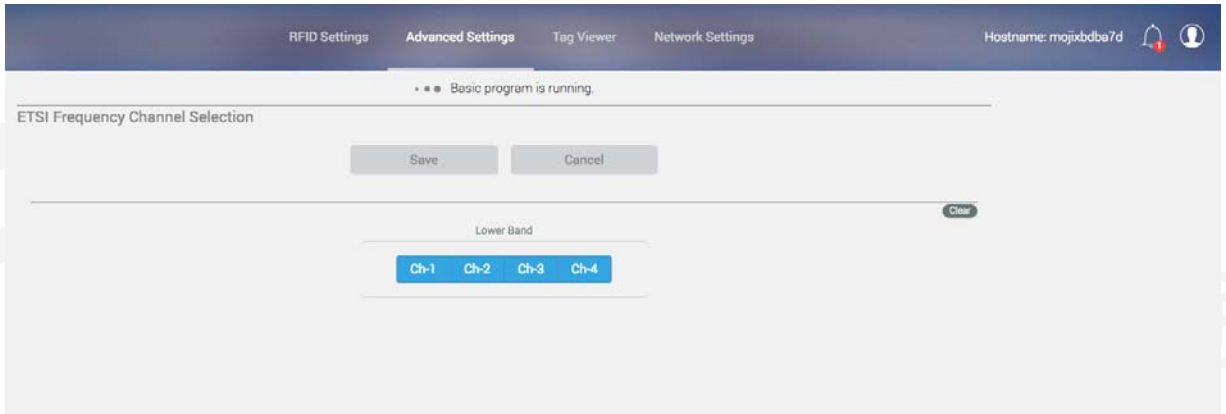
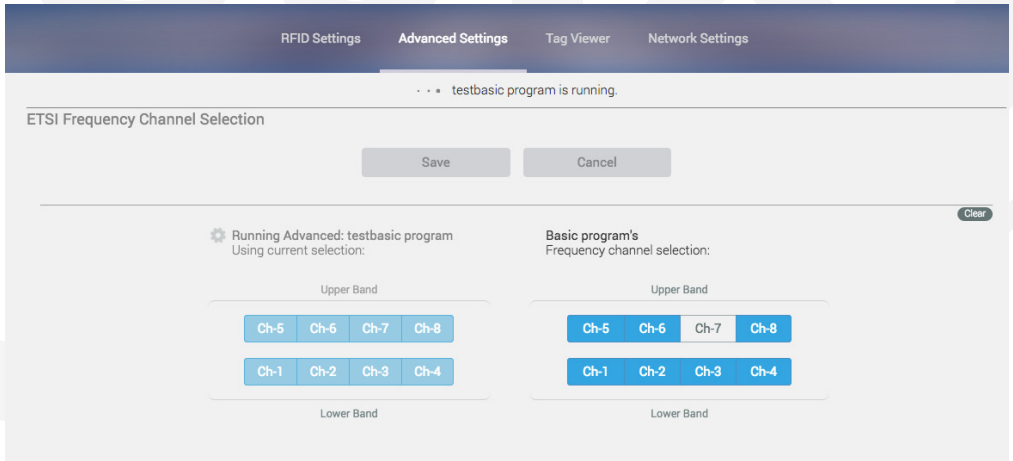
When a Basic program is running there will be a message on the top showing the Basic Program is running:



Note: The Basic program won't be lost upon reboot.

See this section for more information about running the Basic Program

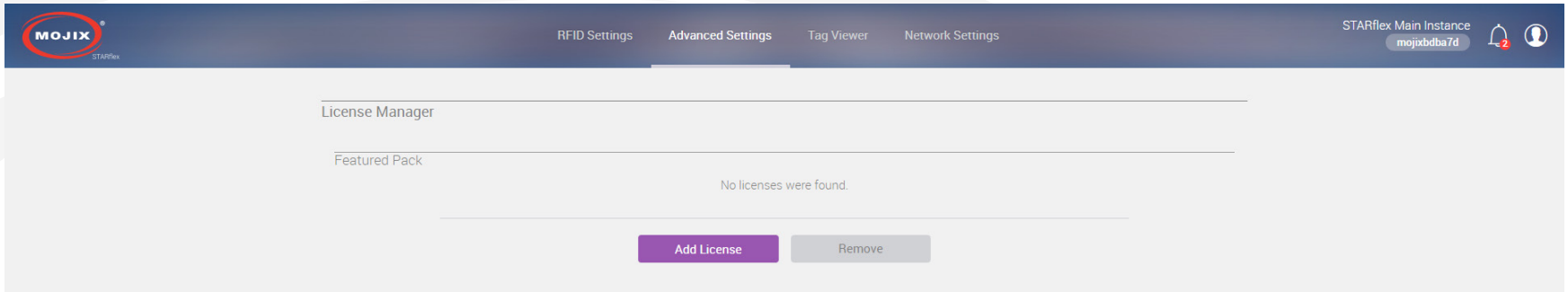
When an Advanced program is running the Frequency Channel displays information of the configured channels



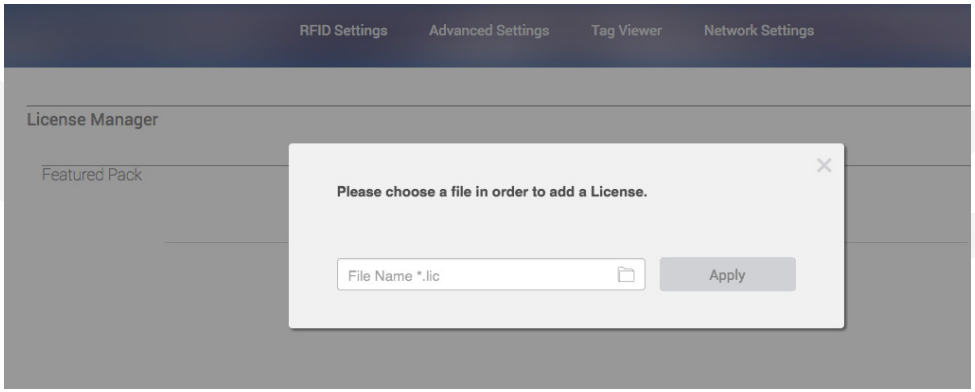
Channel selection for a running advanced program is read only, while the Basic program's buttons can be changed.

License Manager

The “License Manager” page allows the users to upload and add or remove licenses to the STARflex. For detailed information please refer to Chapter VI - License Manager.



To upload a license, click on the Add License button:



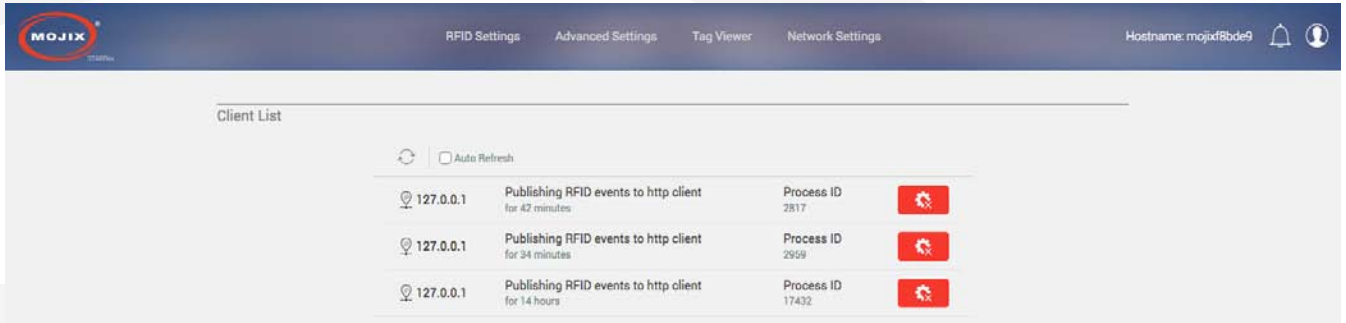
To remove a license click on the Remove button. Note that the STARflex must be rebooted.

Client List

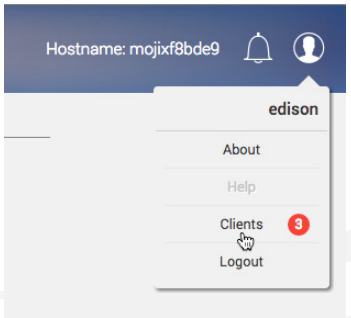
The client list page displays the information of every client that is connected to the STARflex. It includes the IP address, the length of time and the Process ID of each client.

The user can end the process by using the icon

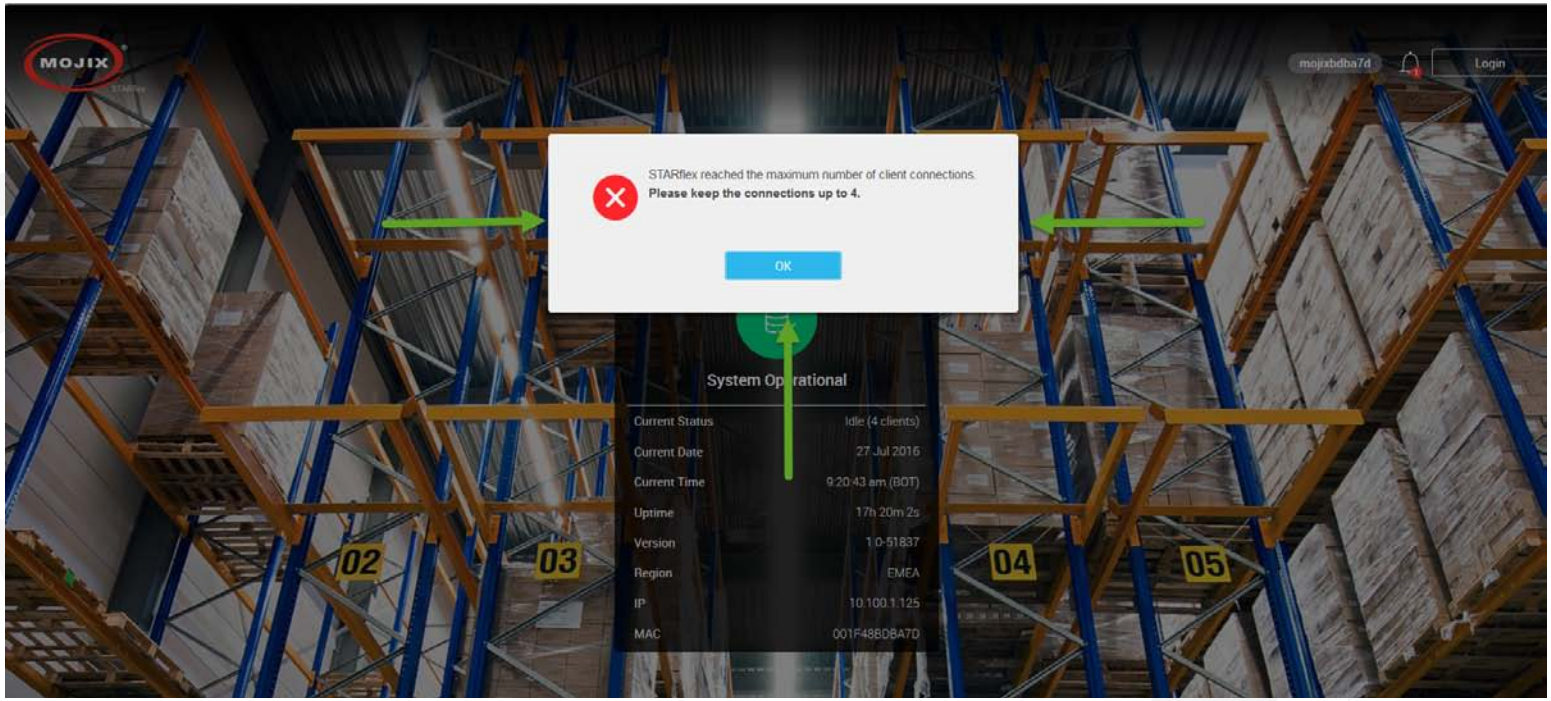
Refresh manually the list by clicking on the icon option , There is the possibility to auto refresh the client list every 10 seconds by selecting the Auto refresh option.



The Client List can be also accessed by clicking on the Client option located at the top right hand corner:



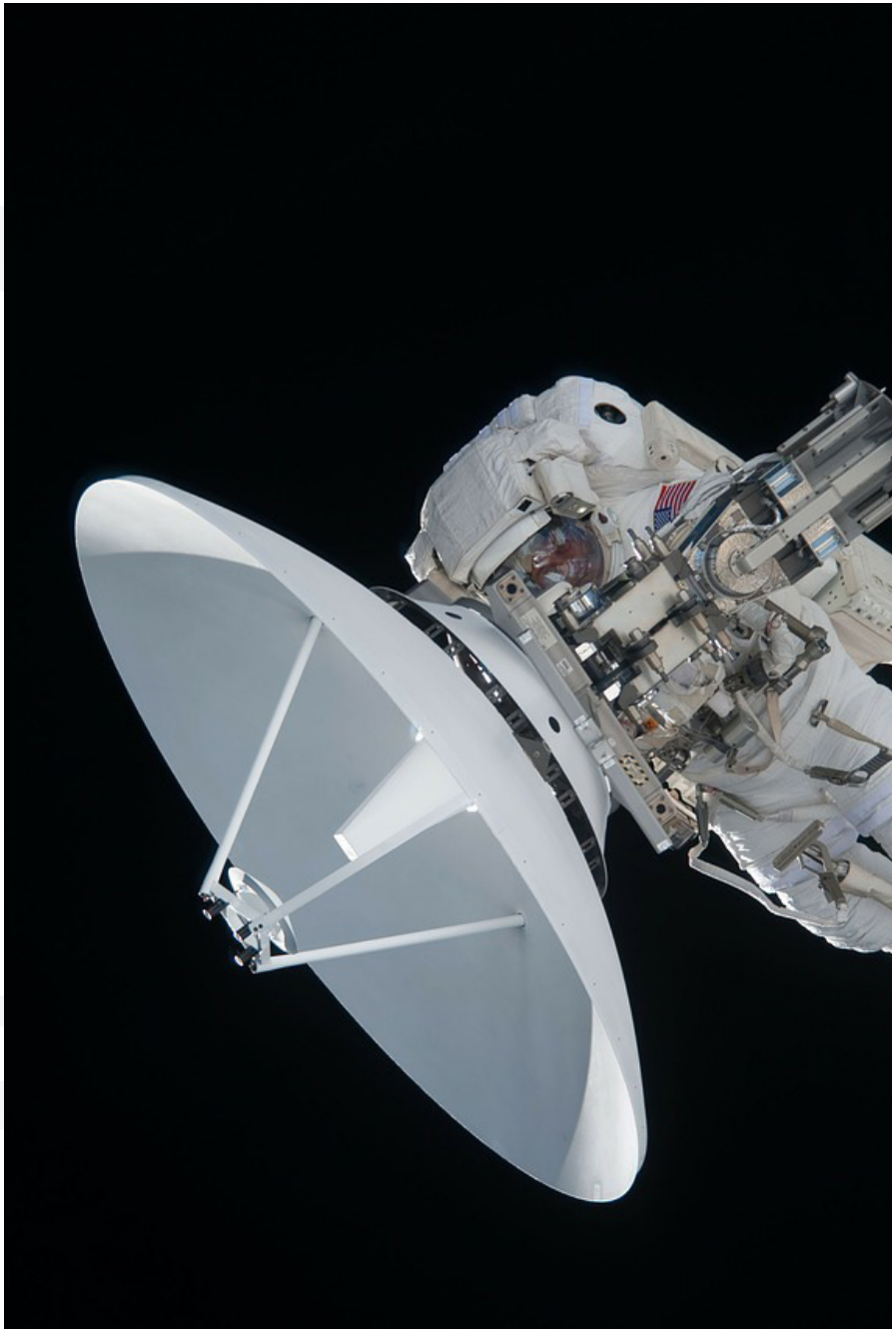
Note: The maximum number of clients connection is **5 (4 http 1 mqtt)**. If it is greater than this connection number, the following message will display:

