

PFM Certification Program Application Note

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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 PFM service. It contains the step-by-step procedure to help the customer in the development an application as PFM Compliant.

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

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.

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.



2. Premium FOTA Management

2.1. Overview

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 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.

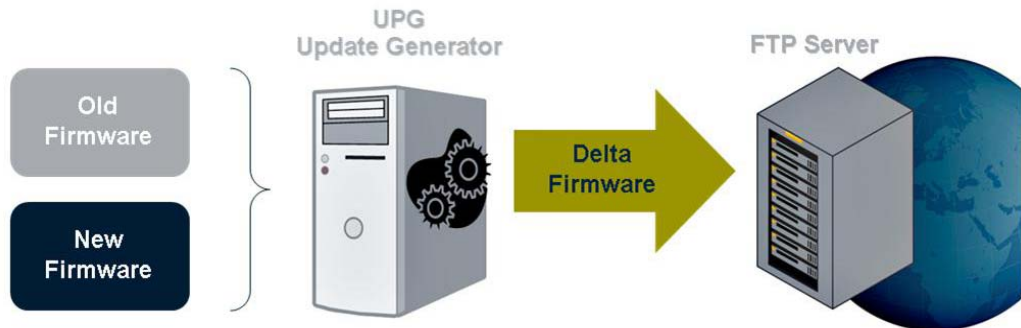


Fig.1 Delta file generation

On the opposite side, Telit Module performs the reverse operation:

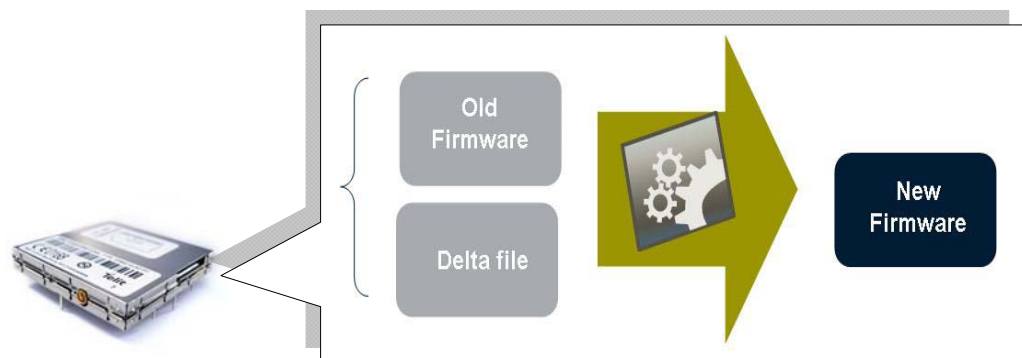


Fig.2 New Firmware generation

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 works through an SMS-based protocol and FTP protocol.

SMS-based communication protocol is used for the handshaking between PFM server and remote module; FTP protocol is used to download the delta files to the remote module.



The Update Procedure is based on SMS messages and FTP protocol. However, the delivery of messages and GPRS/CSD connections are MNO dependant and out of Telit's domain, sometimes little differences affect different mobile operators. A complete list of network mobile operators in which Telit modules are certified is available in Telit website:

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

For mobile operators not included in the list, customer shall provide a separated PFM certification using MNO's SIM and Network if needed.

In this case, a dedicated field test is also recommended.



3. General Requirements

All Telit modules currently in production support PFM. 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 and by the customer's applications.

3.1. Module Requirements

3.1.1. Module Hardware Requirements

The following P/Ns support the PFM Service:

PRODUCT	PART NUMBER ⁽¹⁾
GT863-PY	3990150471
GT864-PY	4990150070
GT864-QUAD	4990150069
GM862-GPS	GM862GPS***-***
GM862-QUAD	GM862QUD***-***
GM862-QUAD-PY	GM862PYT***-***
GC864-PY	GC864PYT***-***
GC864-QUAD	GC864QUD***-***
GC864-PY SIM Holder	GC864PYH***-***
GC864-QUAD SIM Holder	GC864QUH***-***
GC864-PY-C2	GC864QC2***-***
GC864-QUAD-C2	GC864PC2***-***
GE863-GPS	GE863GPS***-***
GE863-PY	GE863PYT***-***
GE863-QUAD	GE863QUD***-***
GE863-SIM	MNO dependent ⁽²⁾
GE864-PY	GE864PYT***-***
GE864-QUAD	GE864QUD***-***
GE864-QUAD Automotive	GE864AUT***-***
GE863-PRO3 w/o OS	GE863PR3***-***
GE863-PRO3 with LINUX	GE863PR3***-***
GE863-PRO3 64MB RAM w/o OS	GE863PR3***-***
GE863-PRO3 64MB RAM with LINUX	GE863PR3***-***

(1) The suffix "***-***" depends on the module HW/SW configuration.

