING PROCESS (METHOD 2)	11
FIGURE 6: FIRMWARE IS UPGRADED SUCCESSFULLY (METHOD 2)	12
FIGURE 7: UPGRADING PROCESS (METHOD 3)	12
FIGURE 8: FIRMWARE IS UPGRADED SUCCESSFULLY (METHOD 3)	13

1 Introduction

This document mainly introduces how to use QFlash tool to upgrade firmware on Linux and Android systems for the following Quectel LTE and LTE-A modules.

1.1. Applicable Modules

Table 1: Applicable Modules

Module Series		Models
LTE	LTE Standard	<ul style="list-style-type: none"> ● EC2x: EC21/ EC25/ EC20 R2.1/ EC20 R2.0/ EC20 ● EG9x: EG91/ EG95 ● EM05 ● EG25-G
	LPWA	<ul style="list-style-type: none"> ● BG96 ● BG95
	Automotive	<ul style="list-style-type: none"> ● AG35 ● AG36 ● AG15
LTE-A		<ul style="list-style-type: none"> ● Ex06: EG06/ EP06/ EM06 ● Ex12: EG12/ EM12 ● EG18 ● EM20

2 Introduction on Port

Before using QFlash tool on Linux & Android systems, please ensure that USB driver of the module has been installed successfully in host system. After the module has been connected to the host via USB cable, the corresponding USB virtual ports will be displayed. The UART ports and the descriptors of corresponding USB virtual ports on the host system are listed as below.

- ttyUSB0 DM Port
- ttyUSB1 NEMA Port (*may not be available in some customized firmware versions*)
- ttyUSB2 AT Port
- ttyUSB3 Modem Port
- ttyUSB4 Wireless Ethernet Adapter Port

NOTE

The descriptors of USB virtual ports listed above are under the assumption that the host is not connected with other USB virtual devices. It is suggested that the host is only connected with Quectel modules when upgrading.

3 Operating Parameters of QFlash

QFlash program can specify the operating parameters in command line. The detailed parameters are illustrated as below.

Table 2: Description of Operating Parameters

Item	Parameter	Optional/ Non-optional	Description
1	-f <firmware package file name>	Non-optional	The name of the firmware package to be upgraded.
2	-p <port>	Optional	The port on which the firmware is upgraded (ttyUSBx), and the default value is ttyUSB0.
3	-m <upgrade method>	Optional	<p>Upgrading methods:</p> <ul style="list-style-type: none"> 0 Sahara first and then Fastboot 1 Streaming 2 AT command first and then Fastboot 3 Firehose <p>The default value is 3. If method 3 is not supported by the module, then the default value will be 0.</p> <p>More details about the upgrading methods are provided in Chapter 4.</p>
4	-u <vid[:pid]>	Optional	<p>Vendor ID and Product ID.</p> <p>The parameter is necessary in some firmware versions with different <vid>s.</p>
5	-s <transport block size>	Optional	The size of the transport block in unit of KB, and the default value is 1024.
6	-v	Optional	Verbose.
7	-h	Optional	Help message.

4 Upgrade Firmware through QFlash

This chapter mainly introduces how to use the QFlash to upgrade firmware on Linux and Android systems. The firmware can be upgraded via the following ports:

- DM port
- AT port
- Modem port virtualized from USB driver
- UART port

There are four methods to upgrade the firmware, and the details are provided in the following chapters.

NOTE

Due to the complex operating environment on Linux and Android systems, sometimes customers have to compile source codes under their own development environment to generate the QFlash tool. In this case, customers need to contact Quectel Technical Support to apply for the source codes to run the QFlash.

