AG35-QuecOpen

DFOTA User Guide

LTE 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:

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About the Document

History

Revision	Date	Author	Description
1.0	2018-04-08	Len ZHANG	Initial
1.1	2018-04-27	Len ZHANG	Added Chapter 3.2.4 & 3.3.5
1.2	2018-05-15	Len ZHANG	Added Chapter 2.3
1.3	2018-08-14	Len ZHANG	Added key point
1.4	2018-09-11	Len ZHANG	Deleted AT and download part

Contents

1 Introduction

The entire upgrade process can be divided into two parts according to the upgrade partition:

(1) DFOTA upgrade, the corresponding URC reporting percentage is 1%~79%, such as +QIND: "FOTA","UPDATING",30
(2) Backup partition update, the corresponding URC reporting percentage is 80%~100%.

As backup area update is completed by script inside module, does not belong to the category of DFOTA and does not elaborate here.

DFOTA Package

2 Make Original and Target Firmware

2.1.

Before DFOTA upgrade, please prepare the corresponding version of DFOTA package in advance. File upgrade\targetfiles.zip in firmware package is actually the compressed file of the original version, which is provided for making DFOTA package. However, during the development process for OpenLinux users, boot.img, rootfs may be modified. If users directly download the modified file into the module as the original version, the targetfiles.zip file will be different with the one which Quectel provide, and causes firmware cannot be updated via the DFOTA package made by users own targetfiles.zip. Thus, when users release firmware please update targetfiles.zip file.

Assume the following situation:
Version1.0\upgrade\targetfiles.zip is the current firmware version in module (including each files in modem bin,kernel image,system), users have made and maintained it before the mass production.

Version2.0\upgrade\targetfiles.zip is the firmware version need update into module (including each files in modem bin,kernel image,system)

2.1.1. Users Make and Maintain targetfiles.zip of DFOTA before Mass Production(Must Read)

Because targetfiles.zip of the original and target versions are created in exactly the same way.

(1) The firmware package released by Quectel including configuration, tools, SDK and corresponding …\upgrade\targetfiles.zip which secondary development environment required.

(2) First copy the targetfiles.zip provided by Quectel to Ubuntu system and unzip it.

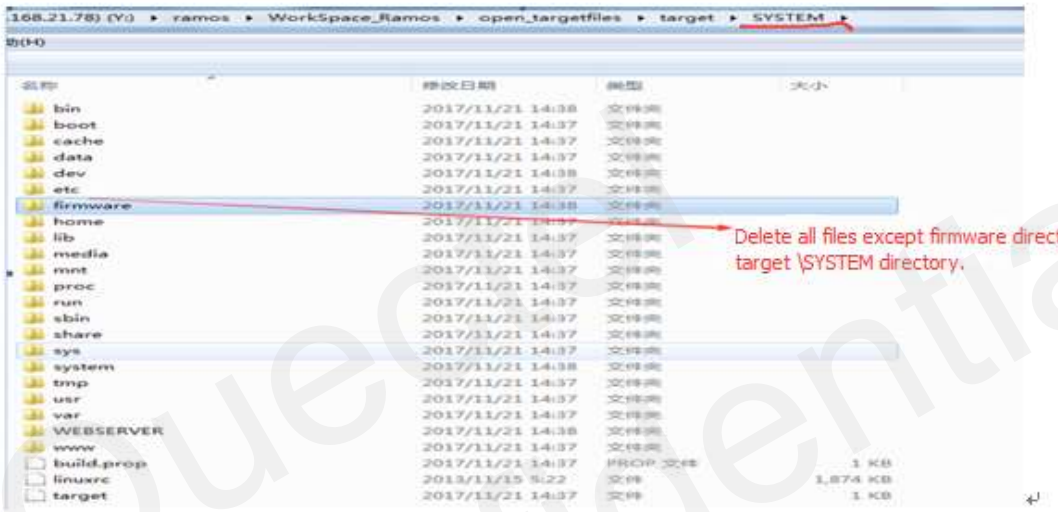
```
unzip -d ./target ./targetfiles.zip        //Execute this command, unzip targetfiles.zip to target directory.
```

(3) Replace files with mdm9607-perf-boot.img developed by users.

Replace boot.img, recovery.img 2 files in step (2) with the users' mdm9607-perf-boot.img.

(4) Replace rootfs

After unzipping quectel targetfiles, delete all files except firmware directory in target \SYSTEM directory. Then copy all files except firmware directory in ql-ol-rootfs in SDK generated by secondary development to SYSTEM directory.



