

Premium FOTA Management Product Description

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1. Introduction

1.1. Scope

This document describes requirements and procedures that customer must follow in order to be compliant with Premium FOTA Management (PFM) the Telit's Over-The-Air firmware update service, one of the Telit's INFINITA services. It contains both the procedure of registration to Telit Firmware Update Program and the Over-The-Air updating procedure steps.

1.2. Audience

This document is intended for customers who design products that integrate Telit modules and are interested in maintaining the module's firmware up-to-date with latest enhancements and features.

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

Or use:

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

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.



1.4. Document Organization

This document contains the following chapters:

[“Chapter 1: Introduction”](#) provides a scope for this document, target audience, contact and support information, and text conventions.

[“Chapter 2: Service Overview”](#) gives a general description of FTMS service, available options of service, reliability and warranty.

[“Chapter 3: General Requirements”](#) describes the hardware and software requirements requested either to modules either to customer applications in order to benefit from the PFM. The PFM Certification Program is also described.

[“Chapter 4: Premium FOTA Management”](#) provides process for Service registration, Telit PFM parameters and description of update procedure steps.

[“Chapter 5: Post Update Report”](#) describes the report issued by Telit PFM Server related to each update performed on a specific module.

[“Chapter 6: Acronyms and Abbreviations”](#) provides definition for all the acronyms and abbreviations used in this document.

1.5. Text Conventions



Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.



Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.



Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

The following documents are related to:

- Premium FOTA Management (PFM) Application Note.
- PFM Certification Program Reference Guide.
- PFM Service Agreement.



1.7. Document History

Revision	Date	Changes	Location
0	2009-06-02	First issue	Trieste
1	2013-01-07	updated	Trieste
2	2014-12-19	Updated Applicability Table	Trieste



2. Service Overview

2.1. General description

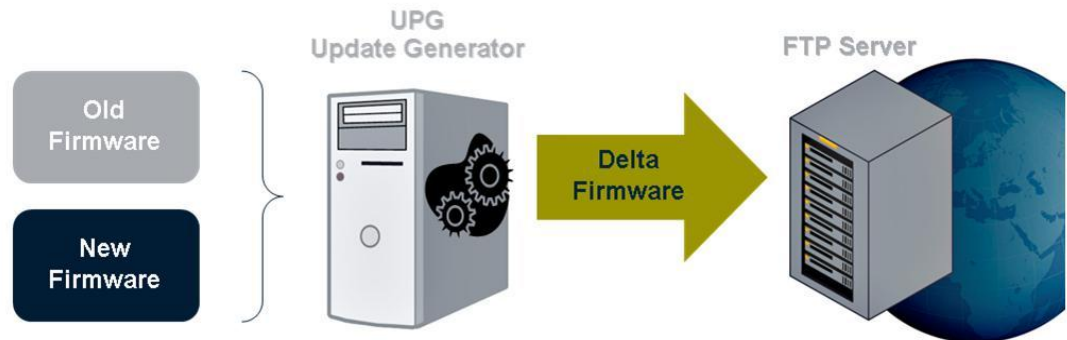
M2M modules have a lifetime of 5 – 15 years; they are often deployed in remote, unmanned locations. Pace of innovation in wireless technologies creates risk of modules becoming quickly outdated.

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

Telit has signed a partnership agreement with the worldwide leader of Mobile Software Management Red Bend. Telit has integrated in its own proprietary protocol the unique vRapid^(*) Mobile Update Installer and Update Generator software for use in its m2m product portfolio.

Telit is 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.

Starting from old and new version Telit creates a delta firmware file. This file is stored in PFM server, available for download.



Delta file generation

^(*)vRapid[®] is a registered trademark of Red Bend Software Inc.