(2) Ask to TTSC for details



4. PFM Certification Program

4.1. Overview

Telit has developed the PFM Certification Program to qualify a customer as being aware of what is the correct procedure to update a module through FOTA technology: only PFM Certified Customers shall be able to FOTA-update their modules.

Basically the PFM Certification Program consists of either a PFM Certification Procedure and an acceptance by the customer to verify that each of his applications containing a Telit module be PFM compliant. The PFM compliance of an application relies on the capability of the application itself to run properly either while the module is FOTA updating its firmware. Telit has no means to verify the compatibility of customer's applications therefore it is responsibility of the customers to self-certify this behaviour: customer is strongly suggested to insert the PFM compliance qualification as a part of its acceptance tests.



Telit does not certify final customer application; final application is out of Telit's domain. Telit does not have any way to control and monitor what customer application performs.

Telit requires that a new customer fulfils at least once the PFM Certification Procedure.



Telit strongly recommends any customer to qualify as PFM compliant any of its applications of Telit modules; moreover Telit strongly suggests any customer to repeat the PFM compliance qualification each time any of its applications of Telit modules evolves, either in hardware or in software.

4.2. PFM Certification Procedure

The PFM Certification Procedure has been defined to qualify a new customer as being able to deal with the FOTA Updating Process: customer shall demonstrate to know how to download the delta-firmware and handle all the updating phases.

The PFM Certification Procedure consists of a number (→25) of complete special FOTA updating in which the overall sms-based communication protocol will be followed, a delta-firmware will be downloaded via ftp and, finally, it will be expanded in the target module flash memory. The only difference from a real FOTA updating is that the object of this mechanism, i.e. the delta-firmware, is a special one: it is a delta from a firmware to itself. It is guaranteed that if such an updating has been completed successfully there is no real firmware updating of the target module.



Customer will develop his application containing a Telit module following the guidelines contained in PFM Application Note (ref. §1.6).

After signing the PFM agreement, a new customer will have the capability to insert in the PFM server the parameters of the modules he is going to use to obtain the PFM Certification; these parameters are:

- IMEI
- MSISDN
- FW version (actual)
- Product Name
- APN
- User Name and Password.

See PFM Product Description for details.

Customer will be assisted by Telit personnel to insert such data.

Telit will provide the new customer with the info to login to the PFM Server web interface. A special access will be provided to new customers in order to let them fulfill the PFM Certification Procedure.

Telit request new customer to successfully complete the special FOTA updating process at least 25 times. Through the special FOTA updating process customer will have the capability to verify that its application has been well-designed from a PFM point of view.



In the figure below are displayed the steps each **not yet certified** customer should fulfill, in order to get the PFM compliance.

