

FOTA Update Procedure for NL-SW-LTE-GELS3-C

NimbeLink Corp

Updated: November 2017



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1. Introduction

1.1 Overview

This guide documents performing a firmware over the air (FOTA) update for the NL-SW-LTE-GELS3-C Skywire™ modem using firmware files from an FTP server and the modem's internal AT commands.

The FOTA process is a device-initiated firmware update triggered by the host system. Firmware files for FOTA operations are available upon request from NimbeLink. Please email product.support@nimbelink.com for the firmware files.

The FTP servers referenced in this document are not live servers and firmware files are not available for download from them. Users are responsible for hosting the firmware files for their FOTA application.

Please email product.support@nimbelink.com should any questions or support requests arise.

The modem cannot be powered down during the delta firmware download, and doing so will cause a failed download and the download will need to be reinitiated.

Applying the firmware update will take around 200 seconds to complete. It is not recommended to power down the modem during this process. Should the modem be powered down during this process the update process will pause and then resume once power is reapplied, but this is not recommended as URC notifications about the update may be missed, the firmware update may fail, and the modem will reset several times itself during the update process.

1.2 Prerequisites

The FOTA process is available on the NL-SW-LTE-GELS3-C firmware and later. To confirm your firmware version, issue the command **ATI1**, and the Skywire will respond with:

Cinterion

ELS31-V

REVISION 4.3.2.0

A-REVISION 4.3.3.0-xxxxx

L-REVISION 3.7.6

OK

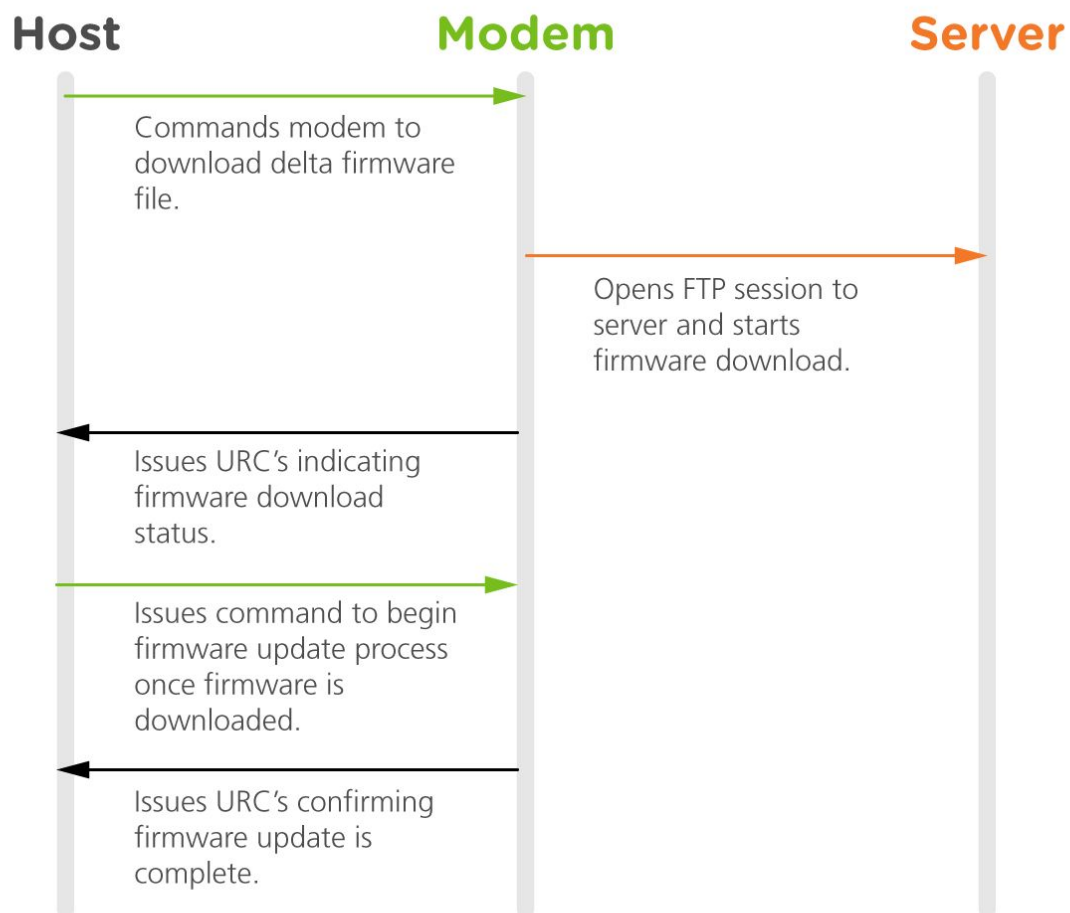
where **xxxxx** is the firmware version. Any version **29632** or higher is able to perform a FOTA update.