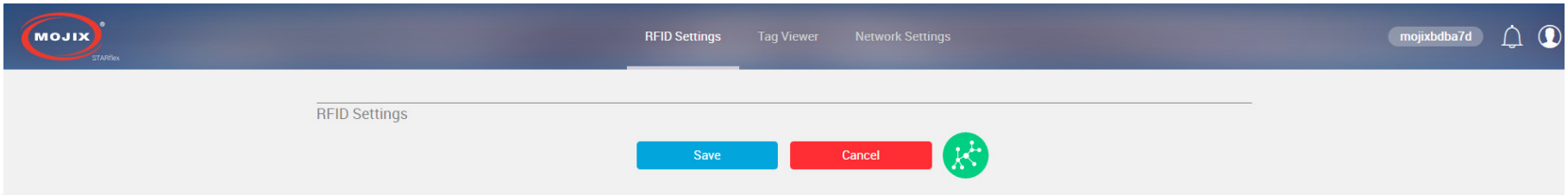


CHAPTER III: RFID SETTINGS

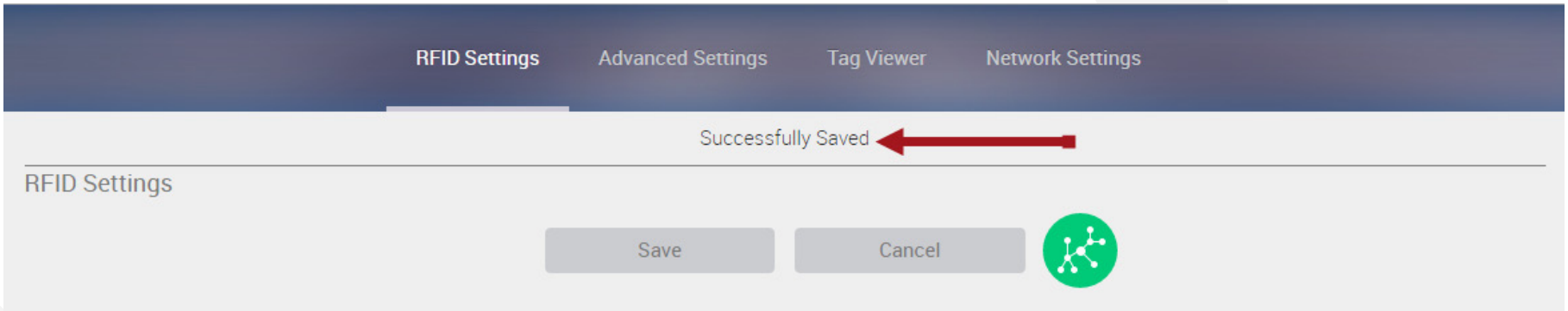
3.1 RFID SETTINGS

RFID Settings menu is available after the user logs in to the application with valid credentials. Once in the RFID Settings page, there are six sections to configure the antennas, the default values are presented the first time the STARflex is configured.





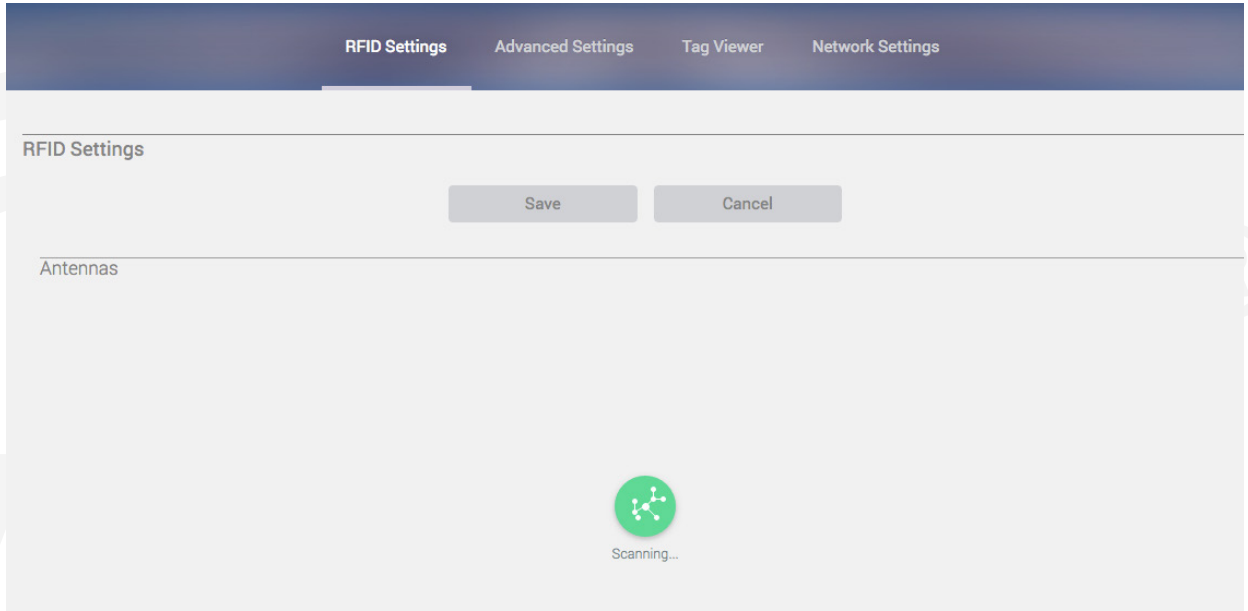
Modifications made on any of the configuration sections can be saved by clicking on the **Save** button and the following message will appear at the top of the section:



Following find the description for each one of the RFID Settings sections.

3.1.1 AUTO DISCOVERY

The auto-discovery process is initiated the very first time a user enters to “RFID Settings” page and every time the user performs a “Default RFID Settings” and a “Firmware Update”and goes to the page. Click on the icon to start scanning antennas.



Supports Auto-discovery of:

- Direct connected antennas
- eXpanders
- eNodes
- GPIOs

Cannot discover:

- Antennas connected to eXpanders
- Antennas connected to eNodes
- eXpanders connected to eNodes

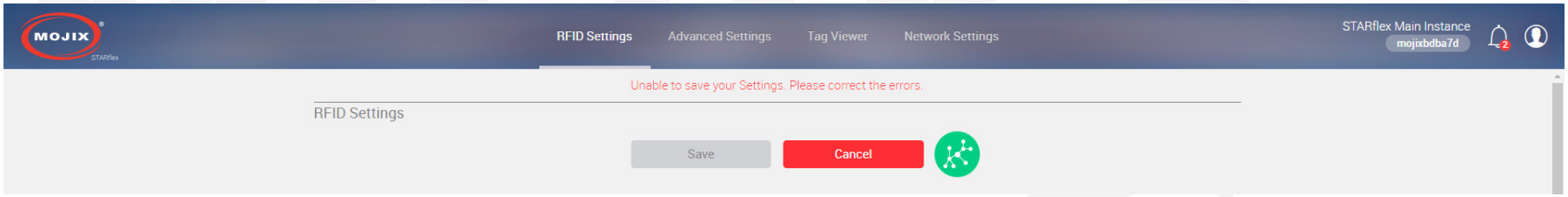
3.1.2 ANTENNAS

In the Antenna section it is possible to select the antennas. There are four antennas available and each can be expanded into four units, making a total of sixteen antennas. An eXpander can be assigned by checking the “Enable eXpander #” option. The STARflex can connect to both options but only one antenna will transmit at any given time. There is a Clear button displayed at the top right side of this section which resets the antenna selection only.

3.1.3 ENODE 1 - ENODE 2

In the eNode section, the eNode ID is entered, this field is editable and when the eNode is not entered, all the related options remain disabled.
A single indicator describes if eXpanders are used. eNodes can be configured as either 4-port devices with antennas attached or as 16-port devices with eXpanders attached.
The **Clear** button is displayed at the top right side, this resets the antenna selection.

When an eNode ID is entered and no antennas are selected, after clicking save, an error message is displayed at the top of the page and the entire antennas section is marked to notify the user about the missing configuration. The same behavior is displayed with the eNode sections when no port antennas are selected. When the eNode ID is not correct, the text field is marked with an error message below it.



3.1.4 PROFILES

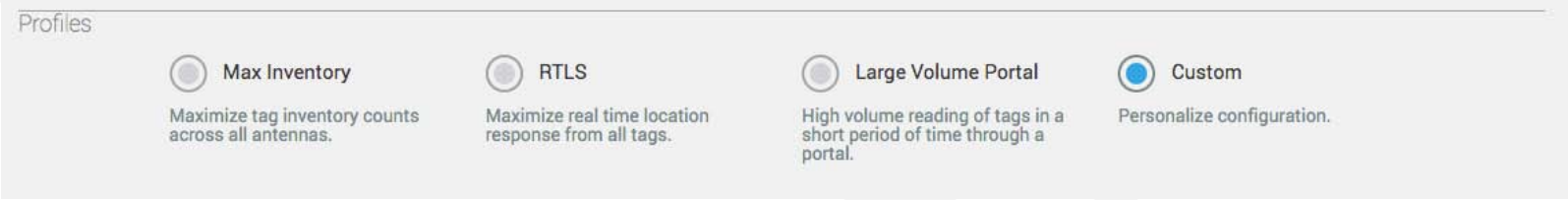
The profiles section display four available options, the first three: “Max Inventory”, “RTLS” and “Large Volume Portal” reflect common RFID modes of operation, the last one “Custom”, allows you to personalize the complete configuration.

- The **“Max Inventory”** profile configuration, maximize the tag inventory counts across all the antennas. An estimated total number of tags covered by the STARflex’s set of antennas is required. This profile automatically selects the session S2, the target group A, a Q value calculated according to the estimated number of tags entered, an LF of 256 kHz., a modulation M4 and the selects enabled periodically.

- The **“RTLS”** profile configuration, maximize real time location response from all tags. An estimated total number of tags covered by the STARflex’s set of antennas is required. This profile automatically selects the session S1, the target group A, a Q value calculated according to the estimated number of tags entered, an LF of 256 kHz., a modulation M4 and the selects enabled.

- The **“Large Volume Portal”** profile configuration, read high volume of tags in a short period of time through a portal. An estimated maximum number of tags that will be moved through the portal is required. This profile automatically selects the session S1, the target group A, a Q value calculated according to the estimated number of tags entered, an LF of 256 kHz., a modulation M4 and the selects disabled.

- The **“Custom”** profile configuration, allows the user to personalize the settings. Three sections are enabled selecting this option: **“2nd Receive Antenna Mode”**, **“Physical Layer Settings”** and **“Select Pattern”**.



3.1.5 2ND RECEIVE ANTENNA MODE

In this section there are two options available, none and auto:

- **None:** No 2nd receive antenna.
- **Auto:** Automatically generated configuration to cycle through all antennas not currently transmitting.

To save the configuration click on the “Save” button, to discard any changes and go back to the last configuration click on the “Cancel” button. The buttons are at the very top of the page.

3.1.6 PHYSICAL LAYER SETTINGS

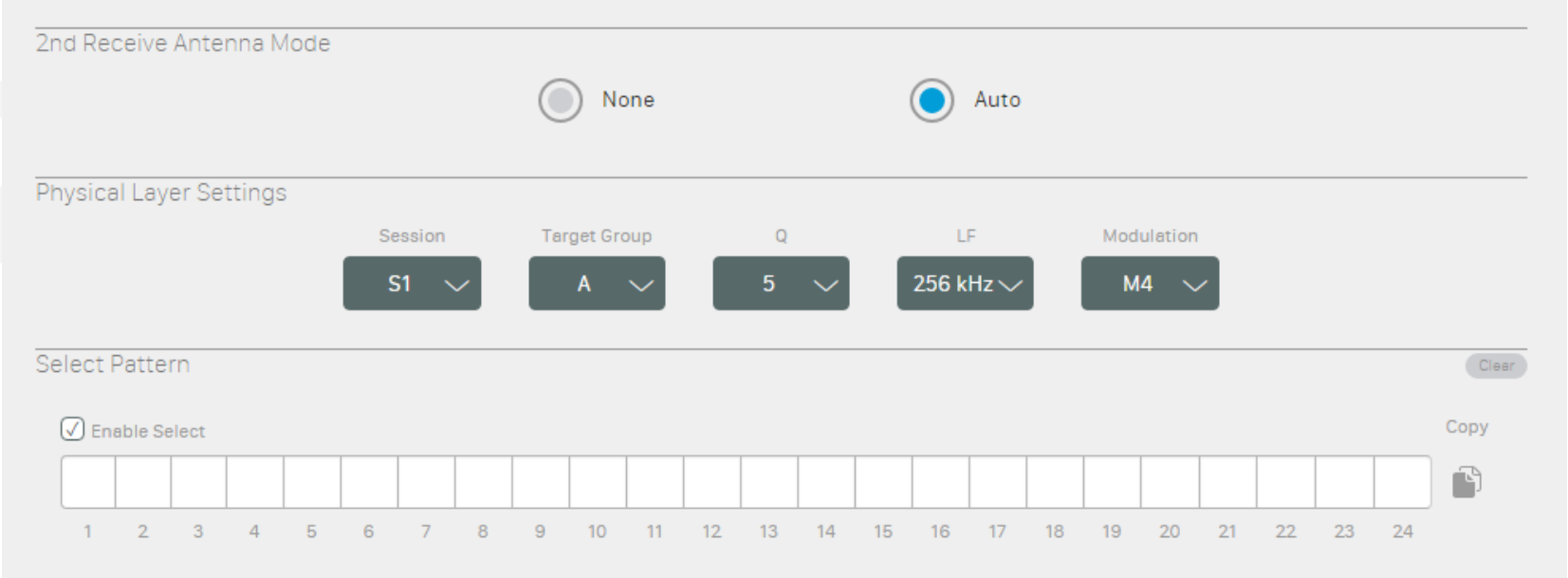
This section allows the user to select different options for the physical layer, there are five combo-boxes available: Session, Target Group, Q, LF and Modulation.