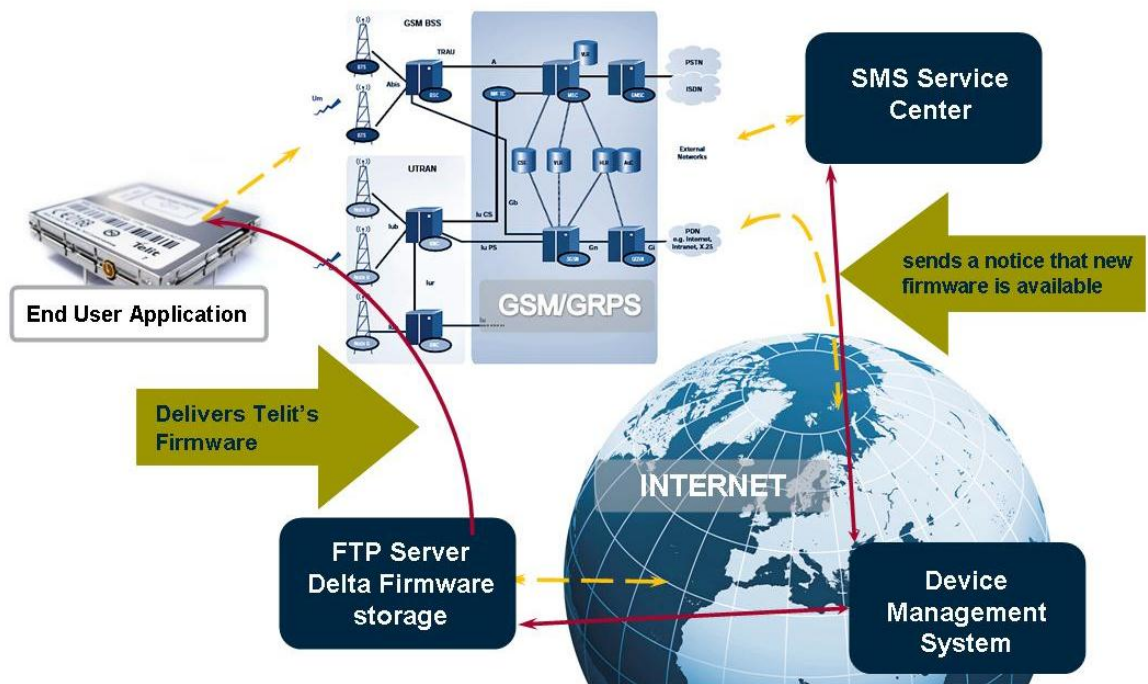
Customer can choose a specific target release, not necessary the latest.

PFM service is available whenever and wherever customer needs to update its own product.



PFM service dramatically reduces maintenance costs.

PFM service maximize lifetime of M2M modules.



Global view of PFM update services

PFM is based on SMS message and FTP protocol.

There are 3 different kinds of update protocol available:

- SMS Protocol (the first developed protocol, supported by all modules)
- SMS-TCP/IP Protocol
- TCP/IP Protocol

Basically the 3 different protocols take into account the 3 different steps in FOTA protocol evolution. Not all of the protocols are supported by all the SW variants.

Please contact Telit Technical support or your regional sales representative for more details.

2.1.1. Fully SMS protocol Description

It is the first FOTA protocol developed in Telit and it is entirely based on SMS messages, except for FTP download of the delta update file.



2.1.2. SMS-FTP protocol Description

The idea is to use the TCP/IP protocol to exchange messages between module and server. An SMS is sent by the server to trigger the TCP/IP connection from the module.

2.1.3. FTP protocol Description

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. In this case no SMS is needed.

2.2. Options of Service

PFM update service is available as extended warranty on the software, on top of the first year of warranty, with several durations. Each customer can find the right PFM option. It has to be noted that customer can choose to update his own modules to a desired target release, not necessary the latest one.

There is no upper limit to the duration of service; otherwise, the minimum duration a customer can subscribe is 1 year.



It will be up to the customer to decide when an update of the module's firmware is needed.

For other requirements or further information, please contact your Telit Representative or TTSC.

2.2.1. Extended Warranty up to 5 years

PFM Supply Agreement provides a minimum of 1 year of extended software warranty the duration can be extended to the entire period covered by PFM service. During this period, the customer can benefit of the remote firmware update at any time.

Only Telit customers with a minimum batch of pieces to update can access to this service.

Please contact your Telit Regional Sales Director for terms and conditions of the service.

2.3. Reliability

Telit Firmware Management Services procedure is fail-proof. It has been designed to recover the module in case of:

- failure in call setup;
- failure due to FTP download error;



- failure during firmware updating.



In all these cases, the update procedure is interrupted and the module goes as before the update process.

If a power supply drop occurs during updating (worst case), at the next reboot, the module:

- Detects an interrupted update procedure;
- Checks and finds the last updating step performed;
- Restarts updating phase from this step.