2. FOTA Process

2.1 Introduction

During the device initiated firmware update, the system host device will issue AT commands to the modem to trigger the modem to download the firmware file and then apply the update.

2.2 Flow chart



2.3 Directions

The following instructions will document the AT commands that the host system must send to the modem to perform a FOTA update for the modem. The modem must have an active SIM card and be registered on the network before starting the FOTA process.

2.3.1 Verify Connection

The FOTA process requires the modem to be registered on the network, and have a correctly configured PDP context in accordance with the carrier's required settings.

To check that the modem is registered on the network, you can issue the **AT+CEREG?** command. The modem will respond with something similar to:

```
+CEREG: 0,x
```

OK

where **x** is a number indicating registration status. **1** means that the Skywire™ is registered on the network. For other responses, please consult the AT command manual for more information.

Next, users should check that the PDP contexts are properly configured with the **AT+CGDCONT?** command. The modem will respond with the following:

```
+CGDCONT: 1,"IPV4V6","VZWIMS",,,,0,0,1,1,0  
+CGDCONT: 2,"IPV4V6","VZWADMIN",,,,0,0,0,0,0  
+CGDCONT: 3,"IPV4V6","APN",,,,0,0,0,0,0  
+CGDCONT: 4,"IPV4V6","VZWAPP",,,,0,0,0,0,0  
+CGDCONT: 8,"IPV4V6","",,,,0,1,1,1,0
```

OK

Where **APN** is the APN that the modem should use for data connections. Lines-of-service activated on go.nimbelink.com use the APN **NIMBLINK.GW12.VZWENTP**. If you activated your line-of-service elsewhere, it will be different. Please contact a representative of where you purchased your line-of-service to get the APN.

2.3.2 Activate Context and Confirm IP Address

The FOTA process requires an active data context. You can activate the context with the command **AT^SICA=1,3**. The Skywire™ will respond with **OK** regardless of activation status. To confirm that the context is active, you can issue **AT^SICA?**. The Skywire™ will respond with:

```
^SICA: 1,1  
^SICA: 2,0
```

^SICA: 3,x
^SICA: 4,0
^SICA: 8,0

OK

where **x** is the activation status. A status of **1** means that the context is active. If your status is **0**, please try the activation command again. If it continues to stay **0**, please confirm your APN and start over at Section 2.3.1.

Next, confirm that you have an IP address using the command **AT+CGPADDR**. The Skywire™ will respond with:

+CGPADDR: 1,"IPV6 address"
+CGPADDR: 2
+CGPADDR: 3,"IPV4 address"
+CGPADDR: 4
+CGPADDR: 8

OK

where **IPV4 address** is the IP address given to you by Verizon. If there is no IP address listed after **3**, the context did not activate. Please return to the beginning of this section to try and activate the context again.

2.3.3 Initiate Firmware Download

Once the modem's network connection has been verified the modem can begin the download of the firmware file using the following command:

AT^SFDOA="<firmware_url>"[, <reboot>[, <progress_report>[, <command_setting>]]]

followed by the Enter key. The modem will respond with different responses depending on the settings below.

<firmware_url> is the username, password, IP address, and port of the FTP server in the following format:

ftp://username:password@server-ip:port/path/to/firmwarefile.sfp

<reboot> can be set to:

0 - No reboot after firmware is installed. You must explicitly reboot the Skywire to activate the new firmware

1 - Reboot automatically after the firmware is installed. Default setting.