- **Target Group:** Default value is A
- **Session:** Sets the session bit to select and query. Default value is S1.
- **Q:** Number of slots 2Q. Default value is 5
- **LF:** Tag backscatter rate. Default value is 256 kHz
- **Modulation:** Select a Modulation. Available values: **M2**, **M4**, **M8** and **FM0**. Default value is Miller-4.

To save the configuration click on the “Save” button, to discard the changes and go back to latest configuration click on the “Cancel” button. Both buttons are at the very top of the page.

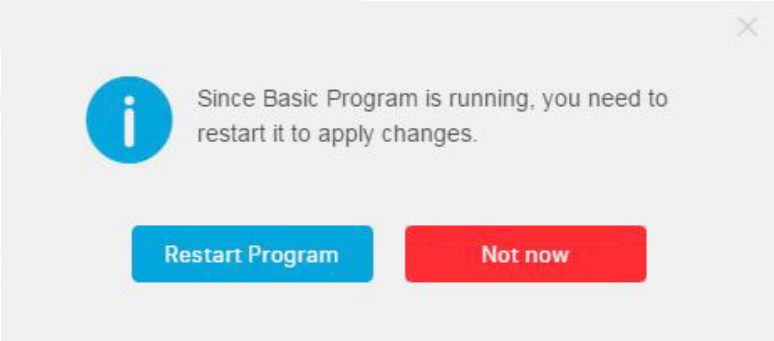
3.1.7 PATTERN

In this menu, the Mask is available to edit if the “Enable Select” option is selected, otherwise the mask is disabled.
Once the mask is enabled, it is possible to select the mask pattern, which is a hexadecimal value representing the bit pattern used to match and select a subset of the tags EPC number separating this tag from the total tag population.
The beginning of the pattern is always bit position 32, the pointer and length will be auto calculated based on the pattern entered.



3.1.8 BASIC PROGRAM RUNNING

When the basic program is running (started in the “Tag Viewer” menu) and changes in the RFID settings are done, these are not applied until the readings are restarted. When pausing the readings, the changes are not applied as only the interface is paused but not the readings in the background. When any change is saved in RFID settings, a dialog is displayed asking the user to reboot at that moment or later.

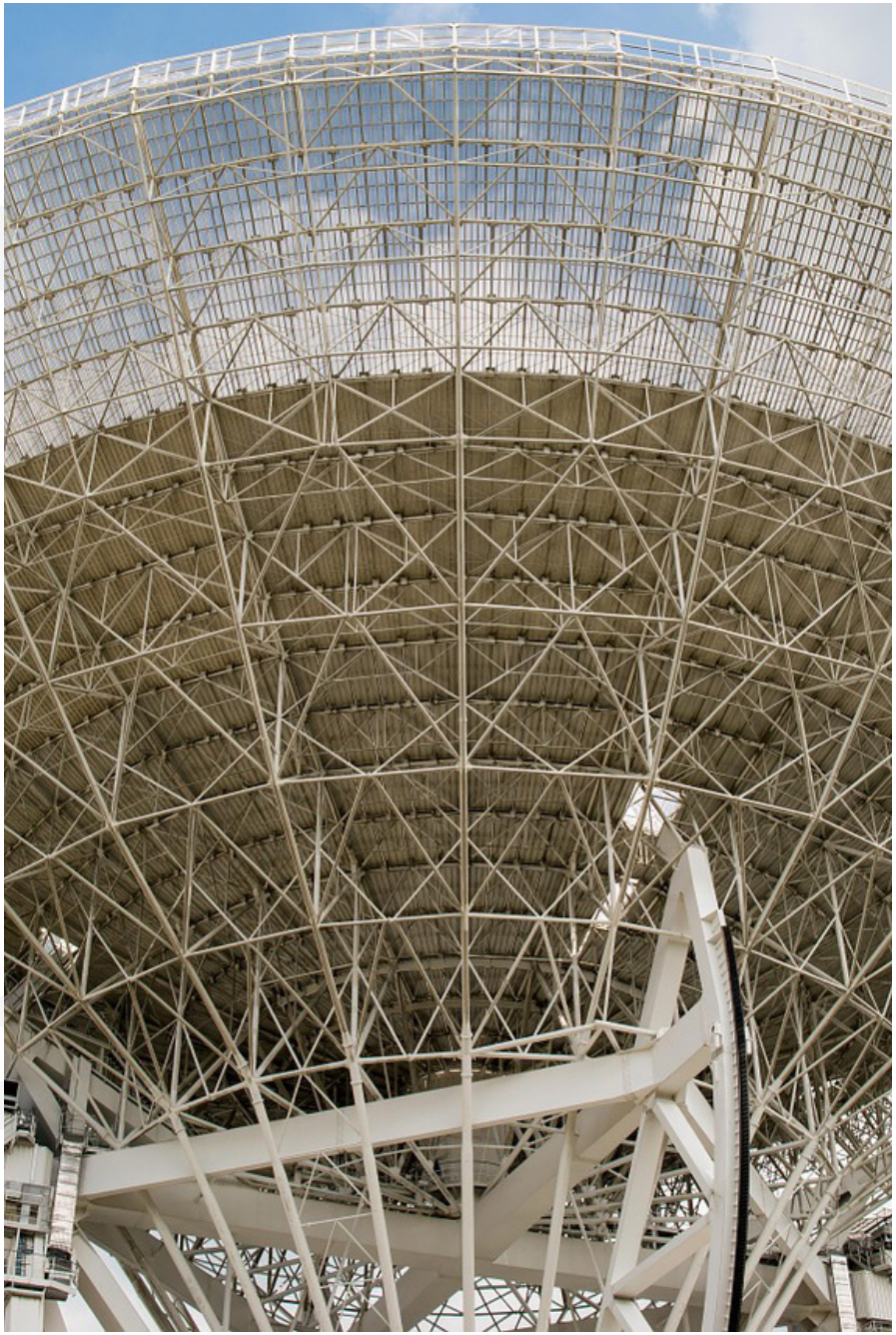


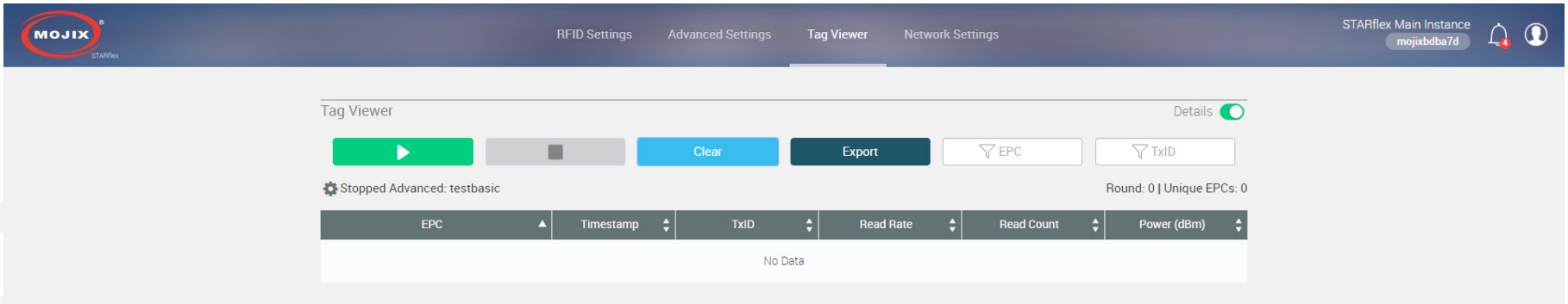
CHAPTER IV: TAG VIEWER

4.1 TAG VIEWER

The tag viewer menu allows the user to quickly select and turn on antennas in order to find and read tags, displaying all the tag found results in a list. In addition, it is possible to filter while live reading the EPCs, TxID (transmit antenna) and export the list in CSV file.

The Tag Viewer menu is available after the user logs in to the application with valid credentials. Once in the Tag Viewer menu, the default view is the list in the simplest mode (EPC, Timestamp, Read Count columns) , without data displayed or RFID program running.

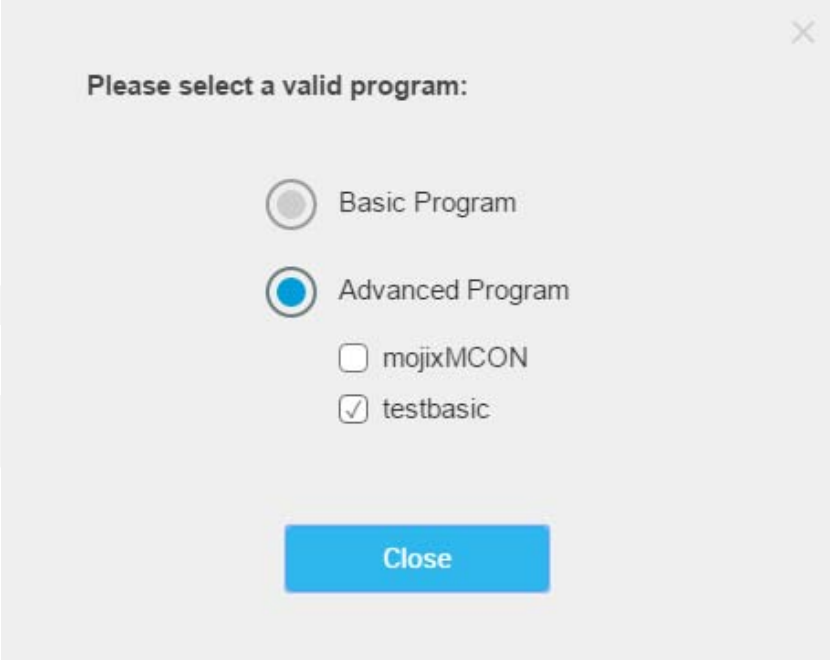




Once the user clicks on the PLAY button (green), the very first time, a popup window will appear requesting the user to select a valid program before running the process. The two possible options are “Basic Settings” and “Advanced Settings ” (with a list of available program files).

Basic Settings, which is always available, refers to the basic RFID program that is in the STARflex system. In the API document it is also called simpleRFID program that is overwritten when modifying the RFID settings.

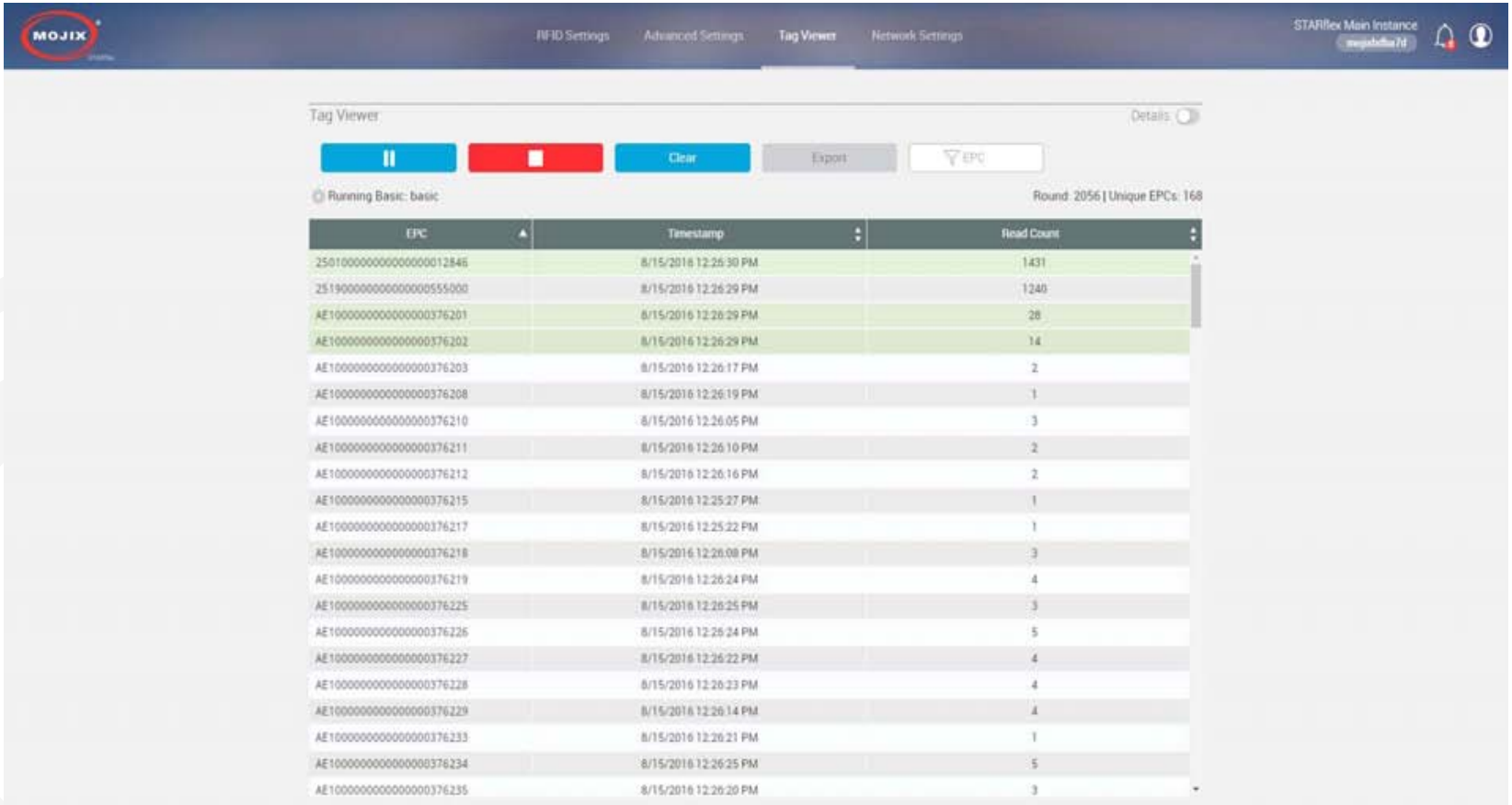
Advanced Settings refers to a RFID programs created in the advanced mode by using the program generation module. There are also RFID programs created by a 3rd party application such as MCON or VIZIX.



Once the user selects the RFID program and clicks continue, the selected program is loaded and starts running, meaning the RFID read operation is initiated.