Once completed, the module reboots with the new firmware release.



3. General Requirements

All Telit modules currently in production support PFM update service. This does not signify that each Telit module inside each customer's application can be updated.

There are some requirements to be respected either by modules or by the customer's applications.

3.1. Module Requirements

3.1.1. Module Hardware and Software Requirements

The following module families with the related SW support the PFM Service:

	SW Versions
GC Family (Compact)	
GC864-QUAD	10.00.xx7
GC864-QUAD V2	
GC864-DUAL V2	
GE/GL Family (Embedded)	
GE864-QUAD	10.00.xx7
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	13.00.xx3
GE910-QUAD AUTO	
GE910-GNSS	
GE910-QUAD V3	16.00.xx2
GE866-QUAD	
GL865-QUAD V3	
GL865-DUAL V3	
GL868-DUAL V3	
GT Family (Terminal)	
GT863-PY	10.00.xx7
GT864-QUAD	
GT864-PY	
HE910 Family	
HE910 (1)	12.00.xx4
HE910-GA	
HE910-D	
HE910-EUR / HE910-EUD	
HE910-EUG / HE910-NAG	
HE910-NAR / HE910-NAD	
UE/UL Family (Embedded)	
UE910-EUR / UE910-EUD	12.00.xx4
UE910-NAR / UE910-NAD	
UL865-EUR / UL865-EUD	
UL865-NAR / UL865-NAD	
UL865-N3G	





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 Commands Reference Guide referring to the software version indicated in the table.



Firmware release older than those specified above cannot be updated via PFM Service.

3.1.1.1. Module Software Requirements: SMS-TCP Update Protocol

refer to Error! Reference source not found.	
Software Version equal/greater than:	Combined SMS-TCP/IP Protocol
10.00.xx3	available
13.00.xx2	available
12.00.xx.2	available

3.1.1.2. Module Software Requirements: Fully TCP Update Protocol

refer to Error! Reference source not found.	
Software Version equal/greater than:	TCP/IP Protocol
10.00.xx4	available
13.00.xx2	available
12.00.xx.2	available



3.2. Customer Requirements

3.2.1. Customer Software Requirements

Customer software must be able to manage the specific PFM AT commands detailed in PFM Application Note (ref. §1.6).

Customer application must pass through Telit Certification Program detailed in § 3.3.



To perform the update procedure, the external application or the Python script has to confirm the update request.

3.2.2. Customer SIM Settings

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

- 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 by the Python script;
- If the GPRS bearer is used to download the delta file, The SIM needs to have GPRS traffic enabled.
- The customer's application must reside on the public IP network.



Further specific setups, concerning the points above, are listed in PFM Application Note.



Once the module is registered in PFM Server with its associated, the exchange of SIM between modules may be handled with care to avoid a miss registration of the module.



3.3. PFM Certification Program

Certification Program is a procedure by means customer certifies the knowledge of PFM protocol and his capability to implement it in an application.

Certification Program is performed by means a tool available in Telit Website. This tool should be included in customer's test protocol each time customer application is enhanced.

Certification is available in Telit website:

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

This tool tests if all the update procedure steps are accomplished by Telit Module. Telit module exchanges with PFM Server the SMS messages and performs the download form FTP server of a "dummy" delta file. At the end of reboot, Telit module gets the same firmware release as before.



By means this procedure, customer qualifies the knowledge of PFM protocol and his capability to implement it.

Customer is charged of the proper running of the others functionalities and AT commands of its application.



Customer is responsible to ensure the compatibility between the new firmware release and his own application before giving his assent to download all the module's stock.



If customer has different applications implementing the PFM capability, Telit strongly recommends the customer to perform a qualification of PFM interface's implementation on each specific application.



Telit does not certify the final customer application; this application is out of Telit's domain.

After getting PFM Certification, and only with customer assent, Telit will perform the updating of concerned modules in batch of agreed quantities.

Some samples of each batch will be verified by customer before proceeding with the next batch.

Contact Telit's Technical Support Center (TTSC) for further information and assistance.



4. Premium FOTA Management

4.1. Service Registration

Customer must register his devices in PFM server to get over-the-air firmware update service. This can be done in two ways:

- Standard Registration;
- Remote Registration.