4.1. Upgrade Firmware by Method 0 (Sahara + Fastboot)

1. Run QFlash by the following command:

```
./QFlash -f <firmware package file name> -m 0
```

2. Then the upgrading process will be shown as below:

```

root@ubuntu:~# ./QFlash -f ../../upgrade-package/EC20CEFAR02A10M4G -m 0
[03-25_13:49:52:475] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_13:49:52:475] Builded at: Mar 25 2019 13:49:15
[03-25_13:49:52:511] Host runtime enviroment check ok
[03-25_13:49:52:511]
[03-25_13:49:52:511] The CPU is little endian
[03-25_13:49:52:511]
[03-25_13:49:52:512] Warn: Fail to open pipe "/data/update.conf"
[03-25_13:49:52:512] Warn: If you want to the feature of 'upgrade progress', you need to read "/data/update.conf"
[03-25_13:49:52:512] Module upgrade tool, Mon Mar 25 13:49:52 2019

[03-25_13:49:52:512] Auto detect quectel diagnose port = ttyUSB0
[03-25_13:49:52:697] find firehose directory!
[03-25_13:49:52:707] firehose files check pass
[03-25_13:49:52:707] file total size: 165427356
[03-25_13:49:52:707] module platform : 9X07
[03-25_13:49:52:707] product model = Android

[03-25_13:49:52:707] Start to open com port: /dev/ttyUSB0
[03-25_13:49:52:912] Use normal diag port
[03-25_13:49:52:912] Get sahara hello packet!
[03-25_13:49:54:915] Error: Timeout Occured, No response or command came from the target!
[03-25_13:49:54:915] Error: Get sahara hello packet failed.
[03-25_13:49:54:915] Detect module status!
[03-25_13:49:54:915] Module status detect
[03-25_13:49:55:915] The module in normal mode
[03-25_13:49:55:919]
[03-25_13:49:55:919] Software Revision = EC20CEFAGR06A10M4G
[03-25_13:49:55:919] Switch to PRG status
[03-25_13:50:01:040] Diagnose port disconnect
[03-25_13:50:05:042] Diagnose port connected.
[03-25_13:50:06:043] Start to open com port: /dev/ttyUSB0
[03-25_13:50:06:044] Try get sahara hello packet!
[03-25_13:50:06:044] Get sahara hello packet successfully!
[03-25_13:50:06:044] Send sahara hello response packet(2)!
[03-25_13:50:09:046] Start Read Data!
[03-25_13:50:09:441] Sahara send /mnt/hgfs/share/test/QFlash_1.4.10/../../upgrade-package/EC20CEFAR02A10M4G/update//NPRG9x07.mbn
[03-25_13:50:09:534] progress : 100% finished
[03-25_13:50:09:537] Send sahara do packet!
[03-25_13:50:09:538] Module Status Detection
[03-25_13:50:09:538] Upgrade in normal mode
[03-25_13:50:25:664] Warn: Diagnose port may be exist always.
[03-25_13:50:26:665] Diagnose port connected.
[03-25_13:50:27:665] Start to open com port: /dev/ttyUSB0
[03-25_13:50:27:970] Module status detect

```

Figure 1: Upgrading Process (Method 0)

- If the prompt in the following red box shows up, then the firmware is upgraded successfully.

```

[03-25_13:51:33:642] /mnt/hgfs/share/test/QFlash_1.4.10/QFlash fastboot reboot
[03-25_13:51:33:789] rebooting...
[03-25_13:51:33:805]
[03-25_13:51:33:805] finished. total time: 0.016s
[03-25_13:51:33:806] [03-25_13:51:33:645] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_13:51:33:806] [03-25_13:51:33:645] Builded at: Mar 25 2019 13:49:15
[03-25_13:51:33:806] [03-25_13:51:33:680] Host runtime enviroment check ok
[03-25_13:51:33:806] [03-25_13:51:33:680] Qflash will use fastboot tool
[03-25_13:51:33:806] [03-25_13:51:33:806] The device restart...
[03-25_13:51:33:806] Welcome to use the Quectel module!!!
[03-25_13:51:33:806] Upgrade module successfully, Mon Mar 25 13:51:33 2019
[03-25_13:51:33:806] THE TOTAL DOWNLOAD TIME IS 101.294 s
root@ubuntu:~#

```

Figure 2: Firmware is Upgraded Successfully (Method 0)

4.2. Upgrade Firmware by Method 1 (Streaming)

This method may take much more time than other methods.

