

APPLICABILITY TABLE

	SW Versions
GC Family (Compact)	10.00.xx.6
GC864-QUAD	
GC864-QUAD-V2	
GC864-DUAL-V2	
GE/GL Family (Embedded)	
GE864-QUAD	
GE864-QUAD-V2	
GE864-QUAD-Automotive-V2	
GE864-QUAD-ATEX	
GE864-DUAL-V2	
GE864-GPS	
GE865-QUAD	
GL865-DUAL	
GL865-QUAD	
GL868-DUAL	
GE910-QUAD	upcoming 13.00.xx3
GT Family (Terminal)	10.00.xx.6
GT863-PY	
GT864-QUAD	
GT864-PY	
GT864-3G	
GT863-3GG	08.01.xx8
HE910 Family	upcoming 12.00.xx4
HE910 ¹	
HE910-GA	
HE910-D	
HE910-EUR / HE910-EUD	
HE910-EUG / HE910-NAR	
HE910-NAD / HE910-NAG	

Tab. 1: Products and Software Versions

NOTICE: *the features and AT commands covered by the present document are concerning the software version shown in the Applicability Table. To get more information about the AT commands and their syntax see the AT Reference Guide referring to the software version indicated in the table.*

Where it is needed, a note is indicated if a specific feature is not supported by the previous software versions.

¹ HE910 is the “type name” of the products marketed as HE910-G & HE910-DG



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1. Introduction

Premium FOTA Managements provides a cost-effective, fast, secure and reliable way for wirelessly re-flashing the firmware on mobile devices, ensuring that embedded software is up-to-date with the latest enhancements and features.

The ability to manage software over-the-air is a necessary requirement for all users who design m2m products because of long lifecycles of m2m enabled products. The lifecycle of m2m enabled applications in the market ranges from 5-10 years. Downloading firmware version updates with new features represents an important new capability for m2m applications. It does away with the need to have the device updated in the field by technicians, cutting costs and timing of maintenance of the fielded applications. Such issues typically arise from a network configuration, a network software update to „fixing bugs“or the introduction of new additional features into the Telit module required by the market.

Telit, which has signed a partnership agreement with the worldwide leader of Mobile Software Management Red Bend, has integrated in its own proprietary protocol the unique vCurrent® Mobile Update Installer and Update Generator software for use in its m2m product portfolio. Telit is therefore able to update its products, using Firmware Over The Air (FOTA) technology, by transmitting only a delta file, which represents the difference between one firmware version and another.

vCurrent® is a registered trademark of Red Bend Software Inc.

1.1. Scope

Scope of this document is to provide all necessary information about Premium FOTA Managements, and how to design an application that benefits from these services.



1.2. Audience

This document is intended for those users that need to develop applications dealing with FOTA service.



WARNING:

Note that this service will be enabled only after signing specific agreement with Telit. Users, who want to benefit from this service, must pass through the Telit certification program, where Telit will assist the customer in validating the correct implementation of firmware update service.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit's Technical Support Center (TTSC) at:

TS-EMEA@telit.com

TS-NORTHAMERICA@telit.com

TS-LATINAMERICA@telit.com

TS-APAC@telit.com

Alternatively, use:

<http://www.telit.com/en/products/technical-support-center/contact.php>

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

<http://www.telit.com>

To register for product news and announcements or for product questions contact Telit's Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.



3. SMS Protocol

In general, firmware update operations are based on a protocol for communication between module and server. Specifically, this protocol can entirely rely on SMSs or can use the TCP/IP. This section deals with SMS protocol, the next with TCP/IP protocol.

3.1. Requirements



WARNING: the **Requirements** listed in paragraph 0 and **Alerts** in paragraph 3.1.2 must be fully respected otherwise the firmware update service is not guaranteed.

3.1.1. Preliminary Requirements

In order to benefit from Telit's firmware update service the following requirements must be fulfilled:

- The SIM needs to have enabled internet connection
- The SIM needs to have enabled SMS service also in roaming
- After the update, the PIN insertion must be managed by the external application or the Python script
- To perform the update procedure, the external application or the Python script has to confirm the update request
- For every firmware update service enabled module, the client has to provide to Telit the IMEI and the phone number (MSISDN) of the on board SIM
- If the GPRS bearer is used to download the delta firmware file:
 - The SIM needs to have GPRS traffic enabled
 - The GPRS Auto attach flag has to be set to 1
 - The GPRS class must not be set to "CC"
- If the CSD bearer is used to download the delta firmware file:
 - The GPRS class must not be set to "CG"