A “PFM enabled device” becomes “PFM registered device” after registration on the PFM server. The registration is allowed only to customers who have signed a contract for PFM. This means that not all PFM enabled devices become PFM registered.

Only certified customers can perform the download from PFM Server, see Telit Certification Program Reference Guide (ref.1.6) for details.

4.1.1. Standard Registration

In order to register his modules in PFM server, customer has to communicate the list of devices.

Device's list can be provided in two ways:

1. Sending to TTSC a file with the following information in CSV format:

```
<IMEI>;<Module Number>;<Product Name>;<Firmware Label>;<Distributor
name>;<Subdistributor name>;<FOTA enabled>;<FOTA activated>;<FOTA
DownINAP FROM DATABASE>;<FOTA DownINAP MANUAL>;<CSD
Bearer>;<GPRS Bearer>;<NAP Username>;<NAP Password>
```

Where:

<IMEI> is the IMEI of the module;

<Module number> is the phone number of the SIM inserted in that module (MSISDN);

<Product Name> is the type of product (GE864-PY, GE863-QUAD.....);

<firmware label> is the current firmware version of the module;

<Distributor name> is distributor name. If this parameter is empty the next parameter (sub-distributor) must be present;

<Subdistributor name> is customer name, if this info is empty; the previous parameter (distributor) must be present;

<FOTA Enabled> and <FOTA activated> these parameters must be present as they are (see example at the end of this paragraph);

<FOTA DownINAP FROM DATABASE> is the APN of the network. This parameter is charged from a table, present in the PFM database, depending



on the PLMN. If this parameters is empty the next (FOTA DownINAP MANUAL) must be present;

<FOTA DownINAP MANUAL> is the APN of the network. It is present if the APN that customer is going to use is not present in the table's database (see above);

<CSD Bearer> if customer is going to use CSD connection, this parameter is YES. If this parameter is empty the next (GPRS Bearer) must be present;

<GPRS Bearer> if customer is going to use GPRS connection, this parameter is YES. If this parameter is empty the previous (CSD Bearer) must be present;

<NAP Username>;<NAP Password> are user name and password to access to that specific network if required.

An example is:

```
123456789040001;+391234560001;GC864-PY;07.02.304.1-
A014_F;TTSC;;FOTA;FOTA ACTIVATED;internet.wind.biz;;;;;
```

2. Inserting all data directly in Telit's website (not available at the moment).

4.1.2. Remote Registration

If the customer does not provide to Telit the IMEI, the phone number, firmware version, model and APN of the on board SIM for each module, Telit can perform a preliminary SMS-based phase, called *Remote Registration*. Remote Registration permits the PFM server to know the association between device's IMEI and phone number of the onboard SIM. In despite of standard registration, this operation needs only the list of MSISDNs and the APN to be performed.

Module will be solicited by PFM Server to send a SMS containing all the useful information to be registered.

Remote registration SMS can also be forced by customer application by means AT command.

For details about the remote registration see Telit Firmware Management Services Application Note (ref §1.6).



Remote registration can be forced also by the customer application, issuing the appropriate AT command, see PFM Application Note for details.



4.2. PFM Server

The PFM service allow to schedule the update procedures in an agreed time slot in order to perform the updating when customer's application is in idle phase or network connection is cheaper. This time slot will be agreed with the customer.

PFM Server monitors in real time each updating phase and it logs all the operations performed on each device.

PFM server can also perform other two operations:

- Test;
In this case the update will not be performed, but only the SMS-based PFM protocol will be exchanged between the PFM server and the module.
- Query.
The query operation forces the module to send a SMS to the PFM server containing all the information concerning the module: IMEI, phone number, model, IMSI, current PLMN.

4.3. PFM Firmware Update Procedure

In order to update his modules, customer has to communicate:

- PFM Agreement reference No.
- Option of Service (years of Extended Update);
- List of concerned devices (in the same format as detailed in §4.1.1)
- Desired Software Release;



If customer has different modules with different firmware releases installed and/or different target releases, a dedicated list shall be prepared for each one. This information is very important in order to create the correct delta file.