(5) Repackage to generate targetfiles.zip

Under target directory execute below command to repackage.

```
zip -qry0 ../targetfiles.zip ./*
```

NOTE

The "-y" parameter of the zip command here cannot be omitted.

2.2. Make DFOTA package

Environment: Ubuntu 14.04 64bit
DFOTA toolpackage: AG35_releasetools

(1) Unzip DFOTA package

```
tar –xzvf AG35_releasetools.tar.gz
```

(2) Install Tool

```
cd AG35_releasetools
```

NOTE

There are quectel_fullota_filelist.txt， quectel_noota_filelist.tx 2 txt files in this path, in which quectel_fullota_filelist.txt is to configure overlay upgrade when FOTA upgrade, quectel_noota_filelist.txt is to configure files do not upgrade.

Copy libbz2.so.0.* which ./bsdiff depended to, to system library directory.
If Ubuntu can connect network, it is recommended that directly install bsdiff via command apt-get install bsdif.

```
sudo cp -P libbz2.so.0* /lib/x86_64-linux-gnu/
```

(3) Enter AG35_releasetools directory, copy the targetfiles.zip of the current running version to v1 directory, and copy the targetfiles.zip of the version need be updated to v2 directory.

(4) Run command ./update_gen.sh a to generate the corresponding DFOTA package.
Since this log will print many log information and not easy to find abnormal information, it is recommended to execute as ./update_gen.sh a > log, then console will only print error information.

(5) Generated update.zip is the final DFOTA package and please copy it to corresponding http, ftp servers.

NOTES

1. Input parameters such as: <a --all >, users only need to input parameter a.
2. If there is any permission not allowed, please execute chmod to add permission.

After DFOTA package creating, under console (OpenLinux client) to perform DFOTA update.

2.3. Modify File Permission

When upgrade via FOTA, the file permission maybe inconsistent before and after upgrade. For example, the file permission is 755 before upgrade, but change to 644 after upgrade. Under this situation often cause user app execution failure, thus Quectel provides below 3 solutions.

2.3.1. Manually Modify Permissions (Not Recommended)

Manually modify the file permissions because the operation is rough, so it is not recommended for subsequent use.

```
script.Print("Patching remaining system files...")
for item in deferred_patch_list:
  fn, tf, sf, size, _ = item
  script.ApplyPatch("/"+fn, "-", tf.size, tf.sha1, sf.sha1, "patch/"+fn+".p")
script.SetPermissions("/system/build.prop", 0, 0, 0644)
script.SetPermissions("/system/etc/launch_adbd", 0, 0, 0744)
script.SetPermissionsRecursive("/system/test_folder/", 0, 0, 0644, 0755)

script.AddToZip(target_zip, output_zip, fota)
WriteMetadata(metadata, output_zip)


def main(argv):
```

As shown above, add command of modification file permission to the ota_from_target_files corresponding position, commands are explained as follows.

script.SetPermissions("/system/etc/launch_adbd", 0, 0, 0744)
This command means modify the permission of /etc/launch_adbd files to 744, userid is 0 (root), groupid is 0 (root)

script.SetPermissionsRecursive("/system/test_folder/", 0, 0, 0644, 0755)
This command means that modify the permission of test_folder to 755, modify the permission of the files in the test_folder to 644, userid is 0 (root), groupid is 0 (root)

2.3.2. Modify Permission by Configuration Files

This solution directly realize the file permission modification feature through configuration file. The specific configuration method is shown are below.

The file quectel_chmod_filelist.txt is used to configure which files or paths need to be modified to what kind of permissions or user, group. The ones that start with "/" by default are considered valid configurations, while others are considered comment lines. Rows that start with "/" and end with "/" are resolved into folders.

```
1 this line is comment
2 #default
3 #example
4 #   file or folder      file_permission     userid  groupid     folder_permission
5 #   default             755                 0       3           755
6 #   /home/test_folder/  755                 1       0           644
7 #   /usr/bin/test_bin   644                 2       2
8 #   /usr/bin/test_bin1  742                 3       1
9 #   /usr/bin/test_bin2
```

The specific meaning of the parameters is shown in line 4 of the figure. Parameters other than filenames and paths can be omitted, which is to use the default configuration. The default file_permission is 755, userid is 0, groupid is 0, folder_permission is 755.

2.3.3. Automatically Modify Permission

DFOTA package tool can automatically determine whether the relevant files need to modify the permission according to the attribute of the file permission. The specific strategy is as follows.

Definition: The version package before the upgrade is the source file package, and the updated version package is the target file package.

If the same file exists in the source file package and also in the target file package, and the file permission is consistent, no permission modification is made.
If the same file exists in the source file package and also in the target file package, but the file permission is inconsistent, permission in the target file package is preferential.
If the file only exists in target file package, use the permission of the target file package.