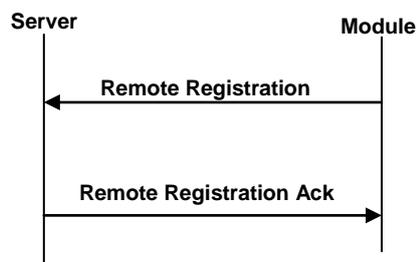


3.2.1. Remote Registration

In order to send a SMS containing all the needed information (IMEI, phone number, model, IMSI, current PLMN) from the module to the server, it is necessary to issue the following AT command:

- **AT#OTASNAP="number"**

where number represents the phone number in international format of the server. The server will respond with a SMS that ends the registration procedure. The SMS scenario is the following:



When the "Remote Registration Ack" SMS is received, the following unsolicited result code (URC) will be prompted on the AT command interface:

- **#OTAEV: Registered**

If, for some reason, the "Remote Registration Ack" SMS is not received, then the module will not be registered and, on every power on, the module will resend automatically the "Remote Registration" SMS.

Another way to force the "Remote Registration" SMS sending when the module is not registered, is to give again the #OTASNAP command.

If a module is still registered and after that the SIM is changed, the module will send automatically the Remote Registration SMS, because the server needs to be updated with the new information regarding the SIM (number, IMSI, etc). If you want to avoid this behavior, please simply run

- **AT#OTASNAP=""**



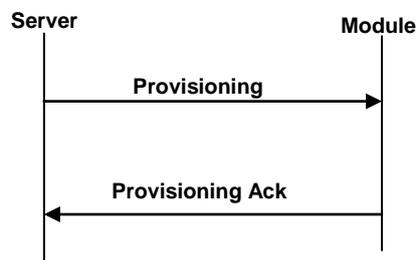


NOTE: the issue of #OTASNAP command, i.e. the issue of registration SMS, must be performed at least once. In this way PFM server knows the parameters of that specific module. Moreover, the issue of OTASNAP command informs Telit module that it is going to use PFM service; this means that after the first issue of OTASNAP, Telit module will send a registration SMS each time the SIM card is changed

3.2.2. Provisioning

Before the first update, a preliminary operation called provisioning will be performed. This has the goal to provide the module with the data relating the GPRS network access point or the CSD number, which the module needs to set up the delta firmware file download.

The server sends the *Provisioning* SMS to the module and this responds with the *Provisioning Ack* SMS. The scenario is the following:



3.2.3. Update

The update operation begins with the Command SMS, see figure below, (containing the FTP server address and credentials) sent from the server to the module. In this message the server requires the module to start the procedure either automatically (without client – user - interaction) or manually (with client – user - interaction): this is an option decided by the server side.

- In the automatic case the following unsolicited result code will be prompted on the AT interface:
 - **#OTAEV: Automatic Fw Upgrade Requested**
- In the manual case the following unsolicited result code will be prompted on the AT interface, see fig. 1:
 - **#OTAEV: Do you want to upgrade the firmware?**

If the user wants to accept this request, it has to provide a response in 60 seconds, giving the following AT command:

- **AT#OTASUAN=1**

In both cases a Command Ack SMS is sent to acknowledge the server and, in the same time, the module starts the procedure of downloading the delta firmware file by opening a FTP connection with the FTP server. When the module starts to download the delta firmware file the following unsolicited result code will be prompted on the AT interface:

- **#OTAEV: Start Fw Download**

When the delta firmware file download is terminated, a Command Progress SMS will be sent to the server and the following unsolicited result code will be prompted on the AT interface:

- **#OTAEV: Fw Download Complete**

At this point, the module checks the delta firmware file validity and in case, it starts the updating phase.



3.2.3.1. Firmware update failure handling

Possible causes for firmware update failure can be:

- Delta firmware file corruption: the version of the downloaded delta file is wrong or the file is corrupted due for example to a partial download;
- FTP error during the download;
- GPRS context activation error or CSD call setup error.

In these cases the firmware update process is interrupted, a URC is sent through the serial port while the module goes on working properly and the external application continues to control it as before the firmware update process.

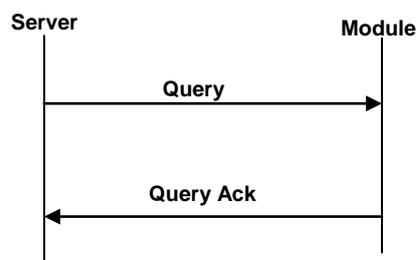
A power supply failure (voltage drop, battery fail...) during firmware update phase is fail proof. In case of power fail during updating phase, the module, at the next restart, will recognize the interruption of the former updating process. It will perform the updating process restarting from the point of interruption. The update process will be completed without any external action.