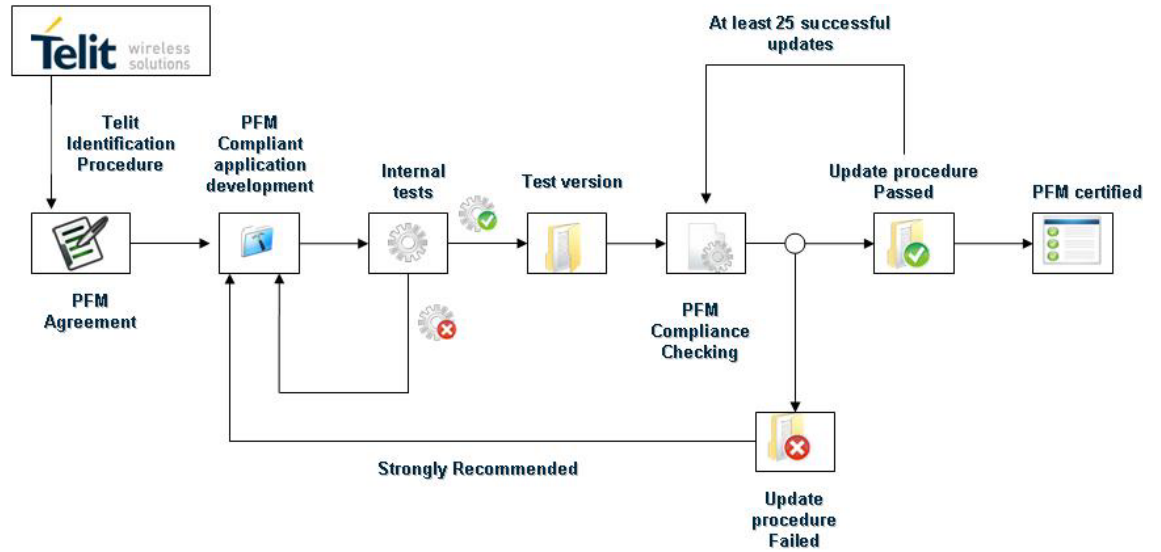


Fig.3 PFM Certification steps overview

In the figure below are displayed the steps each **certified** customer should fulfill each time his application is enhanced, in order to check if the PFM compliance is still valid.

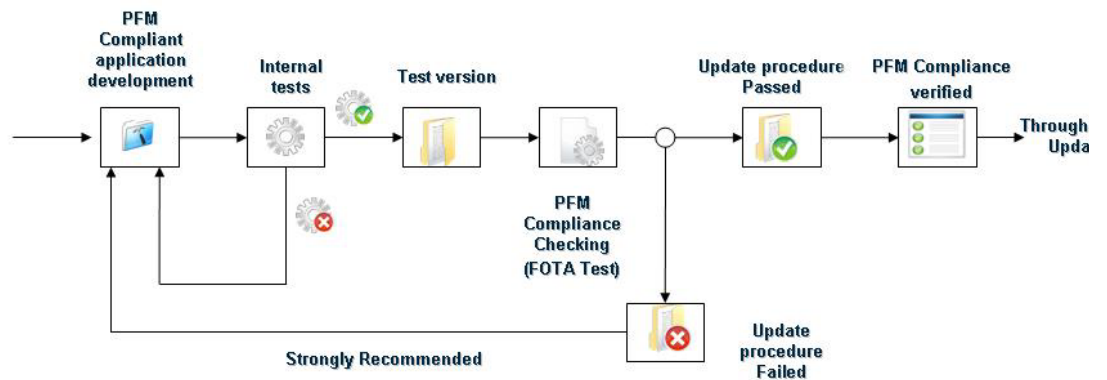


Fig.4 PFM test for certified customers



Telit strongly recommends the certified customers using PFM certification tool each time they implement enhancements in their application.



4.3. PFM Server Web interface

4.3.1. Overview

A web interface to the **PFM Server** has been designed, through which:

- The new user (**not PFM Certified yet**) can get the **PFM Certification**.
- The **PFM Certified** user can
 1. Request the **Special FOTA Updating** of its own modules (the **Special FOTA Updating** executes all the sms-based communication protocol and, as a result, it *doesn't really update* the firmware of the customer modules, the target software release is the same as the original one)
 2. Request the **real FOTA Updating** of its own modules (not available at the moment).
 3. Ask for reports on ... (TBD)

In the following paragraphs it will be shown how a user can get access to the **PFM Server** Web Interface, ask for information, get the **PFM Certification**, request the updating, and so on.

In what follows, we will use with the same meaning the words **IMEI** and **module**.

In what follows, we will use with the same meaning the words **user** and **customer**.

4.3.2. Step 1: Log In to Telit web server

From the Telit website, it is easy for a user to access the PFM web page:

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

and then move to the **PFM Certification Program**.

The authentication dialog of fig.5 appears:



Fig.5 PFM Web Server Interface



The (new) user will select **Distributors** or **Sub-Distributor** as **User Domain**.
Insert **User Name** and **Password** and, finally, push **Verify**.

4.3.3. Step 2: PFM Statistics

If the authentication procedure is correct, it appears a page named “PFM Statistics”.
A highlighted information below the window title reports whether the user has already got the **PFM Certification** (→ “Telit Certified User”, see fig.7) or not (→ “User Not Telit-Certified Yet”, see fig.6).