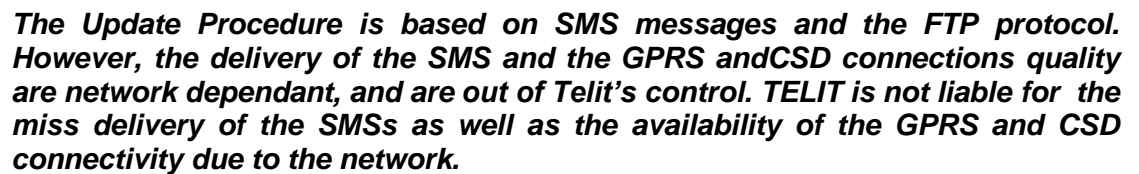
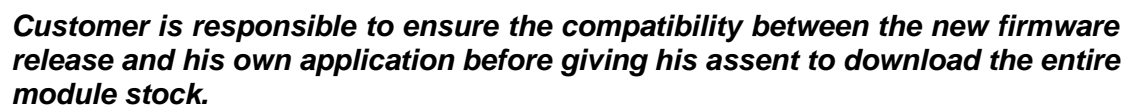
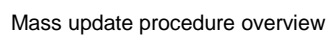
After getting PFM Compliant Certification, and only with customer's assent, Telit will perform the updating of customer modules in batch of agreed quantities.

First of all, Telit will perform the update of some samples of that batch and customer will test it, verifying the complete compliance of the application.

At the end of sample's verification, customer will give his assent to update the entire batch.

Telit will proceed to download some samples of next batch and customer will verify it and so on, until the entire stock is updated.



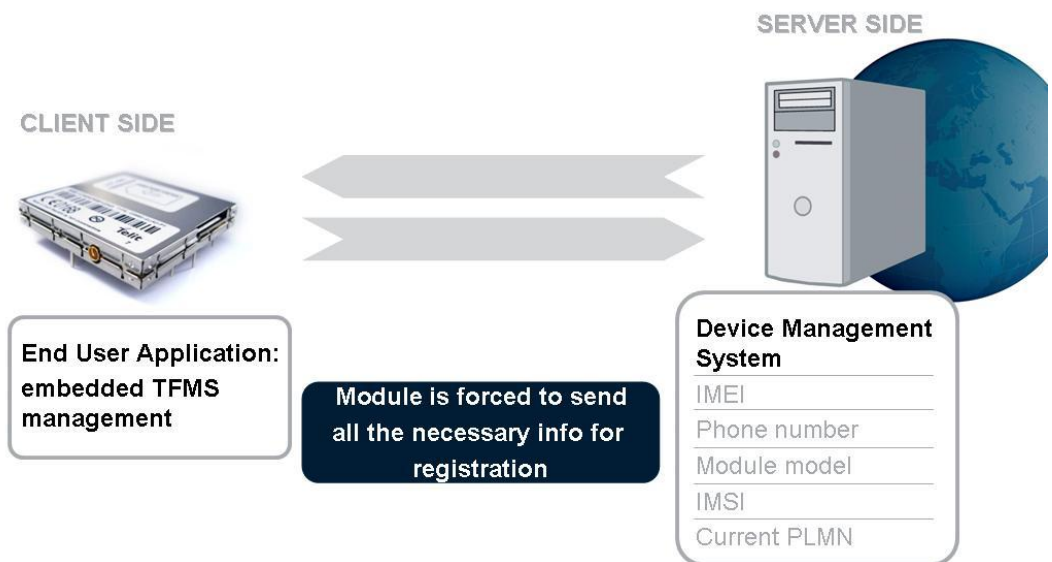


4.3.1. Firmware Updating Steps

The steps of firmware update procedure are listed below:

1. **Remote Registration** (needed if module is not registered yet);

PFM server forces Telit module, via SMS (or TCP socket connection depending if SMS/SMS-TCP or fully TCP FOTA protocol is used), to send a SMS containing all the useful information to be registered in the server. In case of SMS/TCP or fully TCP FOTA protocol is used, the module open a TCP/IP socket connection and send the required data to FOTA server.



2. **Provisioning;**

This phase provides setup of network parameters in the module.



It will be performed only the first connection with PFM server.



PFM server sends to Telit module, via SMS or TCP/IP, network parameters for GPRS and FTP connection.

3. Firmware download;



Module receives a request from server to update the firmware from server by means SMS or TCP/IP.