3.3. Test

On initiative of the server, the test operation can be started to simulate the delta firmware file download operation. In this case the update is not performed, but only the SMS protocol involved in firmware download is exercised between the server and the module.

3.4. Query

The query operation forces the module to send a SMS to the server containing all the information concerning the module: IMEI, phone number, model, IMSI, current PLMN. The scenario is the following:



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80000NT10013a Rev.12, 2012-11-29

When the module receives the Query SMS, the following unsolicited result code will be prompted on the AT command interface:

- **#OTAEV: Notified**

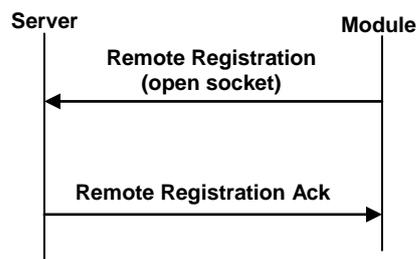


4.2.1. Remote Registration

In order to open a TCP/IP connection from the module to the server and send a message containing all the needed information (IMEI, phone number, model, IMSI, current PLMN), it is necessary to issue the following two AT commands:

- **AT#OTASNAIPCFG=<bearer>,<APN>[,<username>,<password>]**
- **AT#OTASNAIP=<IPort>,<IPAddr>[,<mynumber>]**

where <IPort> and <IPAddr> represent the IP Port and Address of the server. The module closes all the calls and all the PDP contexts and opens a TCP/IP socket connection toward the server; through this socket it sends the message. The server replies with a message that ends the registration procedure. The scenario is the following:



When the Remote Registration Ack is received, the following unsolicited result code will be prompted on the AT command interface:

- **#OTAEV: Registered**

A way to force the Remote Registration sending when the module is not registered is to give again the #OTASNAIP command.

If a module is still registered and after that the SIM is changed, the module will do automatically the Remote Registration via SMS, because the server needs to be updated with the new information regarding the SIM (number, IMSI, etc).





NOTE: the issue of #OTASNAIP command, i.e. the issue of registration TCP/IP message, must be performed at least once. In this way PFM server knows the parameters of that specific module. Moreover, the issue of OTASNAIP command informs Telit's module that it is going to use PFM service; this means that after the first issue of OTASNAIP, Telit module will send a registration SMS message each time the SIM card is changed.

4.2.2. Update

The update operation begins with a Command SMS from the server, refer to figure below, containing the data relating to the GPRS network access point or to the CSD number.

In this message the server requires the module to start the procedure either automatically (without client -user- interaction) or manually (with client -user- user interaction): this is an option decided by the server side.

- In the automatic case the following unsolicited result code will be prompted on the AT interface:
 - **#OTAEV: Automatic Fw Upgrade Requested**
- In the manual case the following unsolicited result code will be prompted on the AT interface, refer to fig. 2:
 - **#OTAEV: Do you want to upgrade the firmware?**

If the client wants to accept this request, it has to provide a response in 60 seconds, giving the following AT command:

- **AT#OTASUAN=1**

In both cases the module then closes all the calls and all the PDP contexts and opens a TCP/IP socket connection to the server.

Through this socket it sends a Command Ack message and receives from the server a Command Progress message (containing the FTP server address and credentials).

The module starts the procedure of downloading the delta firmware file by opening a FTP connection with the FTP server. When the module starts to download the delta firmware file the following unsolicited result code will be prompted on the AT interface:



4.2.2.1. Firmware update failure handling

Possible causes for firmware update failure can be:

- Delta firmware file corruption: the version of the downloaded delta file is wrong or the file is corrupted due for example to a partial download;
- FTP error during the download;
- GPRS context activation error or CSD call setup error.

In these cases the firmware update process is interrupted, a URC is sent through the serial port while the module goes on working properly and the external application continues to control it as before the firmware update process.

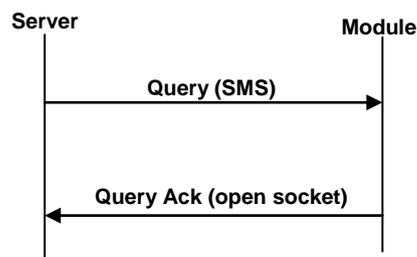
A power supply failure (voltage drop, battery fail...) during firmware update phase is fail proof. In case of power fail during updating phase, the module, at the next restart, will recognize the interruption of the former updating process. It will perform the updating process restarting from the point of interruption. The update process will be completed without any external action.