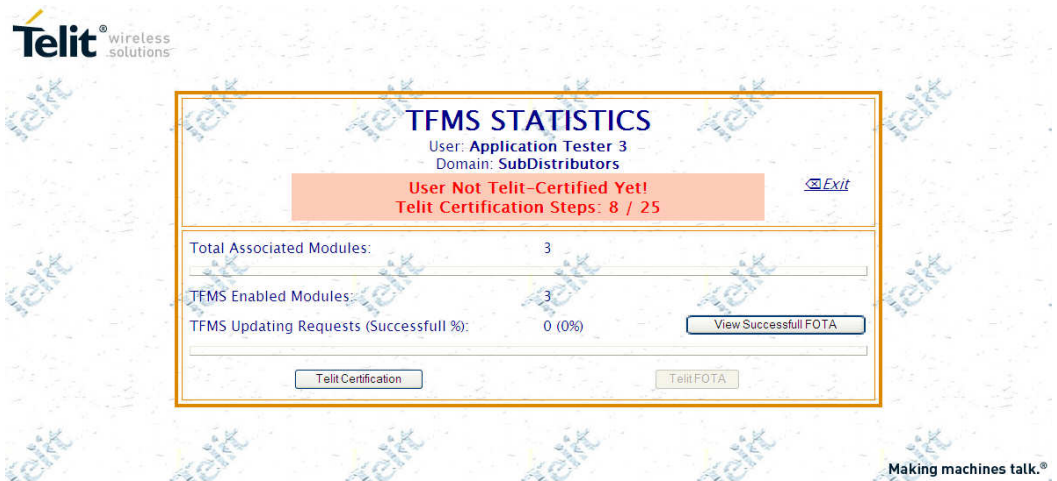


Fig.6 PFM Statistics dialog box in case of Not PFM Certified user (8 positive download).

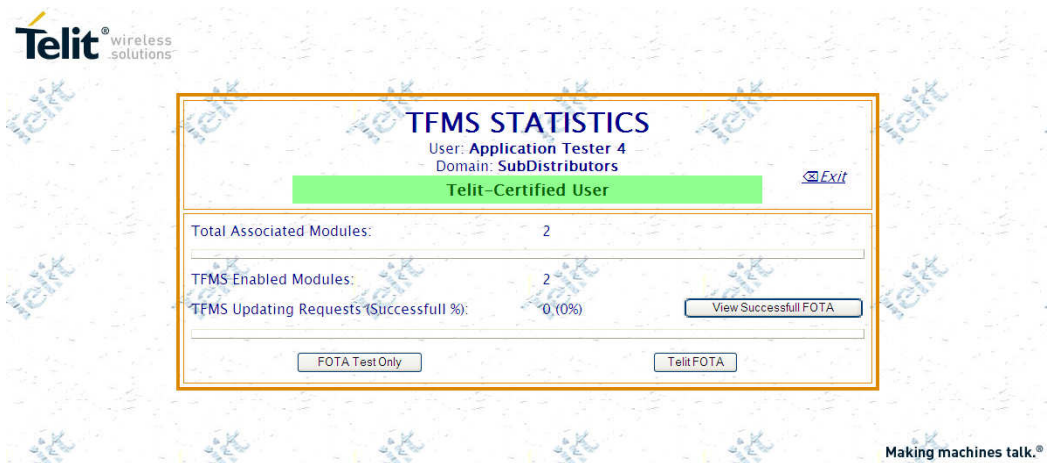


Fig.7 PFM Statistics dialog box in case of PFM Certified customer

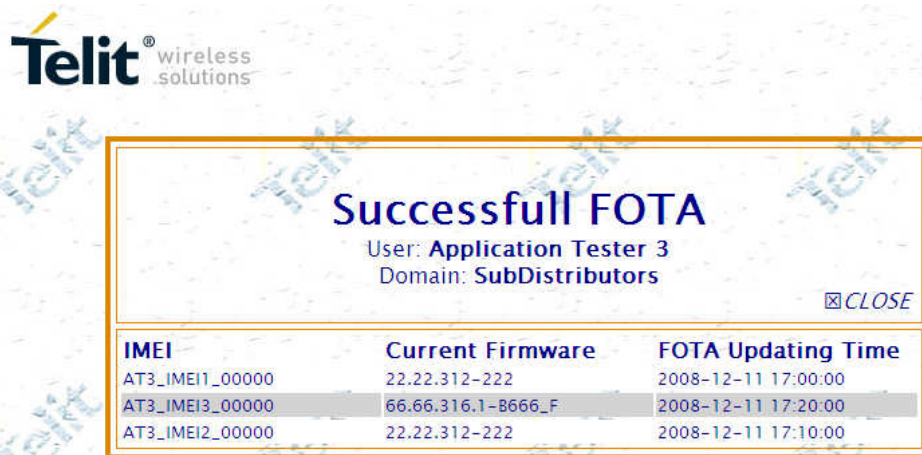


Contents of the page:

- Total number of Telit modules associated to the user, as it appears from the **PFM** internal database;
- How many of these modules are PFM enabled;
- How many PFM Updating requests have been so far done by the user and, in percentage, how many of these have been completed successfully. Moreover, pushing the button [**View Successful FOTA**] the user can get some information about all its successfully completed FOTA Updating requests: this information will be reported in a separate web page, whose format appears in fig. 8.

The meaning of the push buttons on the bottom-side depends on whether the user has been already PFM Certified or not:

- If user has not been PFM Certified yet, only one push button ([**Telit Certification**]) is present and enabled, letting the user to proceed to get the **PFM Certification**.
- If user has already been PFM Certified, two push buttons are present and enabled, the first ([**FOTA Test Only**]) to request a **special FOTA Updating** session (this can be useful for the user when it is testing its own application), the second ([**Telit FOTA**]) to request a **normal FOTA Updating** session.



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

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Fig.8 Module history table



4.3.4. Step 3: Filtering the IMEI List

The web page appearing when pushing either [Telit Certification], either [FOTA Test Only] or [Telit FOTA] is always the same: “Search Options”. This page permits customer to appropriately filter the information about its own modules.

From this web page on, a simple highlighted information below the main table title (if present...) is explaining implicitly what the page has been opened for:

- a) “Telit Certification Program”: special FOTA Updating session to get the PFM Certification (see fig. 9)
- b) “FOTA Test”: special FOTA Updating session (see fig. 10)
- c) Nothing: normal FOTA Updating session

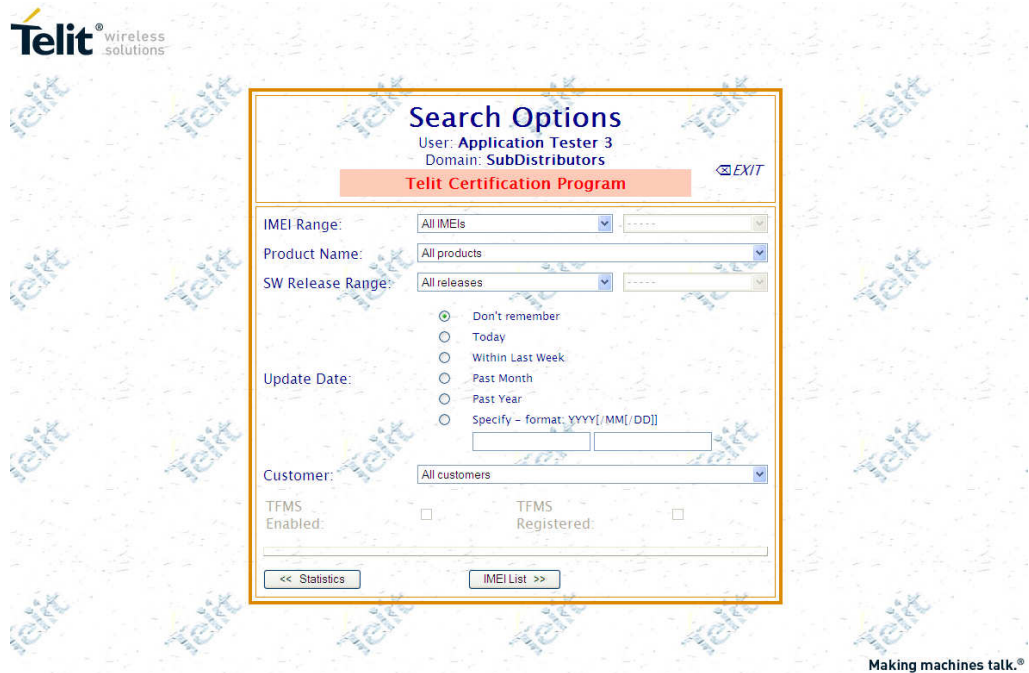


Fig.9 Search dialog box in case of not certified customers



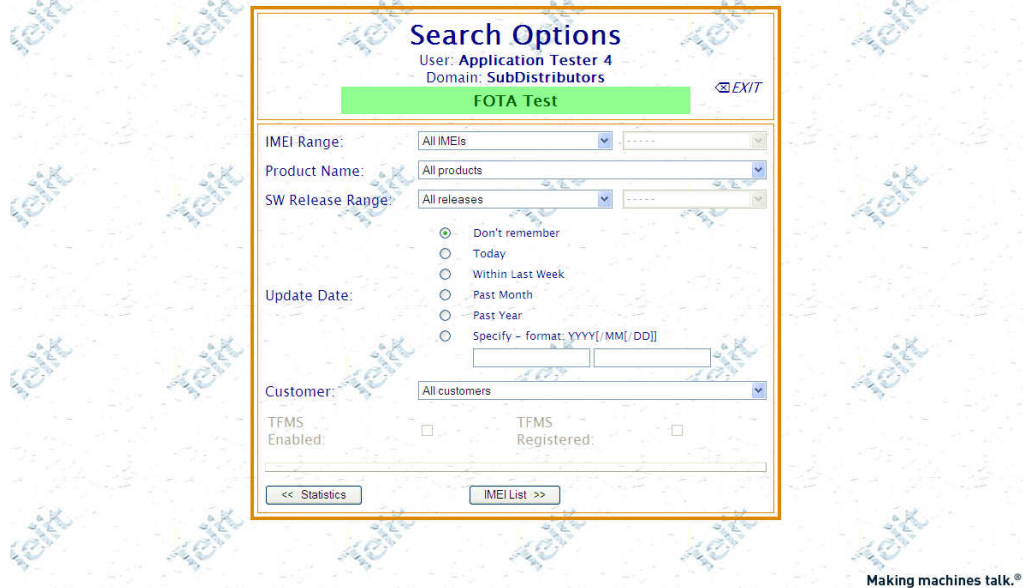


Fig.10 Search dialog box in case of certified customers performing a FOTA Test

Available filters (each of the following filters can be applied either alone or in conjunction with other filters).

- **IMEI range:** customer can identify a subset of its own modules based on the definition of a sub-range of IMEIs.
- **Product Name:** customer can identify a subset of its own modules based on the specification either of a single product or of a class of products (e.g. “FOTA products”).
- **SW Release Range:** customer can identify a subset of its own modules based on the definition of a sub-range of software versions.
- **Updating Date:** customer can identify a subset of its own modules based on the definition of a time bound about the Last Successful FOTA Updating.
- **Customer:** (Distributors only): distributor can identify a subset of the modules owned by its sub-distributors, based on the selection of a single sub-distributor.

In the bottom side of the page you can find the **[IMEI List >>]** button, that permits customer to display the list of all its own modules/IMEIs, as requested and specified through “Search Options” page.



4.3.5. Step 4: IMEI List

This page displays in a table-like format all the information about the subset of customer modules identified by the filtering selections the customer itself did in the “Search Options” page. See fig. 11 and 12.

The “IMEI List” page layout has been designed basically for three purposes:

1. It shows to the customer all the information about all of its modules, as it is known to the PFM Server. This information is presented in a table-like format as it appears in fig.11. Each row refers to a specific module/IMEI; blank cells appear in the row when the PFM Server doesn't know an information for a specific module (e.g. the Product Name);
2. It permits the customer either to select a specific operation to be applied on its modules and to specify which of its modules will be considered for this operation. The coloured column on the left-hand side of the page permits the customer to select the specific operation to request. This column changes its meaning simply pushing the buttons [<<] and [>>]. If the customer entered this page for “Telit Certification Program” or for “FOTA Test” only one operation can be requested and the above mentioned buttons [<<] and [>>] are disabled. If a customer needs to request an operation for a subset of modules, it has to tick the checkbox (...if enabled...) for all the modules of the subset and it has to proceed pushing the bottom-side button [PFM Updating]; this causes another page to be loaded, “Update Page”.
3. It permits the customer either to monitor the state of the updating process of those modules that currently are FOTA updating the firmware or to know what a not operational module needs in order to become operational.
 - a. If a module is **not operational** either, a specific string can be displayed in the coloured cell or the checkbox in that cell appears not ticked and disabled. In both cases, the cell tooltip reports specific information.
 - b. If a module is **operational**, the checkbox in the coloured cell appears not ticked, enabled and modifiable. The cell tooltip reports information about enabled services for that module.
 - c. If a module is **operational** and is currently FOTA updating, the cell is grey coloured and the checkbox in the cell is ticked, enabled and not modifiable. The cell tooltip reports the current state of FOTA updating for the specific module

Other push buttons on this page are:

- **[History]**, one for each item, it is used to show the history table for the specific item.
- **[Mod]**, one for each item, it is used to manually modify/insert a small subset of information about a specific item.



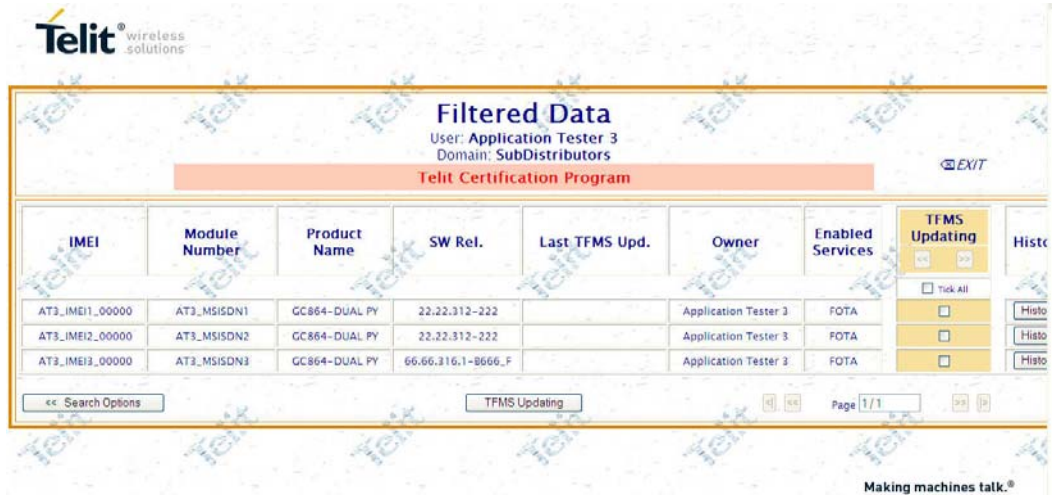


Fig.11 Modules available for PFM certification.

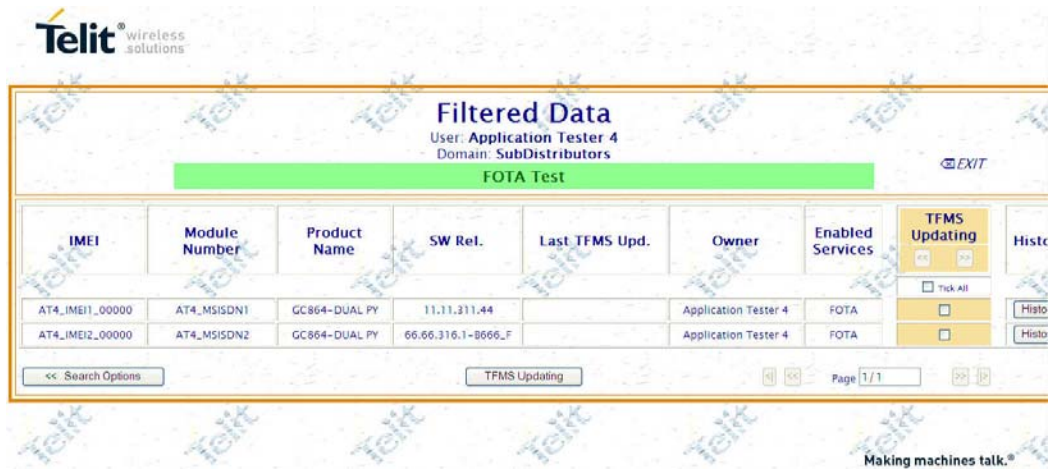


Fig.12 Modules available for FOTA Test.

Customer can access to a “history” file to check all the steps and the complete history of that specific module.

Once selected the module(s), to start the update procedure is sufficient to click on **PFM Updating** button.



4.3.6. Step 5: PFM update procedure

The web page appearing when pushing either **[PFM Updating]** or [...] in the **"IMEI List"** page is always the one appearing in figs. ### or ####. This page permits customer either to select & submit an updating request or to monitor the state of the FOTA Updating currently on service.

- **Select & submit of a FOTA Updating Request.**
 - a) If the page has been opened for "Telit Certification Program" or for "FOTA Test" the [Target SW Release] column, if enabled, will contain the same software release label as in the [Current SW Release] column, i.e. it is possible to submit only a special PFM Updating Request.
 - b) If the page has been opened for normal FOTA Updating the [Target SW Release] column, if enabled, will contain the label of all the software releases to which a specific module can update
- **FOTA Updating Monitoring.** After an Updating Request has been submitted and during the whole updating phase, the column **[Performing]** will represent the current FOTA Updating status of a module in textual format and the column **[Progress]** will represent it in graphical format

Clicking the **PFM Updating** button in dialog box **Filtered Data**, the following dialogue box appears if customer is performing the certification:



IMEI	Module Number	Product Name	Current SW Release	Target SW Release	Scheduled TFMS Updating	Elapsed Time	Performing	Progress	History
AT3_IMEI1_00000	AT3_MSISDN1	GC964-DUAL py	22.22.312-222	22.22.312-222	---	---	---	██████████	History
AT3_IMEI2_00000	AT3_MSISDN2	GC964-DUAL py	22.22.312-222	22.22.312-222	---	---	---	██████████	History
AT3_IMEI3_00000	AT3_MSISDN3	GC964-DUAL py	66.66.316.1-8666_F	66.66.316.1-8666_F	---	---	---	██████████	History

Fig.13 To start and monitor the dummy update

If customer is certified the window is the same with only the difference in the certification status:





Fig.14 To start and monitor the FOTA tests

To start a FOTA update test press **submit FOTA Updating Request** button, the displayed module(s) will be updated as shown in the figure below:



Fig.15 Performing the dummy update, provisioning phase in progress

When the operation is in progress, it is possible to go back in the previous window and perform other operations.

When the required operation is completed, the **Performing** column will display two possible statuses:

- Updated;
- Not Updated.

A full report will be generated.



This report is available clicking on **History** button.

If customer is certified and is performing a FOTA Test, the window is the following:

TFMS Updating Request
User: Application Tester 4
Domain: SubDistributors

FOTA Test EXIT

automatic refresh every 20s.

IMEI	Module Number	Product Name	Current SW Release	Target SW Release	Scheduled TFMS Updating	Elapsed Time	Performing	Progress	History
AT4_IMEI1_00000	AT4_MSISDN1	GC864-DUAL py	11.11.311.44	11.11.311.44	----	0:00:01	Provisioning		History
AT4_IMEI2_00000	AT4_MSISDN2	GC864-DUAL py	66.66.316.1-B666_F	66.66.316.1-B666_F	----	0:00:01	Provisioning		History

<< Filtered Data Submit TFMS Updating Request

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Fig.16 Performing the FOTA Test, provisioning phase in progress

4.3.7. Step 6: Operation Report

A complete report is displayed clicking on the button **History** in the column **History** for a specific module.

The following window appears:

History Table
User: TTSC
Domain: Distributors

IMEI: 357022000037450 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

Fig.17 Module history table

PFM server traces each updating phase in format:



5. Acronyms and abbreviations

Term	Definition
APN	Access Point Name
CSD	Circuit Switched Data
FTP	File Transfer Protocol
FOTA	Firmware Over The Air
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
PFM	Premium FOTA Managements
PLMN	Public Land Mobile Network
SIM	Subscriber Identity Module
SMS	Short Message Service
TTSC	Telit Technical Support Centre