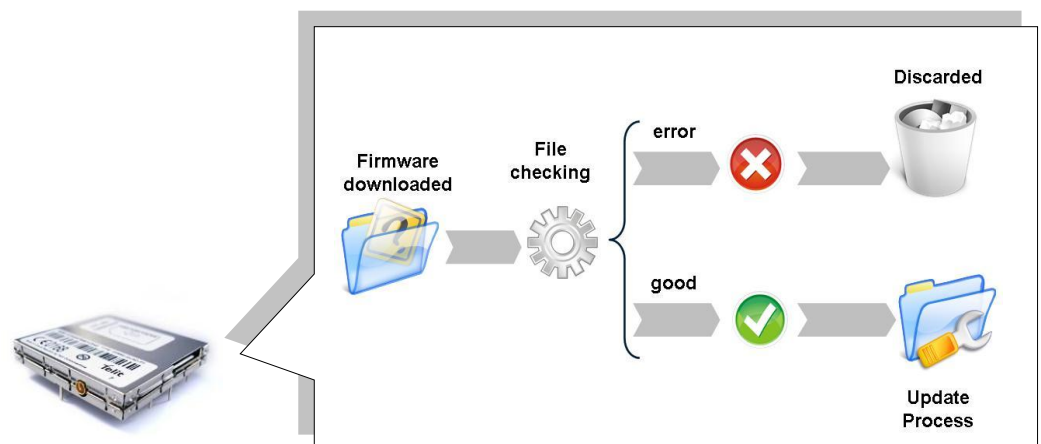
Module sends a SMS message to accept the request (or accept via TCP socket connection, depending on the used protocol) and performs a FTP connection to download the delta file from FTP Server.



To perform the update procedure, the external application or the Python script has to confirm the update request.

4. Firmware Check;

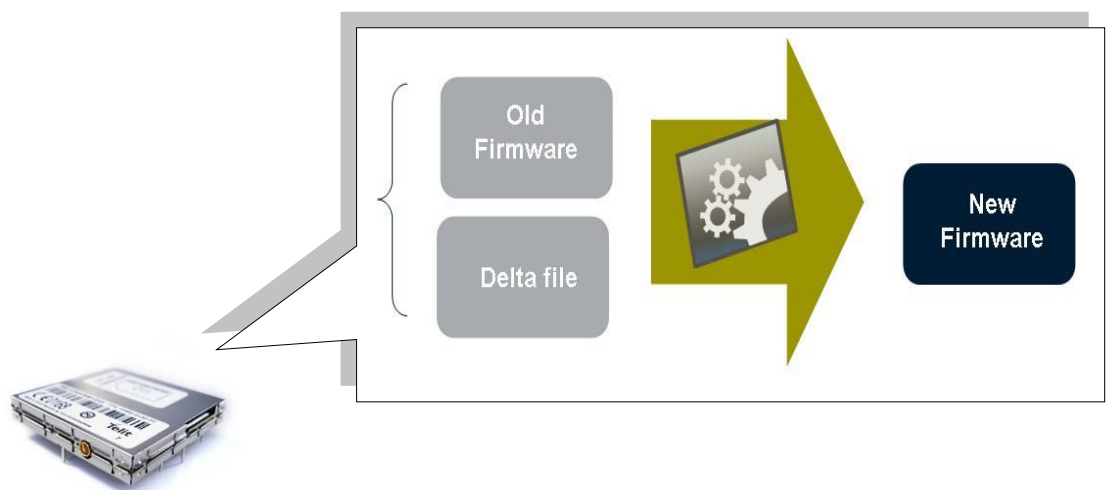
When download is completed, the delta file is checked to verify the consistency and errors if the case.



If an error is detected, the file is discarded and module goes as before. A SMS or error message via TCP/IP socket is issued to report a fail to the server.

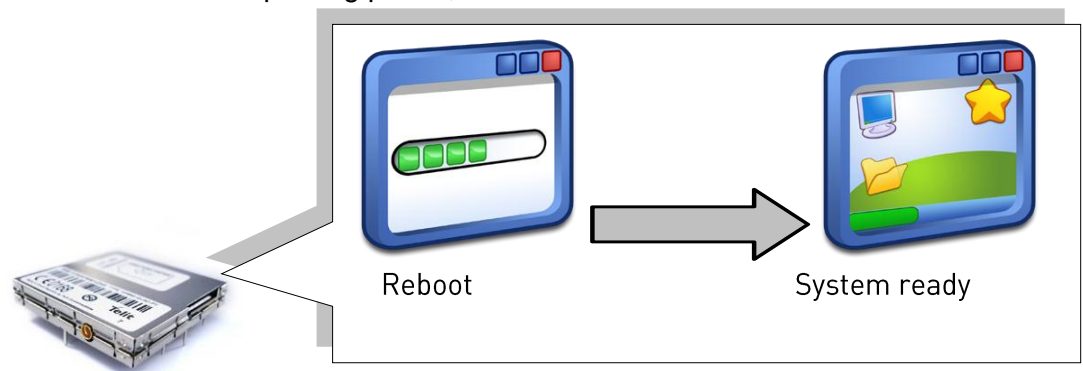
5. Firmware Updating;

Starting from current firmware and delta file downloaded from PFM server, module is able to build the new firmware version.



6. Module Reboot;

At the end of the updating phase, the module reboots with the new firmware.



After reboot, the PIN insertion must be managed by the external application or the Python script.

Some particular setups must be re-programmed after reboot. See PFM Application Note for the complete list of setups to be reprogrammed.



7. Update result message;

A final SMS is sent to PFM Server reporting the result of updating (updated, not updated). If SMS/TCP or fully TCP protocol is used, a new TCP socket connection is opened and a result message is send to the server.

In case of fail (delta file error, FTP connection fail, etc.) the result message contains a specific error code.

LAST STEP: Final Result Message

CLIENT SIDE



End User Application:
Successful update or
Error code

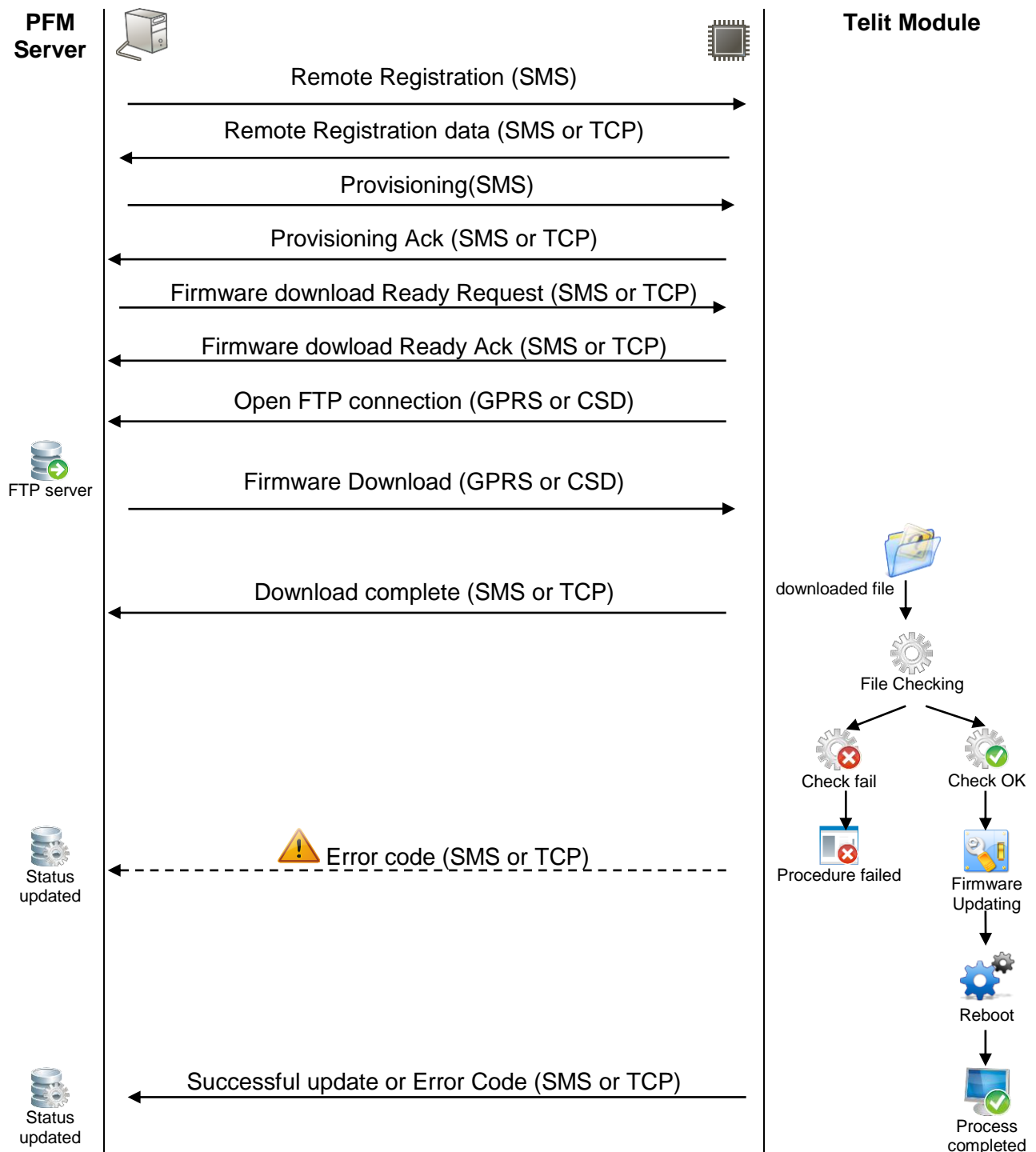


SERVER SIDE



A general review of message exchange and operations are listed below:

General review of message exchanges



5. Post-update Report

Each updating phase is recorded in a file stored in PFM Server.

There are two possible reports available in PFM website:

1. A General Report

The General Report contains all the IMEI provided by customer to be updated by PFM with the actual firmware version and date of last update.

2. A Module Report

The Module Report is a dedicated report by means customer can check all the operations carried on a specific module.

The procedure to access to the update reports is exactly the same report request performed during Certification Program.

See Certification Program Reference Guide for details (ref. §1.6).

An example of each report is reported below:



Successful FOTA
User: **Application Tester 3**
Domain: **SubDistributors** ☒ CLOSE

IMEI	Current Firmware	FOTA Updating Time
AT3_IMEI1_00000	22.22.312-222	2008-12-11 17:00:00
AT3_IMEI3_00000	66.66.316.1-B666_F	2008-12-11 17:20:00
AT3_IMEI2_00000	22.22.312-222	2008-12-11 17:10:00

Making machines talk.®

General Report

History Table	
User: TTSC	
Domain: Distributors	
IMEI: 357022000037450	
<input checked="" type="checkbox"/> CLOSE	
2008-01-31 12:15:41	Remote Registration
2008-01-31 12:15:41	Remote Registration
2008-01-31 12:17:02	FOTA Request from 07.02.104-B002 to 07.02.104-A009
2008-01-31 12:17:15	Download started
2008-01-31 12:20:48	FOTA Request from 07.02.104-B002 to 07.02.104-A009
2008-01-31 12:20:54	Provisioning started
2008-01-31 12:22:08	FOTA Request from 07.02.104-B002 to 07.02.104-A009
2008-01-31 12:22:08	Provisioning started
2008-01-31 12:23:56	Provisioning completed
2008-01-31 12:23:58	Download started
2008-01-31 12:36:37	Download completed
2008-01-31 14:01:40	FOTA Request from 07.02.104-A009 to 07.02.104-B002
2008-01-31 14:01:51	Download started
2008-01-31 14:04:47	Download failed: client error
2008-01-31 14:24:23	FOTA Request from 07.02.104-A009 to 07.02.104-B002
2008-01-31 14:24:41	Download started
2008-01-31 14:27:35	Download failed: client error
2008-01-31 14:59:23	FOTA Request from 07.02.104-A009 to 07.02.104-B002
2008-01-31 14:59:42	Download started
2008-01-31 15:02:40	Download failed: client error
2008-01-31 17:20:25	FOTA Request from 07.02.104-A009 to 07.02.104-B002
2008-01-31 17:20:26	Provisioning started

Module Report



6. Acronyms and abbreviations

Term	Definition
APN	Access Point Name
CSD	Circuit Switched Data
FOTA	Firmware Over The Air
FTP	File Transfer Protocol
GSM	Global System for Mobile communication
GPRS	General Packet Radio Service
IMEI	International Mobile Equipment Identity
M2M	Machine-to-Machine
MNO	Mobile Network Operator
MSISDN	Mobile Station International Subscriber Directory Number
PLMN	Public Land Mobile Network
SIM	Subscriber Identity Module
SMS	Short Message Service
PFM	Premium FOTA Management
TTSC	Telit Technical Support Centre