4.3. Test

On initiative of the server, the test operation can be started to simulate the delta firmware file download operation. In this case the update is not performed, but only the TCP/IP protocol involved in firmware download is exercised between the server and the module.

4.4. Query

The query operation forces the module to open a TCP/IP connection toward the server and send a message containing all the information concerning the module: IMEI, phone number, model, IMSI, current PLMN. The scenario is the following:



5. TCP/IP Protocol

It is possible to use only the TCP/IP protocol and avoid using the SMS protocol, starting the Update process from the module and not from the server.

5.1. Requirements



WARNING: the **Requirements** listed in paragraph 5.1.1 and **Alerts** in paragraph 5.1.2 must be fully respected otherwise the firmware update service is not guaranteed.

5.1.1. Preliminary Requirements

In order to benefit from Telit's firmware update service the following requirements must be fulfilled:

Software Version equal/greater than:	refer to Tab. 1 TCP/IP Protocol
10.00.xx4	available
13.00.xx2	available
12.00.xx.2	available

- The SIM needs to have enabled internet connection
- After the update, the PIN insertion must be managed by the external application or the Python script
- To perform the update procedure, the external application or the Python script has to request the update
- For every firmware update service enabled module, the client has to provide to Telit the IMEI and the phone number (MSISDN) of the on board SIM
- If the GPRS bearer is used for the firmware update protocol and to download the delta firmware file:
 - The SIM needs to have GPRS traffic enabled
 - The GPRS Auto attach flag has to be set to 1
 - The GPRS class must not be set to "CC"
- If the CSD bearer is used for the firmware update protocol and to download the delta firmware file:
 - The GPRS class must not be set to "CG"

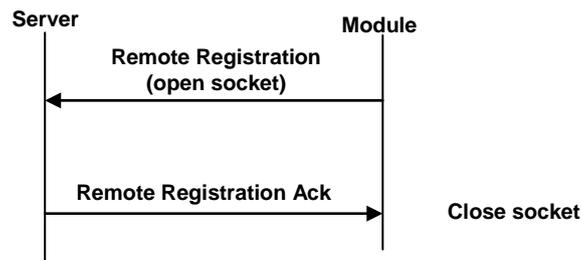


5.2.1. Remote Registration

In order to open a TCP/IP connection from the module to the server and send a message containing all the needed information (IMEI, phone number, model, IMSI, current PLMN), it is necessary to issue the following two AT commands:

- **AT#OTASNAIPCFG=<bearer>,<APN>[,<username>,<password>]**
- **AT#OTASNAIP=<IPort>,<IPAddr>[,<mynumber>]**

where **<IPort>** and **<IPAddr>** represent the IP Port and Address of the server. The module closes all the calls and all the PDP contexts and opens a TCP/IP socket connection toward the server; through this socket it sends the message. The server replies with a message that ends the registration procedure. The scenario is the following:



When the Remote Registration Ack is received, the following unsolicited result code will be prompted on the AT command interface, refer to fig. 3:

- **#OTAEV: Registered**

A way to force the Remote Registration sending when the module is not registered is to give again the #OTASNAIP command.

If a module is still registered and after that the SIM is changed, the module will do automatically the Remote Registration via SMS, because the server needs to be updated with the new information regarding the SIM (number, IMSI, etc).



7. Critical Scenario

The following critical scenario has been detected and has to be avoided:

1. there are 2 modules:
 - a. SIM A inserted in module A
 - b. [module A, SIM A] registered for the Service
 - c. SIM B inserted in module B
 - d. [module B, SIM B] registered for the Service

2. Move SIM A from module A to module B: the module A remains without SIM and the module B executes automatically a registration to communicate to the server the new SIM. After this operation, the situation is the following:
 - a. by the server side:
 - i. module A is not registered to any SIM
 - ii. [module B, SIM A] registered for Service
 - b. By the module side:
 - i. module A is without SIM but the SIM A IMSI is stored in the NVM
 - ii. SIM A inserted in module B
 - iii. [module B, SIM A] registered for Service

3. Move back SIM A from module B to module A: the module B remains without SIM. The module A doesn't execute automatically the registration because it reads from NVM the SIM A IMSI: it means that [module A, SIM A] should be already registered. After this operation the situation is the following:
 - a. by the server side:
 - i. module A is not registered to any SIM
 - ii. [module B, SIM A] registered for Service
 - b. By the module side:
 - i. SIM A inserted in module A
 - ii. [module A, SIM A] registered for Service
 - iii. module B is without SIM but the SIM A IMSI is stored in the NVM

It is now impossible to request a firmware updating of module A firmware