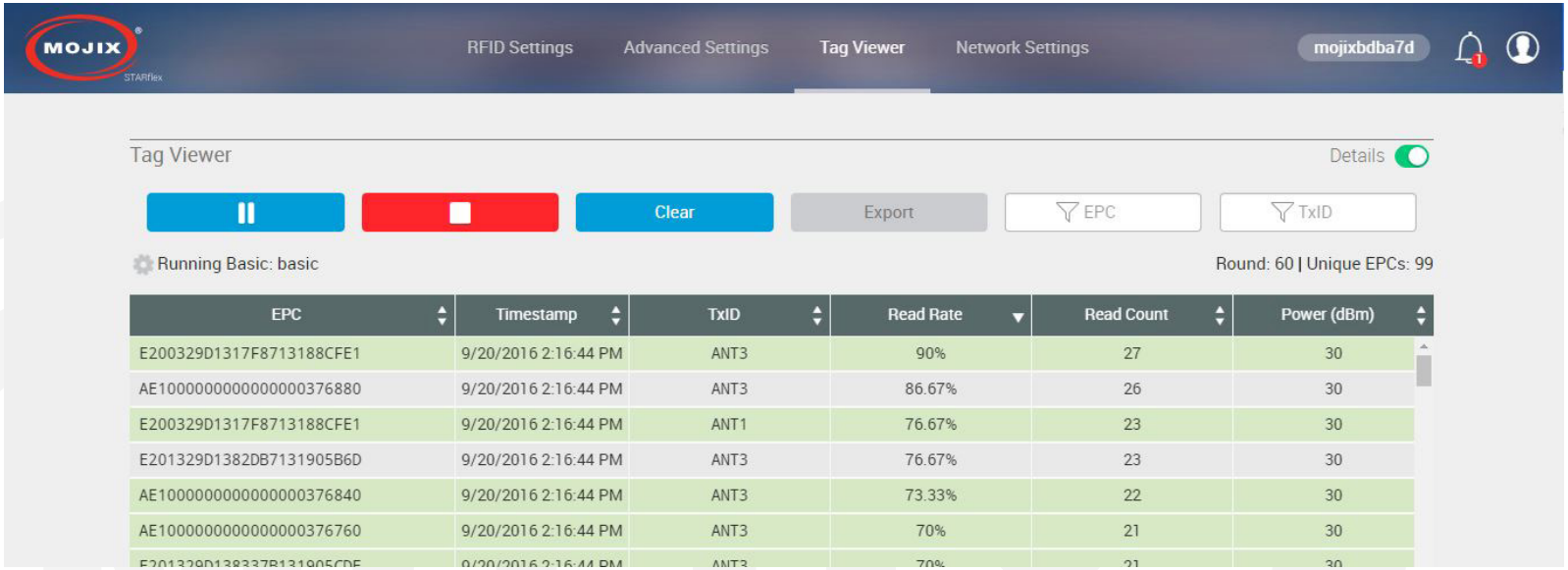
The results will be displayed in simple mode by default, however there is a detailed mode which displays more complex results.

Simple mode view will display one row for EPC tag. The columns for each row shall be EPC , Timestamp, and Read Count. The column Read Count will display the total number of TagReadData packets that match the EPC.



To view the results in **Detailed mode**, there is a switch at the top right side of the page, once it is enabled the results will be expanded showing one row for each EPC, tx Antenna Port, tx Expander Port and power tuple. The columns for each row shall be EPC, Timestamp, TxID (transmit antenna), Read Rate (showed in % is the # of reads / # of read attempts), Read Count, Power.

STARflex



When switching between the **Simple** mode and **Detail** mode the data will be persistent, the only difference should be the way this data is displayed.

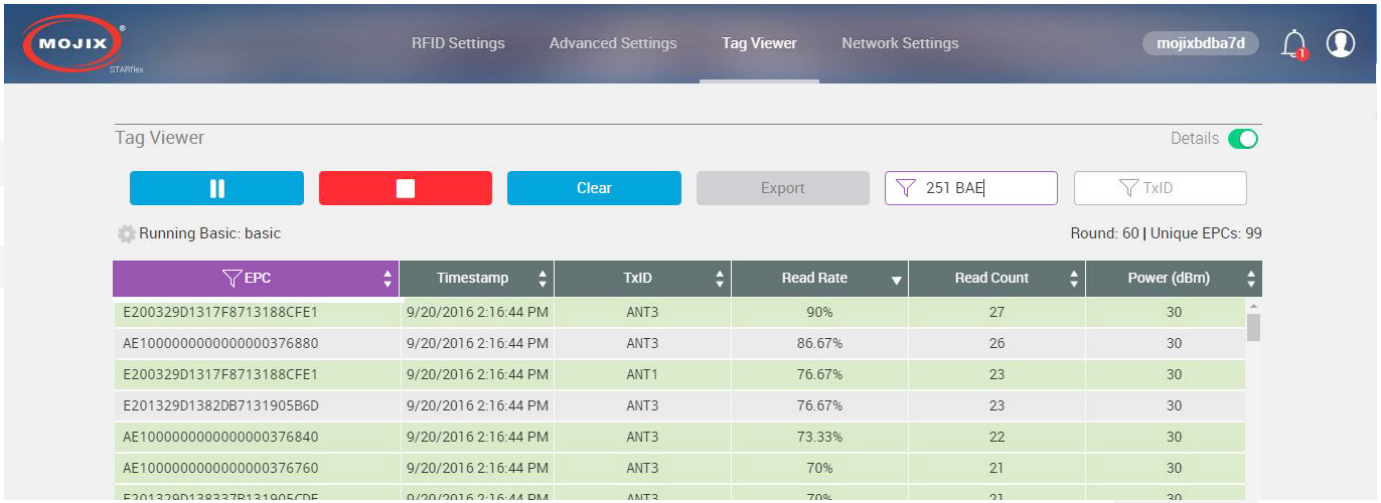
While the process is running and the tags are being read, if the PLAY button (green) is clicked, the color changes to blue and the button becomes a PAUSE button, the STOP (red) and the CLEAR (blue) buttons are enabled, and the EXPORT button is disabled.

The PAUSE button (blue) pauses the user interface only, the process is still reading the tags in background, once clicked its color changes to green with the PLAY button replacing the PAUSE one. The STOP (red), CLEAR and EXPORT buttons are enabled

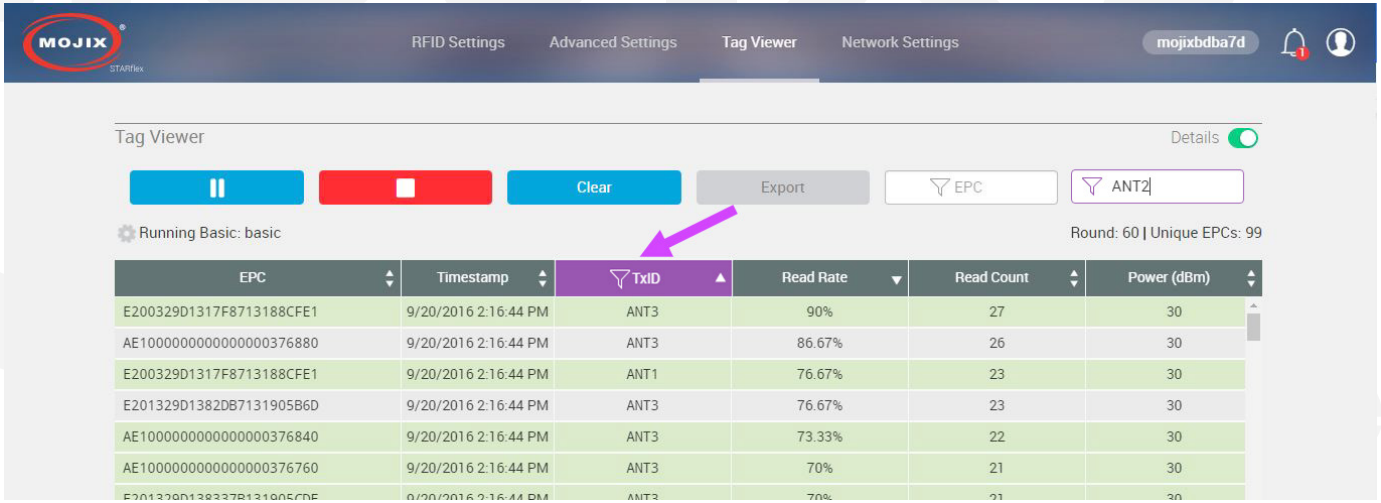
Clicking the STOP button will tell the STARflex to stop the RFID reads, it does not close the SSE socket previously opened with GET .../rfid/events. If the STARflex were to be subsequently commanded again to start reading tags, tag reads would be immediately delivered via all open SSE sockets.
Clicking on the CLEAR button will clear all the results currently displayed.

The EXPORT button will be enabled only when a program is stopped or paused and it will export all the displayed results at that moment in a CSV file.
Besides the buttons, there are two autocomplete filters, EPC and TxID (only in detailed mode), that while the user is typing, the results will be automatically filtered.

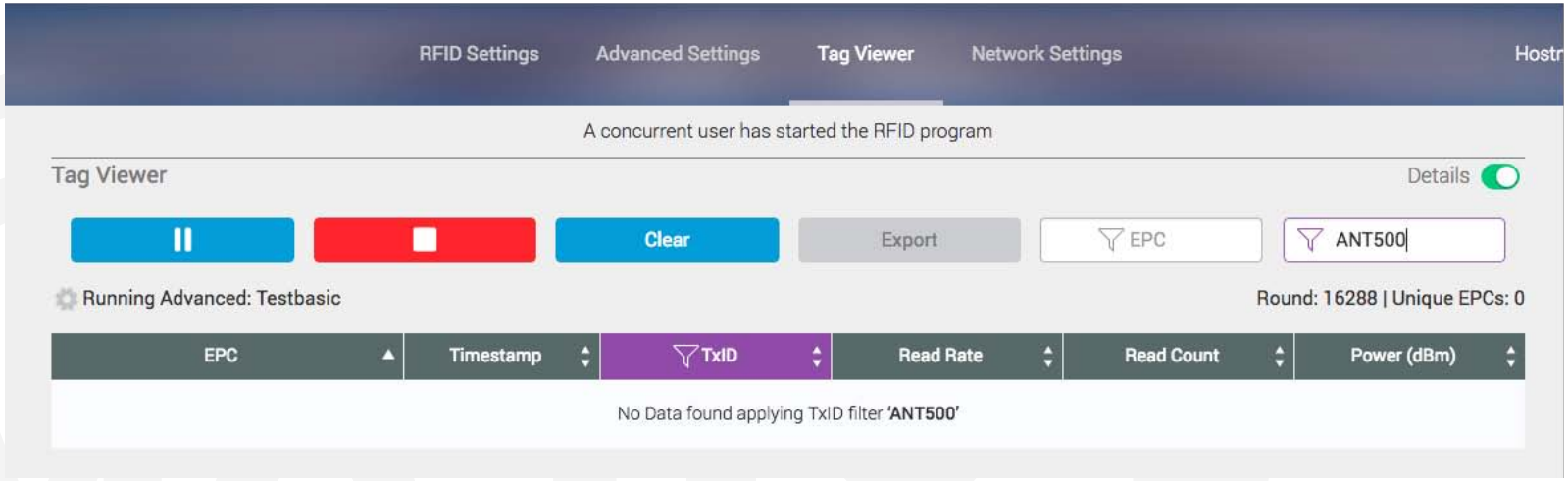
Use a single wildcard as “*”, a blank space is a logical “or”: Example: 300 056 searches for pattern 300 or 056. Note that we do not use or as logical or.



In addition, the column, where results are found, will have a distinctive mark:



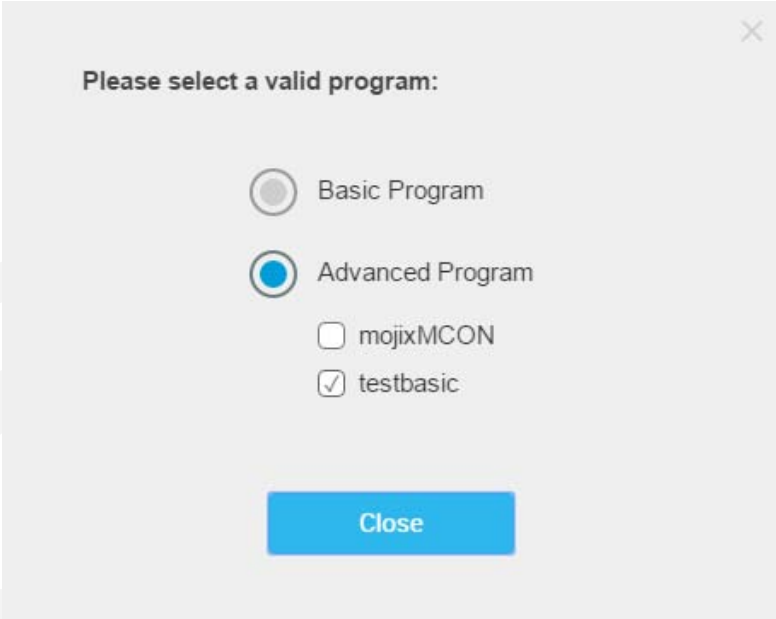
If no results are found the following message will display:



Below the mentioned buttons and above the results table, a code wheel, the number of Rounds and the number of Unique EPCs are displayed.
The Code Wheel allows the user to change the program (Basic and Advanced), it is disabled while the RFID program is running, once the program is stopped, the code wheel is enabled. The label next to the code wheel shall correspond to the following:

- **While running:** Running Basic or Advanced: <filename>
- **While stopped:** Stopped Basic or Advanced: <filename>
- **While paused:** Paused Basic or Advanced: <filename>

Clicking in the Code Wheel will open a new dialog box and it is possible to change the program between Basic and Advanced. For the advanced settings there is a list presented with the available program files resident in the STARflex.

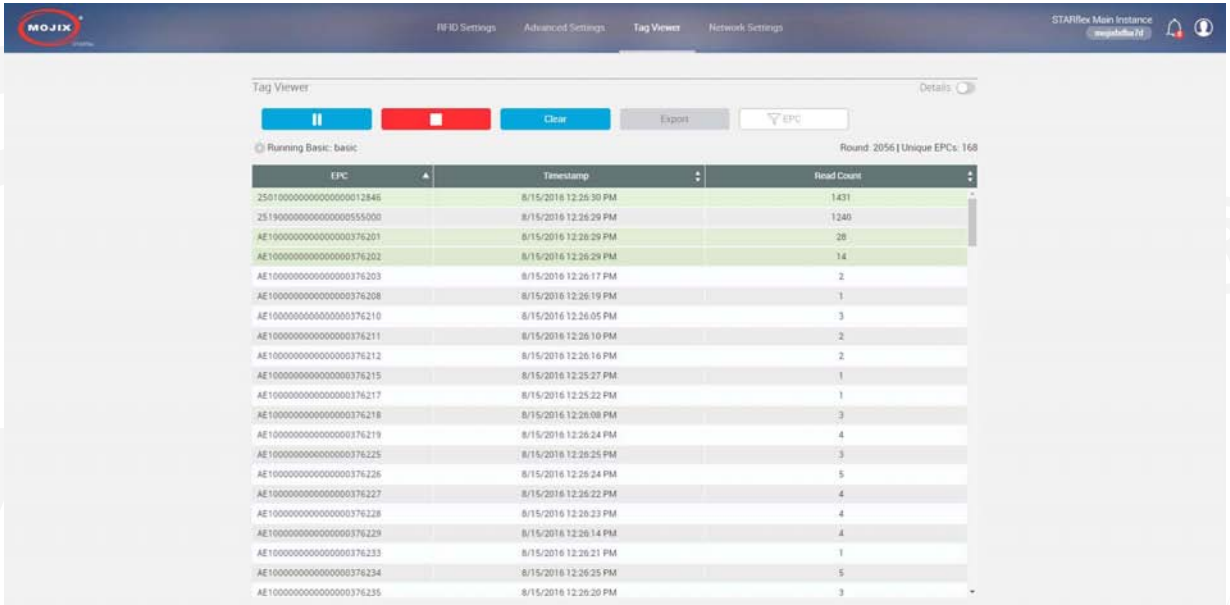


In the results table there is a color code for the tag readings. The default background color is white. When a new tag comes in, it is displayed in a blue background. The background transitions to white are over 0.5 sec.