1. Run QFlash by the following command:

```
./QFlash -f <firmware package file name> -m 1
```

2. Then the upgrading process will be shown as below:

```
root@ubuntu:~# ./QFlash -f ../../upgrade-packege/EC20CEFAR02A10M4G -m 1
[03-25_13:56:53:435] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_13:56:53:435] Builded at: Mar 25 2019 13:49:15
[03-25_13:56:53:471] Host runtime enviroment check ok
[03-25_13:56:53:471]
[03-25_13:56:53:471] The CPU is little endian
[03-25_13:56:53:471]
[03-25_13:56:53:472] Warn: Fail to open pipe "/data/update.conf"
[03-25_13:56:53:472] Warn: If you want to the feature of 'upgrate progress', you need to read "/data/update.conf"
[03-25_13:56:53:472] Module upgrade tool, Mon Mar 25 13:56:53 2019

[03-25_13:56:53:473] Auto detect quectel diagnose port = ttyUSB0
[03-25_13:56:53:484] find firehose directory!
[03-25_13:56:53:486] firehose files check pass
[03-25_13:56:53:486] file total size: 165427356
[03-25_13:56:53:486] module platform : 9X07
[03-25_13:56:53:486] product model = Android

[03-25_13:56:53:487] Start to open com port: /dev/ttyUSB0
[03-25_13:56:54:061] Use normal diag port
[03-25_13:56:54:061] Get sahara hello packet!
[03-25_13:56:56:064] Error: Timeout Occured, No response or command came from the target!
[03-25_13:56:56:064] Error: Get sahara hello packet failed.
[03-25_13:56:56:064] Detect module status!
[03-25_13:56:56:064] Module status detect
[03-25_13:56:57:065] The module in normal mode
[03-25_13:56:57:067]
[03-25_13:56:57:067] Software Revision = EC20CEFAR02A10M4G
[03-25_13:56:57:067] Switch to PRG status
[03-25_13:57:02:189] Diagnose port disconnect
[03-25_13:57:06:249] Diagnose port connected.
[03-25_13:57:07:250] Start to open com port: /dev/ttyUSB0
[03-25_13:57:07:251] Try get sahara hello packet!
[03-25_13:57:07:252] Get sahara hello packet successfully!
[03-25_13:57:07:252] Send sahara hello response packet(2)!
[03-25_13:57:10:253] Start Read Data!
[03-25_13:57:10:647] Sahara send /mnt/hgfs/share/test/QFlash_1.4.10/../../upgrade-packege/EC20CEFAR02A10M4G/update//NPRG9x07.mbn
```

Figure 3: Upgrading Process (Method 1)

3. If the prompt in the following red box shows up, then the firmware is upgraded successfully.

```
[03-25_14:11:43:962] Warn: Fail to open pipe "/data/update.conf"
[03-25_14:11:43:962] Warn: If you want to the feature of 'upgrate progress', you need to read "/data/update.conf"
[03-25_14:11:43:968] /mnt/hgfs/share/test/QFlash_1.4.10/QFlash fastboot reboot
[03-25_14:11:44:125] rebooting...
[03-25_14:11:44:141]
[03-25_14:11:44:141] finished. total time: 0.017s
[03-25_14:11:44:141] [03-25_14:11:43:974] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_14:11:44:141] [03-25_14:11:43:974] Builded at: Mar 25 2019 13:49:15
[03-25_14:11:44:141] [03-25_14:11:44:019] Host runtime enviroment check ok
[03-25_14:11:44:141] [03-25_14:11:44:019] Qflash will use fastboot tool
[03-25_14:11:44:142] [03-25_14:11:44:142] Upgrade module successfully, Mon Mar 25 14:11:44 2019
[03-25_14:11:44:142] THE TOTAL DOWNLOAD TIME IS 60.426 s
root@ubuntu:~#
```

Figure 4: Firmware is Upgraded Successfully (Method 1)

4.3. Upgrade Firmware by Method 2 (AT Command + Fastboot)

Method 2 also uses Fastboot method to upgrade firmware. The difference between Method 0 and Method 2 is that the former uses Sahara first to get needed firmware package, while the latter uses **AT+QFASTBOOT** command to enter Fastboot mode first before upgrading.

1. Run QFlash by the following command:

```
./QFlash -f <firmware package file name> -m 2
```

2. Then the upgrading process will be shown as below:

```
root@ubuntu:~# ./QFlash -f ../../upgrade-package/EC20CEFAR02A10M4G -m 2
[03-25_14:10:43:679] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_14:10:43:679] Builded at: Mar 25 2019 13:49:15
[03-25_14:10:43:716] Host runtime enviroment check ok
[03-25_14:10:43:716]
[03-25_14:10:43:716] The CPU is little endian
[03-25_14:10:43:716]
[03-25_14:10:43:717] Warn: Fail to open pipe "/data/update.conf"
[03-25_14:10:43:717] Warn: If you want to the feature of 'upgrate progress', you need to read "/data/update.conf"
[03-25_14:10:43:717] Module upgrade tool, Mon Mar 25 14:10:43 2019

[03-25_14:10:43:717] Auto detect Quectel modem port = ttyUSB3
[03-25_14:10:43:734] find firehose directory!
[03-25_14:10:43:736] firehose files check pass
[03-25_14:10:43:737] file total size: 165427356
[03-25_14:10:43:737] module platform : 9X07
[03-25_14:10:43:737] product model = Android

[2019-03_25:14:10:043] open device /dev/ttyUSB3 correctly
[2019-03_25:14:10:043] AT> ATE0Q0V1
[2019-03_25:14:10:043] AT< ATE0Q0V1
[2019-03_25:14:10:043] onUnsolicited ATE0Q0V1
[2019-03_25:14:10:043] AT< OK
[2019-03_25:14:10:043] AT> ATI;+CSUB;+CVERSION
[2019-03_25:14:10:043] AT< Quectel
[2019-03_25:14:10:043] AT< EC20F
[2019-03_25:14:10:043] AT< Revision: EC20CEFAR02A10M4G
[2019-03_25:14:10:043] AT< SubEdition: V02
[2019-03_25:14:10:043] AT< VERSION: EC20CEFAR02A10M4G
[2019-03_25:14:10:043] AT< Aug 19 2017 14:02:53
[2019-03_25:14:10:043] AT< Authors: QCT
[2019-03_25:14:10:043] AT< OK
[2019-03_25:14:10:043] AT> AT+qfastboot
[2019-03_25:14:10:043] atchannel: EOF reached
[2019-03_25:14:10:043] onReaderClosed
[03-25_14:10:43:787] going to fastboot modle ...
[2019-03_25:14:10:043] AT channel closed
[2019-03_25:14:10:043] at_close
```

Figure 5: Upgrading Process (Method 2)

- If the prompt in the following red box shows up, then the firmware is upgraded successfully.

```
[03-25_13:51:33:642] /mnt/hgfs/share/test/QFlash_1.4.10/QFlash fastboot reboot
[03-25_13:51:33:789] rebooting...
[03-25_13:51:33:805] finished. total time: 0.016s
[03-25_13:51:33:806] [03-25_13:51:33:645] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_13:51:33:806] [03-25_13:51:33:645] Built at: Mar 25 2019 13:49:15
[03-25_13:51:33:806] [03-25_13:51:33:680] Host runtime environment check ok
[03-25_13:51:33:806] [03-25_13:51:33:680] Qflash will use fastboot tool
[03-25_13:51:33:806] [03-25_13:51:33:806] The device restart...
[03-25_13:51:33:806] Welcome to use the Quectel module!!!
[03-25_13:51:33:806] Upgrade module successfully, Mon Mar 25 13:51:33 2019
[03-25_13:51:33:806] THE TOTAL DOWNLOAD TIME IS 101.294 s
root@ubuntu: #
```

Figure 6: Firmware is Upgraded Successfully (Method 2)

4.4. Upgrade Firmware by Method 3 (Firehose)

This method cannot be operated in virtual environment. If this method is intended to be used, then it is necessary to remove qcserial module or remove '05c6:9008' in qcserial module source code.

- Run QFlash by the following command:

```
./QFlash -f <firmware package file name> -m 3
```

- Then the upgrading process will be shown as below:

```
root@0:/home/q/Desktop/QFlash# ./QFlash -f ../EC20CEFAR02A10M4G/ -m 3
[03-25_14:20:31:600] QFlash Version: LTE_QFlash_Linux&Android_V1.4.10
[03-25_14:20:31:600] Built at: Mar 25 2019 14:18:04
[03-25_14:20:31:646] Host runtime environment check ok
[03-25_14:20:31:646] The CPU is little endian
[03-25_14:20:31:646] Error: fail to create named pipe "/data/update.conf" errno 2 (No such file or directory)
[03-25_14:20:31:646] Module upgrade tool, Mon Mar 25 14:20:31 2019

[03-25_14:20:31:646] Find device vid:2c7c pid 0125
[03-25_14:20:31:646] Auto detect Quectel modem port = ttyUSB3
[03-25_14:20:31:743] find firehose directory!
[03-25_14:20:31:756] firehose files check pass
[03-25_14:20:31:756] file total size: 165427356
[03-25_14:20:31:757] module platform : 9X07
[03-25_14:20:31:757] product model = Android

[03-25_14:20:31:872] D: /dev/bus/usb/001/002 idVendor=2c7c idProduct=0125
[03-25_14:20:31:872] C: /dev/bus/usb/001/002 bNumInterfaces: 5
[03-25_14:20:31:872] I: If#= 0 Alt= 0 #EPs= 2 Cls=ff Sub=ff Prot=ff
```

Figure 7: Upgrading Process (Method 3)

3. If the prompt in the following red box shows up, then the firmware is upgraded successfully.

```
[03-25_14:21:05:223] [029.195] <log value="INSIDE HANDLE PROGRAM"/>
[03-25_14:21:05:223] [029.195] <log value="start_sector 0, last_sector_address 50"/>
[03-25_14:21:05:224] [029.196] <response value="ACK" rawmode="true" />
[03-25_14:21:05:224] [029.196] send ../sbl1.mbn, filesize=201616
[03-25_14:21:05:265] [029.237] Upgrade progress: 100
[03-25_14:21:05:266] [029.238] send finished
[03-25_14:21:05:267] [029.239] <log value="Finished sector address 0"/>
[03-25_14:21:05:267] [029.239] <response value="ACK" rawmode="false" />
[03-25_14:21:05:267] [029.239] <power value="reset" />
[03-25_14:21:05:268] [029.240] <log value="Inside handlePower() - Requested POWER_RESET"/>
[03-25_14:21:05:268] [029.240] <response value="ACK" />
[03-25_14:21:06:270] [030.242] inf[0] ep_in -1/1024, errno = 71 (Protocol error)
[03-25_14:21:06:270] [030.242] qusb_noblock_read read=-1, errno: 71 (Protocol error)
[03-25_14:21:06:270] [030.242] qusb_noblock_read cur=0, min_size=1
[03-25_14:21:06:270] [030.242] firehose/firehose_protocol.c fh_rcv_cmd 286 fail
[03-25_14:21:06:270] [030.242] THE TOTAL DOWNLOAD TIME IS 30.241 s
[03-25_14:21:06:270] [030.242] Upgrade module successfully.
[03-25_14:21:06:271] Upgrade module successfully, Mon Mar 25 14:21:06 2019
[03-25_14:21:06:271] THE TOTAL DOWNLOAD TIME IS 34.625 s
root@Q:/home/q/Desktop/QFlash#
```

Figure 8: Firmware is Upgraded Successfully (Method 3)