Conclusion: The permission of target file package is preferential.

Upgrade

3 CMDLINE Upgrade

3.1.

Since the final DFOTA package will be saved as ”/usrdata/cache/fota/ipth_package.bin”, cmdline upgrade method is to download DFOTA package first and then save it as ”/usrdata/cache/fota/ipth_package.bin”. If checking upgrade progress is required, please configure AT port in recoveryfs to report progress. Besides, when download or manually push DFOTA package, please ensure the free space of usrdata partition must be greater than the differential packet size, else will cause failure. The specific cmdline upgrade process can be divided into below 3 steps.

3.1.1. URC Port Configuration

During the upgrade process, if users need to view the upgrade progress in real time, please configure the corresponding URC PORT, as follows:

(1) Mount recoveryfs
```
mtdnum=`cat /proc/mtd | grep -w recoveryfs | awk -F["d"":"] '{print $2}'`
ubiattach -m $mtdnum -d 3 /dev/ubi_ctrl
mkdir –p /tmp/mount_recovery
mount -t ubifs /dev/ubi3_0 /tmp/mount_recovery -o bulk_read
```
(2) URC port configuration
```
rm /tmp/mount_recovery/sbin/usb/boot_hsusb_composition
ln -s /sbin/usb/compositions/recovery_9607 \
/tmp/mount_recovery/sbin/usb/boot_hsusb_composition
```

3.1.2. Move DFOTA package

When moving the DFOTA package, please make sure the original path already exists, and there is no old DFOTA package and log file under this path, and finally make sure the file is written to flash.

Process:
```
mkdir –p /usrdata/cache/fota
rm –rf    /usrdata/cache/fota/*
mv local DFOTA package /usrdata/cache/fota/ipth_package.bin
sync "/sys/bus/msm_subsys/devices/subsys1/restart_level"
```

3.1.3. Start Upgrade Program

In console, FOTA upgrade program are started in 2 ways and there is no essential difference..

(1) reboot-recovery

(2) sync && sys_reboot recovery (Add the sync operation before the restart to prevent the file from not fully writing to flash and then causing the fota upgrade to fail.)

After executing this command, FOTA upgrade program can be executed.

NOTES

1. Step 3.1.1 can be omitted, because without URC port configuration has no effect on the upgrade program.
2. Step 3.1.2 can be omitted, if the "/usrdata/cache/fota/ipth_package.bin" file exists and the file is correct, users can directly execute FOTA upgrade via reboot-recovery command.
3. Step 3.1.3 cannot be omitted.

3.2. APP Upgrade

Quectel adds the APP command of one-key upgrade method in the system, command is qlfotapp. The usage is as follows.

(1) qlfotapp ./location_file

Directly use command + local DFOTA package to execute FOTA upgrade.

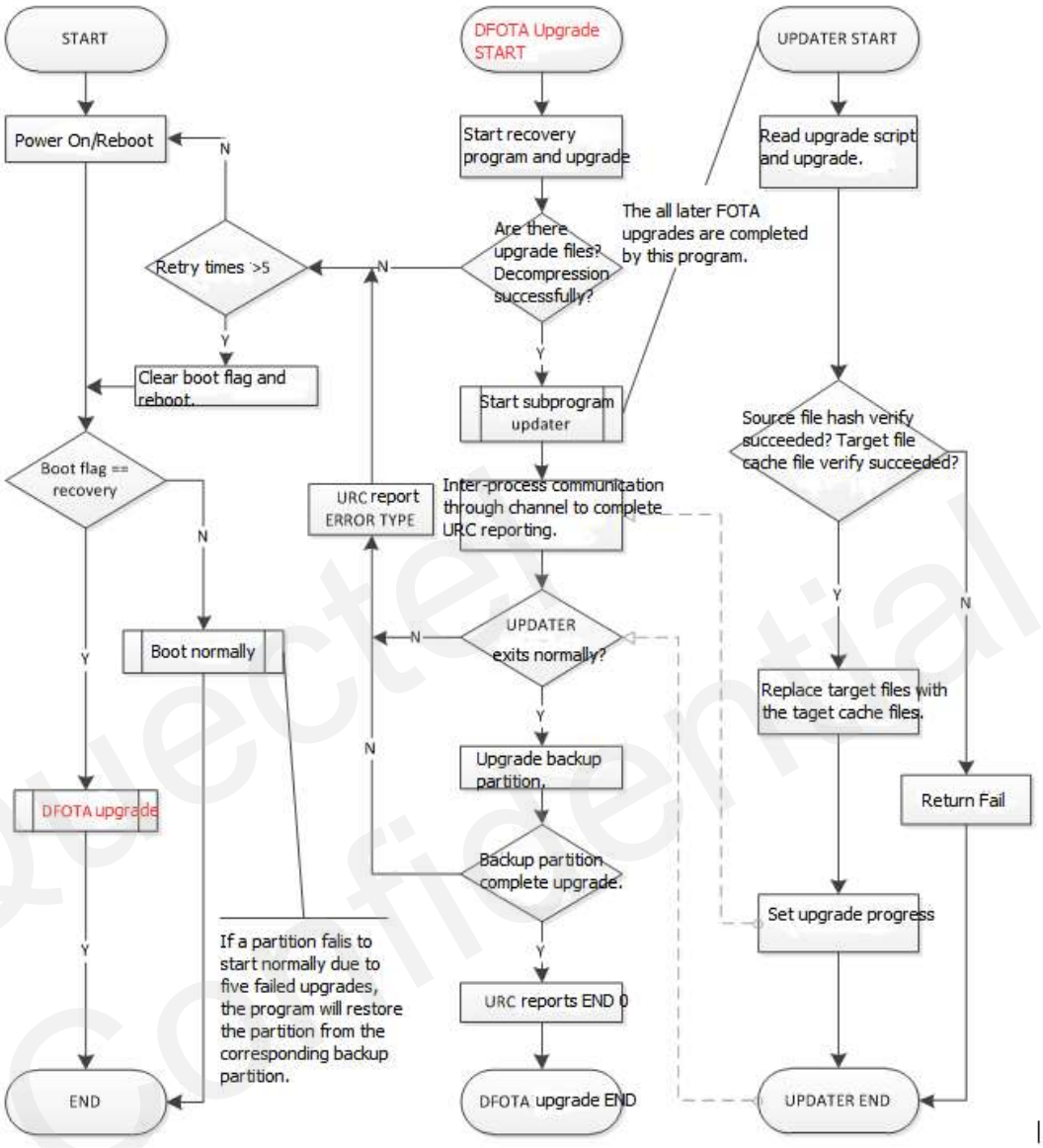
After executing above command and DFOTA package exists, system will execute FOTA upgrade automatically, and the later upgrade process is same as cmdline upgrade.

Since this feature only supports some versions, please confirm whether there is command qlfotapp in the current version.

NOTE

The command qlfotapp of initial version may trigger FOTA upgrade failed, for the solution please refer to Chapter 3.1.4

3.3. Upgrade Overview Diagram



4 Troubleshoot Simple Problems

In the DFOTA upgrade process, in general, the upgrade time is proportional to the size of the DFOTA package. For DFOTA package downloaded via http(s)/ftp, it is better to check the integrity of DFOTA package before upgrading. It is recommended to use the md5sum command to check.

During the upgrade process, due to various reasons, such as flash stability, high and low temperature environments, random power cut off and other unpredictable situations, it cannot guarantee that every upgrade is 100% successful. Therefore, for the entire upgrade process, the software will try five times. If the upgrade fails five times, the entire upgrade process fails. At this time, the restoration will be triggered and the version will be restored to the version of the backup partition.

If the program fails while upgrading the backup partition, the module will automatically restart and enter normal state, but the backup partition is not upgraded successfully.

During the upgrade process, in addition to the normal URC reports, such as the percentage of upgrades, FOTA START, and FOTA END 0, if an exception occurs and the upgrade fails, the URC will report the corresponding URC value. The report format is as follows:

```
+QIND: "FOTA","START"
+QIND: "FOTA","UPDATING",<percent>
+QIND: "FOTA","UPDATING",<percent>
...
+QIND: "FOTA","END",<err>
```

Here are meanings of some common URC report values.

0	Upgrade successfully
1	Failed to upgrade the backup partition, often due to insufficient flash space, resulting in the corresponding ubi file generation failure.
501	Upgrade start, the URC is generally caused by DFOTA package cannot be normal decompressed or decompression required space is insufficient.
502	Upgrading, this URC is generally caused by an abnormal exit from the upgrade program.
510	Upgrading, file verification failed.
511	Upgrading, insufficient space for upgrade.
OK	Command executed successfully (AT upgrade only)

ERROR	Command format error (AT upgrade only)

5 Optimization

After FOTA upgrade, there is the possibility that the permissions may be changed for the files added by customers. The files of configuration permission list will be added in the DFOTA tool to facilitate customer configuration.

Before the FOTA upgrade, customers need to manually download the corresponding DFOTA package and save it locally, and ensure the correctness of the DFOTA package.