<progress_report> can be set to:

0 - Do not report the download progress

1 ... 100 - Reports the download progress with the unsolicited response code (URC)
"^SFDOA": "downloading",<percentage_downloaded>.

<command_setting> can be set to:

0 - Starts upgrade in the foreground. Default setting.

1 - Starts upgrade in the background. Launches the upgrade and returns immediately with OK if the upgrade was started correctly, or with a +CME ERROR. The upgrade progress is reported through the URC "^SFDOA".

2 - Cancel upgrade if any, or do nothing, then return OK.

Please see the AT command manual for more information.

Here is an example with the <progress_report> set to **20** and the <reboot> set to **1**:

```
AT^SFDOA="ftp:/user:password@123.456.789.012:34/firmware.sfp",1,20
```

```
^SFDOA: "downloading",0
```

```
^SFDOA: "downloading",20
```

```
^SFDOA: "downloading",40
```

```
^SFDOA: "downloading",60
```

```
^SFDOA: "downloading",80
```

```
^SFDOA: "downloading",100
```

```
^SFDOA: "installed"
```

```
^SFDOA: "rebooting"
```

OK

2.3.4 Verify Firmware Version

Once the firmware package is downloaded and installed, and the Skywire™ has rebooted, you can query the firmware version using the command **ATI1**. The Skywire will respond with something similar to:

```
Cinterion
```

```
ELS31-V
```

```
REVISION 4.3.2.0
```

```
A-REVISION 4.3.3.0-xxxxx
```

```
L-REVISION 3.7.6
```

OK

where **xxxxx** is the firmware that you are upgrading to.

2.3.5 Example Log

The following is a log of a NL-SW-LTE-GELS3-C modem running 29632 firmware performing a locally administered FOTA update to 29979 firmware. Comments on each step are in blue text and start with "//". User-entered commands are in bold.

// Wait for boot

^SYSSTART

// Check firmware version

ATI1

Cinterion

ELS31-V

REVISION 4.3.2.0

A-REVISION 4.3.3.0-29632

L-REVISION 3.7.6

OK

// Check signal quality

AT+CESQ

+CESQ: 99,99,255,255,13,47

OK

// Check that the modem is registered on the network

AT+CEREG?

+CEREG: 0,1

OK

// Check that the modem has the correct APN configuration

AT+CGDCONT?

+CGDCONT: 1,"IPV4V6","VZWIMS",,,,0,0,1,1,0

+CGDCONT: 2,"IPV4V6","VZWADMIN",,,,0,0,0,0,0

+CGDCONT: 3,"IPV4V6","NIMBLINK.GW12.VZWENTP",,,,0,0,0,0,0

+CGDCONT: 4,"IPV4V6","VZWAPP",,,,0,0,0,0,0

+CGDCONT: 8,"IPV4V6","",,,,0,1,1,1,0

OK

// Activate the context

AT^SICA=1,3

OK

// Query the context status

AT^SICA?

^SICA: 1,1

^SICA: 2,0

^SICA: 3,1

^SICA: 4,0

^SICA: 8,0

OK

// Check IP address

AT+CGPADDR

+CGPADDR: 1,"012.345.678.901.234.567.890.123.456.789.012.345.678.9.0.1"

+CGPADDR: 2

+CGPADDR: 3,"123.456.789.012"

+CGPADDR: 4

+CGPADDR: 8

// Initiate the FOTA process

AT^SFDOA="ftp://user:password@180.200.95.20:21/file/firmware.sfp",1,2

^SFDOA: "downloading",0

^SFDOA: "downloading",20

^SFDOA: "downloading",40

^SFDOA: "downloading",60

^SFDOA: "downloading",80

^SFDOA: "downloading",100

^SFDOA: "installed"

^SFDOA: "rebooting"

OK

// Check new firmware version after reboot

^SYSSTART

ATI1

Cinterion

ELS31-V

REVISION 4.3.3.0

A-REVISION 4.3.3.0-29979

L-REVISION 3.7.6