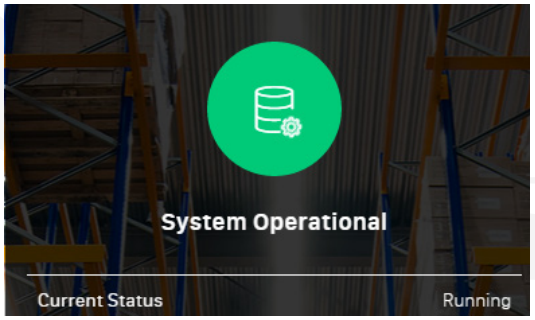
When a tag is read but it has been displayed before, this tag is updated in place by painting the background green. The green background fades to white over 0.5 sec, for a tag that is read much faster than the 0.5 sec, that tag row essentially stays constant green. So it is easy to tell at a glance which tags are reading well or which tags may be only just reading.

Concurrent users

When different users enter to the Tag Viewer section and START or STOP the tag reading, it is possible for them to see if another user is doing the same action. A message is displayed notifying that another user has started or stopped the reading and the corresponding buttons (PLAY and STOP) are enabled or disabled accordingly.



When a user is in the landing page, the current status of the STARflex also changes accordingly, if an RFID program is running or not. “**Running**” will be displayed if a program is running, “**Idle**” if not.



CHAPTER V: NETWORK SETTINGS

5.1 NETWORK SETTINGS

The Network Settings menu is available after the user logs in to the application with valid credentials. Once in the Network Settings menu, it is possible to configure the STARflex to the network that this is going to use. For this the following fields are available:

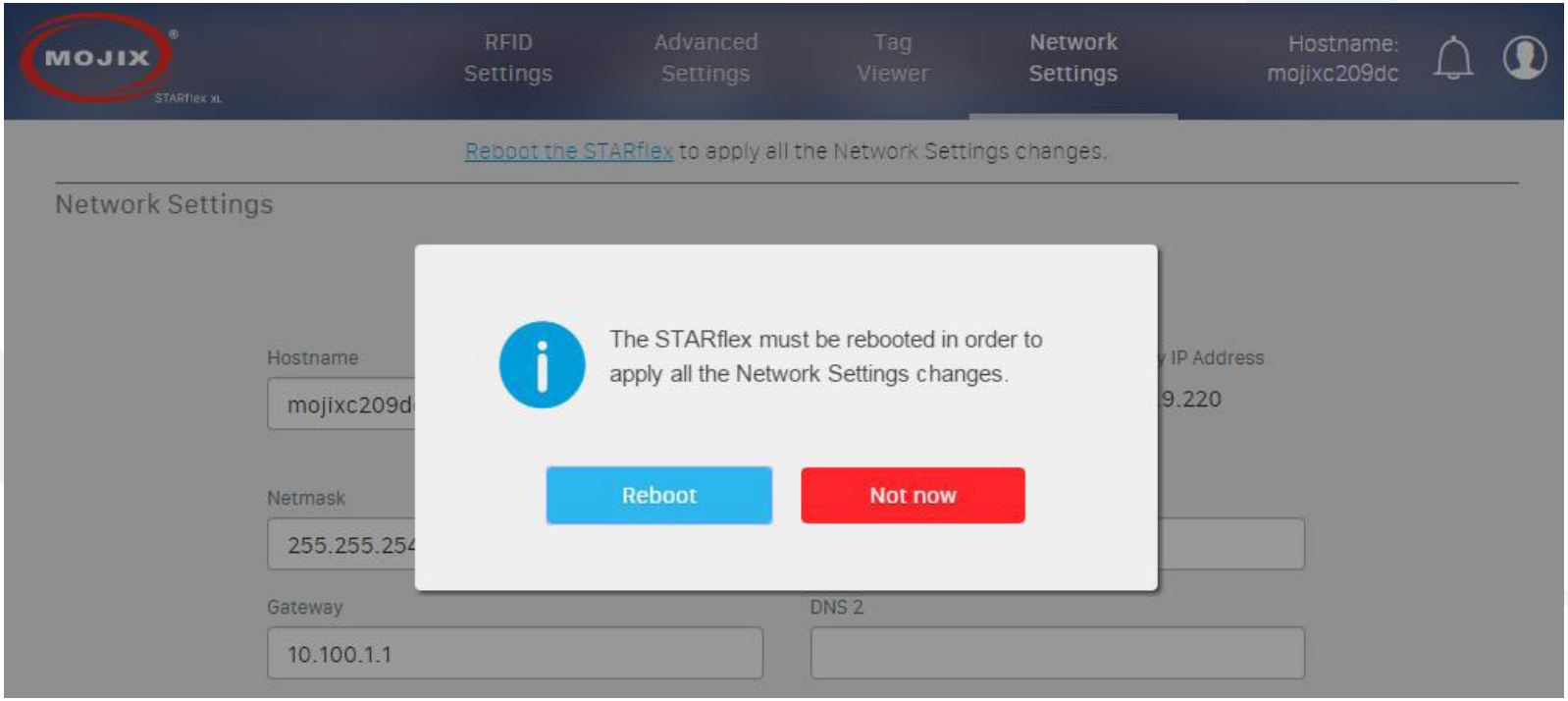
Hostname: Always editable to set the hostname.

DHCP: Three fields for DHCP are available, IP address, netmask and gateway. If the option to enable DHCP is selected, the fields will be disabled and the corresponding data will be auto populated. If DHCP is disabled, fields will be available to assign manually.
Next to the field for the IP address there is a label for the temporary IP address which indicates the default IP address of the STARflex.

DNS: Two entries for DNSs are available, if DHCP is enabled, these will be disabled with the corresponding data auto populated.

After modifying the hostname, IP address, netmask, gateway, DHCP, or DNS, a reboot of the STARflex is required in order to apply the changes, so after modifying any of these fields a dialog with a message is displayed asking to reboot the STARflex. It is also possible not to restart the STARflex at the moment, in that case a message will remain at the top of the “Network Settings” page.

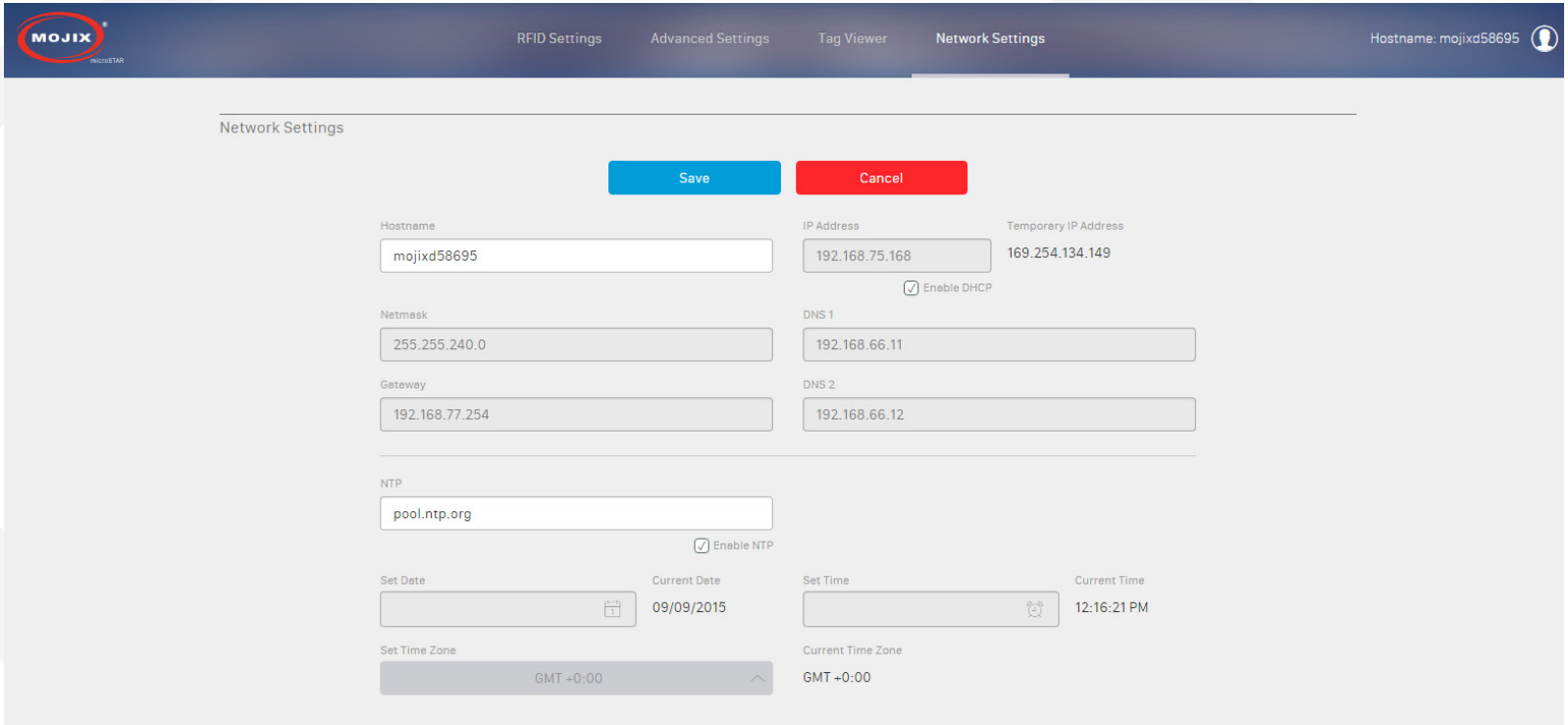
Once the STARflex is rebooted, a new tab in the browser is displayed with the STARflex available and the new network values set. In case your new IP address or hostname is unreachable, it is necessary to check your configuration manually or contact your IT personnel.



NTP: Single entry for NTPs is displayed and available to edit only when the option “Enable NTP” is selected.

If NTP is enabled the fields “Set Date” and “Set Time” will be disabled.

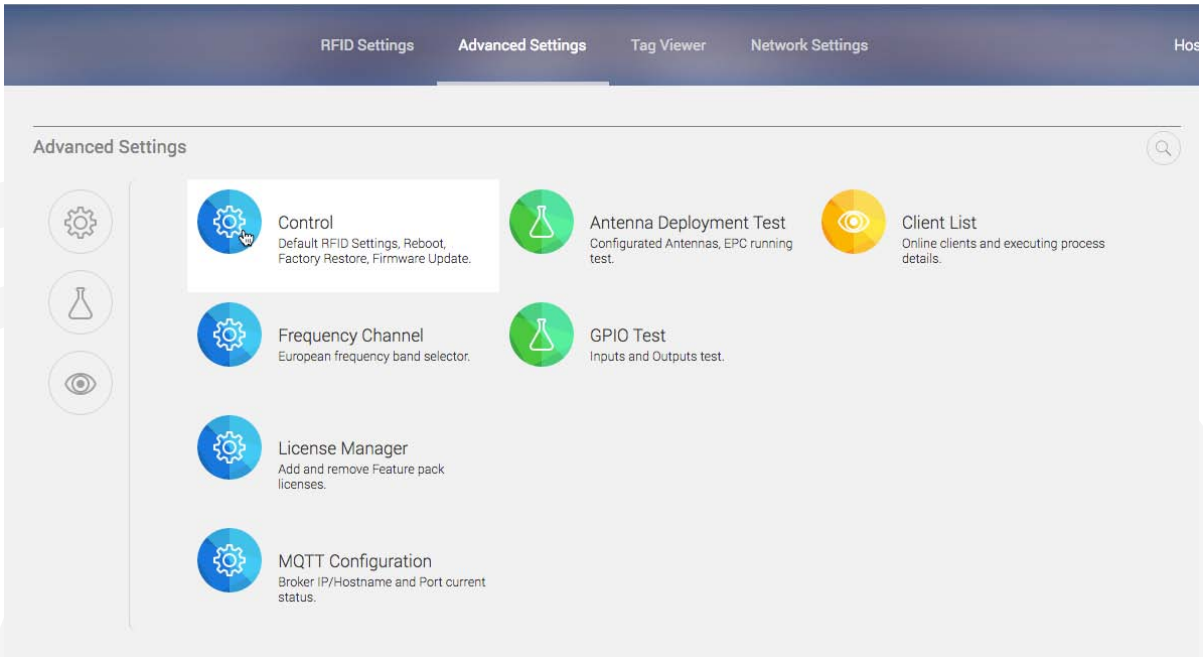
Date, Time & Timezone: A field to set the date, time and timezone are available. The fields display the user’s machine date, time and timezone by default. Clicking on the “Set Date” field a datepicker is displayed in order to choose the date. Clicking on the “Set Time” field a time picker is displayed in order to choose the time for the STARflex.
There are labels to show the current date, time, and time zone, the labels show the current values configured in the STARflex. These values are the same as the ones displayed in the landing page.



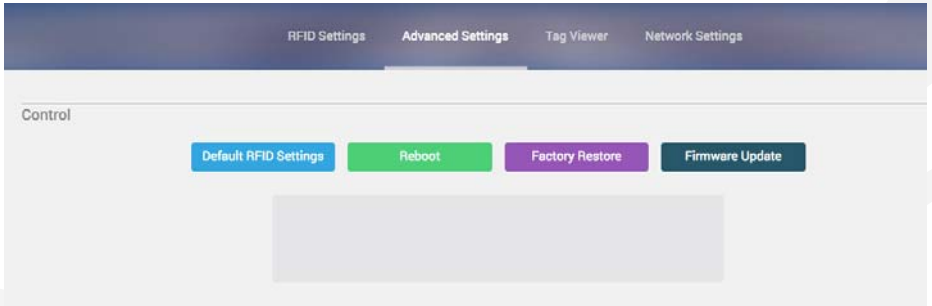
CHAPTER VI: CONTROL

6.1 CONTROL

In order to access to the Control menu, the user must be logged into the application, after that the user must select “Advanced Mode” option and provide the password to have the advanced mode option visible in the menu, once visible and click on it, a group of options will be displayed including “Control”.



Once in the Control page, there are four visible buttons, Default RFID Settings, Reboot, Factory Restore and Firmware Update



6.1.1 DEFAULT RFID SETTINGS

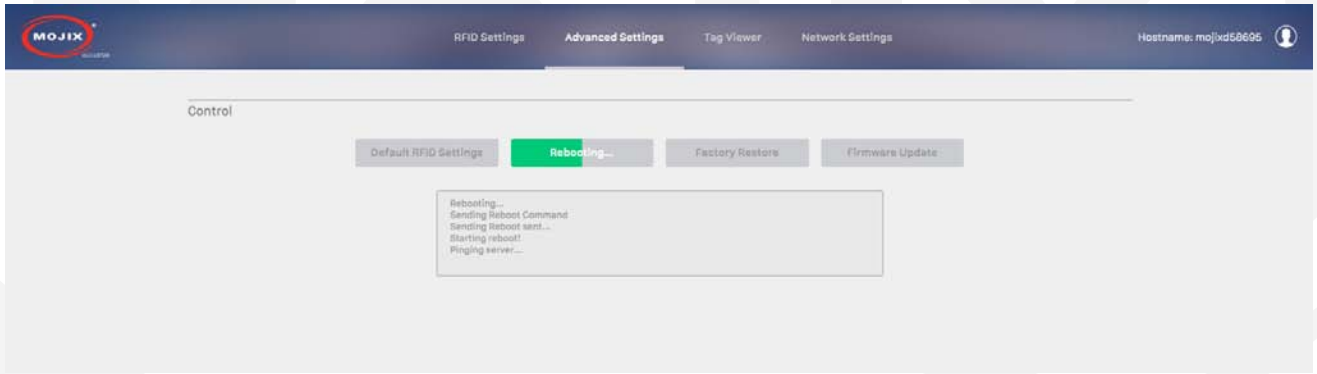
Once this option is clicked and after confirming the action, the application will reset all the RFID settings in both the basic and advanced pages to a known default configuration.

The **Basic** mode default settings are:

- **No eXpanders** enabled.
- 2nd receive antenna set to **Auto.**
- Physical Layer Defaults:
    - Target Group: **A**
    - Session: **S1**
    - Q: **5**
    - LF: **256 kHz**
    - Modulation: **Miller-4**
- Selects enabled and **NO mask**

6.1.2 REBOOT

This option allows the user to reboot the STARflex, the result notification messages are displayed in the area below the buttons.



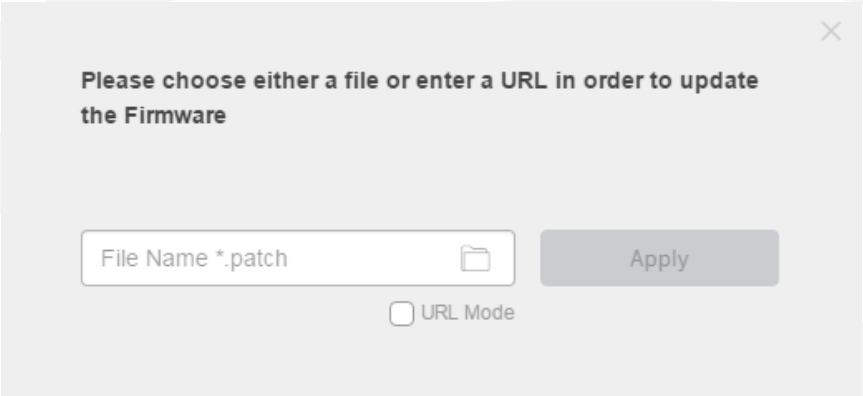
Important. *Once the reboot is done, any of the changes in the RFID Settings page (simpleProgram configuration) will be saved. Any subscription running at the moment is stopped, it is needed to start it again after the update process.*

6.1.3 FACTORY RESTORE

This option allows the user to restore the STARflex back to its original configuration (the one given in the manufacturing) including all the default network settings and default name. The notification messages are displayed in the area below the buttons.

6.1.4 FIRMWARE UPDATE

Once clicked this option, a new dialog will be displayed asking for the file to update the Firmware. In this new dialog a folder icon is displayed, it will launch the file picker in order to select the corresponding file. Additionally, the option “URL Mode” is available allowing to enter the URL where the file is located and download it to the current machine.
After choosing the file and clicking “Apply”, the current dialog is closed and the application uploads the file, however before the process starts, the RFID program is stopped. Once it is done, the corresponding upgrade process starts and after the process completes, a reboot of the STARflex is done. The notification messages will be displayed in the area below the buttons.



Important. *Upon a firmware update any subscription running at the moment is stopped, it is needed to start again after the update process.*

In IOS devices the “locations” to upload attachments are set up by third party applications, by default only the Photo Album contents are selectable.

By having third party applications such as DropBox, Google Drive, you can have other locations from where you could choose the file for firmware update. We have similar behavior for Android devices.

Works on IOS version 9.0 or higher, you will have to install other third applications for versions earlier than 9.0 in your IOS device.

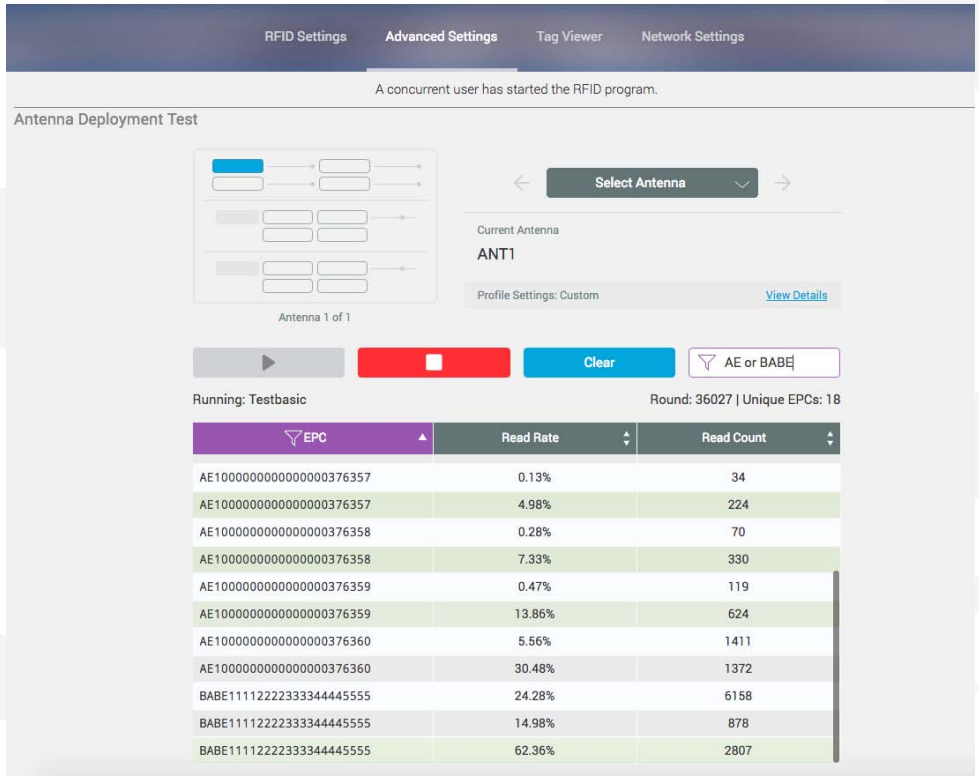
6.2 ANTENNA TEST

The “Antenna Deployment Test” page allows the user to step through the configured antennas in the basic settings page (refer to Chapter III - RFID Settings) in order to test them one by one and make sure they each can read tags. This process ensures proper continuity of cables and antennas.

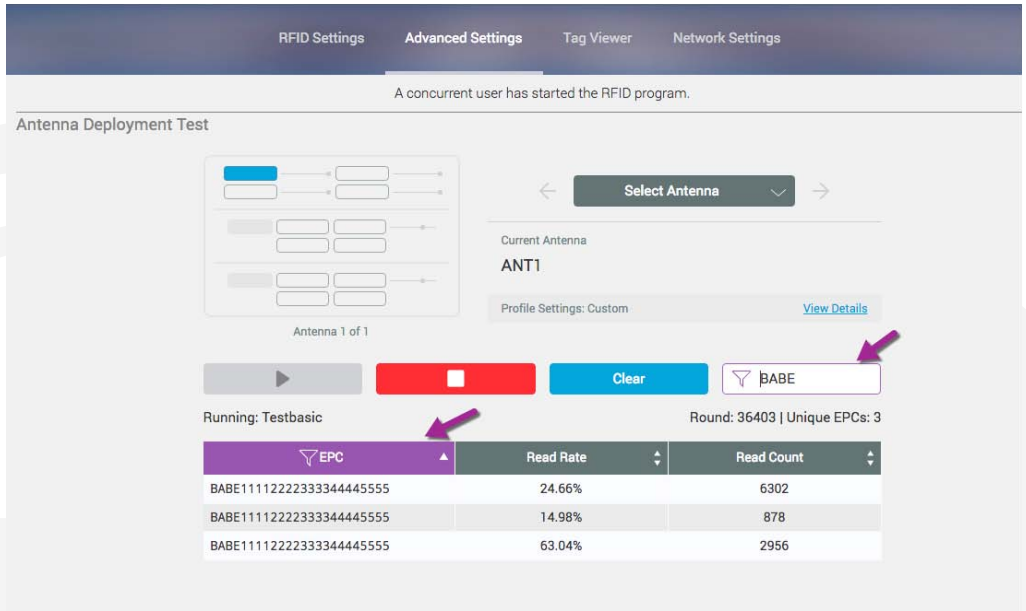
In this page, a map is displayed, giving an overall view of the configuration showing all the antennas and highlighting the antenna that is tested at the moment. In order to select the antennas there are 2 arrows next to the map which allows to go through all of them, in addition the name of the antenna selected is displayed.
A section with the profile settings is available to show and hide by clicking on the “View details” link

Below, the buttons to Start, Stop and Clear the list of read tags are displayed and next to them an “EPC” filter.

Use a single wildcard as “*”, a blank space is a logical “or”: Example: 300 056 searches for pattern 300 or 056. Note that We do not use or as logical or.



In addition, the column where results are found and the EPC filter text area will have a distinctive mark:

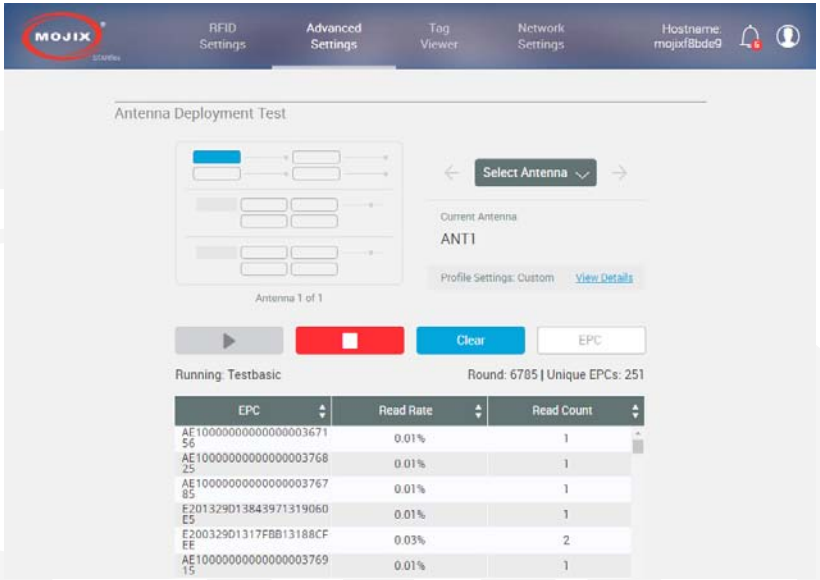


Moreover, the number of Rounds, number of unique EPCs and the name of the program that is currently running are displayed.

At the end of the page a list with the tag reads is available with 3 columns: EPC, Read Rate and Read Count.

If there are no antennas selected in the basic settings page, a message should be displayed at the top of the page. In addition, the map, arrows, name of the antennas, power and the buttons (Play, Stop and Clear) are disabled.

If the program is started from the “Antenna Deployment Test” page, any program running at the moment in the “Tag Viewer” is stopped and right after that the “Testbasic” program (advanced) starts running. However, if the basic program or any other (except Testbasic) is started from the “Tag Viewer”, the Antenna Deployment Test remains stopped.


MOJIX
RFID Settings
Advanced Settings
Tag Viewer
Network Settings
Hostname: mojixf8bde9
Antenna Deployment Test
Select Antenna
Current Antenna
ANT1
Profile Settings: Custom
View Details
Antenna 1 of 1
Clear
EPC
Running: Testbasic
Round: 6785 | Unique EPCs: 251
EPC
Read Rate
Read Count
AE100000000000000003671 56
0.01%
1
AE100000000000000003768 25
0.01%
1
AE100000000000000003767 85
0.01%
1
E201329D13843971319060 E5
0.01%
1
E200329D1317FBB13188CF EE
0.03%
2
AE100000000000000003769 15
0.01%
1

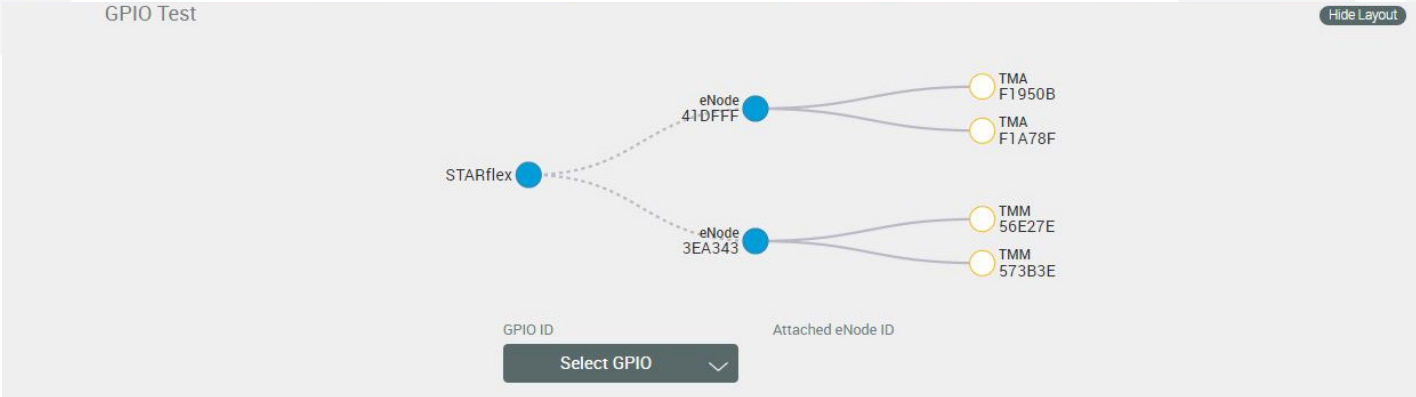
6.3 GPIO TEST

The “GPIO Test” page allows the user to validate the state of connected input devices and to test output devices by triggering the respective output through the interface. Once in the page, the GPIO IDs and eNodes are auto discovered and displayed in a tree showing the current configuration.

The tree allows the user to select and connect the GPIOs, expand or collapse the eNodes, zoom in or zoom out and move the whole tree. Once a GPIO is selected, the ID and the eNode (if it is attached to an eNode) are populated in the corresponding combo-box and label below. In the same way if a GPIO is selected from the combo-box, the change is reflected in the tree.

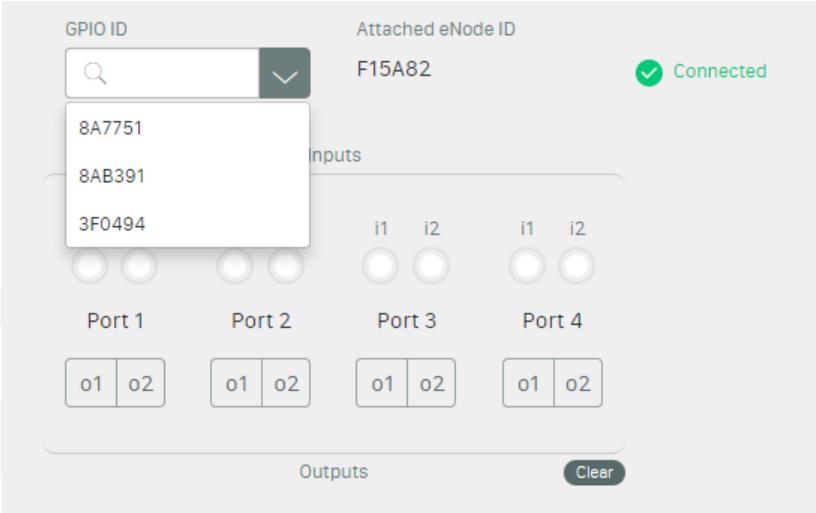
A dotted line is displayed from the STARflex node to the eNodes and a straight line from the eNode to GPIO.

Configurations that include Turbo Mux or Turbo Antenna will have the possibility to see the connection here as well, a straight line from an eNode to the corresponding Turbo Mux or Turbo Antenna will be displayed.

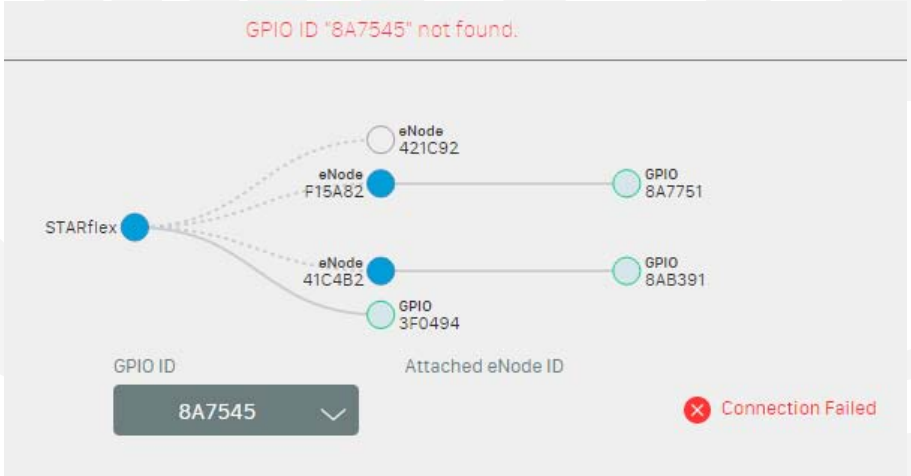


It is possible to select the GPIO IDs from the combo-box or typing in the GPIO ID field and being helped with the auto complete functionality. If the ID is not in the list, it is also possible to add it as new.

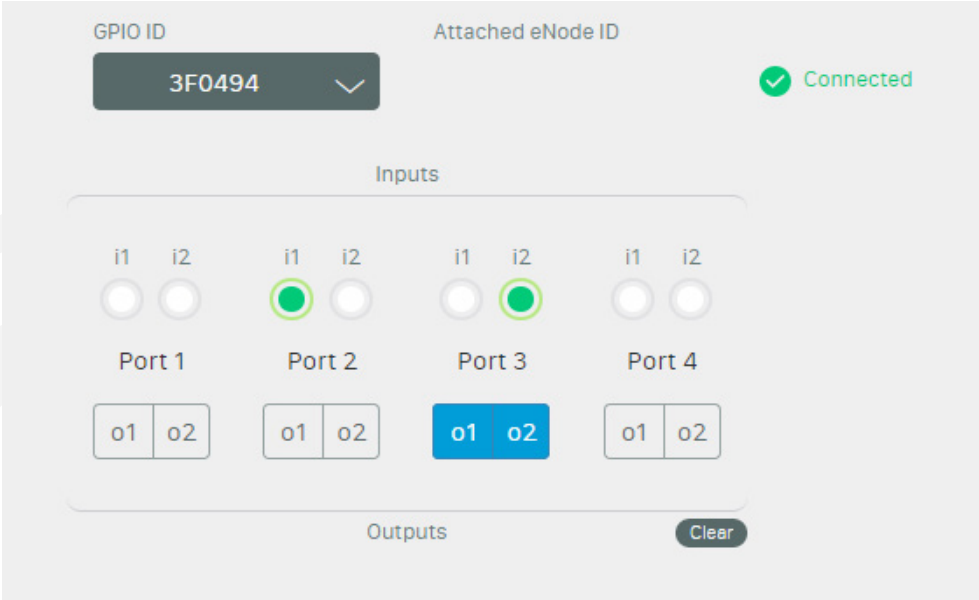
Important. *The GPIO ID selected remains connected for the current session.*



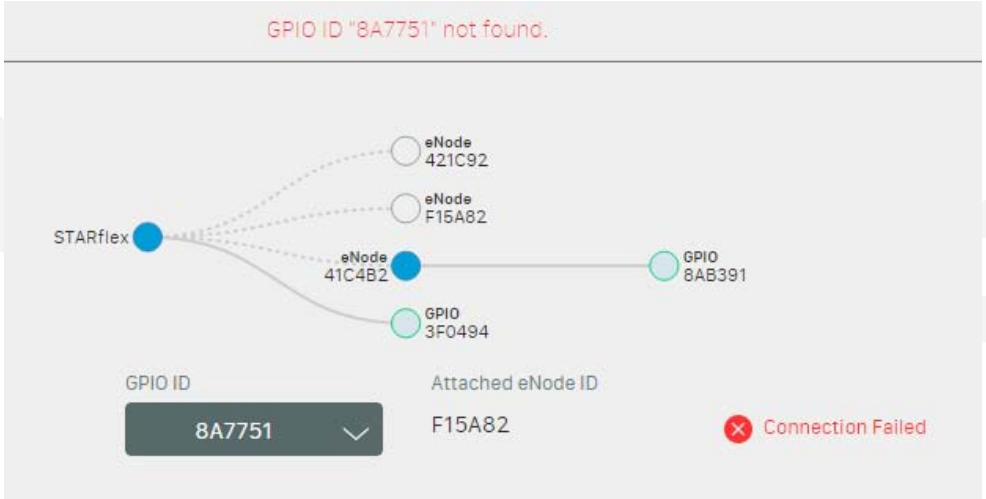
A green ok icon is displayed when the entered GPIO ID is valid. In case the ID is invalid or is not connected to the unit, a red X icon is displayed.
If the GPIO is attached to an eNode, the corresponding ID is populated right next to the GPIO ID.



With a valid GPIO ID, the state of the connected input devices is reflected in the corresponding input and port, the output buttons are enabled to trigger the respective output devices through the interface.

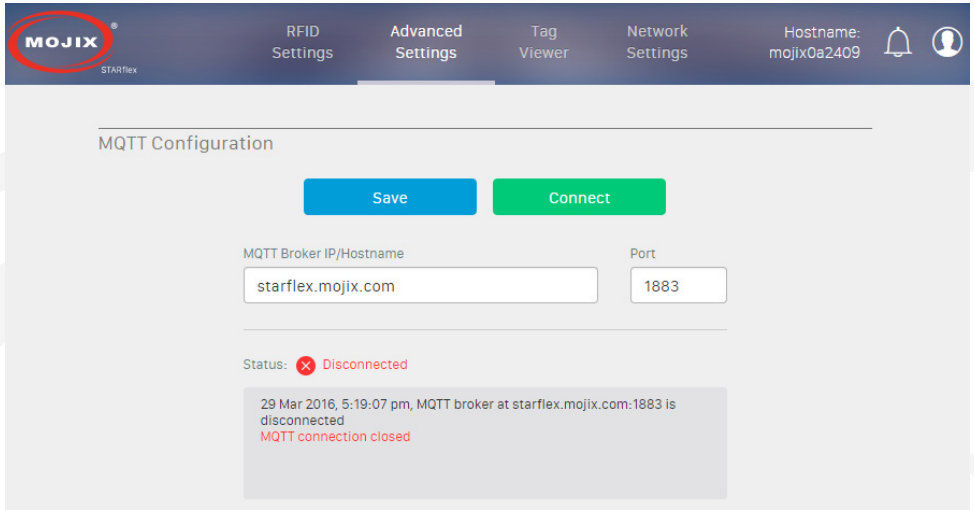


If an output device is unplugged from the GPIO and the corresponding button is clicked, an error message is displayed.



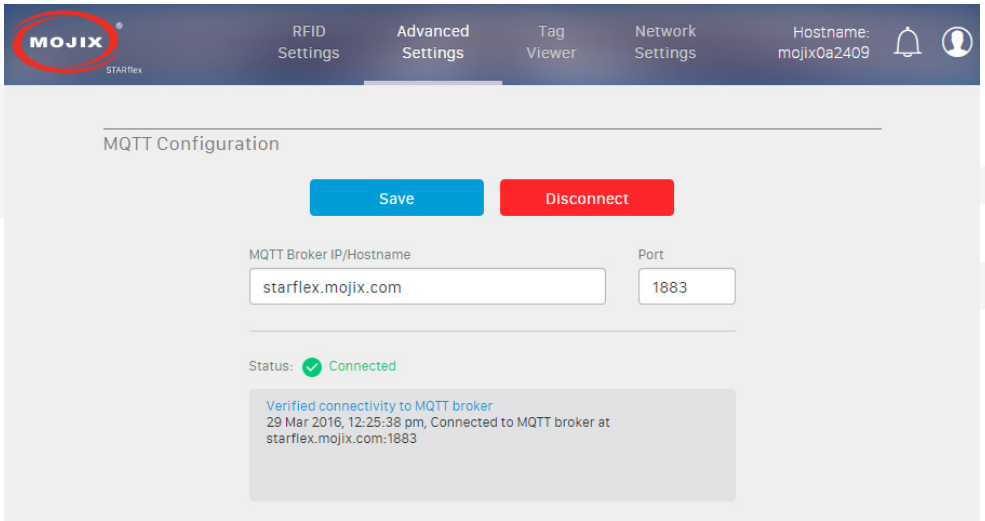
6.4 MQTT CONFIGURATION

The “MQTT Configuration” page allows the user to set up the hostname/IP address, port to connect and test to the MQTT broker.
The “Save” and “Connect” buttons are enabled once the MQTT broker IP and port are entered.

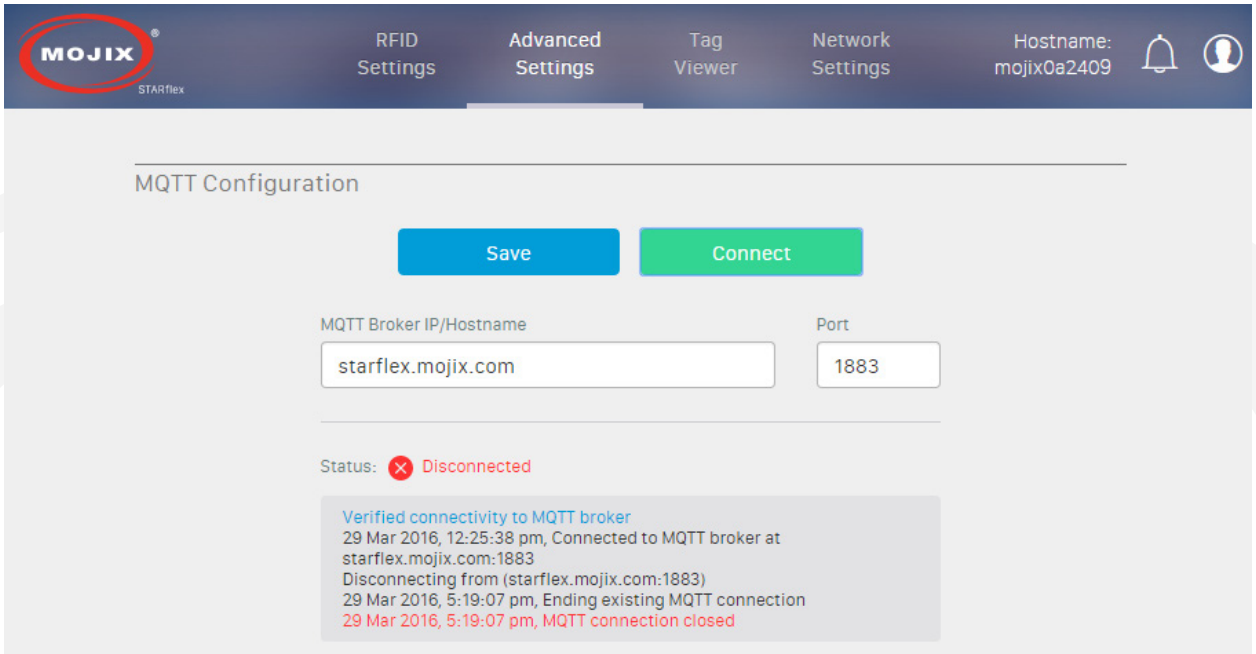


With the “Connect” option it is possible to connect to the MQTT broker without saving the information and with the “Save” option the data to connect to the MQTT Broker is saved.

After the MQTT broker is connected, the label of the “Connected” button turns to “Disconnect” and this option disconnects the STARflex from the MQTT broker.

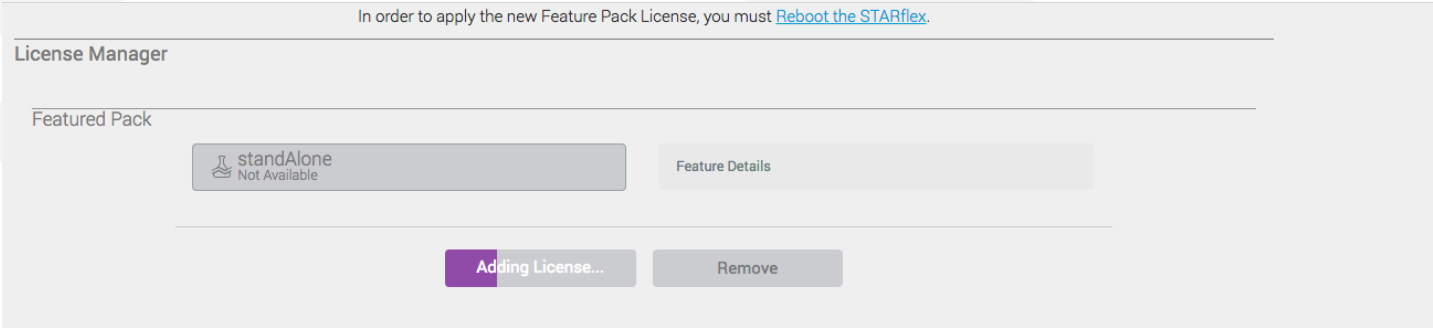


If the connection is successful, the status “Connected” and a green ok icon are displayed, otherwise the status “Disconnected” and a red error icon are shown. In addition, in the rectangular section displayed below, all the MQTT related messages regarding the connection are displayed.

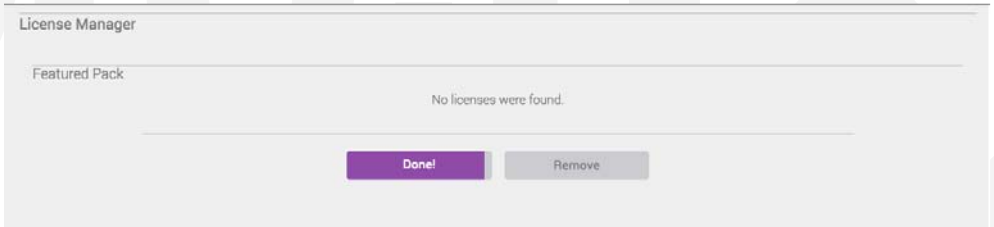


6.5 LICENSE MANAGER

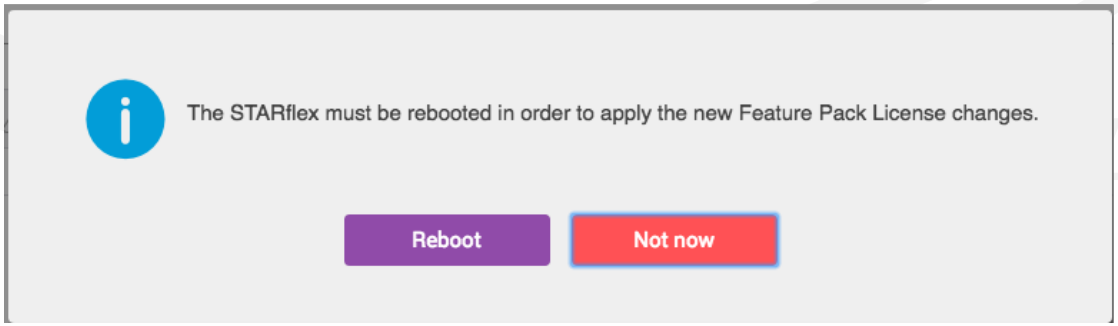
The “License Manager” page allows the users to upload and add or remove licenses to the STARflex.
To upload a new license click on “Add License” button, with the file picker select the corresponding license and apply. A loading indicator will appear while the license is uploading:



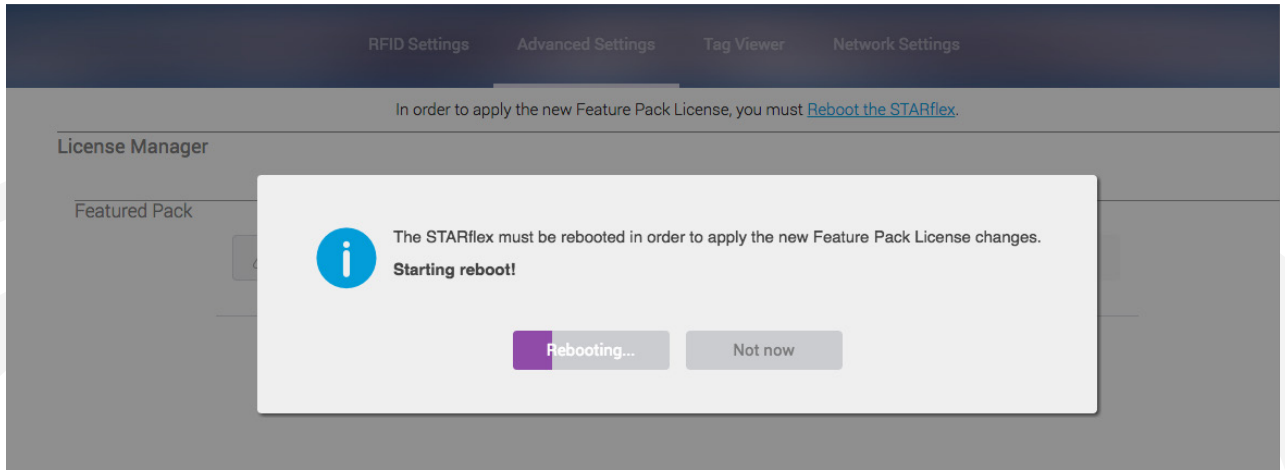
The license will be successfully uploaded when the button changes to **Done**!



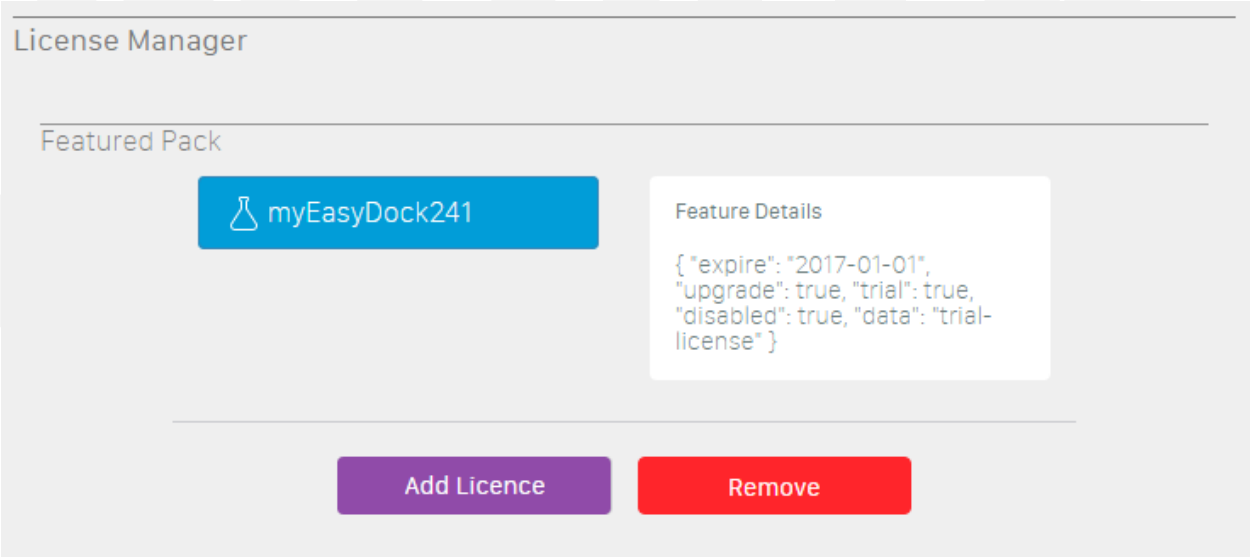
Click on the **Reboot** button in order to apply the new License:



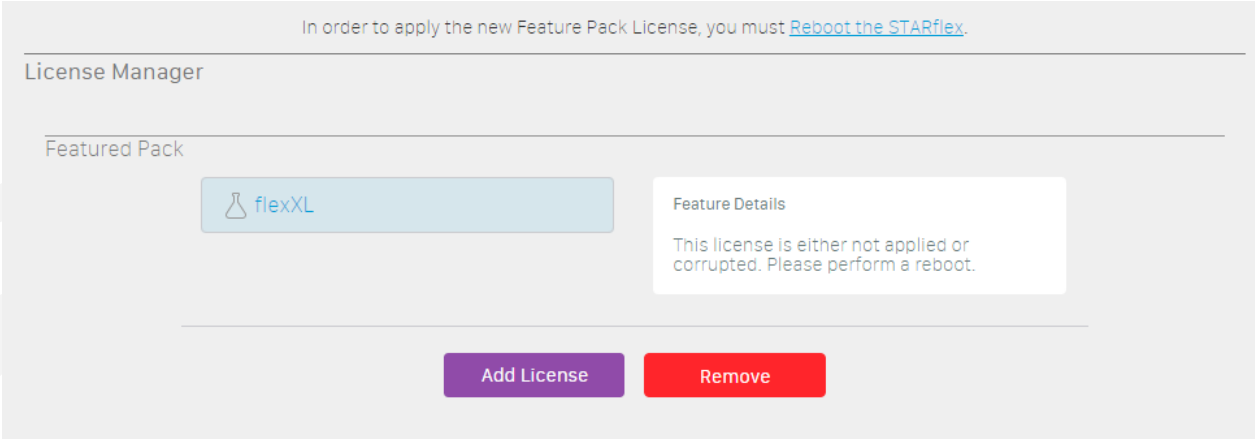
The reboot process will be automatically displayed:



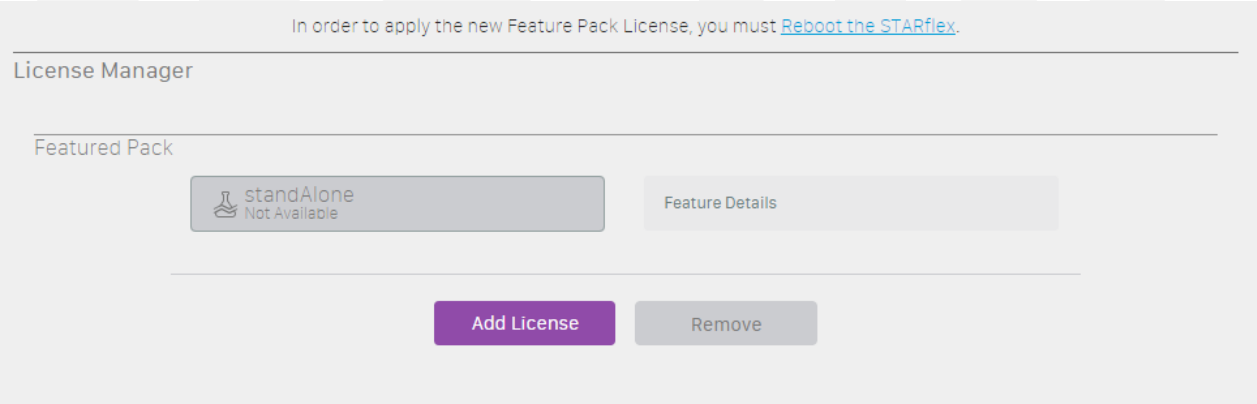
After the reboot is completed the license is displayed as available. The feature details can be displayed by clicking on it.



Invalid licenses are listed and visible however these are disabled.



To remove a license click on it and click on “Remove”, it remains displayed but not available, a reboot is required for valid licenses in order to remove them completely.



In **IOS devices** *the “locations” to upload attachments are set up by third party applications, by default only the Photo Album contents are selectable.*

By having third party applications such as DropBox, Google Drive, you can have other locations from where you could choose the file for license manager. We have similar behavior for Android devices.

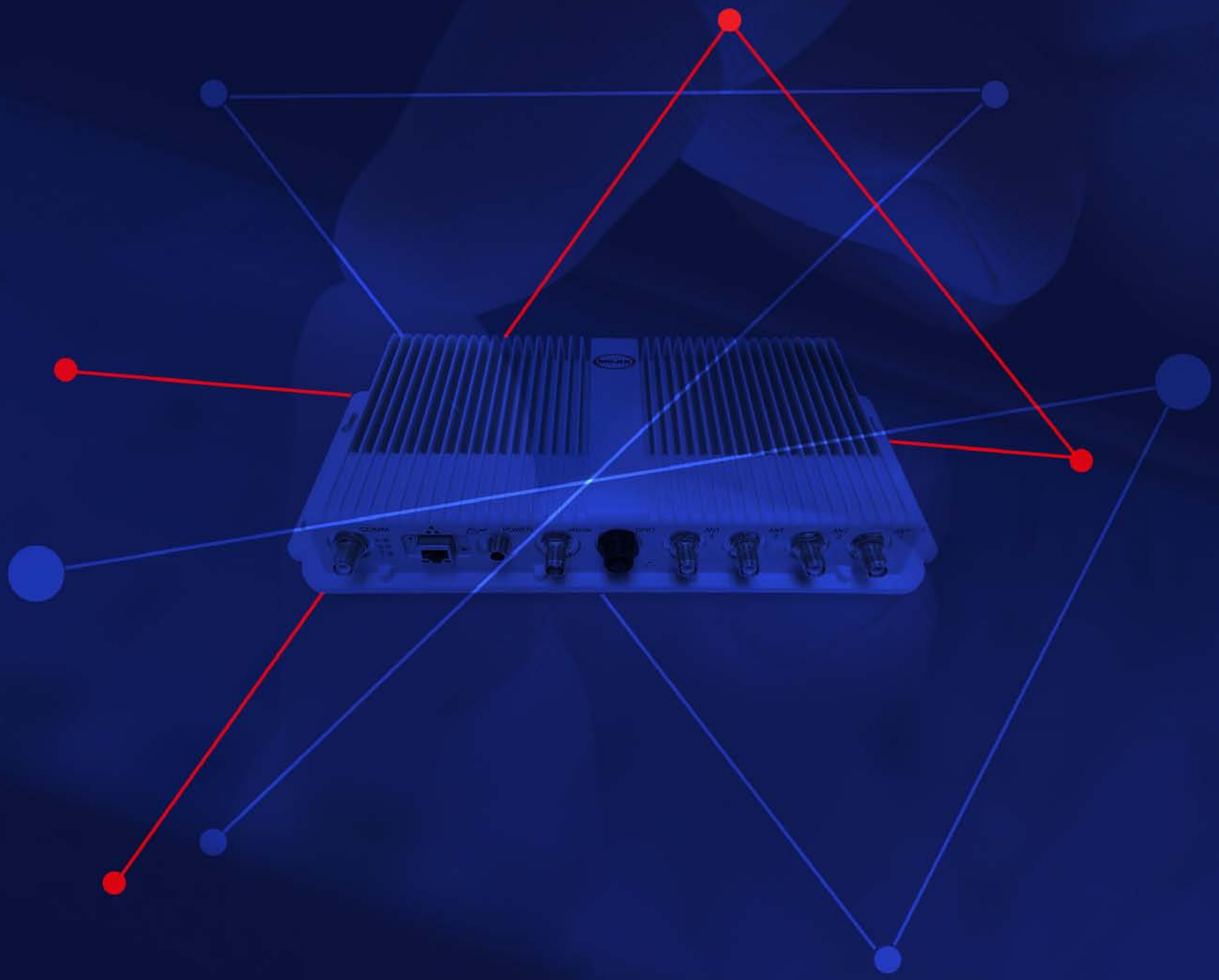
Works on IOS version 9.0 or higher, you will have to install other third applications for versions earlier than 9.0 in your IOS device.

APPENDIX

FCC Notice, STARflex and eNode

CAUTION: To comply with FCC RF exposure compliance requirements, a separation distance of 20 cm must be maintained between the antenna of this device and all persons.

WARNING: This equipment has been tested and found to comply with the limits for Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction's manual, may cause interference to radio communications. Operation of this equipment in a residential area is likely to cause interference in which case the user will be required to correct the interference at his own expense. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the Mojix Professional Services organization.

In order to ensure compliance with FCC regulations, shielded and grounded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment.