TEKTELIC **COMMUNICATIONS INC.**

TEKTELIC OAM SERVER USER GUIDE

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Document Revision

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0.1	March 27, 2020	OS	Based on 2.2.0 production OAM Server release
0.2	April 02, 2020	KC	Added Bulk Upgrade, Updated Contents for few topics

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OAM features on OAM Server:

You have to login to OAM Server (https://gateway-oam.tektelic.com/) as a ***customer administrator or provider administrator to use OAM features***. Before start using OAM features on the OAM server, the user has to register their Gateways in OAM server. The Tektelic MQTT Bridge should be installed on their Gateways. Then fields for the OAM should be enabled (uncommented) on the /etc/default/mqtt-bridge.conf on the GW. Then Credentials from /etc/default/mqtt-bridge.conf file should be used in OAM Server->Gateway Groups->Gateway->Manage Credentials.

1. MQTT Bridge configuration

OAM Server:

To ensure the connection to the OAM server will be established successfully, you should specify the right credentials. You can find them in the mqtt-bridge.conf file on your gateway in the /etc/default/ directory. There are specified oam host, oam user and password.

IMPORTANT: Remember to uncomment it. Only one server can be used in the same time: or NS, or OAM.

NOTE: oam stream host should be also uncommented if you want to use Log Retrieval. It should be configured as “gateway-oam.tektelic.com:8082”

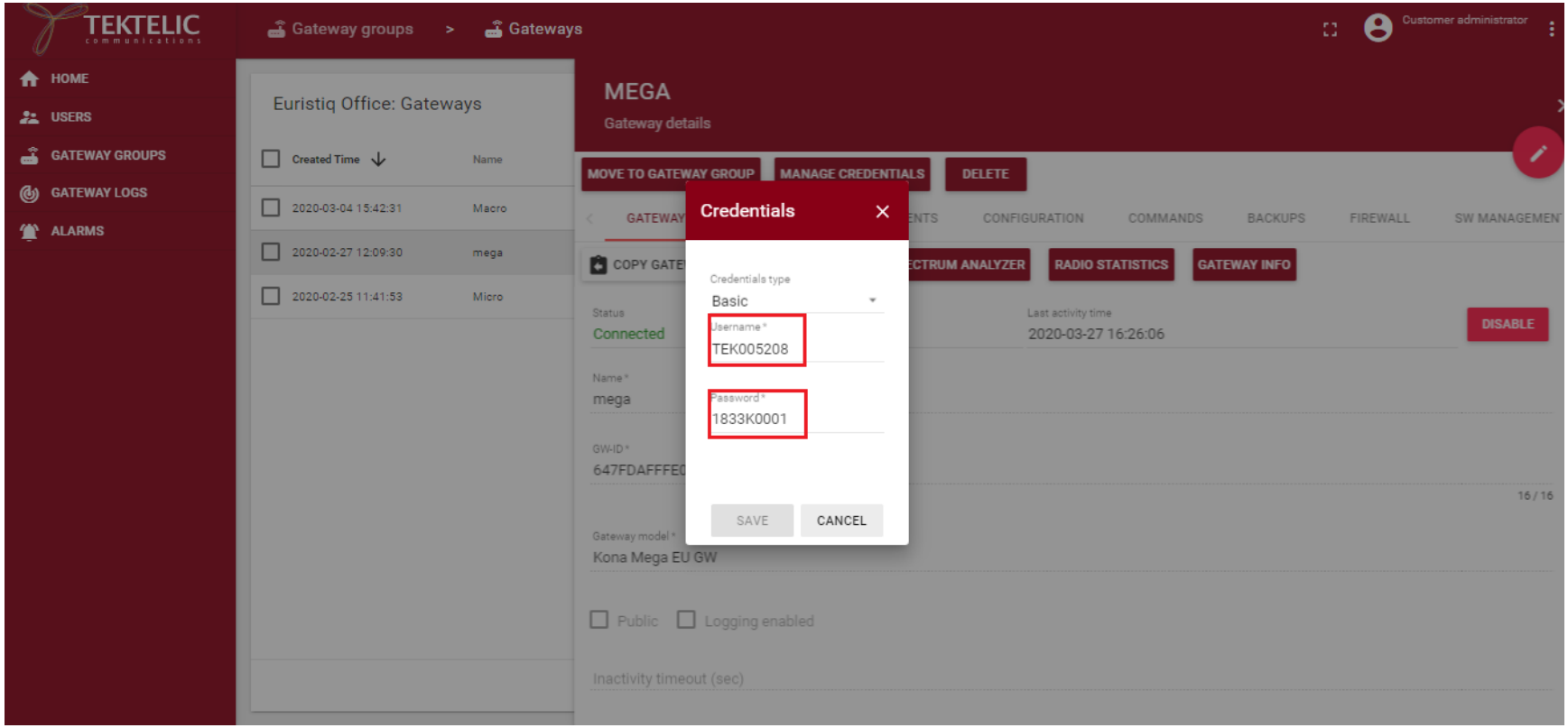
```
## OA&M server host. Optional.
## If not set, the NS host address will be used for establishing OA&M connection.
## If NS host address is not defined, SNMP (control plane) <-> MQTT bridging
## will be completely disabled.
## Value here provided only for a reference! When running in real environment,
## one must place here _real_ OA&M host.
##
# oam_host                        gateway-oam.tektelic.com

## The gateway username obtained from the OA&M Server. Optional.
## Relevant only if "oam_host" is set.
## Value here provided only for a reference. When running in real environment,
## one must place here _real_ OA&M username.
##
# gw_oam_user                     oam_username

## The gateway password obtained from the OA&M Server. Optional.
## Relevant only if "oam_host" is set.
## Value here provided only for a reference! When running in real environment,
## one must place here _real_ OA&M password.
##
# gw_oam_password                 oam_password

## OA&M file stream host. Optional.
## The file stream host defines HTTP/HTTPS endpoint to receive file data
## requested by OA&M.
## If not set, the file transfer features will that rely on HTTP file streaming
## will not be supported.
## Value here provided only for a reference! When running in real environment,
## one must place here _real_ OA&M host.
##
# oam_stream_host                 stream-oam.tektelic.com
```

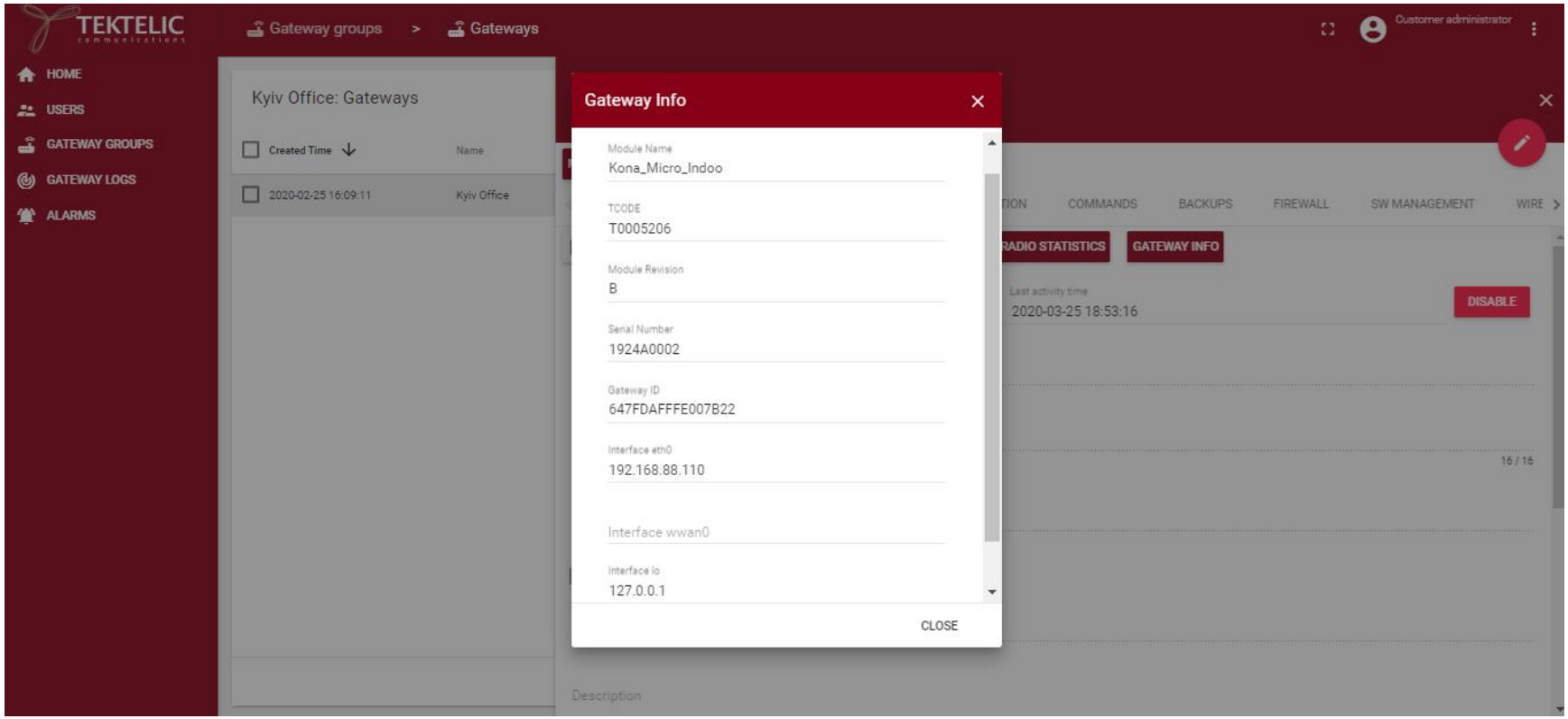
Gateway oam user and password from the mqtt-bridge.conf should be specified as credentials to your GW on the OAM server. Check the screenshot below.



2. Description of each OA&M Feature

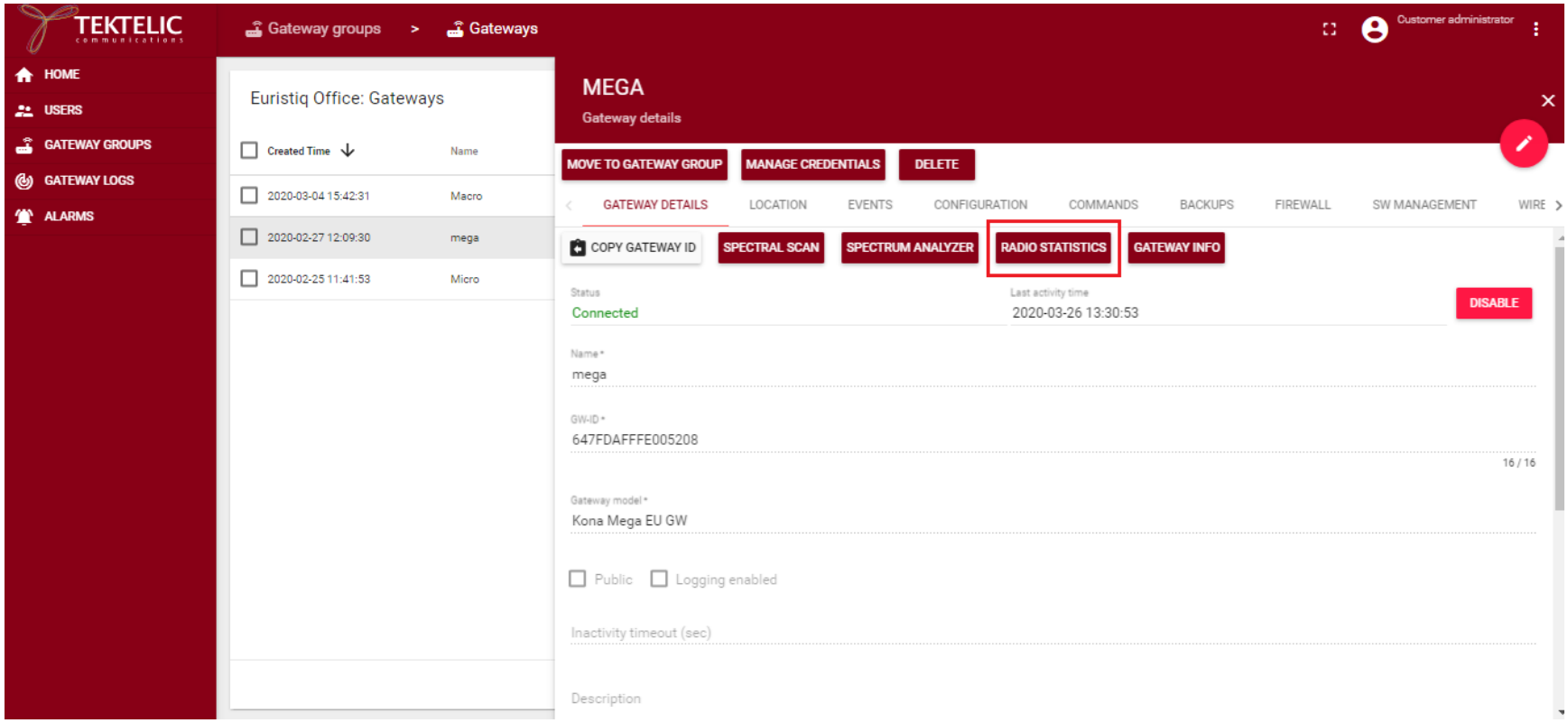
2.1 Gateway Info:

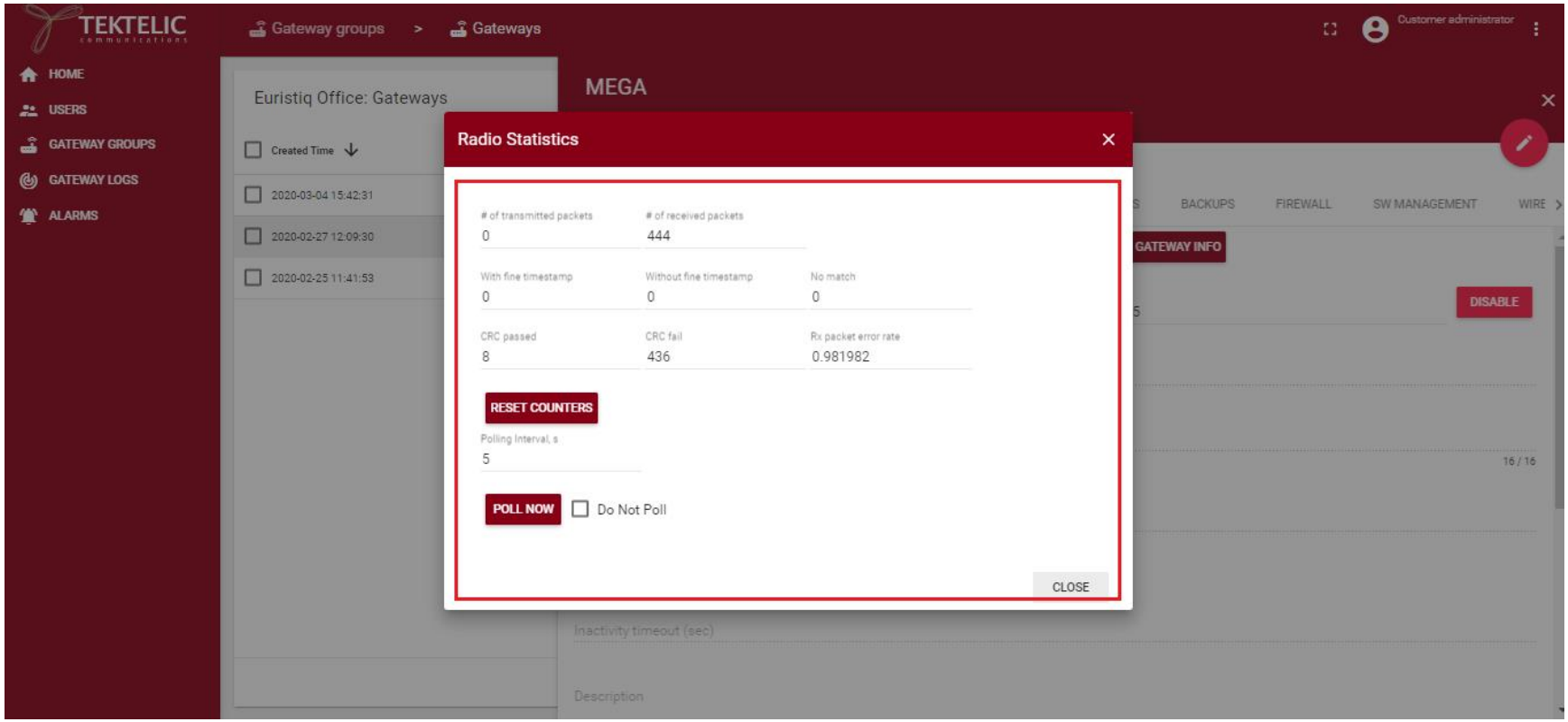
This tab provides Module Name, T-code, Module Revision, Serial number, Gateway ID, IP addresses of Eth0, wwan0 and Loopback.



2.2 Radio Statistics:

This tab provides number of transmitted and received packets, number of packets with and with out timestamps, number of packets with CRC passed and failed and number of packets with RX packet error rate and no match. By default, the poll Interval is 5 sec.

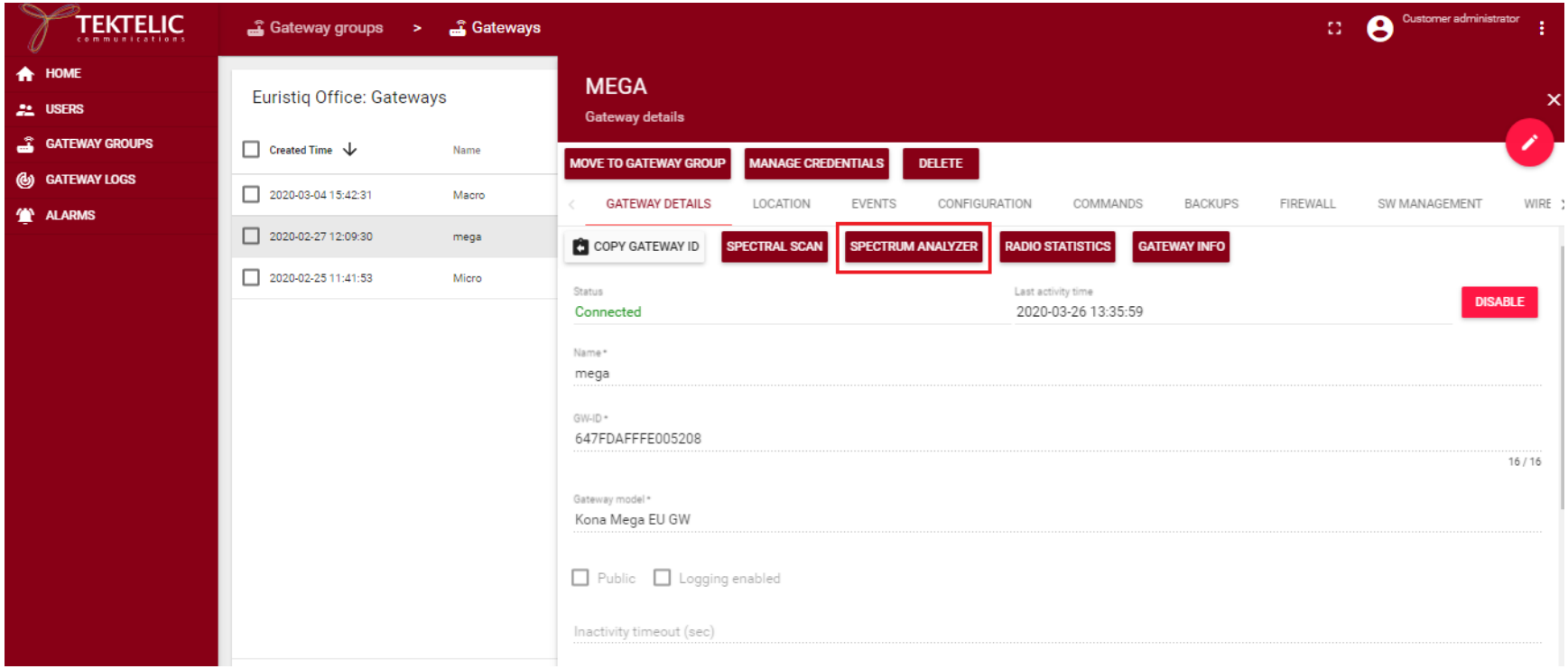


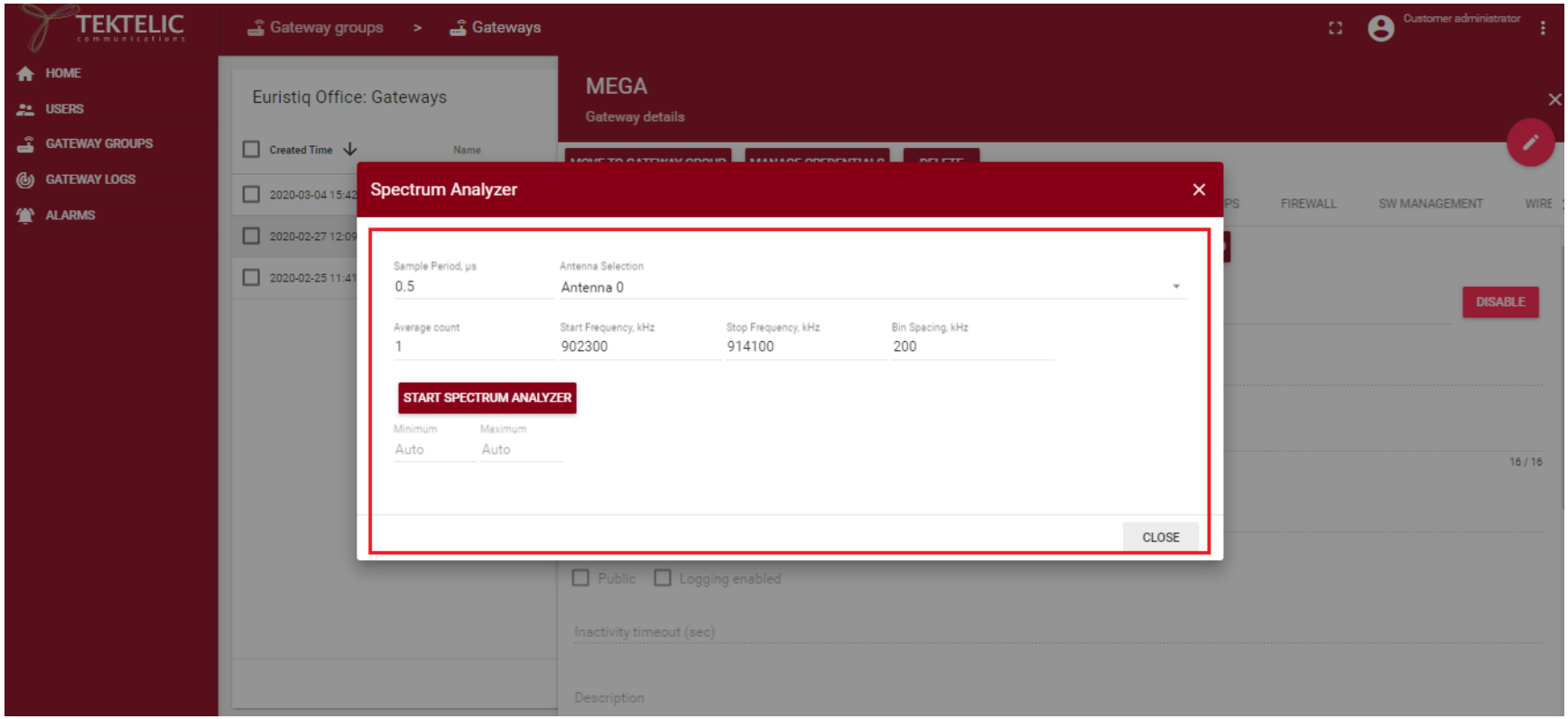

TEKTELIC
Gateway groups
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office: Gateways
Created Time
2020-03-04 15:42:31
2020-02-27 12:09:30
2020-02-25 11:41:53
MEGA
BACKUPS
FIREWALL
SW MANAGEMENT
GATEWAY INFO
DISABLE
16 / 16
Inactivity timeout (sec)
Description
Radio Statistics
# of transmitted packets
0
# of received packets
444
With fine timestamp
0
Without fine timestamp
0
No match
0
CRC passed
8
CRC fail
436
Rx packet error rate
0.981982
RESET COUNTERS
Polling Interval, s
5
POLL NOW
Do Not Poll
CLOSE

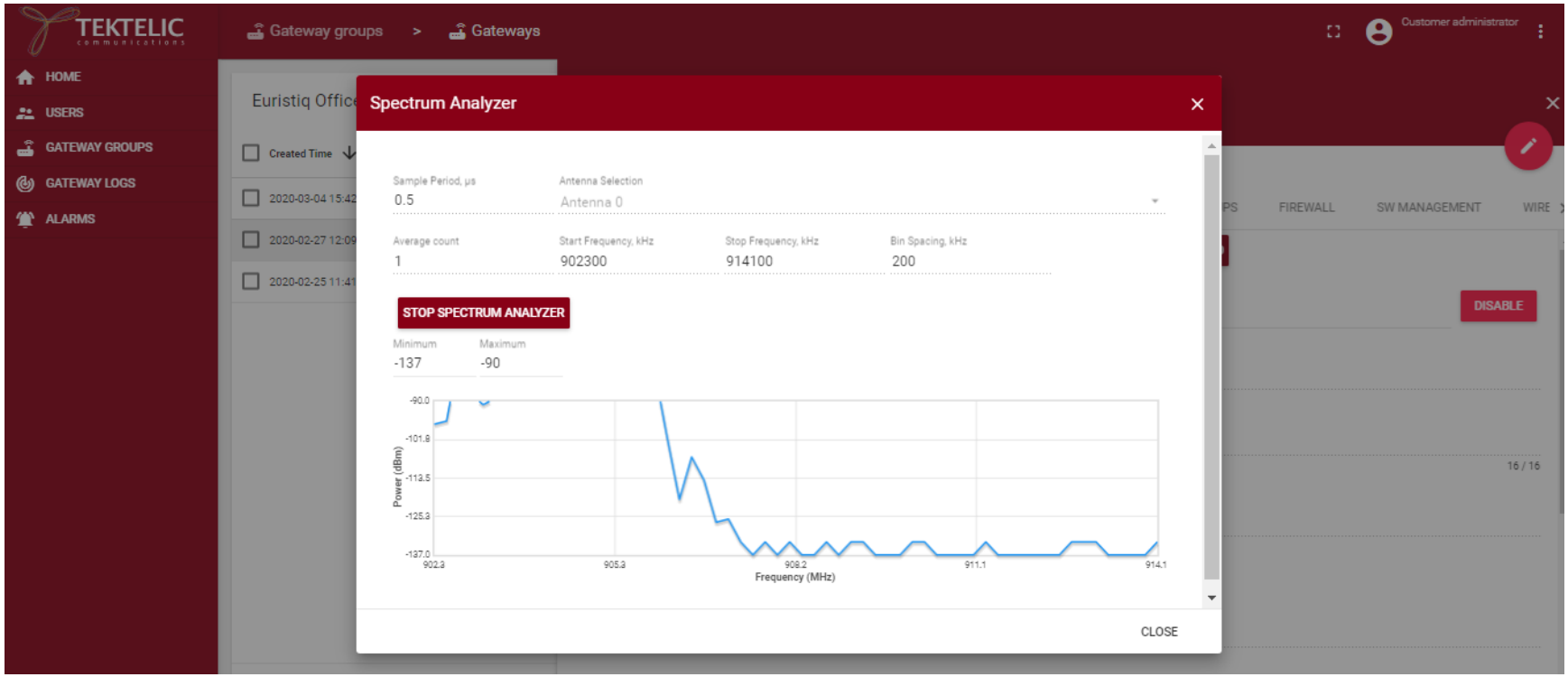
2.3 Spectrum Analyzer:

This feature is not yet supported on Micro platform.

This tab plot the graph between frequency and power with live data. The user should set the start and stop frequency, bin spacing, sample period and Antenna before start the Spectrum Analyzer.

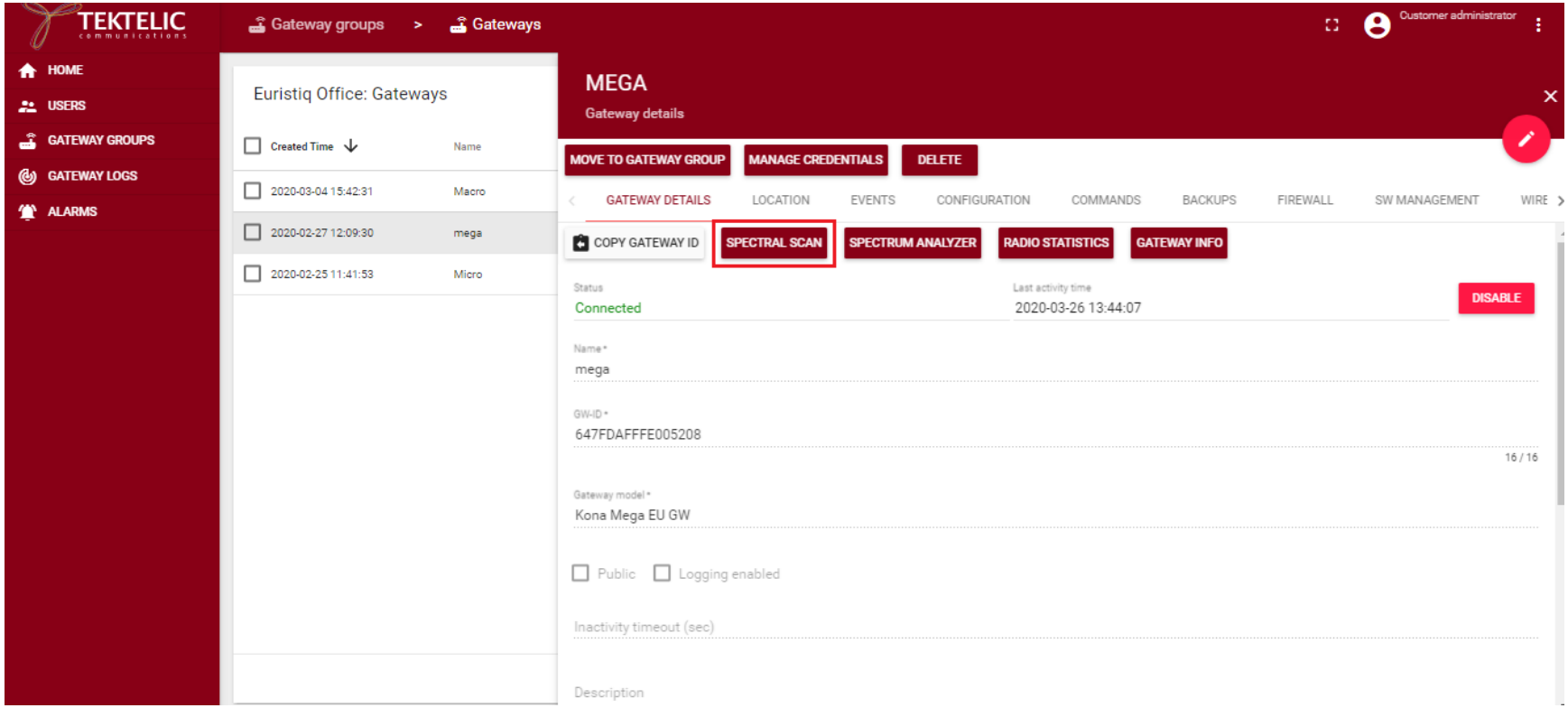


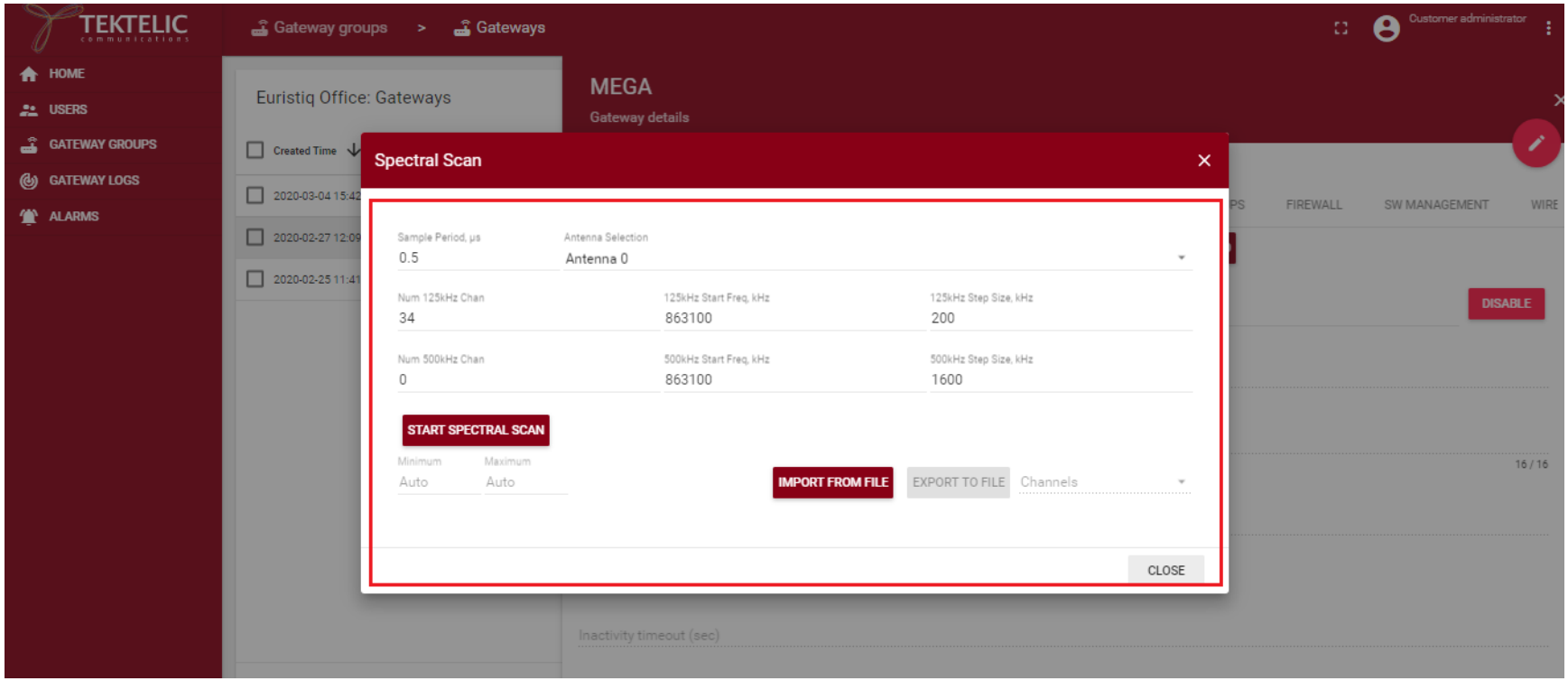

TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office: Gateways
Created Time
Name
2020-03-04 15:42
2020-02-27 12:09
2020-02-25 11:41
MEGA
Gateway details
FIREWALL
SW MANAGEMENT
DISABLE
16 / 16
Public
Logging enabled
Inactivity timeout (sec)
Description
Spectrum Analyzer
Sample Period, µs
0.5
Antenna Selection
Antenna 0
Average count
1
Start Frequency, kHz
902300
Stop Frequency, kHz
914100
Bin Spacing, kHz
200
START SPECTRUM ANALYZER
Minimum
Auto
Maximum
Auto
CLOSE

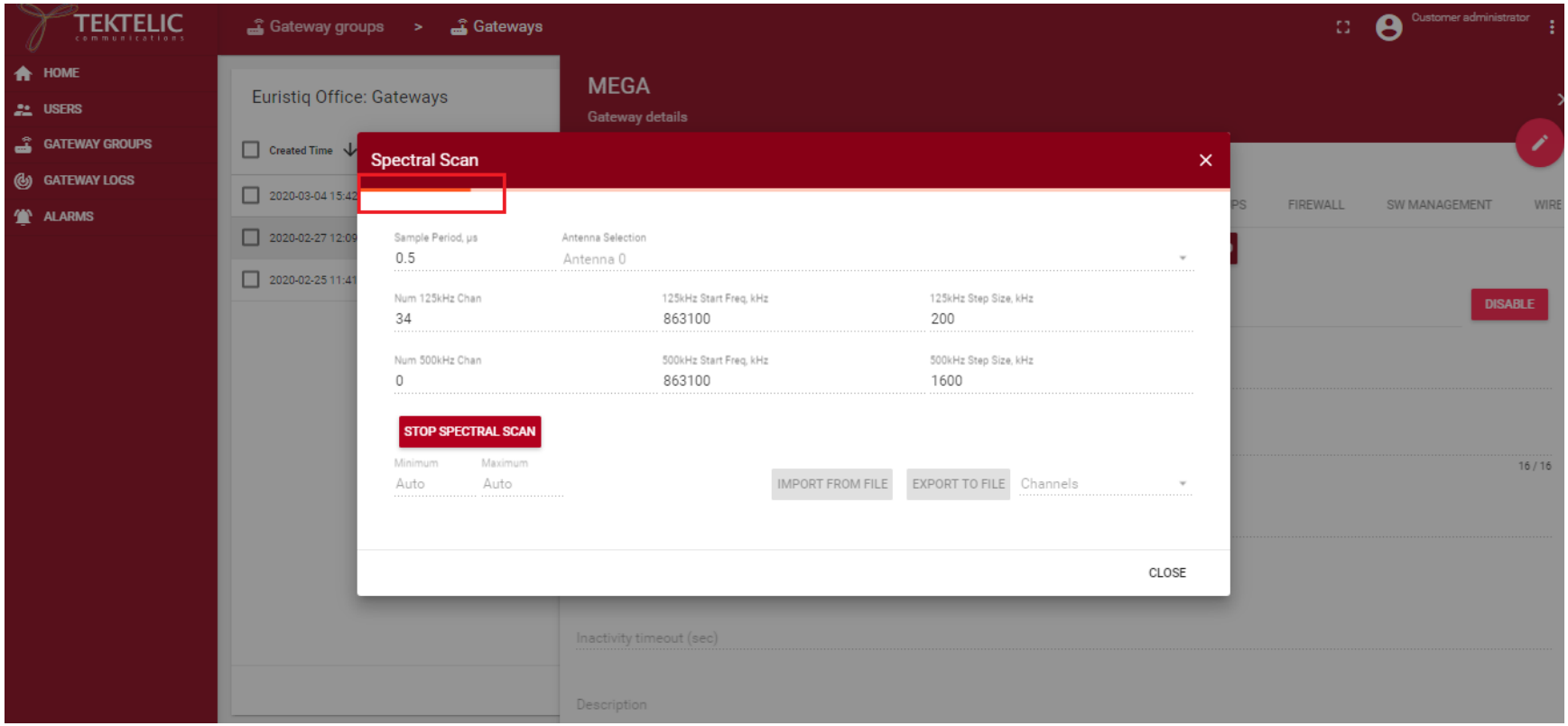

TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office
Created Time
2020-03-04 15:42
2020-02-27 12:09
2020-02-25 11:41
FIREWALL
SW MANAGEMENT
WIRE
DISABLE
16 / 16
Spectrum Analyzer
Sample Period, µs
0.5
Antenna Selection
Antenna 0
Average count
1
Start Frequency, kHz
902300
Stop Frequency, kHz
914100
Bin Spacing, kHz
200
STOP SPECTRUM ANALYZER
Minimum
-137
Maximum
-90
-90.0
-101.8
-113.5
-125.3
-137.0
Power (dBm)
902.9
905.3
908.2
911.1
914.1
Frequency (MHz)
CLOSE

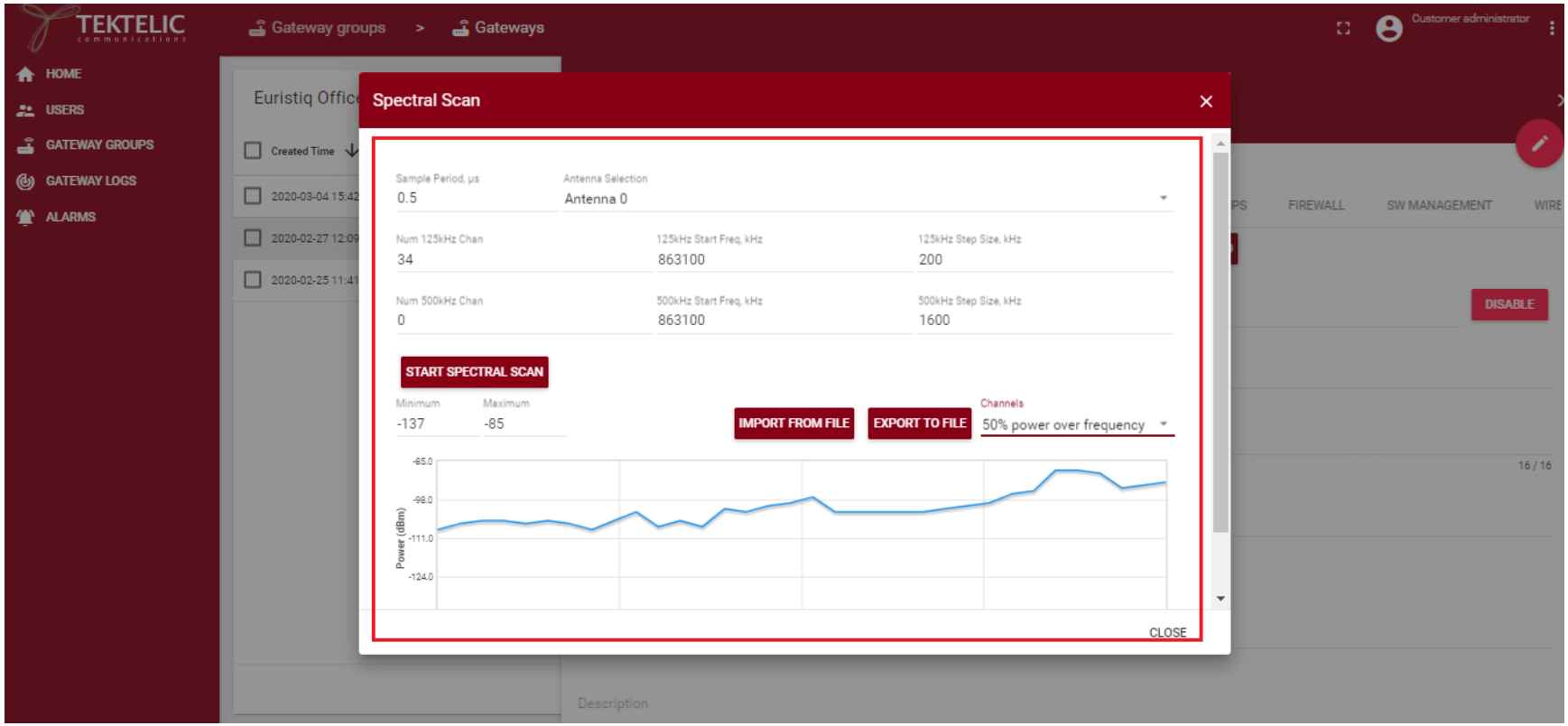
2.4 Spectral Scan:

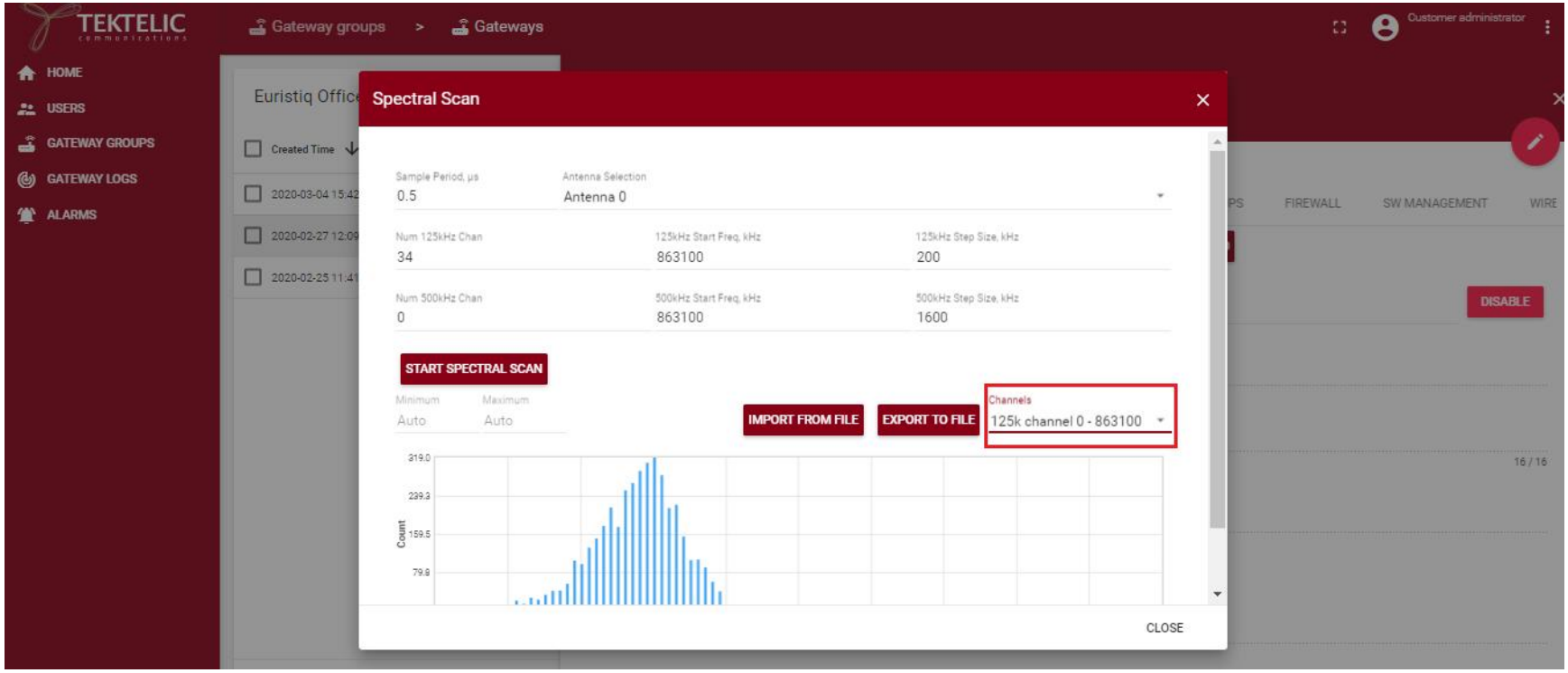
Spectral scan will scan the channels on the Gateway and plot and display the graph between frequency and power, and Count and Power bins. It will take a minute to provide results. The channels, antenna, step size and sample period have to be configured properly before start the Spectral Scan.




TEKTELIC
communications
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Gateway groups
>
Gateways
Customer administrator
Euristiq Office: Gateways
Created Time
2020-03-04 15:42
2020-02-27 12:09
2020-02-25 11:41
MEGA
Gateway details
FIREWALL
SW MANAGEMENT
WIRE
DISABLE
16 / 16
Inactivity timeout (sec)
Spectral Scan
Sample Period, µs
0.5
Antenna Selection
Antenna 0
Num 125kHz Chan
34
125kHz Start Freq, kHz
863100
125kHz Step Size, kHz
200
Num 500kHz Chan
0
500kHz Start Freq, kHz
863100
500kHz Step Size, kHz
1600
START SPECTRAL SCAN
Minimum
Auto
Maximum
Auto
IMPORT FROM FILE
EXPORT TO FILE
Channels
CLOSE


TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office: Gateways
Created Time
2020-03-04 15:42
2020-02-27 12:09
2020-02-25 11:41
MEGA
Gateway details
FIREWALL
SW MANAGEMENT
DISABLE
16 / 16
Inactivity timeout (sec)
Description
Spectral Scan
Sample Period, µs
0.5
Antenna Selection
Antenna 0
Num 125kHz Chan
34
125kHz Start Freq, kHz
863100
125kHz Step Size, kHz
200
Num 500kHz Chan
0
500kHz Start Freq, kHz
863100
500kHz Step Size, kHz
1600
STOP SPECTRAL SCAN
Minimum
Auto
Maximum
Auto
IMPORT FROM FILE
EXPORT TO FILE
Channels
CLOSE

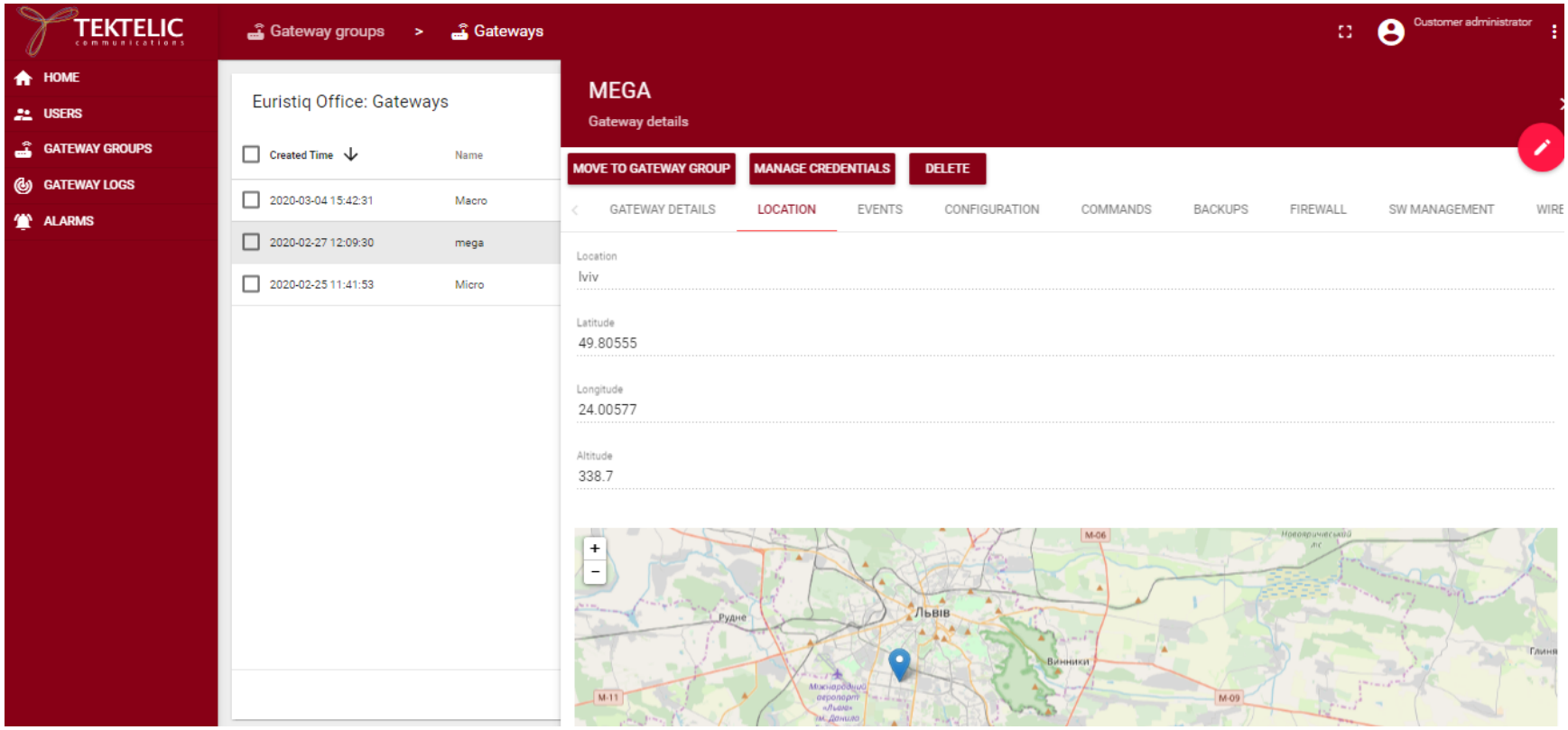

TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office
Created Time
2020-03-04 15:42
2020-02-27 12:09
2020-02-25 11:41
Description
FIREWALL
SW MANAGEMENT
DISABLE
16 / 16
Spectral Scan
Sample Period, µs
0.5
Antenna Selection
Antenna 0
Num 125kHz Chan
34
125kHz Start Freq, kHz
863100
125kHz Step Size, kHz
200
Num 500kHz Chan
0
500kHz Start Freq, kHz
863100
500kHz Step Size, kHz
1600
START SPECTRAL SCAN
Minimum
-137
Maximum
-85
IMPORT FROM FILE
EXPORT TO FILE
Channels
50% power over frequency
-85.0
-98.0
-111.0
-124.0
Power (dBm)
CLOSE


TEKTELIC
Gateway groups
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Spectral Scan
Sample Period, µs
0.5
Antenna Selection
Antenna 0
Num 125kHz Chan
34
125kHz Start Freq, kHz
863100
125kHz Step Size, kHz
200
Num 500kHz Chan
0
500kHz Start Freq, kHz
863100
500kHz Step Size, kHz
1600
START SPECTRAL SCAN
Minimum
Auto
Maximum
Auto
IMPORT FROM FILE
EXPORT TO FILE
Channels
125k channel 0 - 863100
Count
CLOSE
FIREWALL
SW MANAGEMENT
DISABLE

2.5 Location:

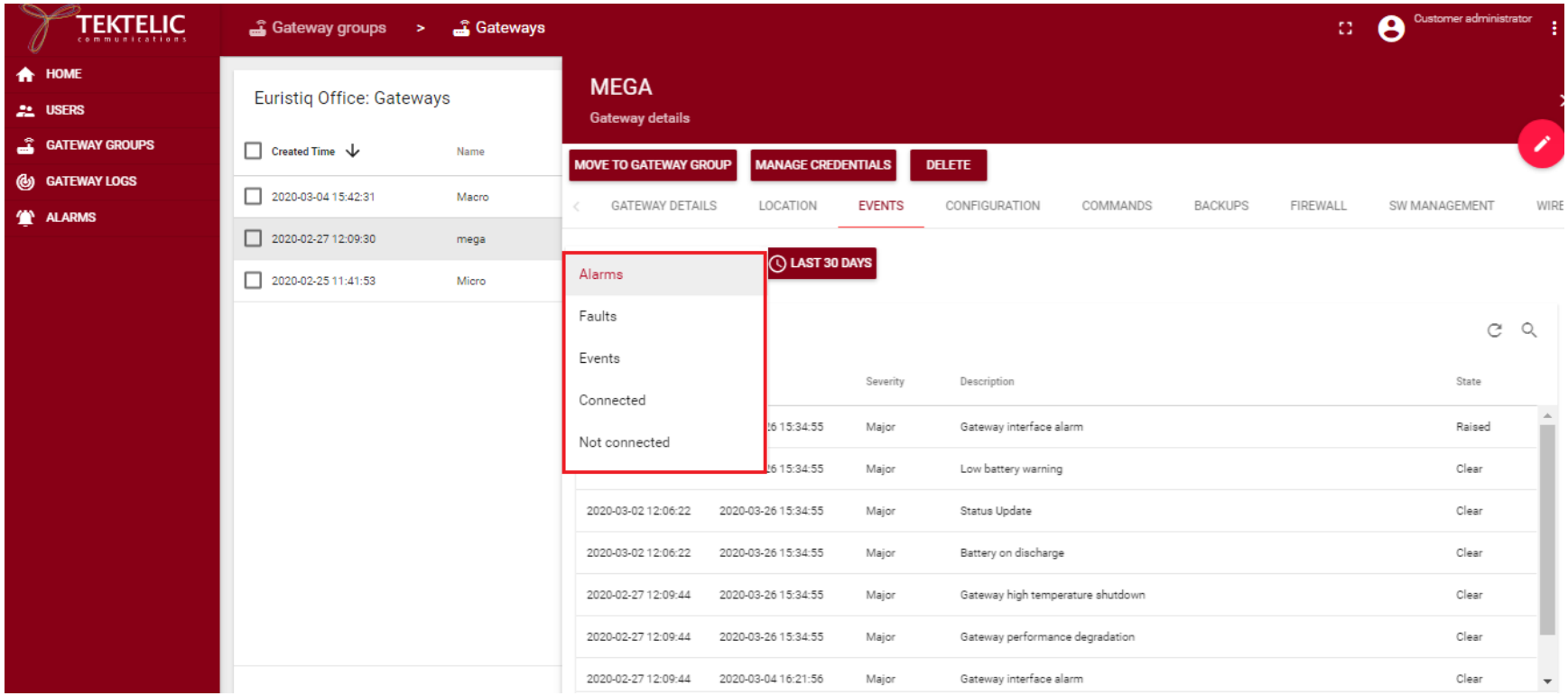
The Micro GW does not send the coordinates, because it doesn't have GPS antenna. For Micro GW, User can manually enter the Location information by clicking "toggle edit mode" (pencil icon).

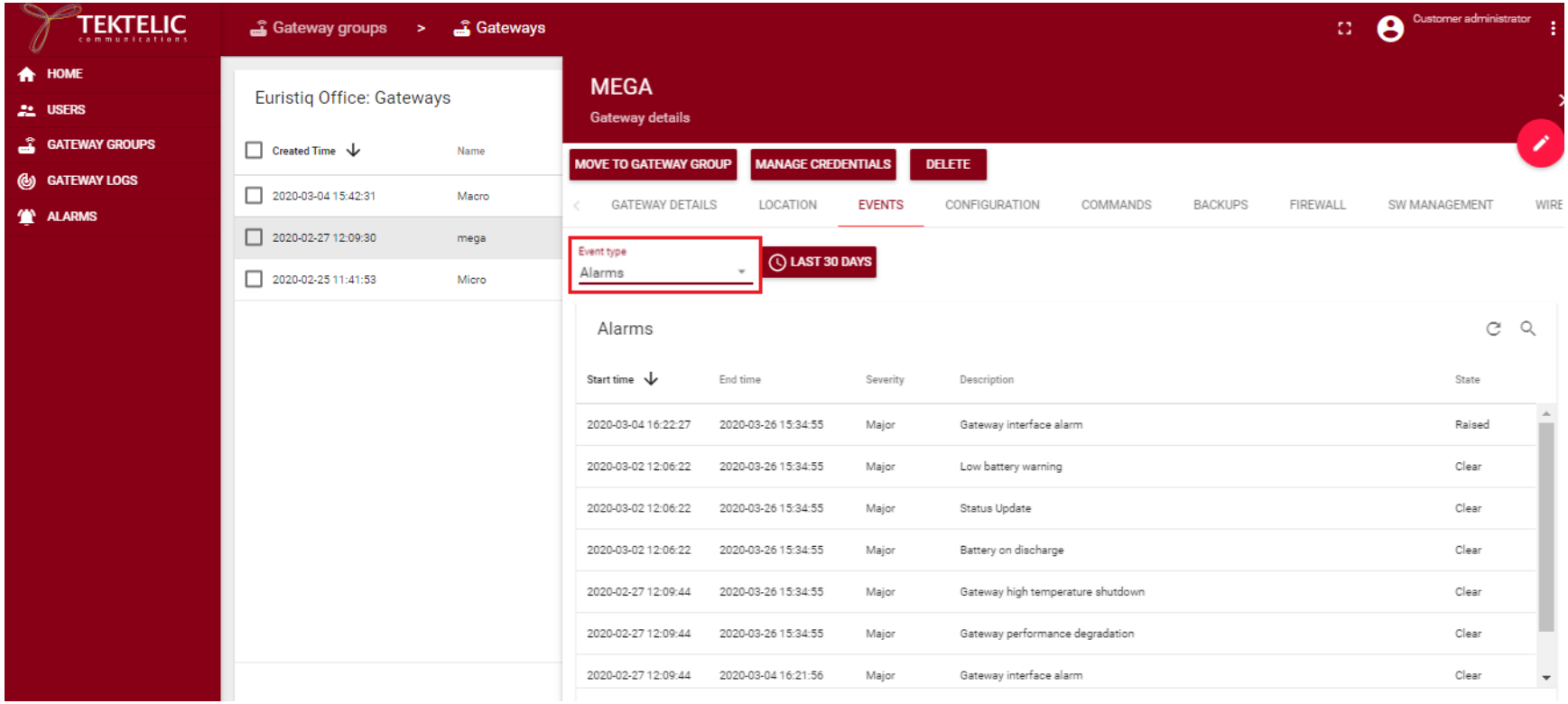
The location tab will show the coordinates of the gateway taken from /tmp/position file. Also, the coordinates will be shown on a map. Location tab gets updated every 2 minutes. They can be changed manually if the GW do not send that data.



2.6 Events:

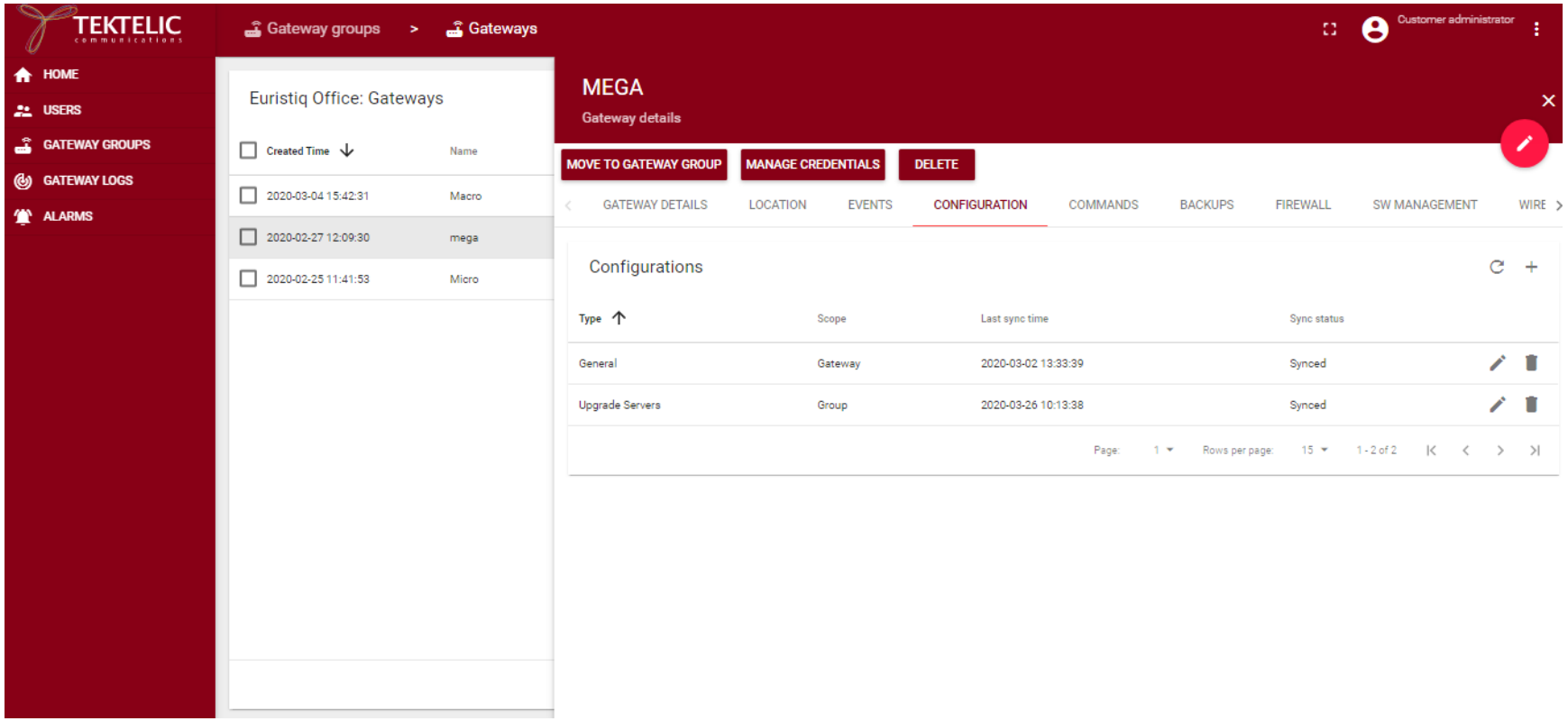
This tab displays different event types. Alarms and Faults which are generated by the gateway. Online and offline status are provided by the OAM Server. With the current implementation events from the event types won't provide anything.



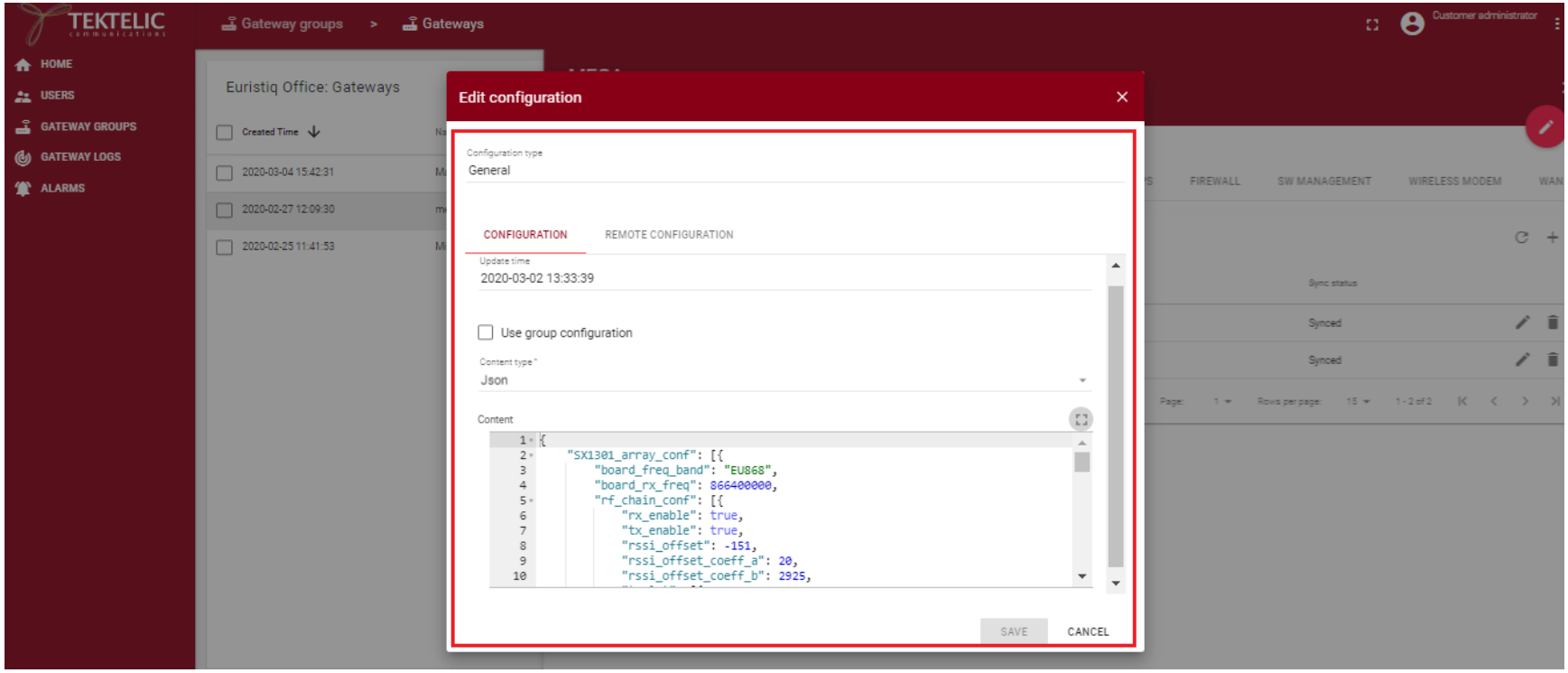

TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office: Gateways
Created Time
Name
2020-03-04 15:42:31
Macro
2020-02-27 12:09:30
mega
2020-02-25 11:41:53
Micro
MEGA
Gateway details
MOVE TO GATEWAY GROUP
MANAGE CREDENTIALS
DELETE
GATEWAY DETAILS
LOCATION
EVENTS
CONFIGURATION
COMMANDS
BACKUPS
FIREWALL
SW MANAGEMENT
WIRE
Event type
Alarms
LAST 30 DAYS
Alarms
Start time
End time
Severity
Description
State
2020-03-04 16:22:27
2020-03-26 15:34:55
Major
Gateway interface alarm
Raised
2020-03-02 12:06:22
2020-03-26 15:34:55
Major
Low battery warning
Clear
2020-03-02 12:06:22
2020-03-26 15:34:55
Major
Status Update
Clear
2020-03-02 12:06:22
2020-03-26 15:34:55
Major
Battery on discharge
Clear
2020-02-27 12:09:44
2020-03-26 15:34:55
Major
Gateway high temperature shutdown
Clear
2020-02-27 12:09:44
2020-03-26 15:34:55
Major
Gateway performance degradation
Clear
2020-02-27 12:09:44
2020-03-04 16:21:56
Major
Gateway interface alarm
Clear

2.7 Configuration:

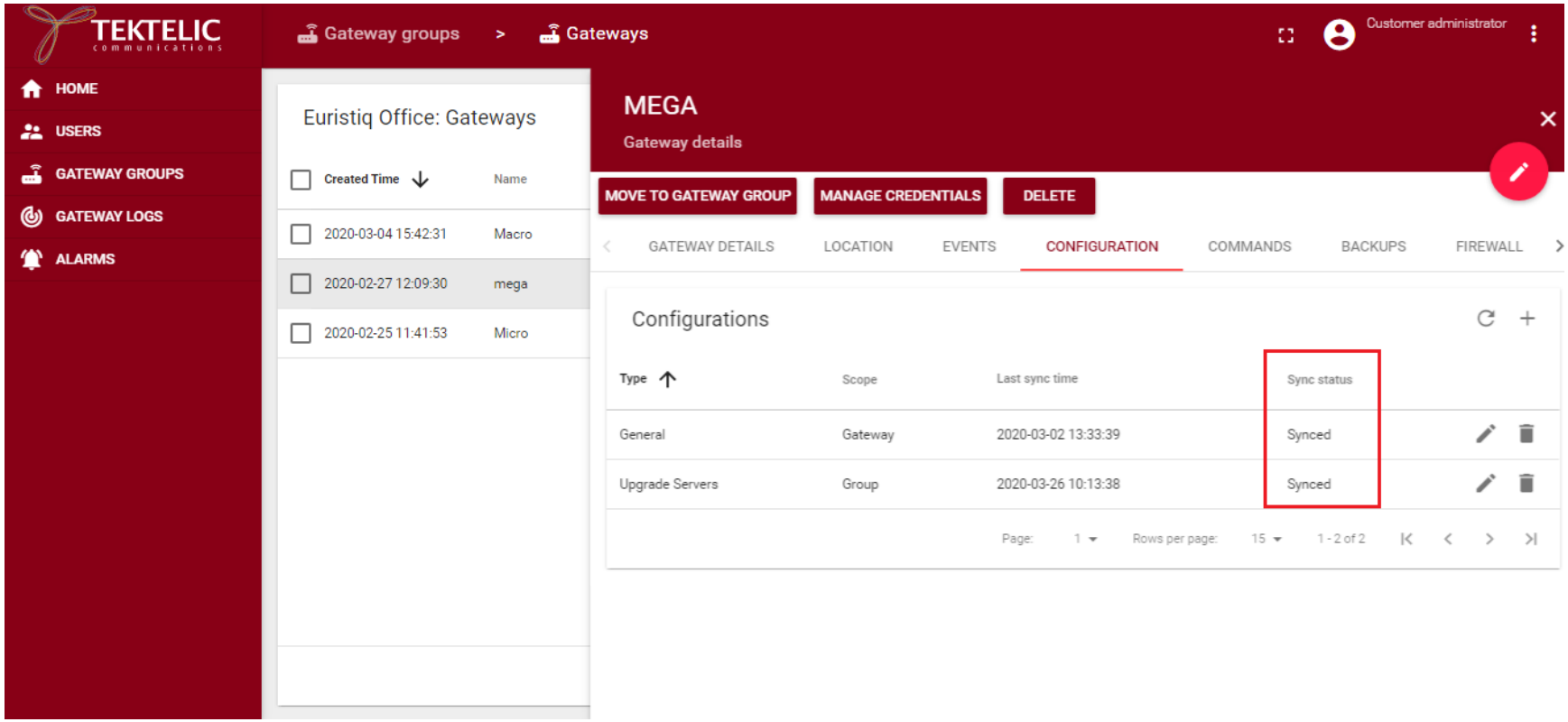
This tab provides last sync time with config.json file from the gateway.



To view a configuration file on the gateway, click on the pencil for the type (General/Upgrade Servers) of configuration. Then click on “Remote Configuration” For example, the config.json file on the gateway can be accessed by clicking on the pencil of the “General” configuration, then selecting “Remote Configuration”.



To make a change to the file, select the whole file from remote configuration and copy it. On the “Configuration” tab, deselect “Use group configuration” and paste the file into the content section. For this .json file example, choose “Json” under the “Content type” pull-down menu. Note: C-style comments (/* */) are not allowed in .json files. The default config.json file has comments (/* */) indicating the fields that can be adjusted – adjust the settings as desired then remove the comment lines. The “Save” option won’t be available until the comment lines are removed. Once the file is saved, the “Remote Configuration” on the gateway will be synced to the updated “Configuration” file. This can be seen by looking at the Sync Status column on the “Configurations” screen as shown below.



Important: Before performing a BSP software upgrade for the first time on a particular gateway, the "Upgrade Servers" configuration needs to be updated.

From the "Configuration" tab, select the pencil icon on the "Upgrade Servers" row. If a software upgrade has never been performed on a gateway, the "Remote Configuration" will be blank. In this case, in the "Edit Configuration" window, de-select the "Use group configuration" box, and select "Json" as Content type.

Choose from the following text options depending on the type of gateway being upgraded, copy the text and paste into the content section of the "Edit configuration" window:

For micro gateway copy the following info into the Content section (everything within and including the square brackets:

```
[{
   "type": "src/gz",
   "name": "bsp",
   "address": "file:///lib/firmware/bsp/"
}, {
   "type": "src/gz",
   "name": "gpio-fpga",
   "address": "file:///lib/firmware/gpio-fpga/"
}]
```

For macro (no-geolocation) and mega gateways, copy the following info into the Content section (everything within and including the square brackets:

```
[{
  "type": "src/gz",
   "name": "bsp",
   "address": "file:///lib/firmware/bsp/"
}, {
  "type": "src/gz",
   "name": "fe-fpga",
   "address": "file:///lib/firmware/fe-fpga/"

}, {
  "type": "src/gz",
   "name": "gpio-fpga",
   "address": "file:///lib/firmware/gpio-fpga/"

}]
```

For geo-location enabled macro gateways copy the following info into the Content section (everything within and including the square brackets:

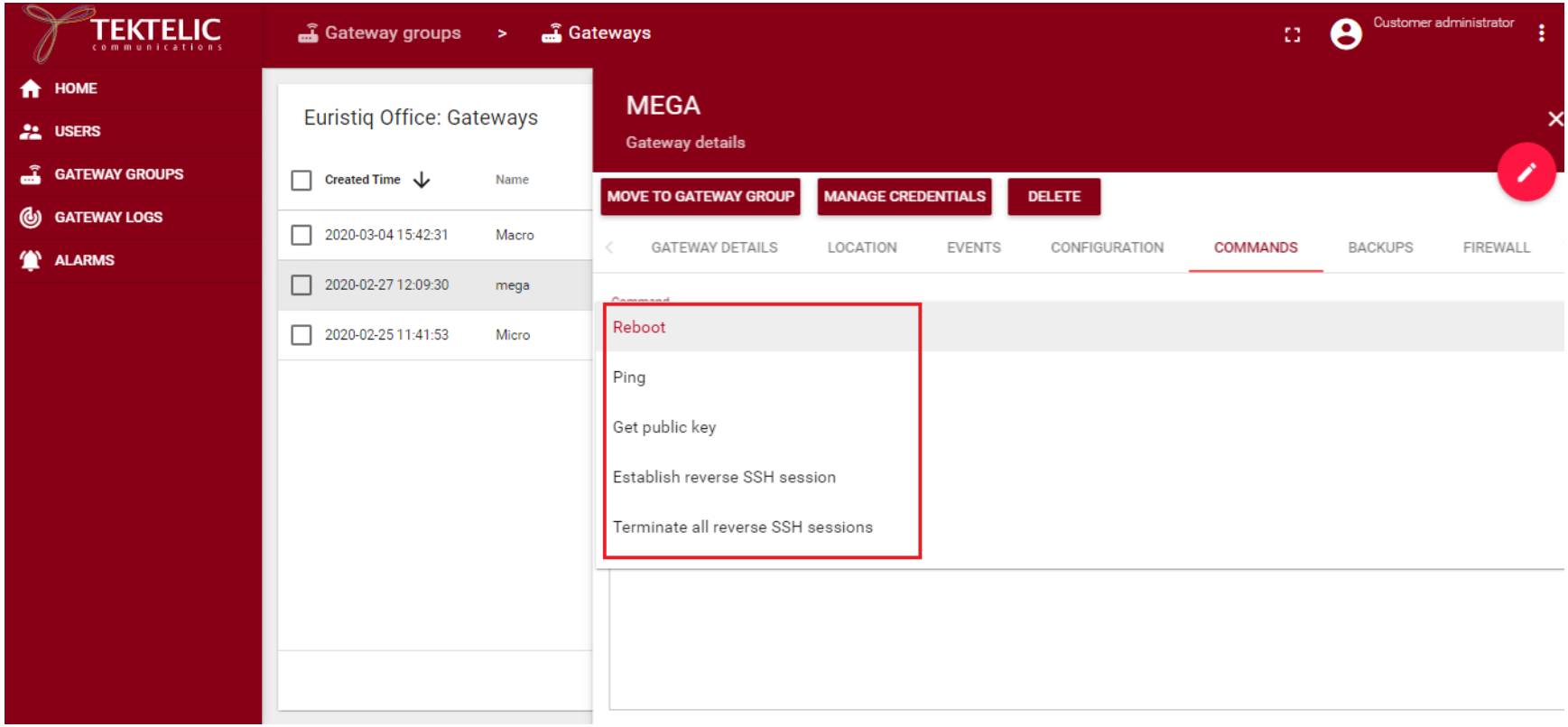
```
[{
  "type": "src/gz",
   "name": "bsp",
   "address": "file:///lib/firmware/bsp/"
}, {
  "type": "src/gz",
   "name": "fe-fpga-geo",
   "address": "file:///lib/firmware/fe-fpga-geo/"

}, {
  "type": "src/gz",
   "name": "gpio-fpga",
   "address": "file:///lib/firmware/gpio-fpga/"
}]
```

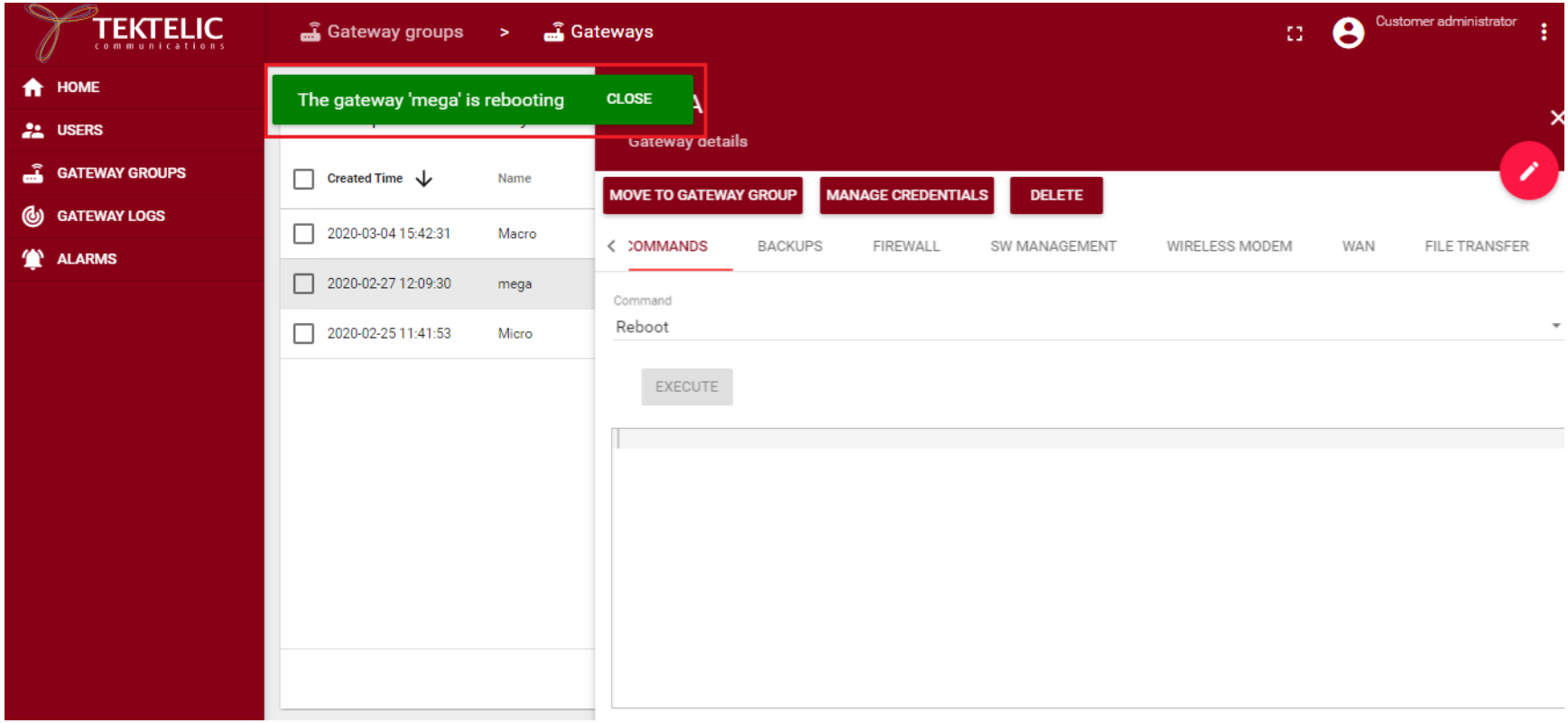
2.8 Commands:

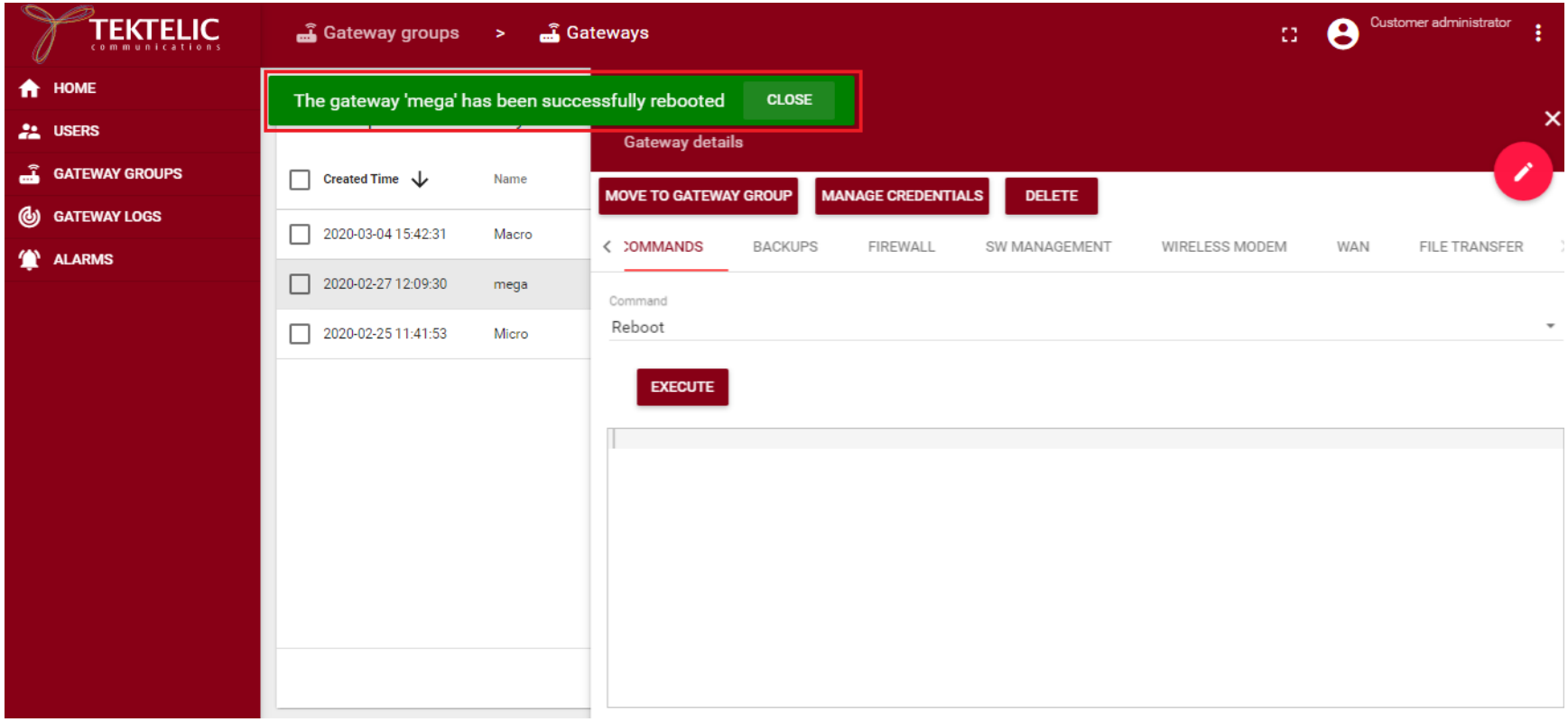
By using this tab, user can:

- reboot the gateway
- check the ping from the gateway
- get public key
- establish and terminate ssh sessions
- execute script
- get antennas count
- get GPS coordinates.

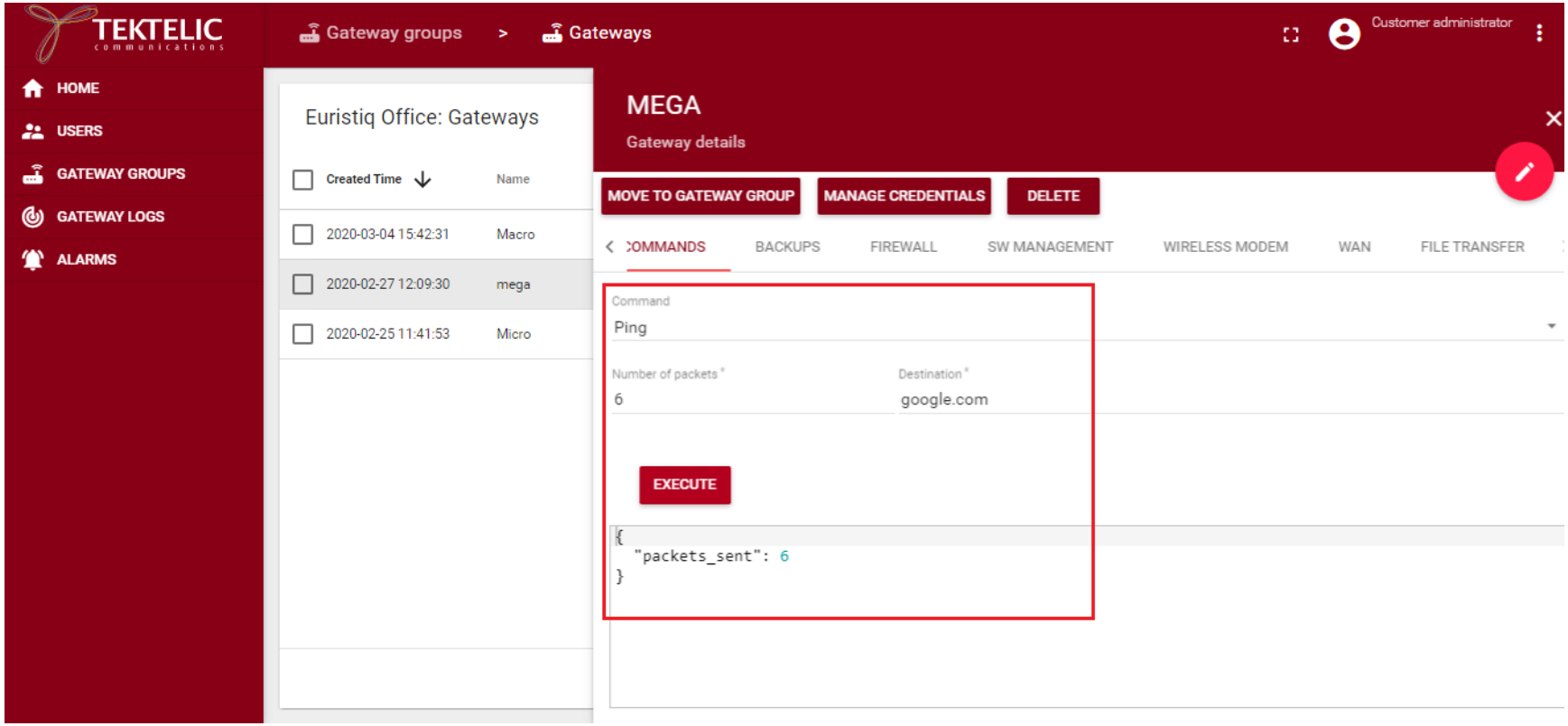


To execute Reboot command, select reboot from the list of available commands and select execute button. This will reboot the gateway. After execute this command, NS will display a confirmation message.

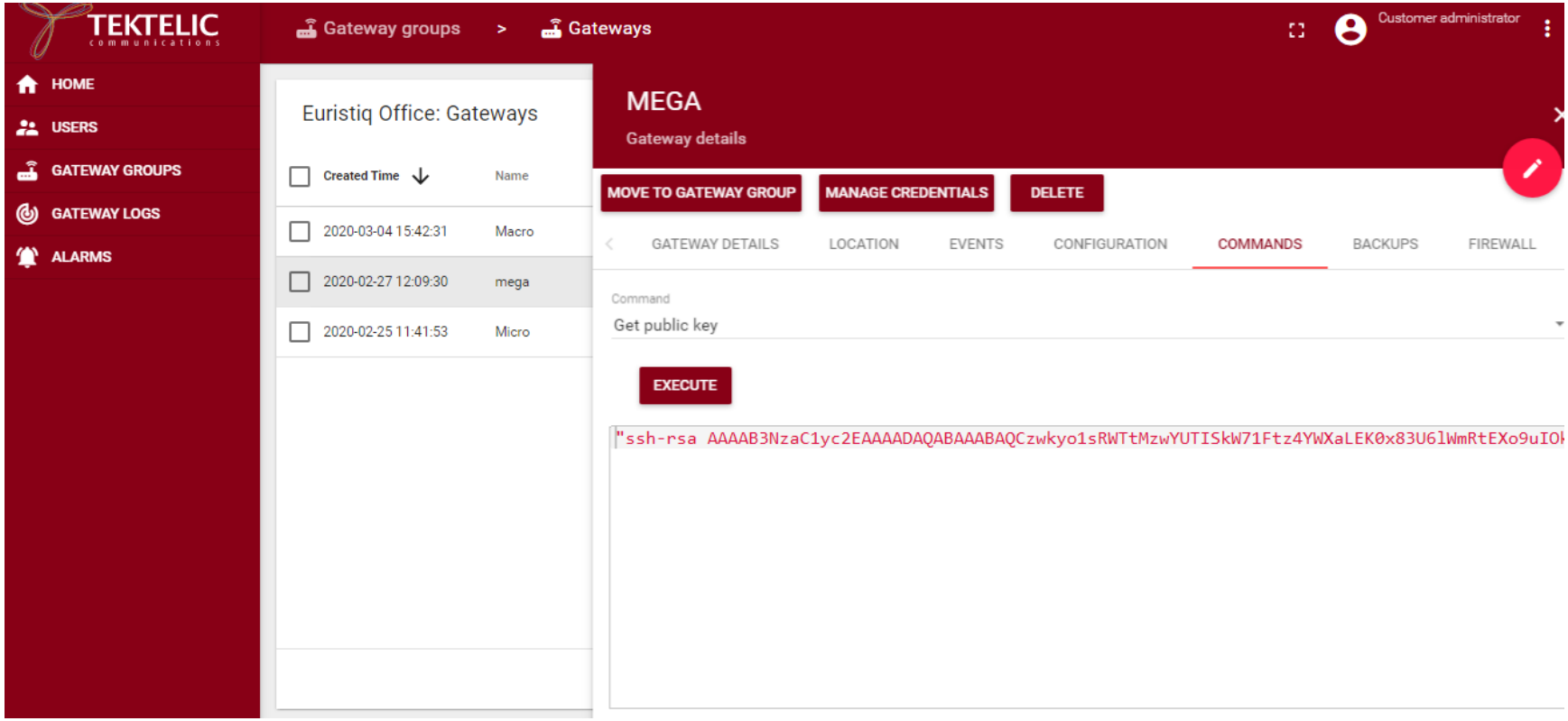



TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
The gateway 'mega' has been successfully rebooted
CLOSE
Gateway details
Created Time
Name
2020-03-04 15:42:31
Macro
2020-02-27 12:09:30
mega
2020-02-25 11:41:53
Micro
MOVE TO GATEWAY GROUP
MANAGE CREDENTIALS
DELETE
COMMANDS
BACKUPS
FIREWALL
SW MANAGEMENT
WIRELESS MODEM
WAN
FILE TRANSFER
Command
Reboot
EXECUTE

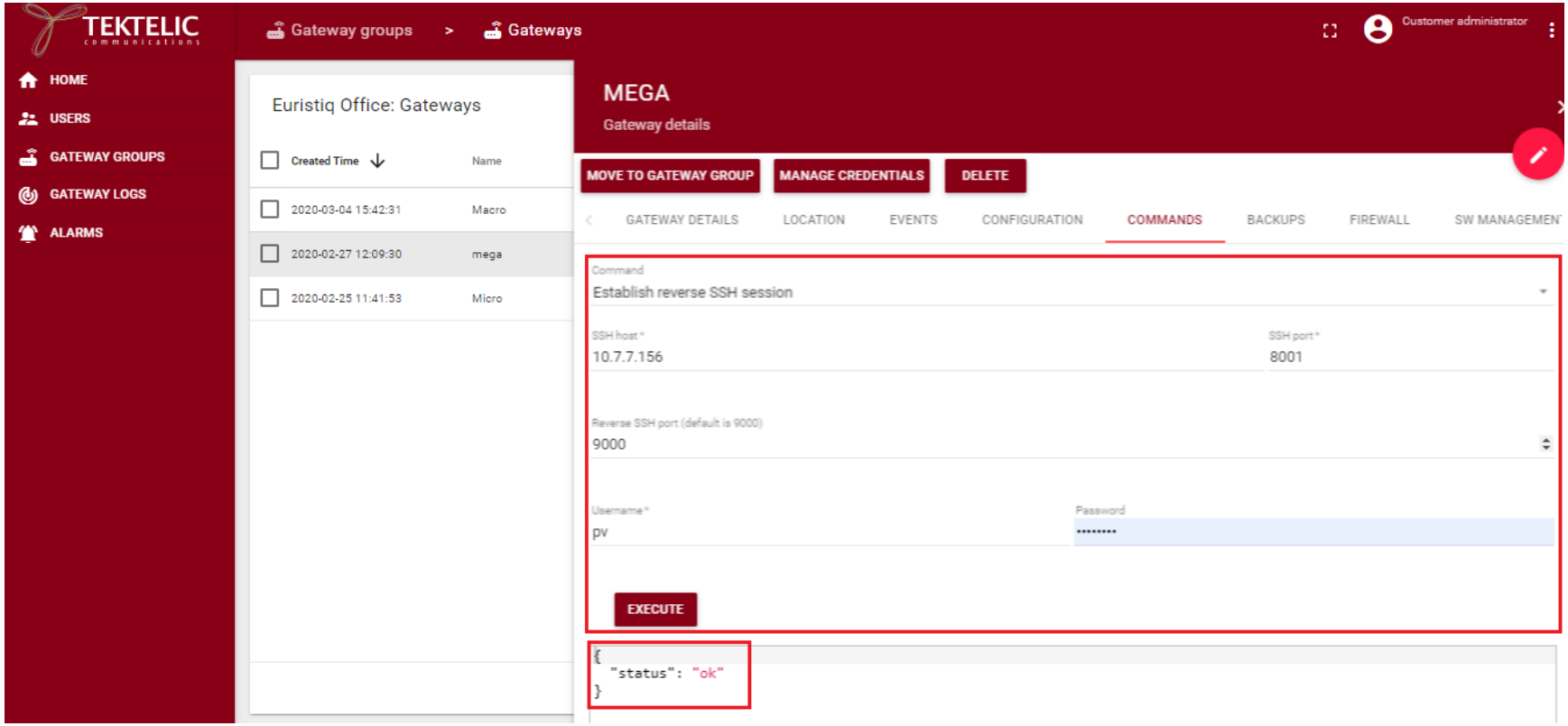
To execute ping command, select ping command from the list, then set the number of packets to sent from the gateway and the destination IP address or host name.



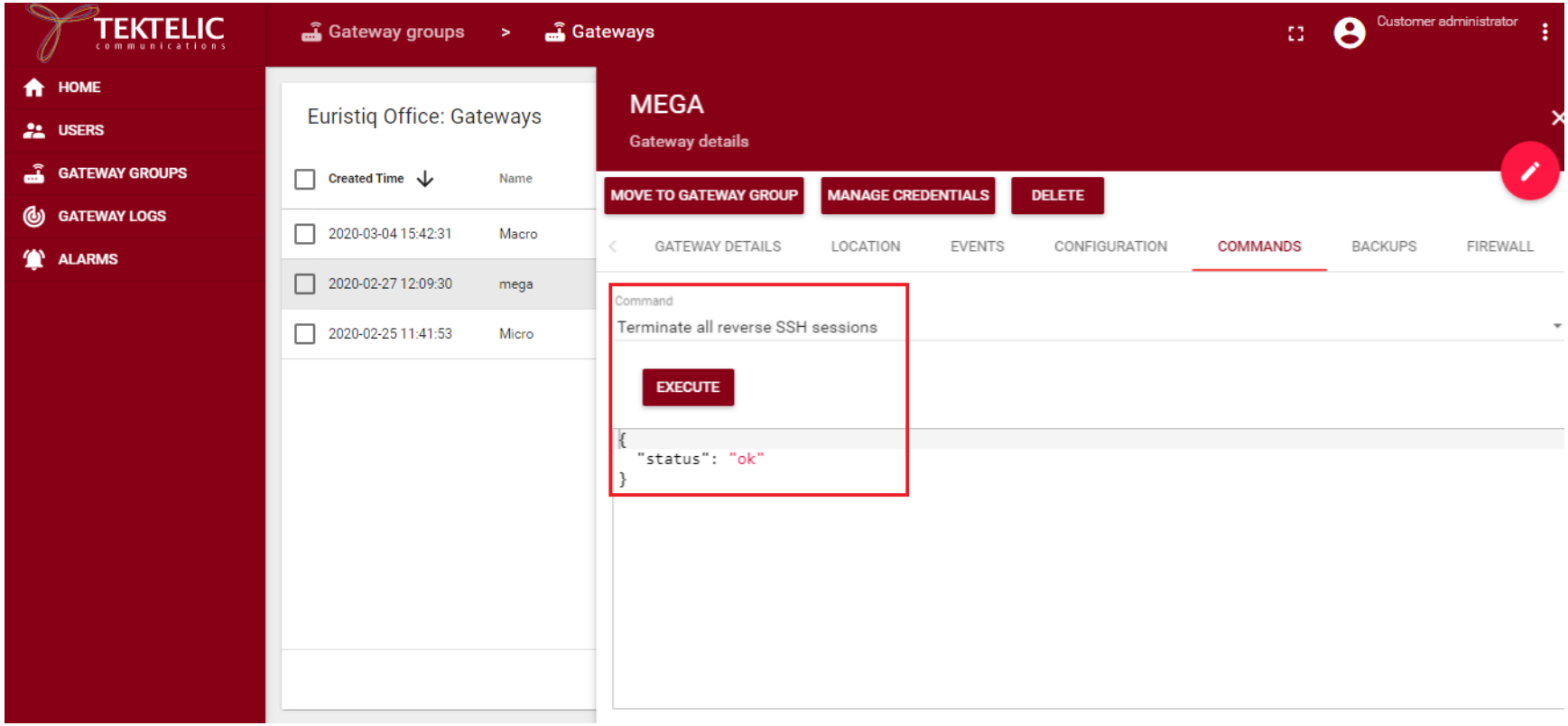
To execute get public key command, select this command from the list and press on the “Execute” button. An example of the result is shown on the screenshot below.



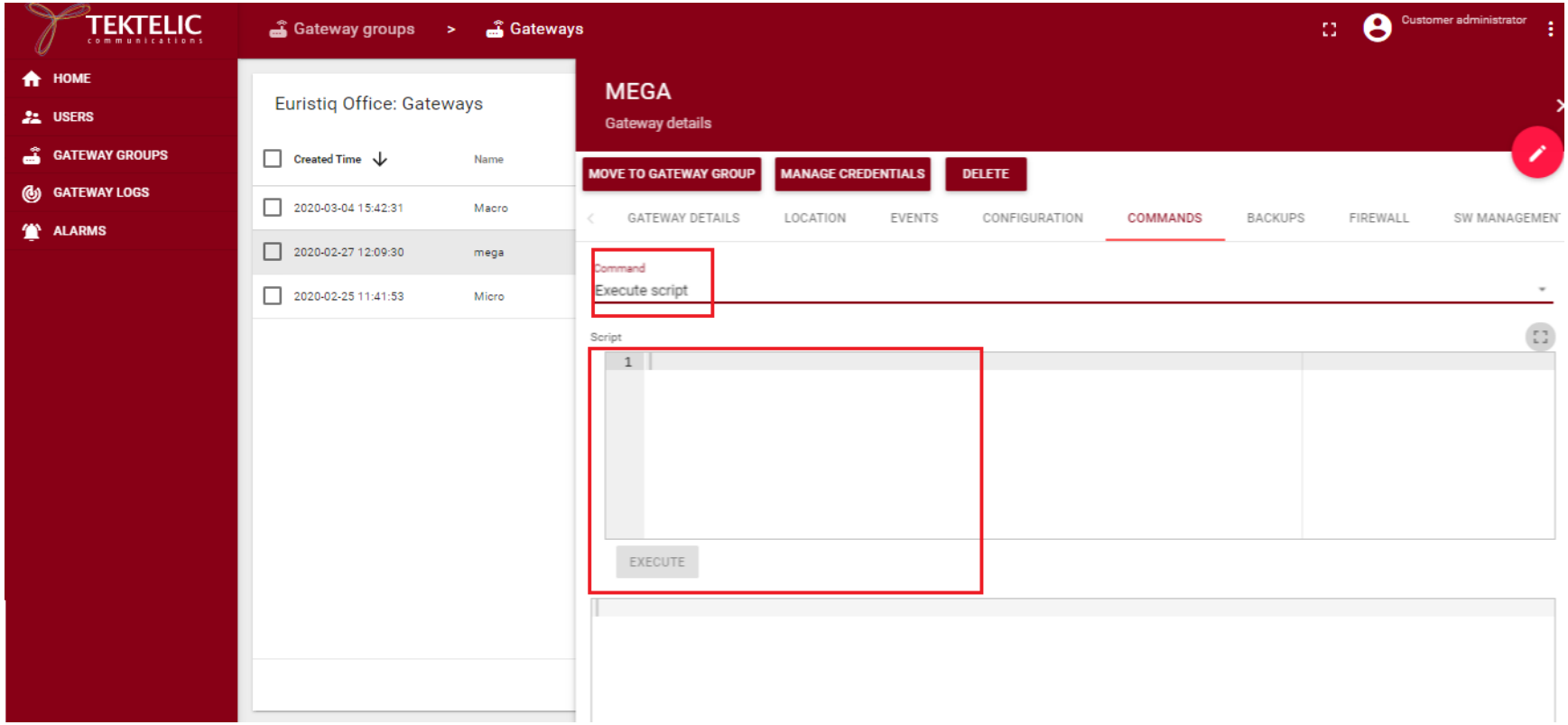
To execute establish reverse SSH session command, select this command from the list, fill the fields as shown below and press on the “Execute” button. An example of the result is shown on the screenshot below.



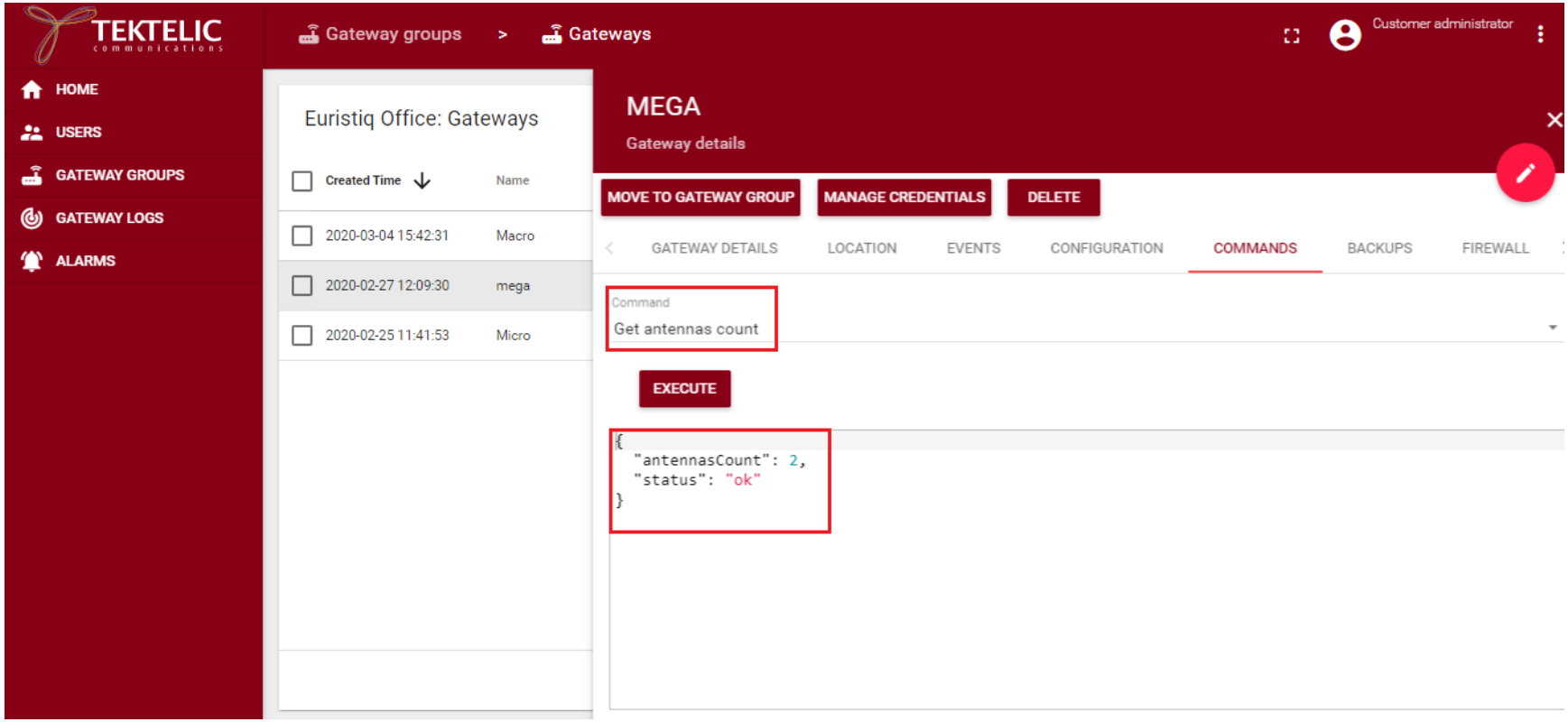
To execute terminate all reverse SSH sessions command, select this command from the list and press on the “Execute” button. An example of the result is shown on the screenshot below.



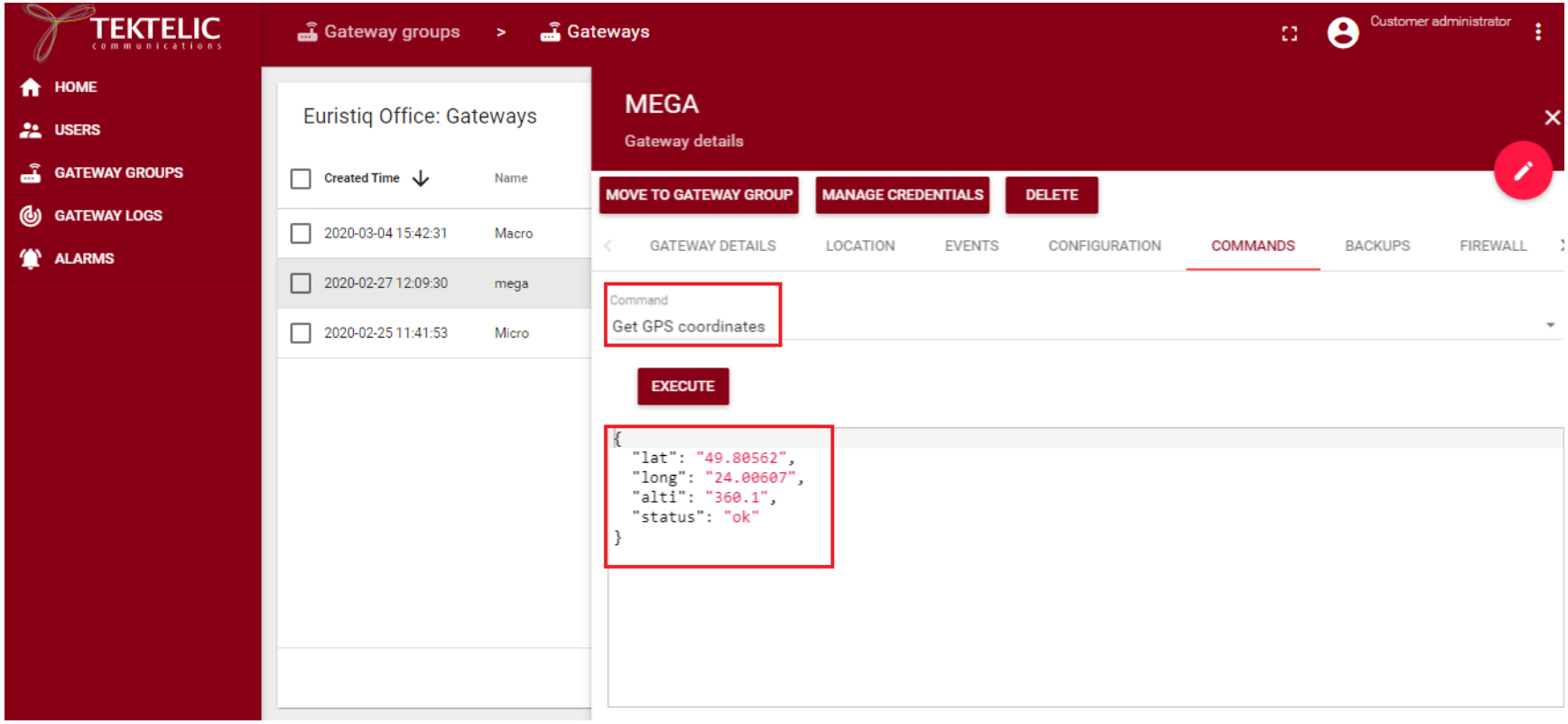
To execute script, select this command from the list, write a script and press on the “Execute” button. (*This is for future use)*



To execute get antennas count, select this command from the list and press on the “Execute” button. An example of the result is shown on the screenshot below.



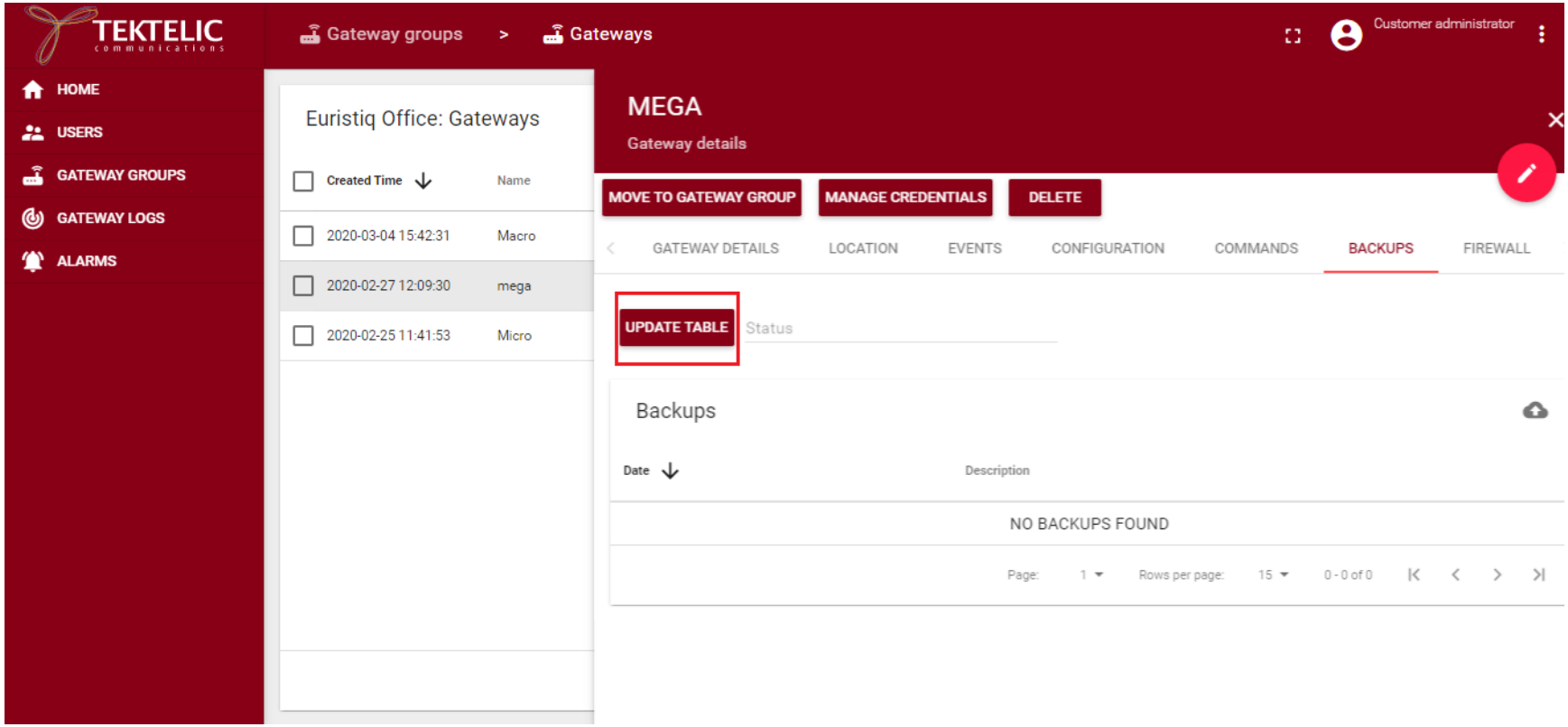
To execute get GPS coordinates, select this command from the list and press on the “Execute” button. An example of the result is shown on the screenshot below.



2.8 Backup and Restore:

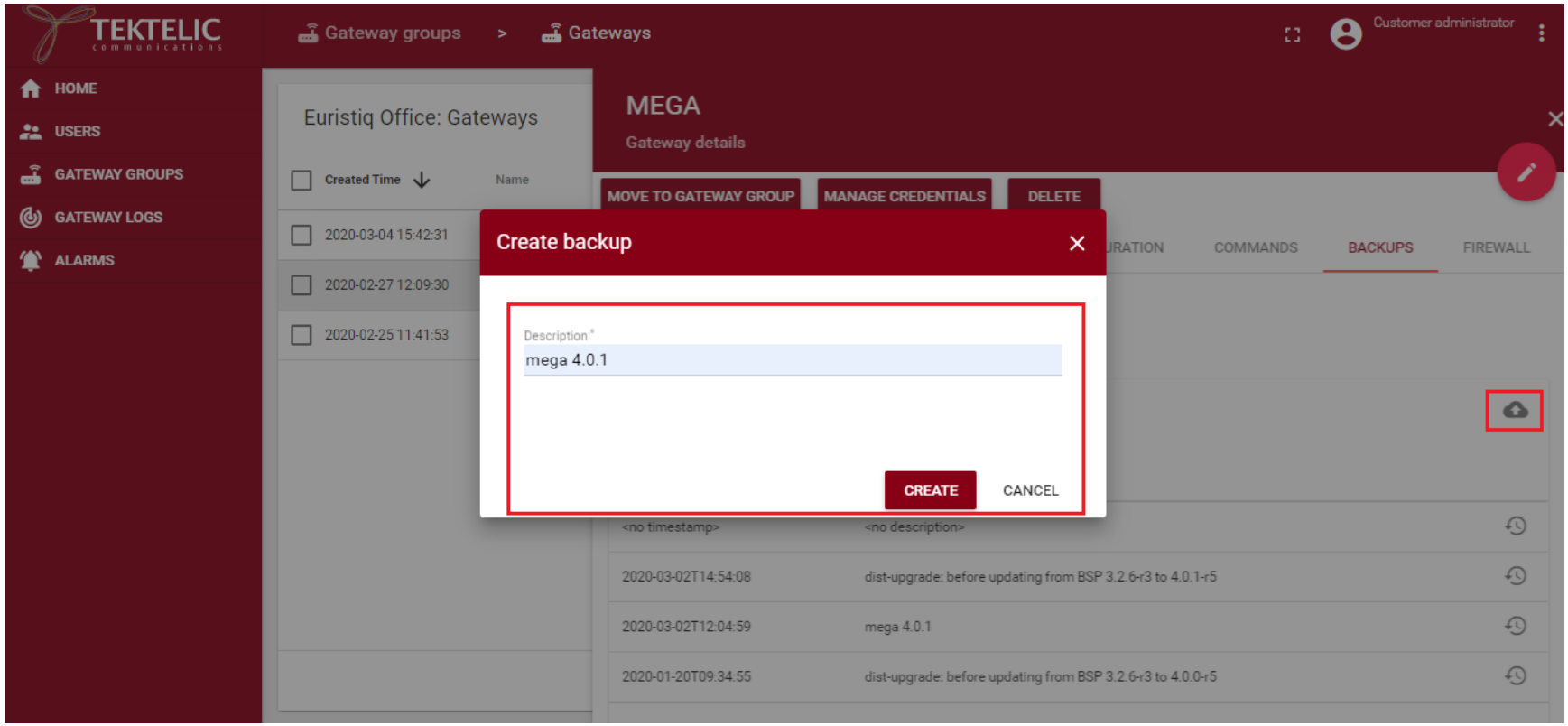
Backup:

When you select update table under the backup tab, this will list the available backups. If there are no available backups then status says n/a.

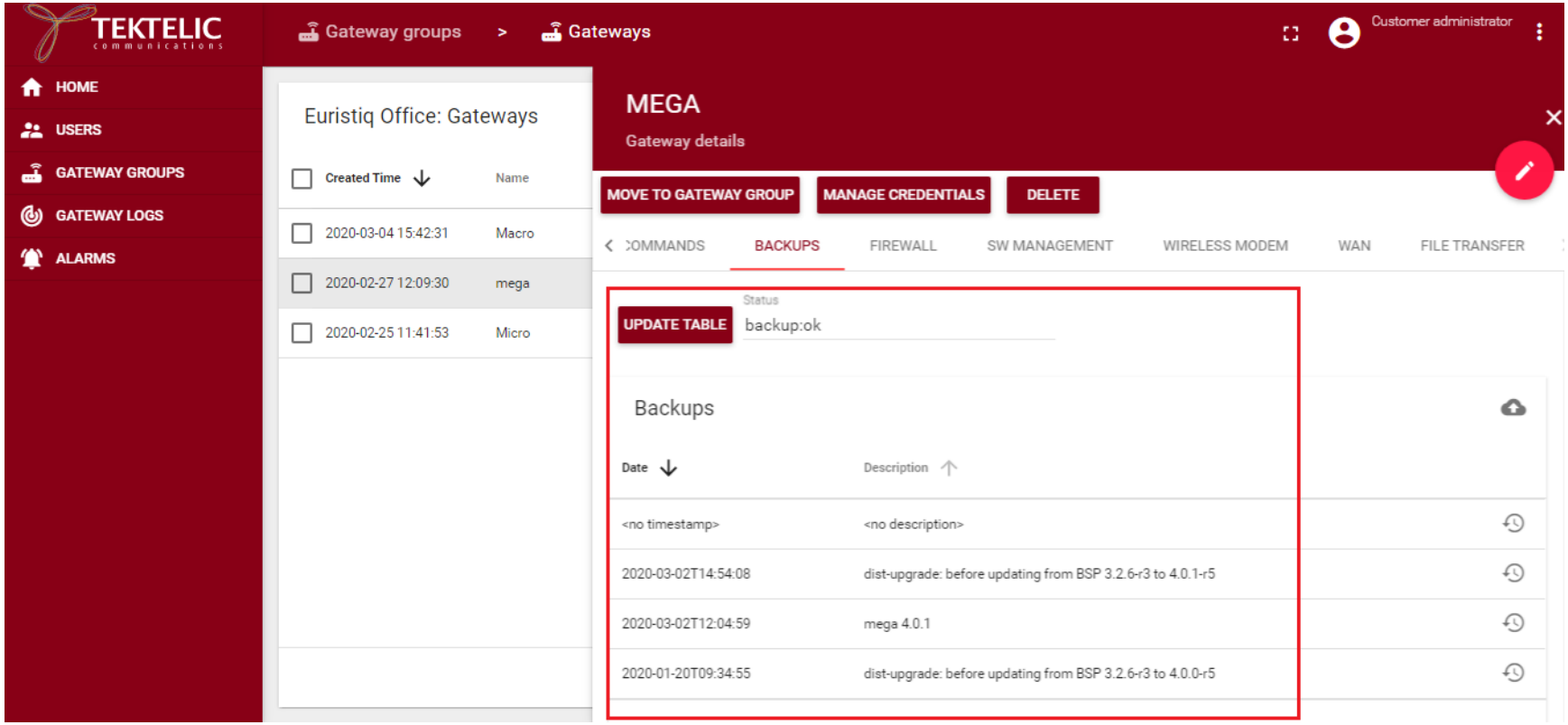


Create Backup:

Select create backup icon. Then enter the description for backup. Then select Create button.

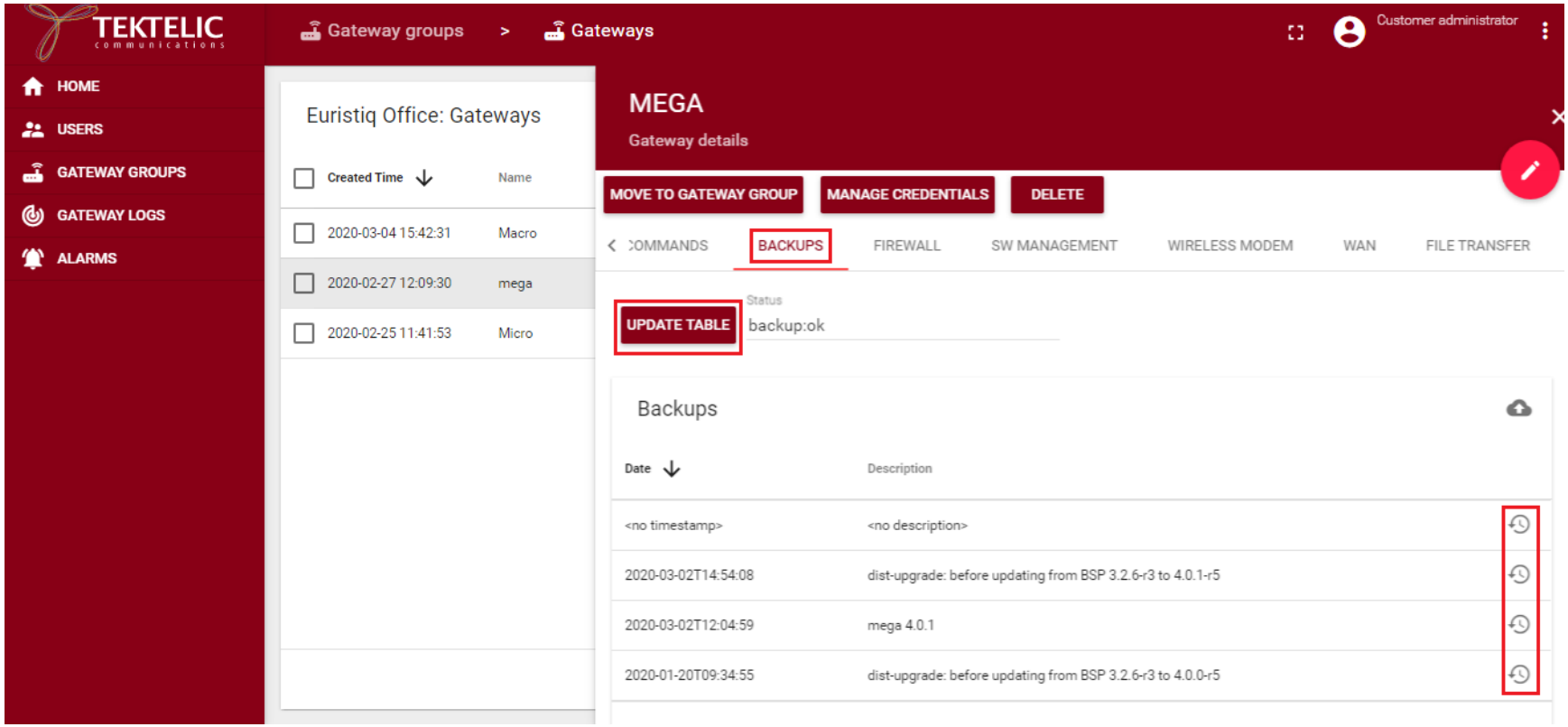


Then status will display backup-in-progress message. And also, you can see the backup that is in-progress in the table. Wait at least for a minute then select update table, the status will display ok message if the backup is completed.

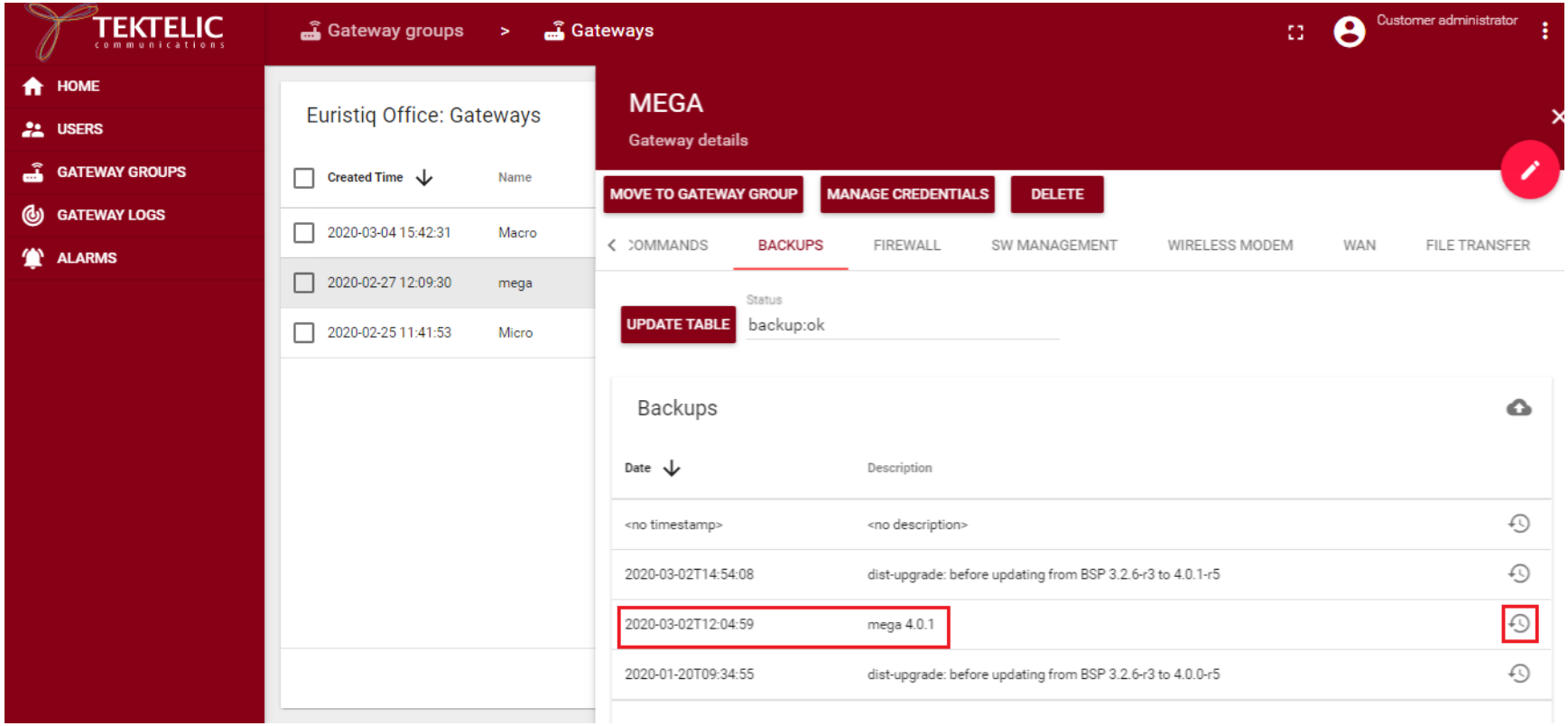


Restore:

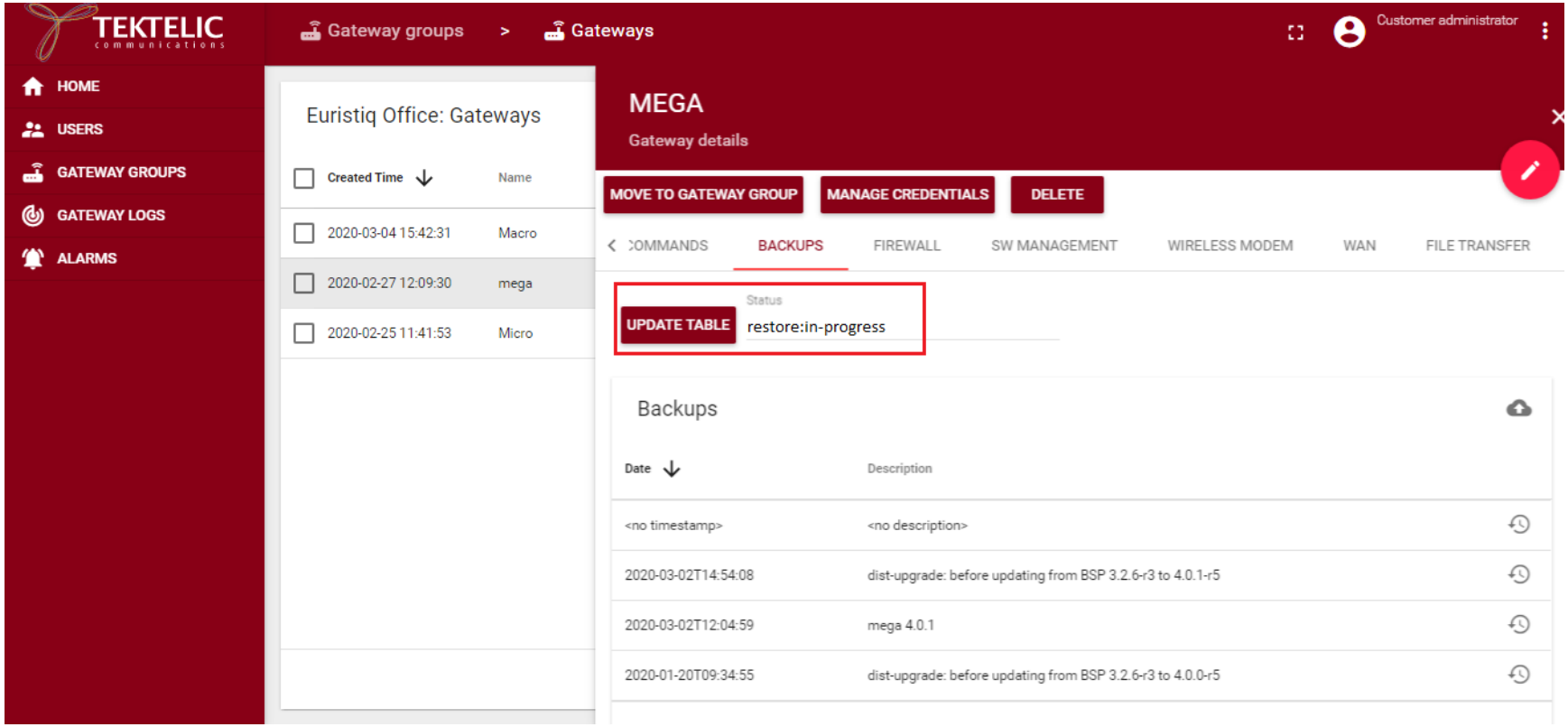
Go to Backups tab in NS. Then select Update Table to view the available Backups.



Then decide the backup that you want to restore then select the restore icon from the backup list to restore. In this example, I want to restore to mega 4.0.1 from the list.

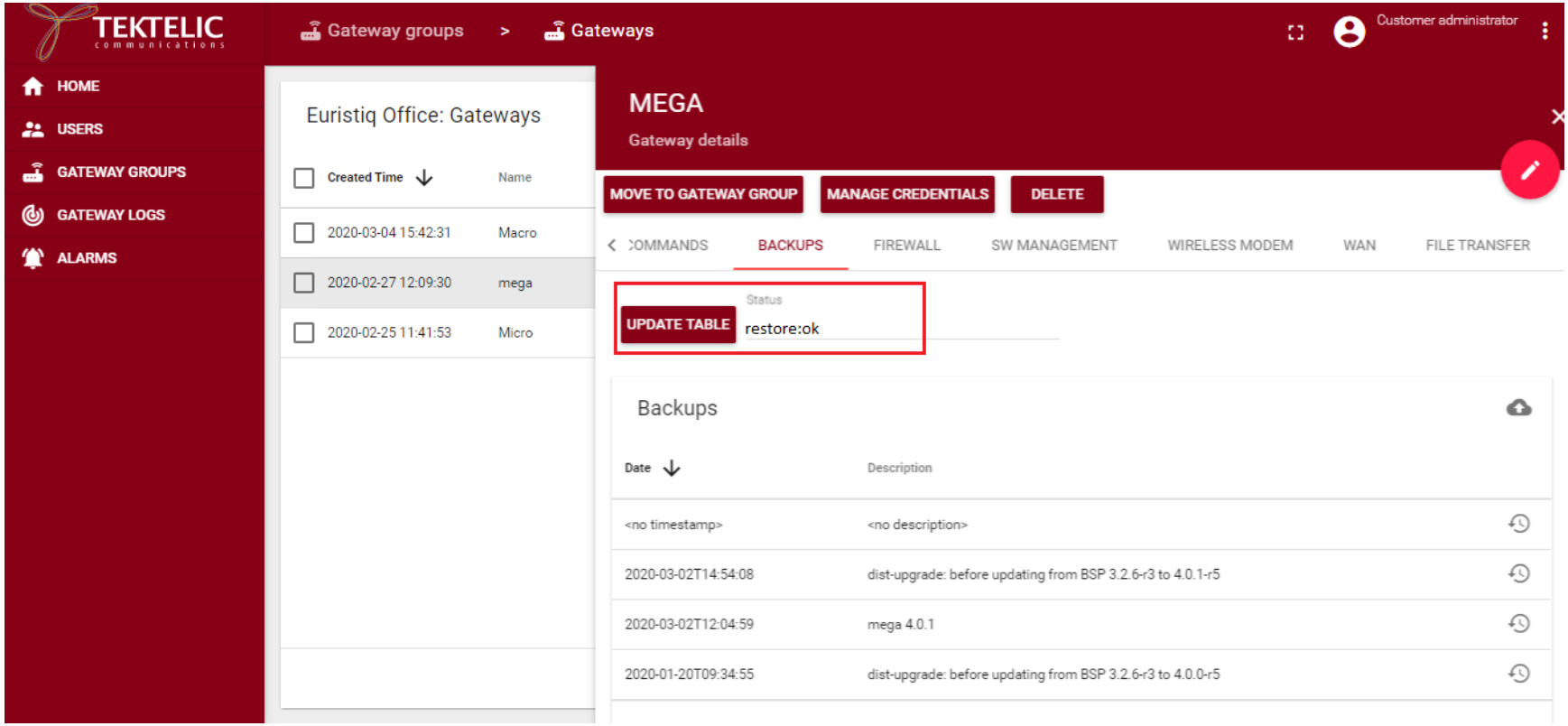


Once you select restore backup icon, you will see restore:in-progress message.



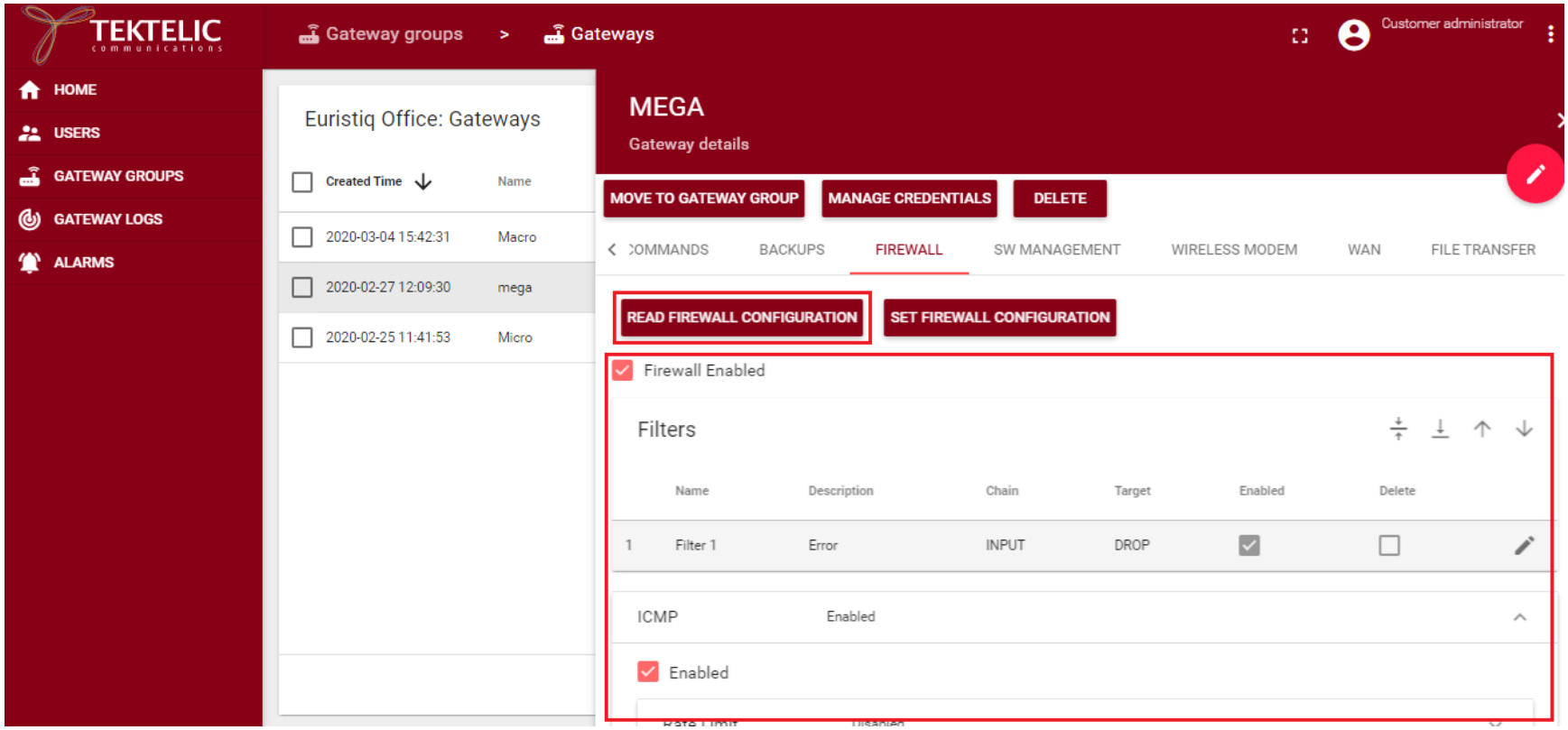
Wait for at least a minute, then select Update Table button, the status message will display ok message. This means restore is successful. Then the gateway will reboot automatically to restore to take effect.

Note: reboot is mandatory after the restore.

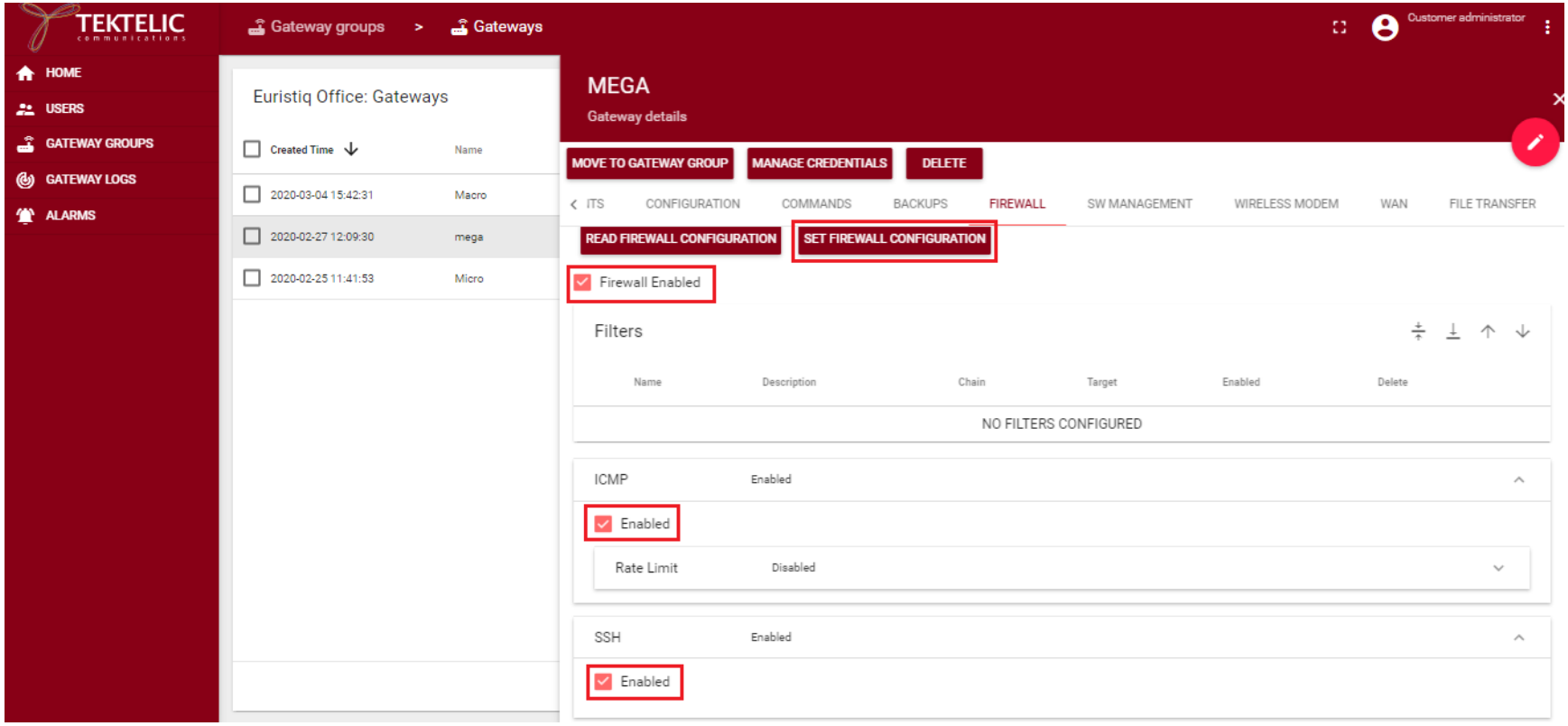


2.9 Firewall:

This tab will help user to read and write firewall configuration on the gateway. Select Read Firewall Configuration button to view the firewall settings from your gateway.



To set/change firewall configuration check/uncheck a tick that you need, add/delete filters and then press “Set firewall configuration” button. After that, you can press “Read firewall configuration” and check that changes were made.

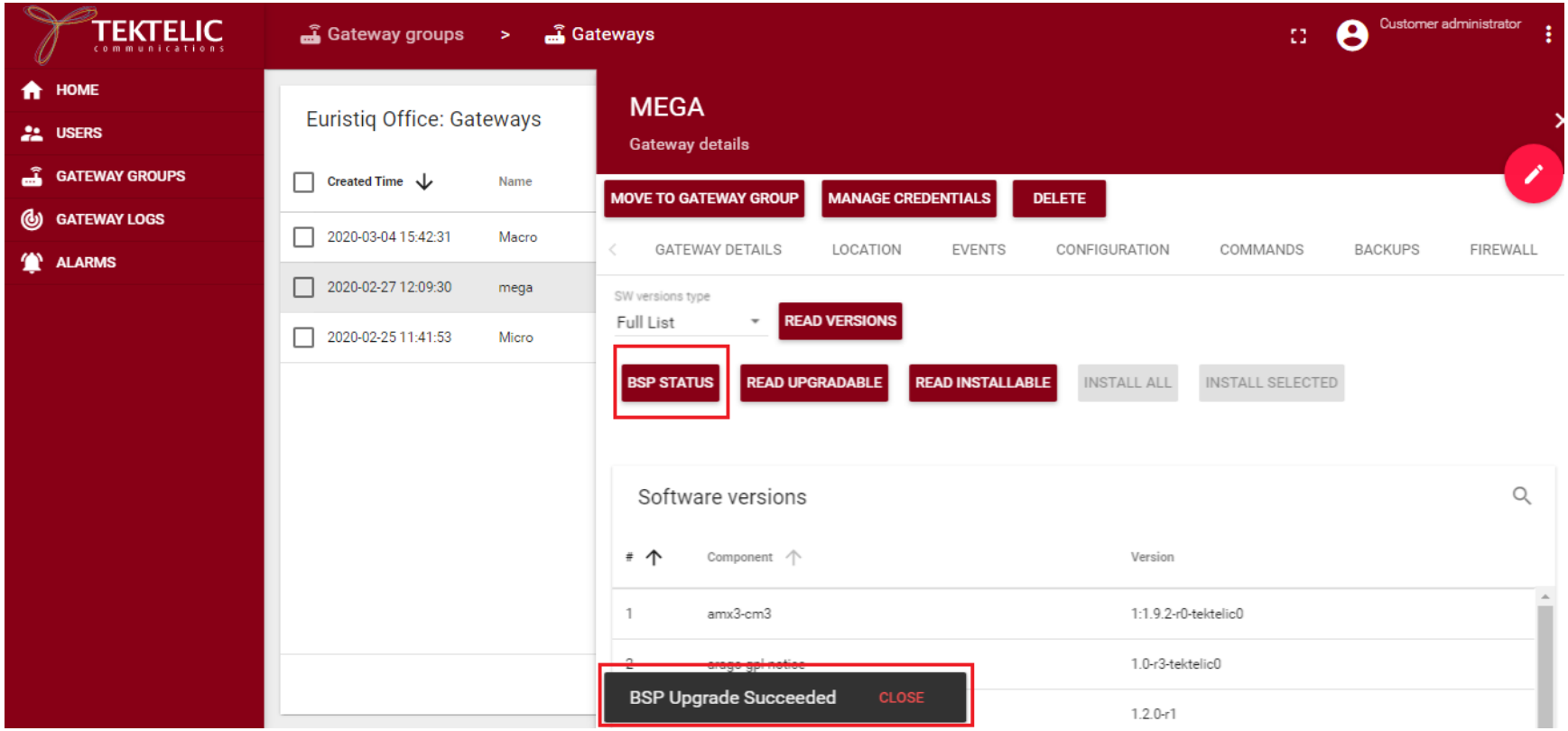


2.10 SW Management:

This tab allows users to read the installed software versions from the gateway, upgrade to new software version and install new software packages.

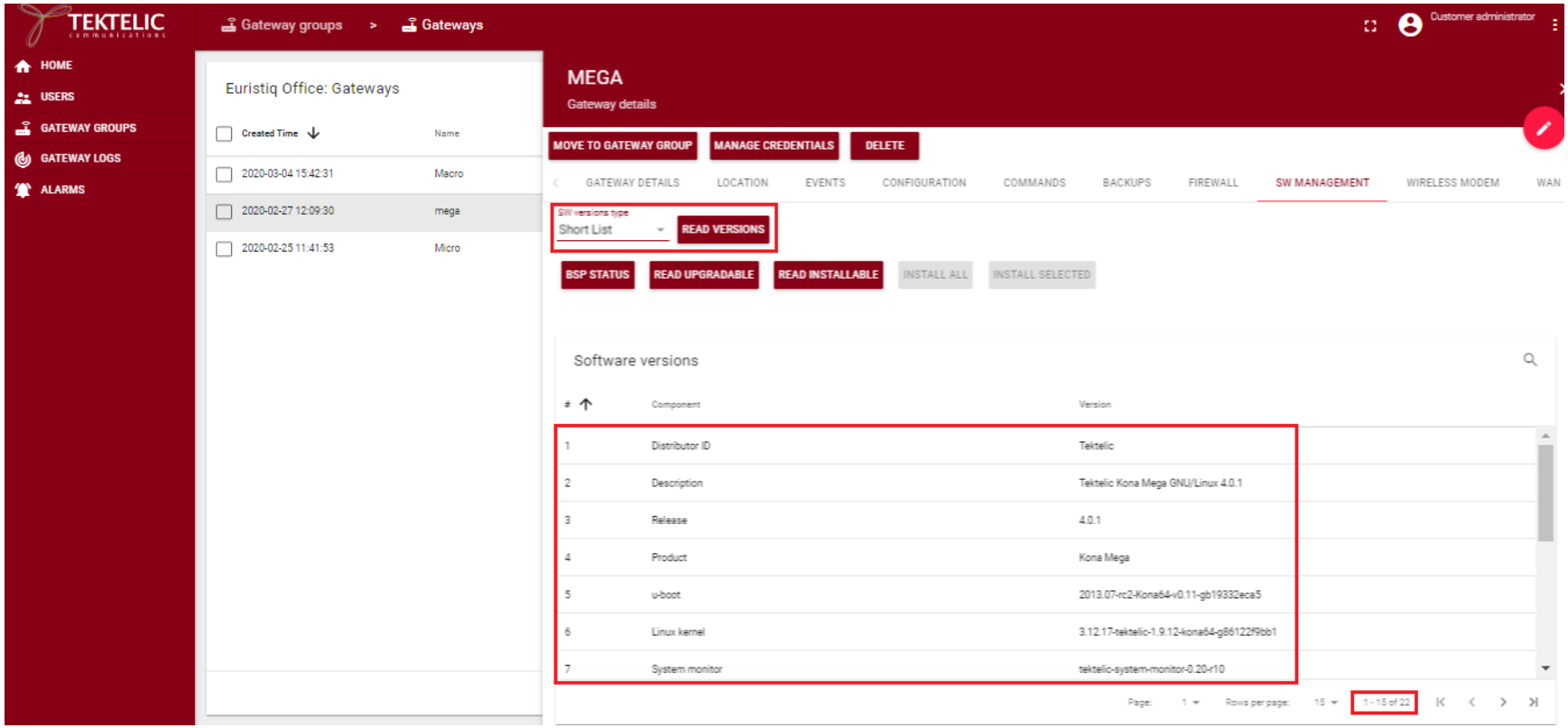
Important: Before performing a software upgrade for the first time on a particular gateway, the “Upgrade Servers” configuration file needs to be updated. Please refer to section 2.7.

You can also check the BSP status: BSP Upgrade Never Performed, BSP Upgrade Succeeded, BSP Upgrade Failed.

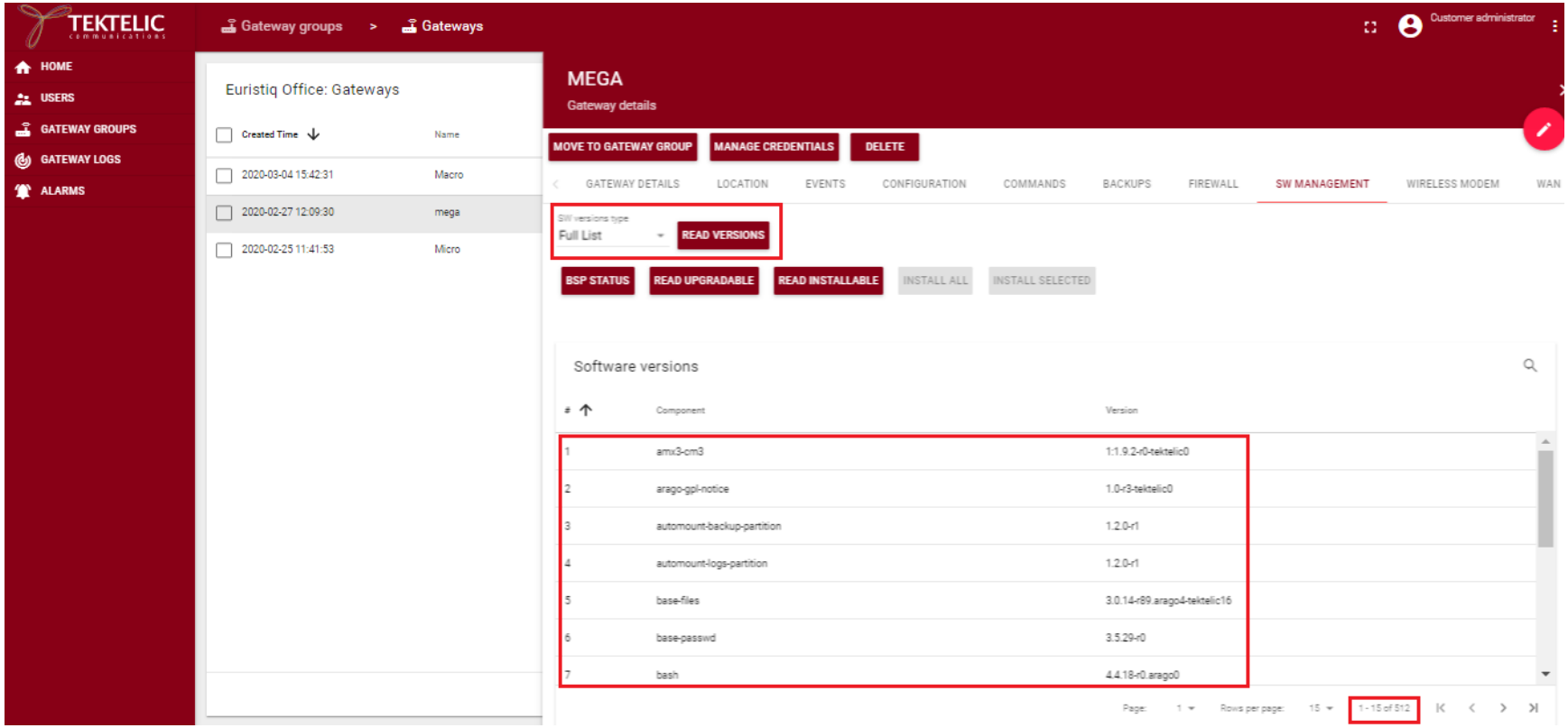


Read Version:

Short List: It will display major version of packages installed from the gateway.

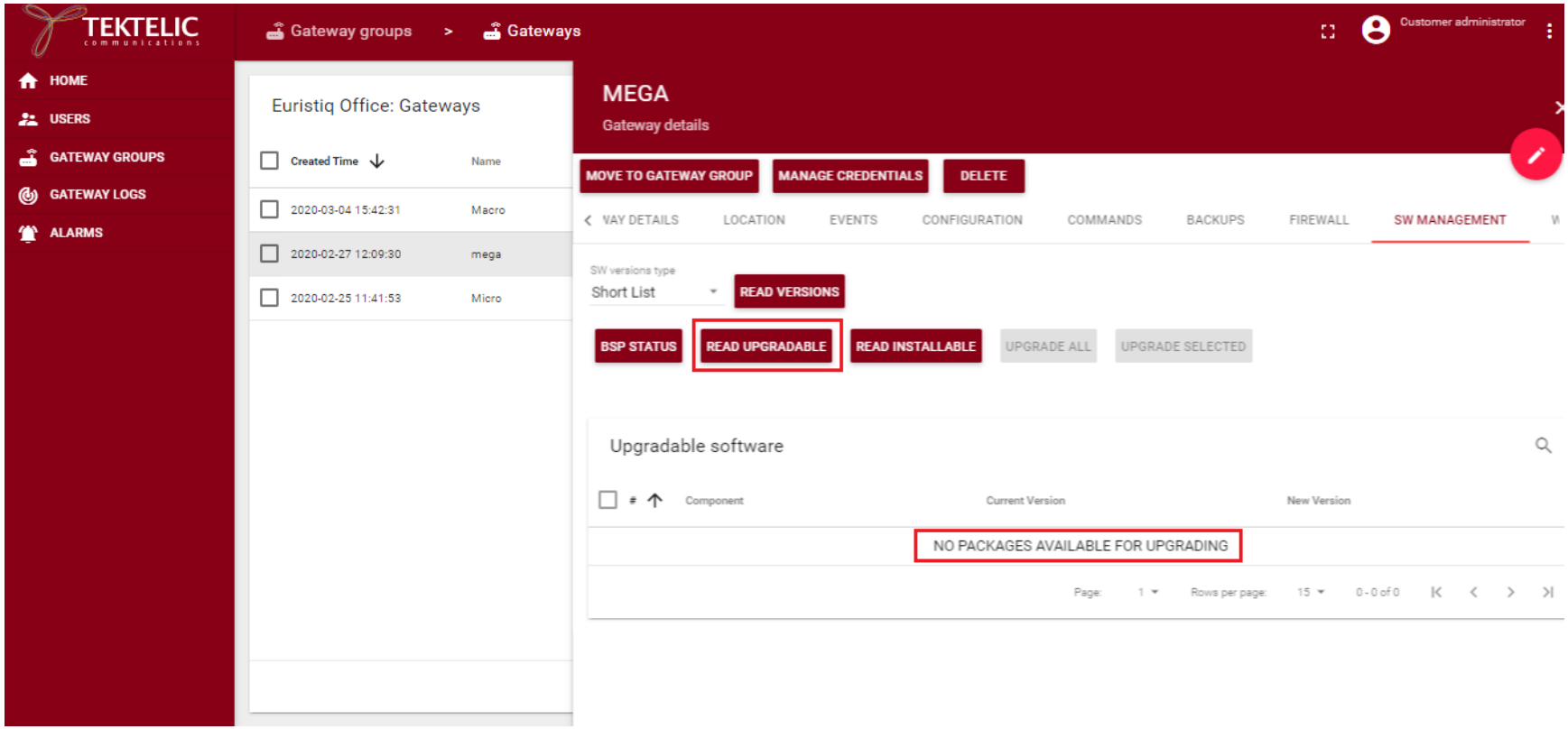


Full List: It will display all the versions of packages and tools installed from the gateway.



Software Upgrade:

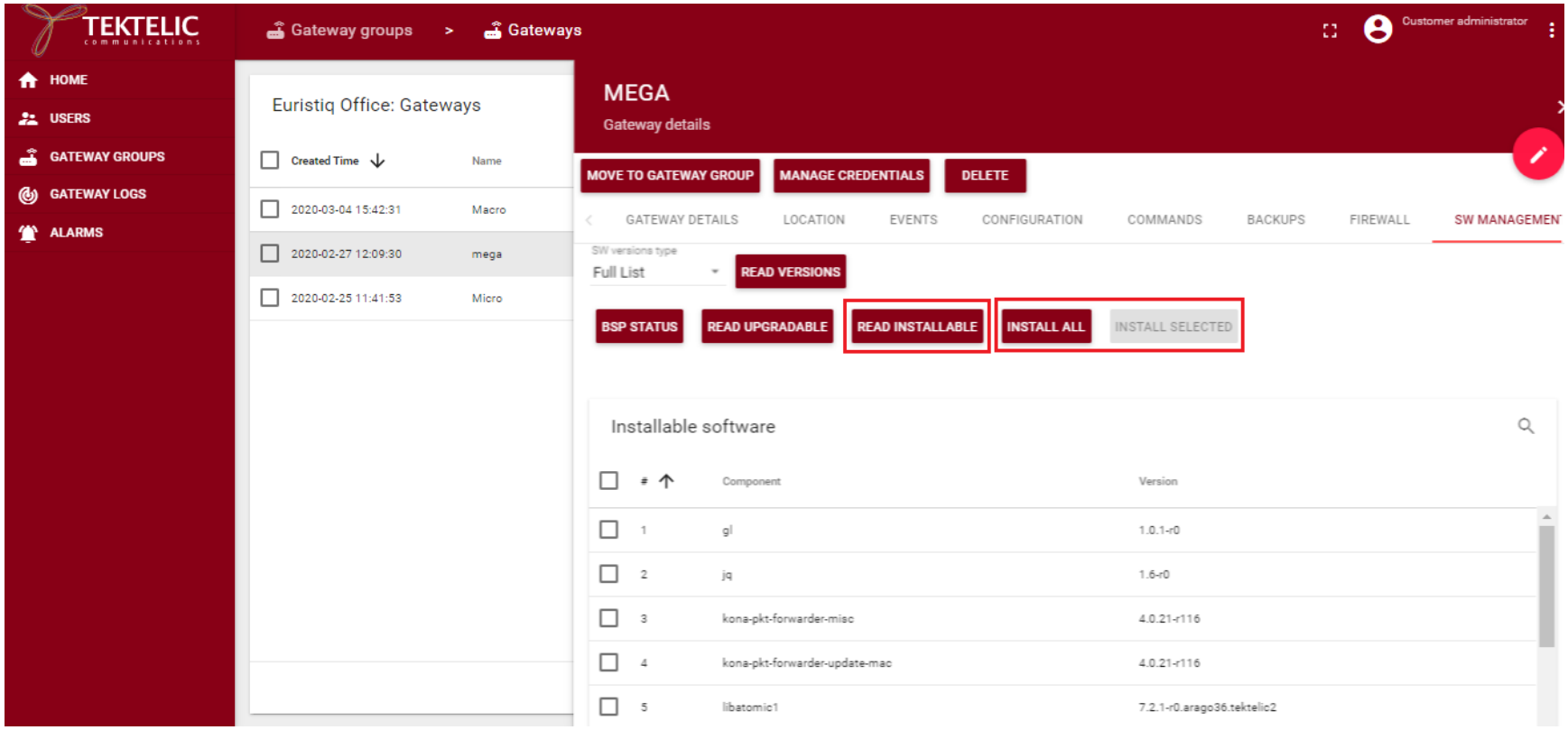
To upgrade the BSP, please, press on the “Read Upgradable” button. You will see the list with the BSP components, available for upgrading. Then you can press “Upgrade BSP”. The upgrading process will start. The progress bar and a warning message will inform you that the process was started. The next message will tell you when upgrading will be completed. Usually, it takes a 10-15 minutes.



Packages Installation:

To install new packages, please, press on the “Read Installable” button. You will see the list with the packages, available for installation. Then you can press “Install all” or choose a few packages and press “Install Selected”. The installation process will start. The progress bar and a warning message will inform you that the process was started. The next message will tell you when installation will be completed. Usually, it takes a few minutes.

If there are no packages, you will see the message that “NO PACKAGES AVAILABLE FOR INSTALLATION”.

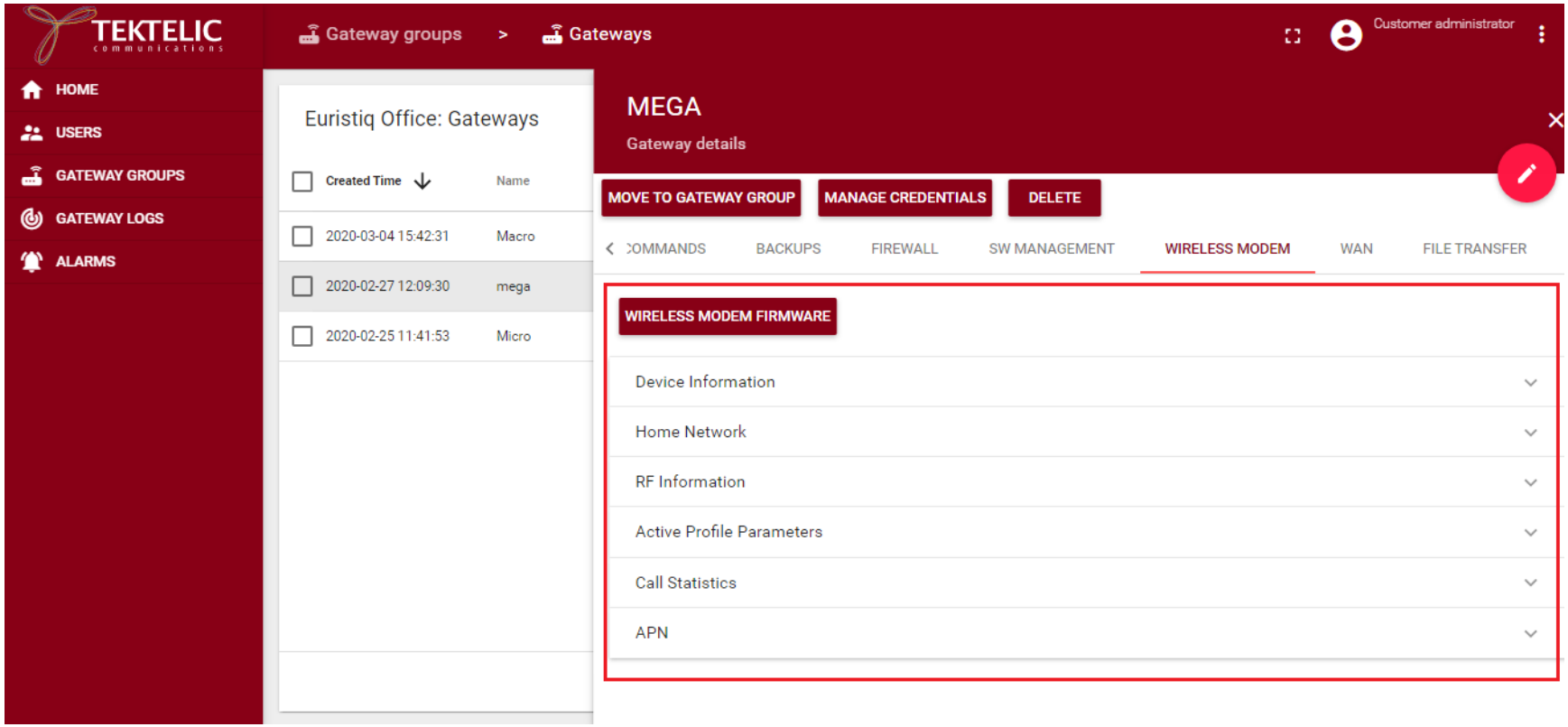


2.11 Wireless Modem:

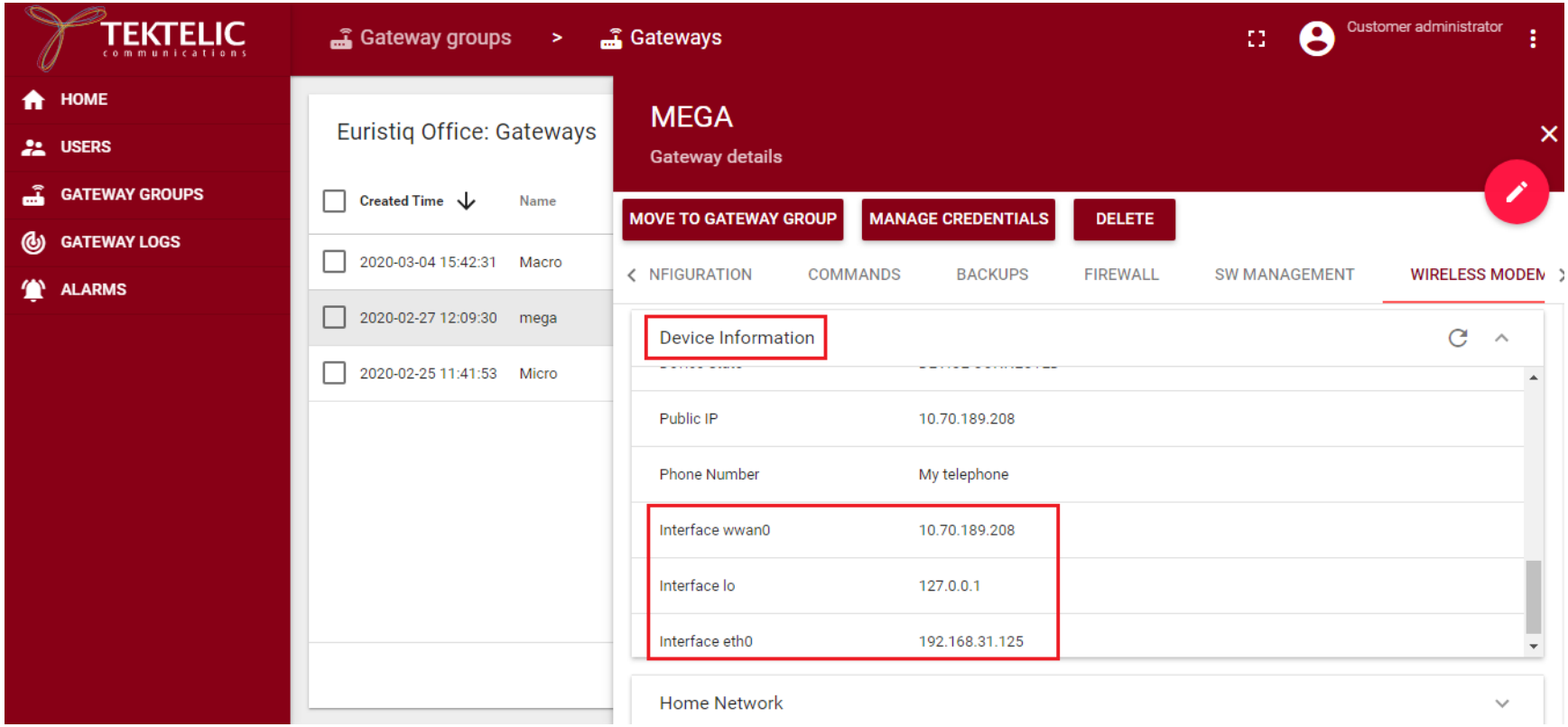
This tab provides information of Modem, SIM, APN and Modem Firmware update.

The device information tab provides information about Modem.

Note: Wireless modem firmware button will allow user to upgrade modem firmware on the GW, but this feature is still under development.

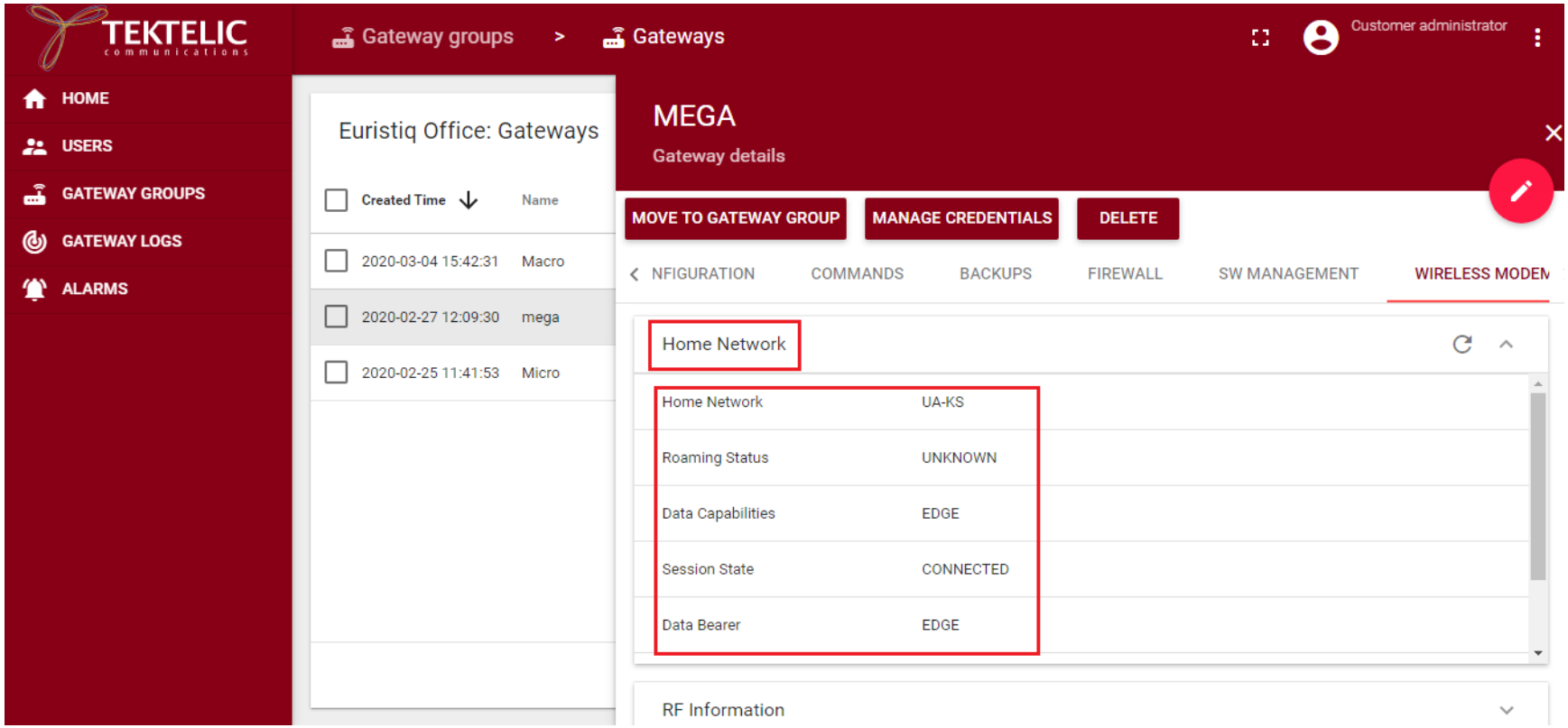


Device Information:



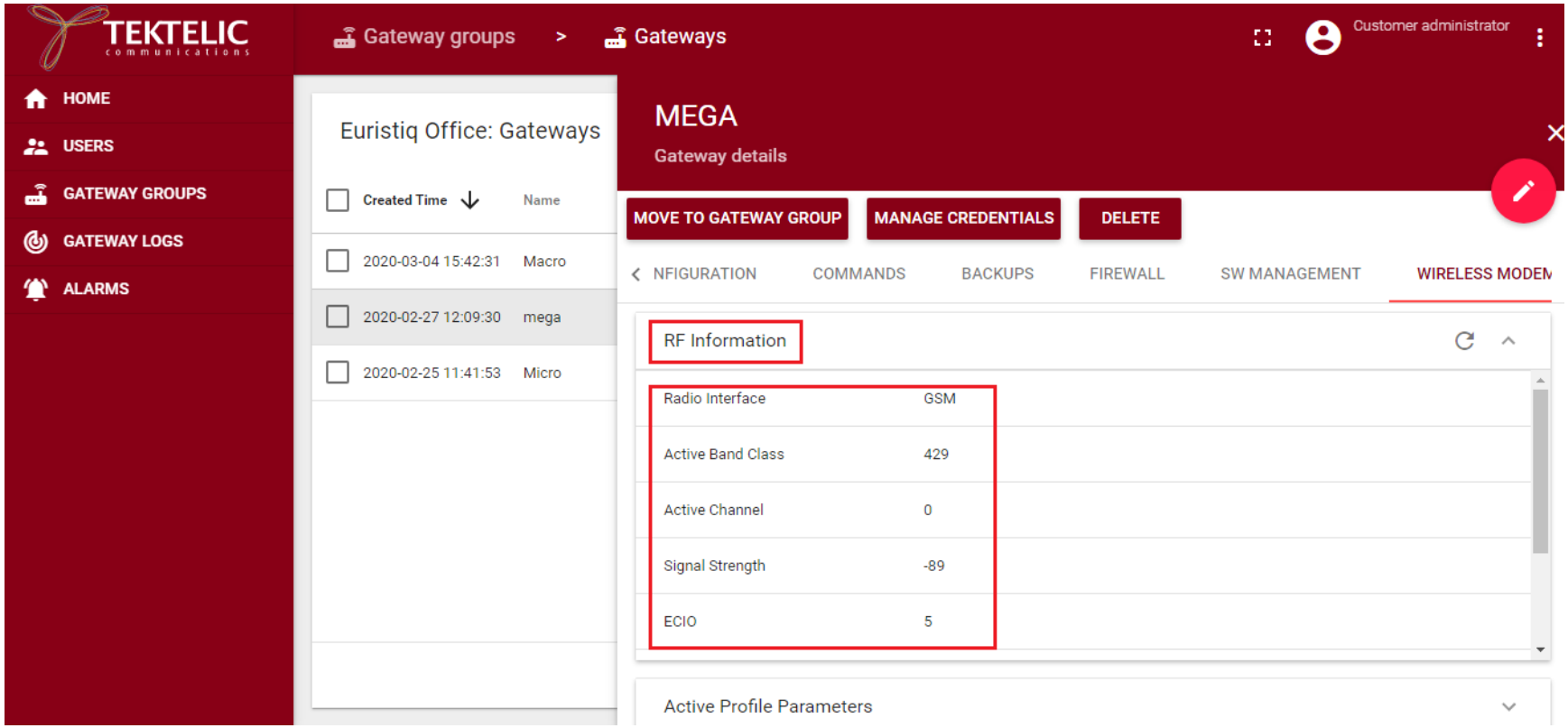
Home Network:

This tab provides information about SIM, Roaming Status, Data Capabilities, Session state etc.



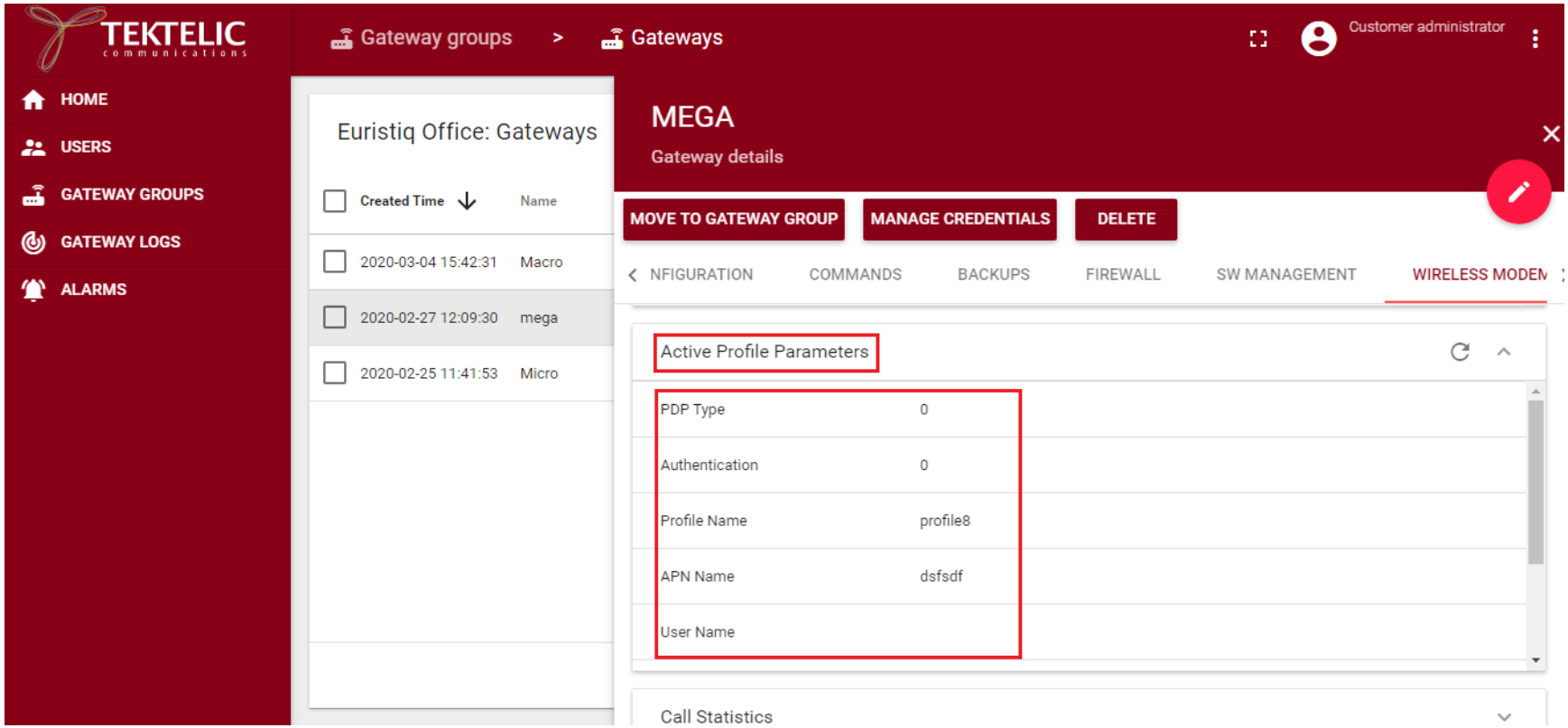
RF Information:

This tab provides information about Signal Strength, Active Band, Active Channel etc.



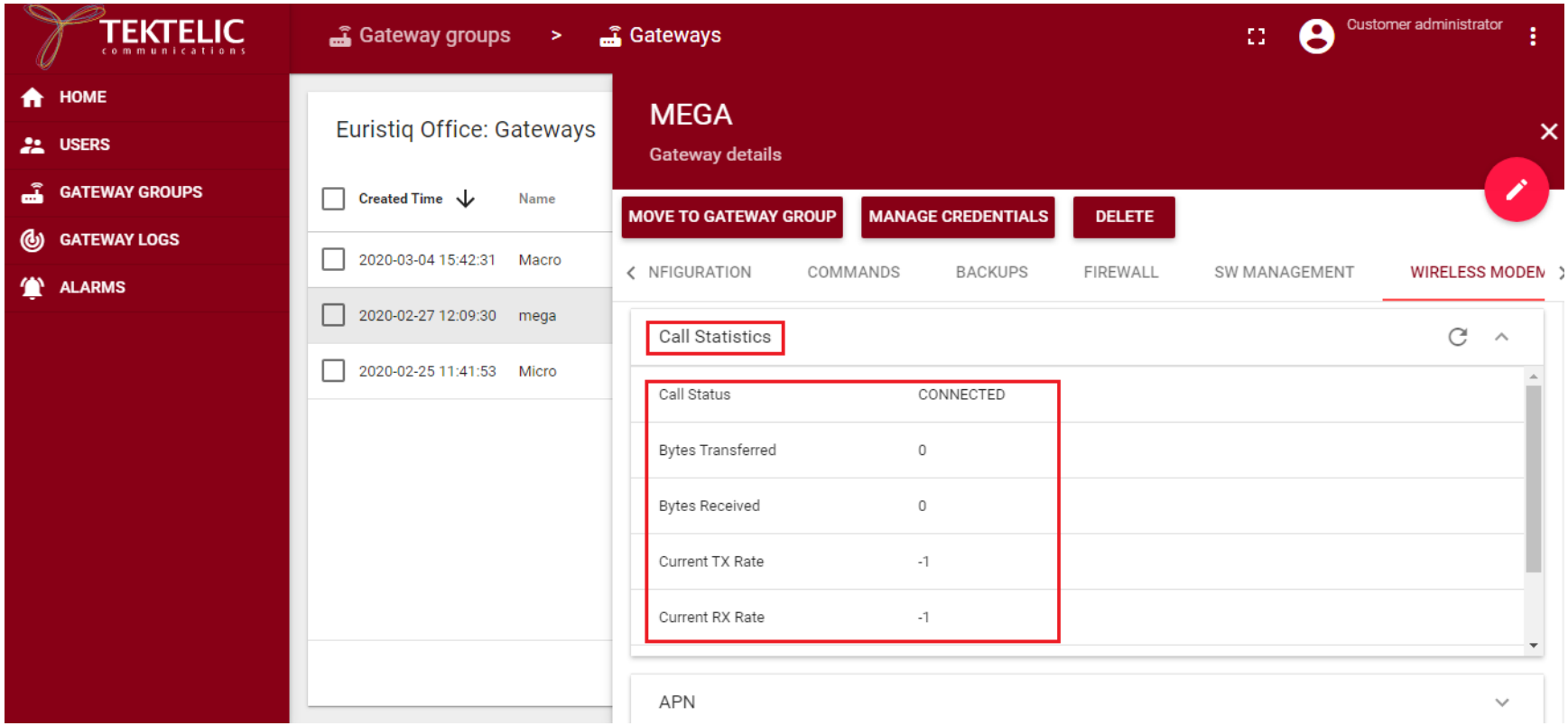
Active profile parameters:

This tab provide information about active APN profile name, APN Name, Username etc.



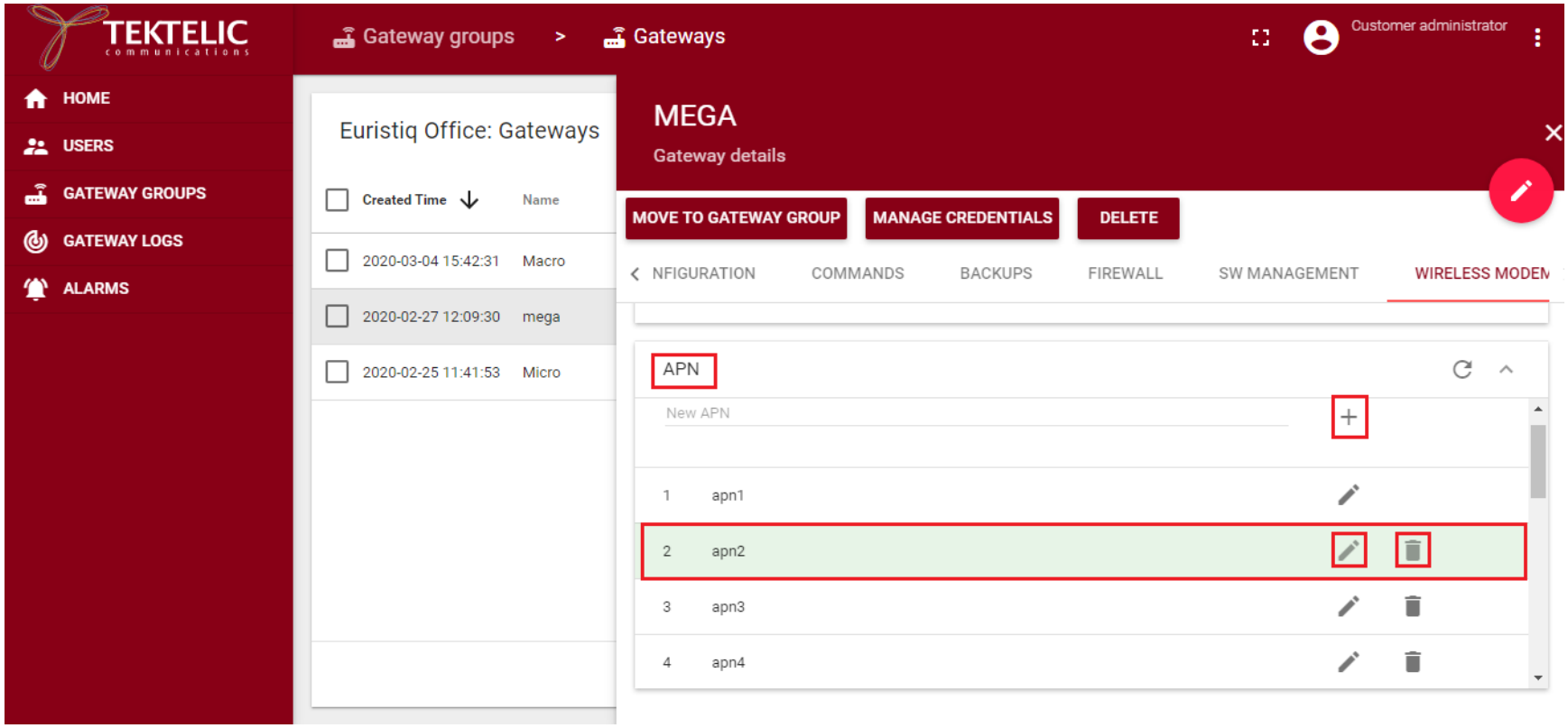
Call Statistics:

This tab provides information about Call Status, Byte Transferred and Received and current Rx and Tx rate.



User will see the list of added APNs here, he can add, modify, delete and set (as active) APNs:

Note: Maximum number of allowed APNs - 16. Current Active APN will be highlighted in Green.

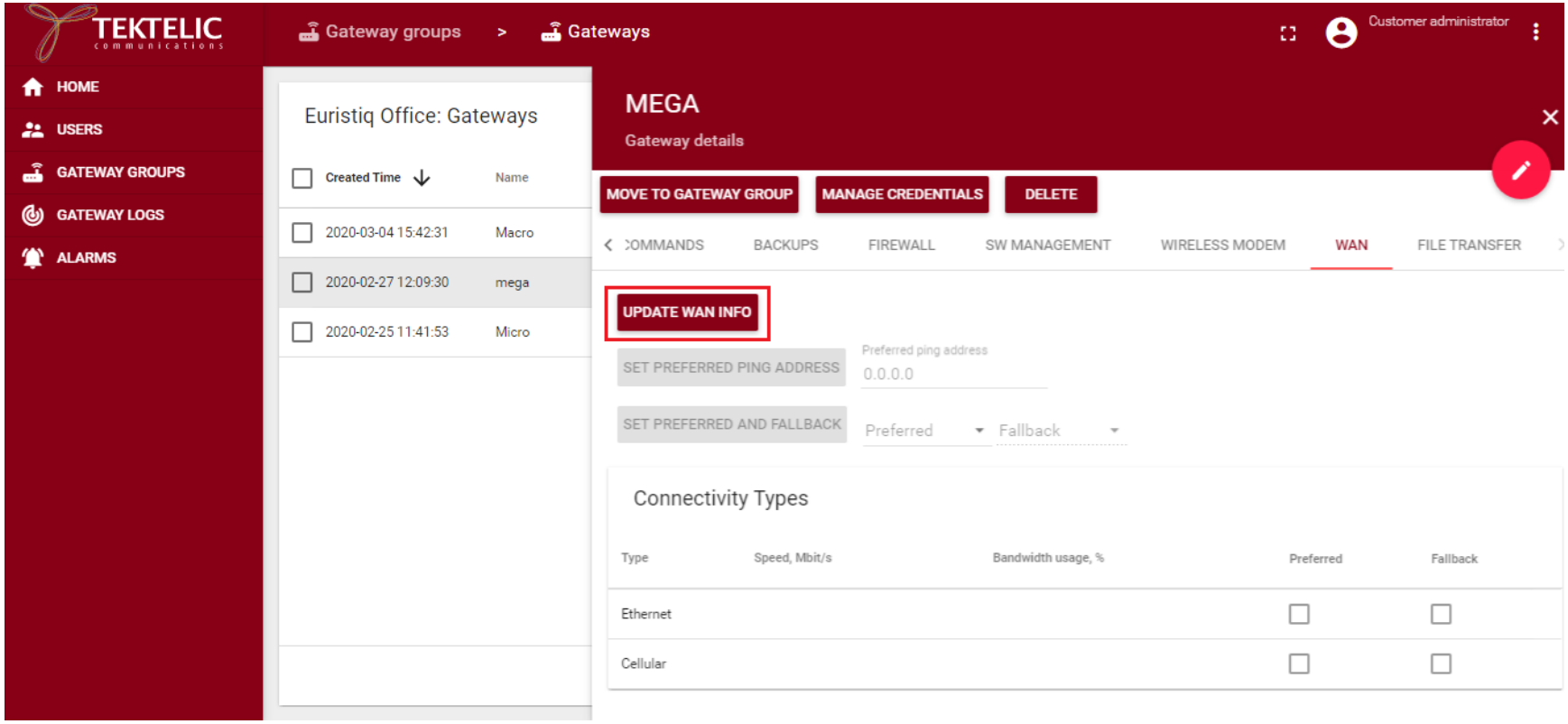


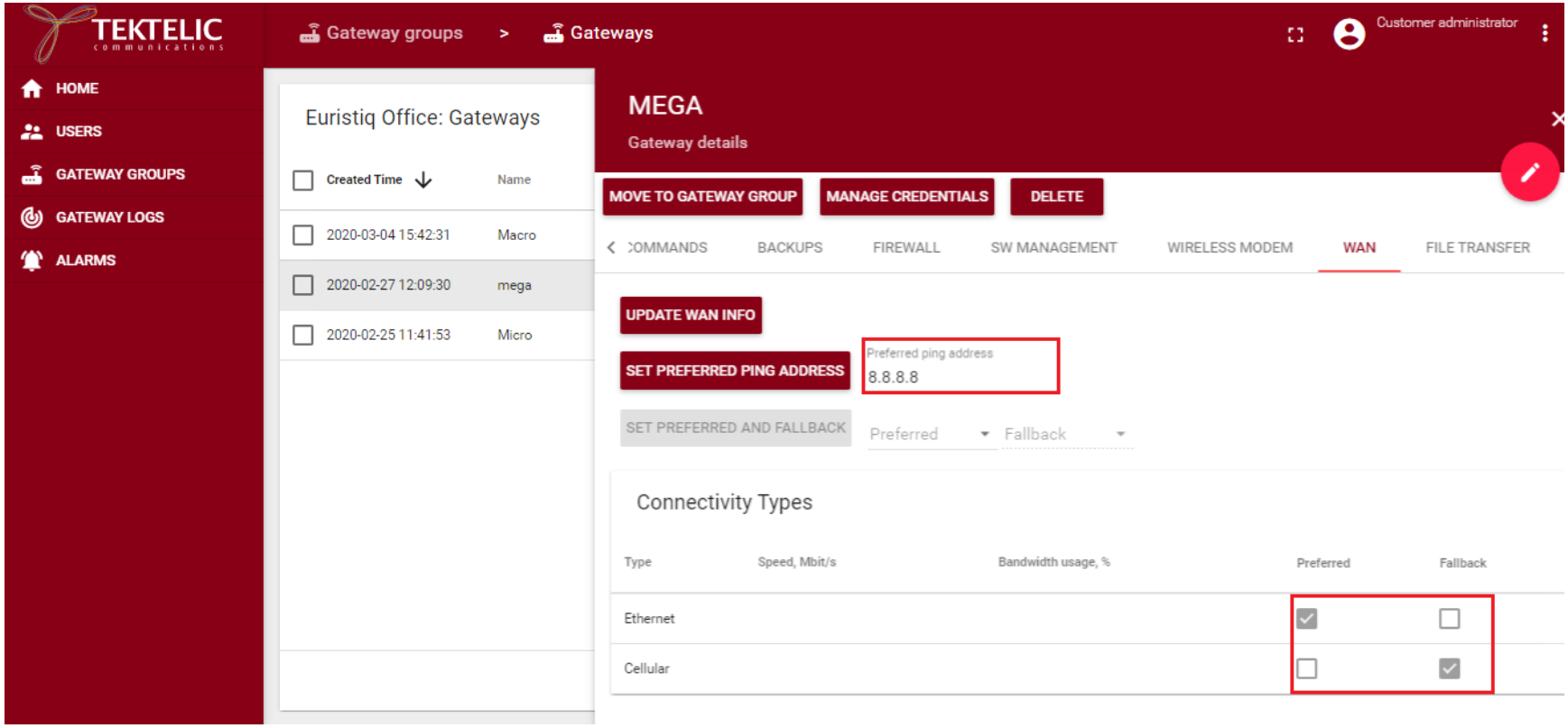
2.12 WAN

This tab would allow users to change ping address for preferred interface (by default 8.8.8.8) and change the preferred and fallback Interface (By default preferred interface is Eth0). “Update WAN Info” button will get current settings from the gateway.

To change the Preferred Ping Address, enter the IP address/Domain Name and select “Set Preferred Ping Address” button.

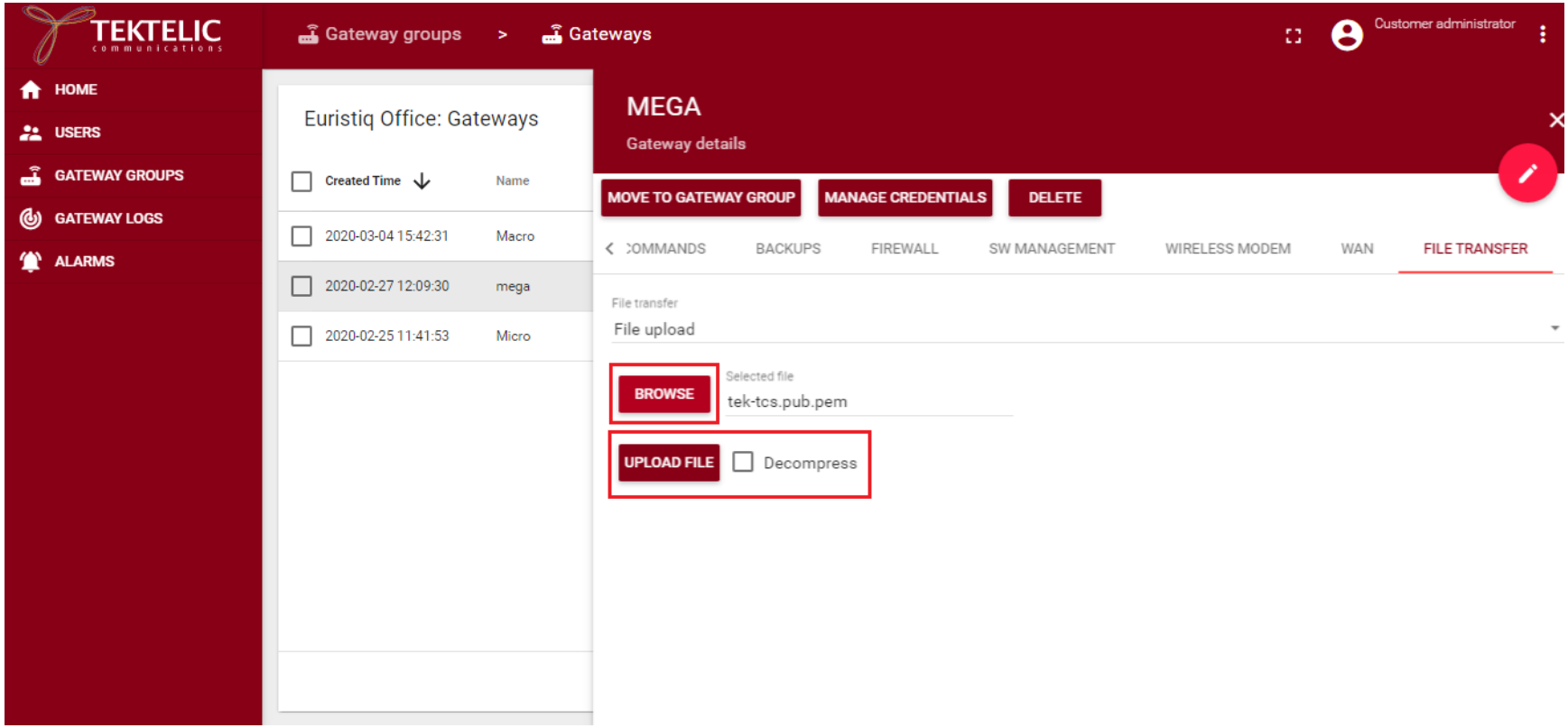
To change the Preferred, fall back Interface, use the Preferred and Fallback pull down menus, then select “Set Preferred and Fallback” button to set this.




TEKTELIC
communications
Gateway groups
>
Gateways
Customer administrator
HOME
USERS
GATEWAY GROUPS
GATEWAY LOGS
ALARMS
Euristiq Office: Gateways
Created Time
Name
2020-03-04 15:42:31
Macro
2020-02-27 12:09:30
mega
2020-02-25 11:41:53
Micro
MEGA
Gateway details
MOVE TO GATEWAY GROUP
MANAGE CREDENTIALS
DELETE
COMMANDS
BACKUPS
FIREWALL
SW MANAGEMENT
WIRELESS MODEM
WAN
FILE TRANSFER
UPDATE WAN INFO
SET PREFERRED PING ADDRESS
Preferred ping address
8.8.8.8
SET PREFERRED AND FALLBACK
Preferred
Fallback
Connectivity Types
Type
Speed, Mbit/s
Bandwidth usage, %
Preferred
Fallback
Ethernet
Cellular

2.13 File Transfer

The functionality on the File Transfer page is identical to that of the File Transfer function within Kona FT. Select the “Decompress” check box when uploading BSP software releases in .zip format. Click “Browse” to select a file to upload from the computer you are accessing the OAM server webpage from. Click “Upload File” once you have selected the file to upload. Zip files are uploaded to /dev/shm/ then extracted to /lib/firmware/. Non-zipped files are uploaded to /dev/shm/.

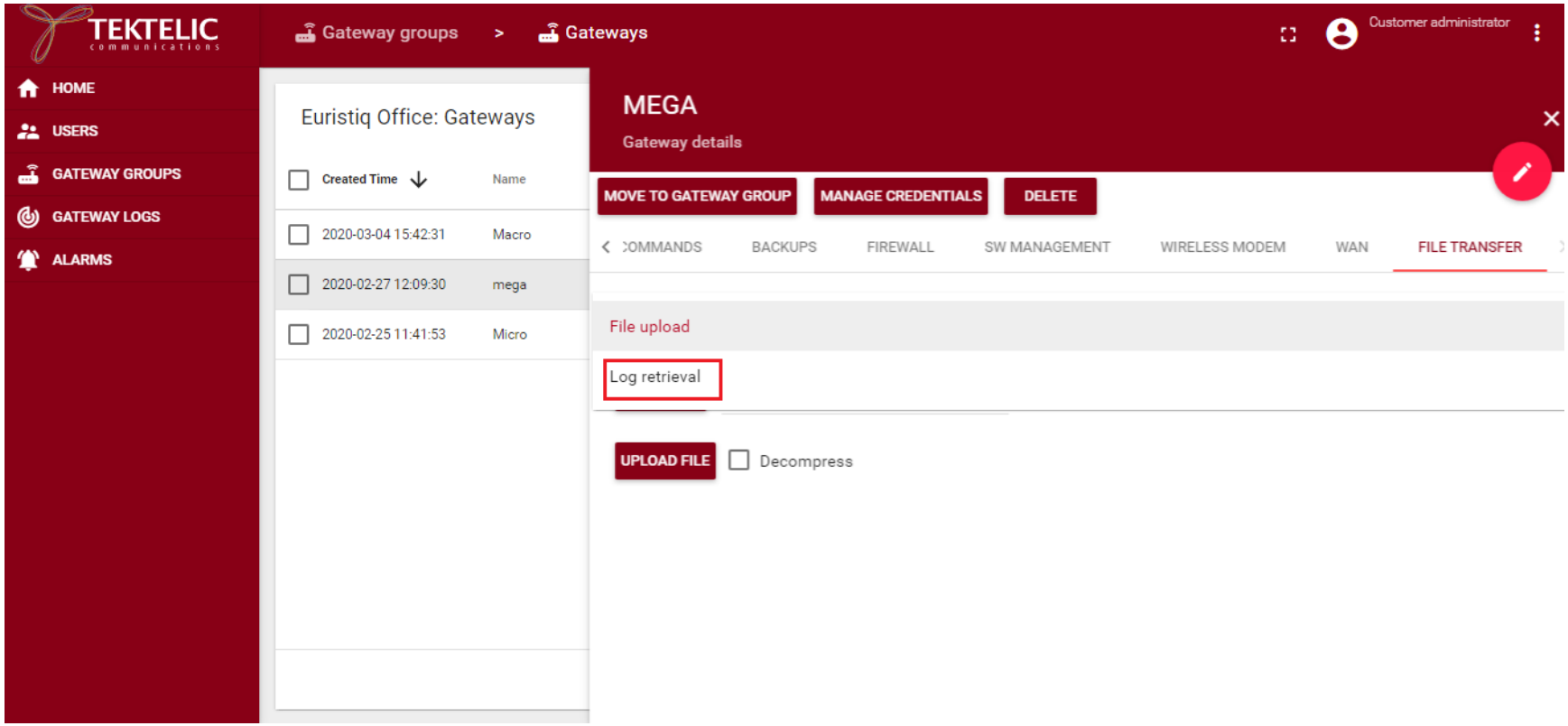


2.14 Log Retrieval

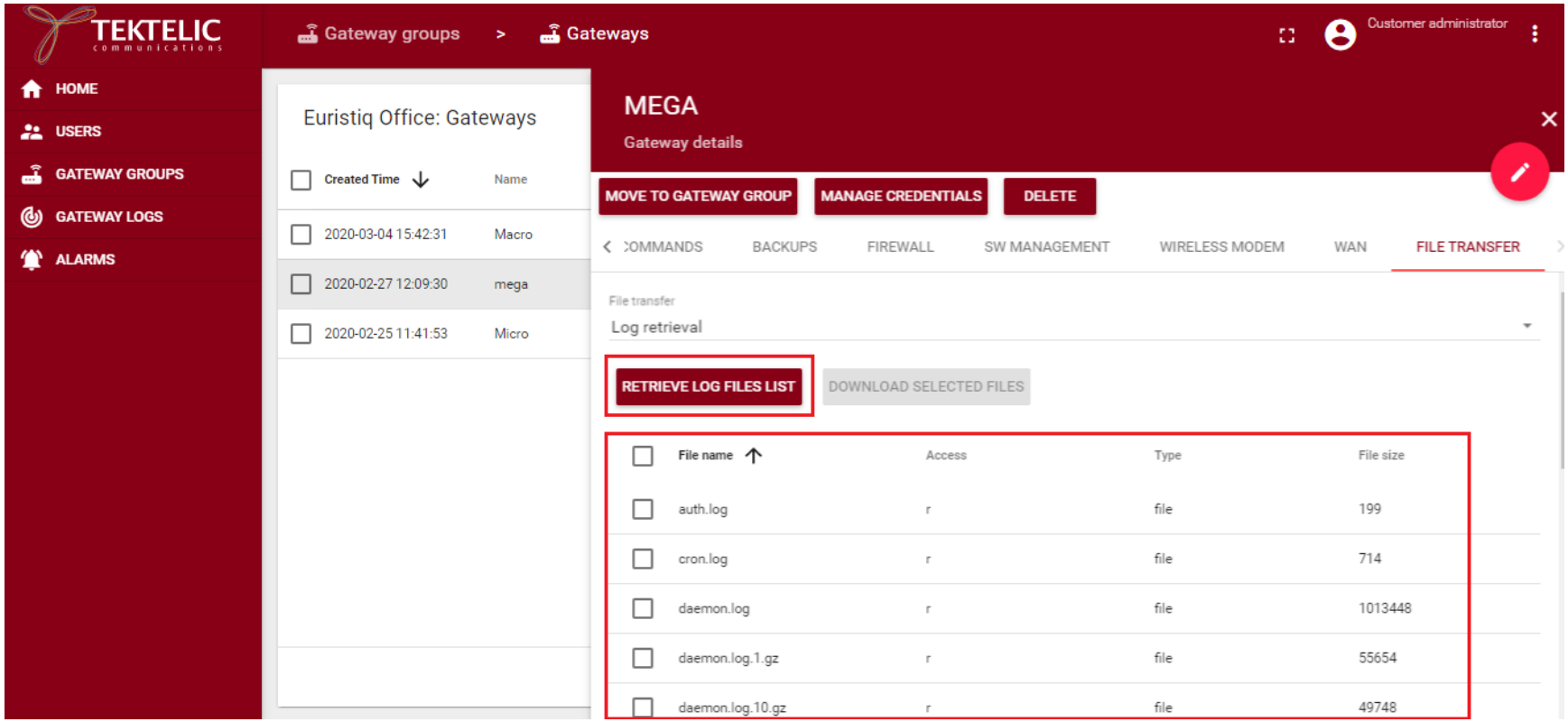
This functionality allows user to download the logs from the GW to his Computer. Log retrieval you can find on the file transfer tab. Just choose Log retrieval from drop down list.

NOTE: oam stream host should be also uncommented if you want to use Log Retrieval. It should be configured as “gateway-oam.tektelic.com:8082”. Check section 1.1 of this document.

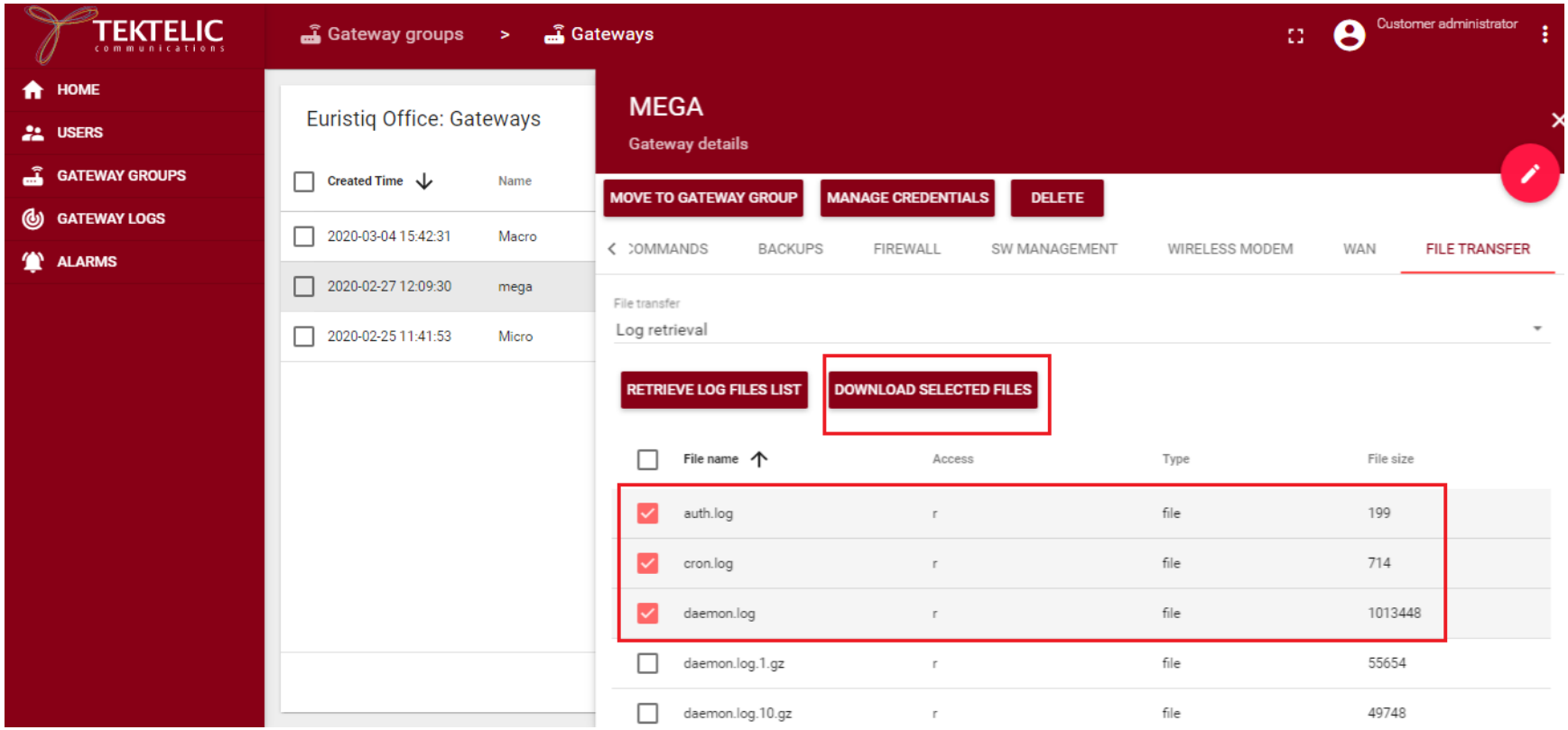
This feature is not fully implemented yet. Still under development.



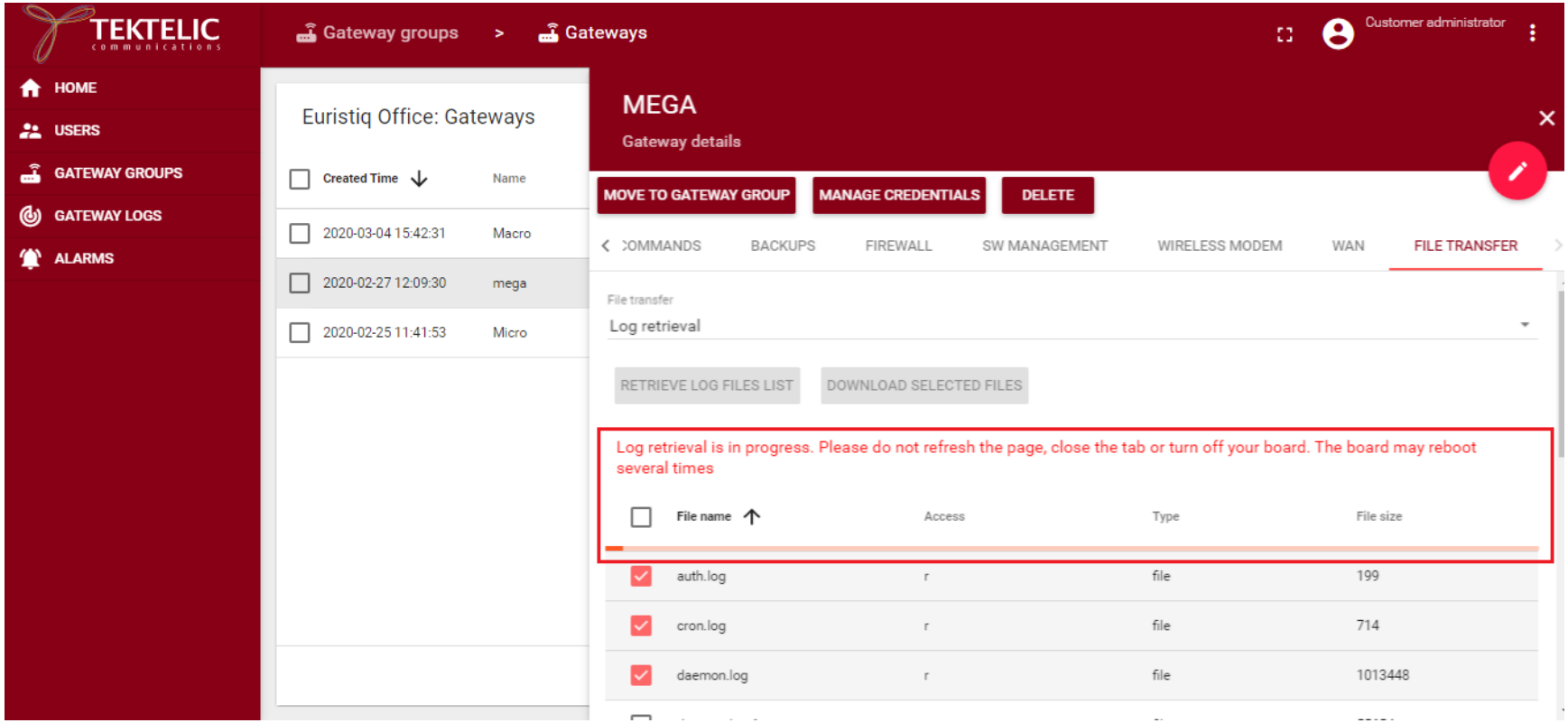
Press the "Retrieve log files list" and all log files will be shown in the table below.



Choose some files and press on the “Download selected files”. The dialog window will ask where you want to download you files.

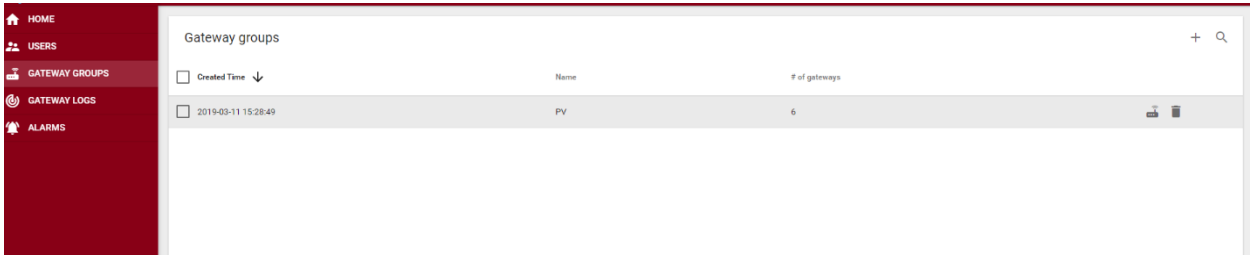


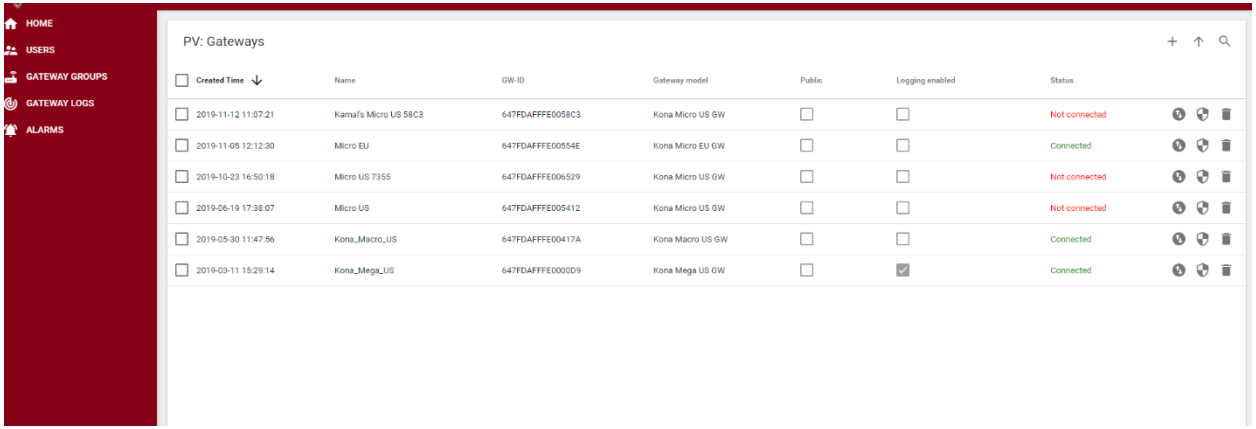
After you choose the directory, the process will start. The progress bar and a warning message will inform you that the process was started. The next message will tell you when files uploading will be stoped. Usually, it takes a few minutes.



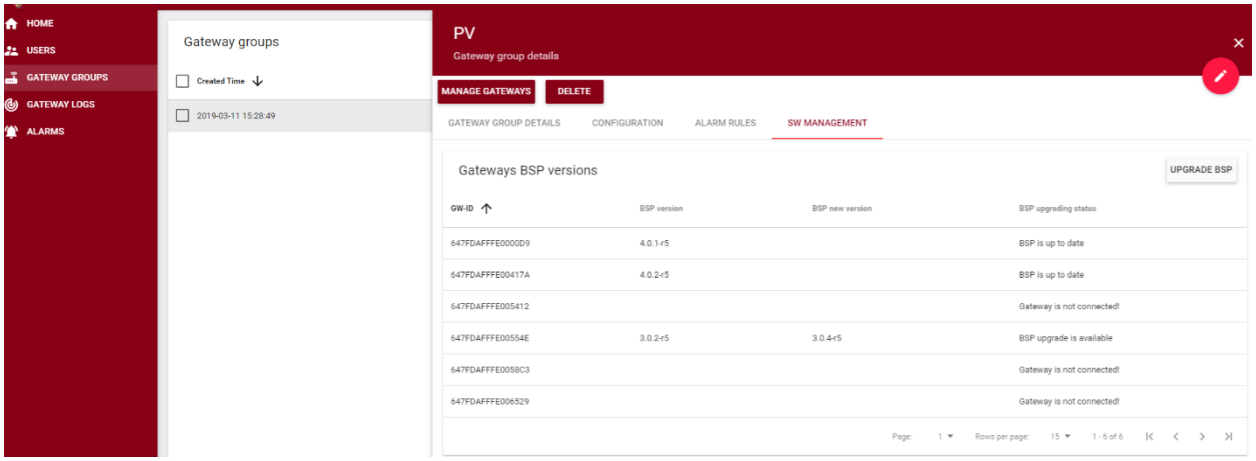
2.15 Bulk Upgrade

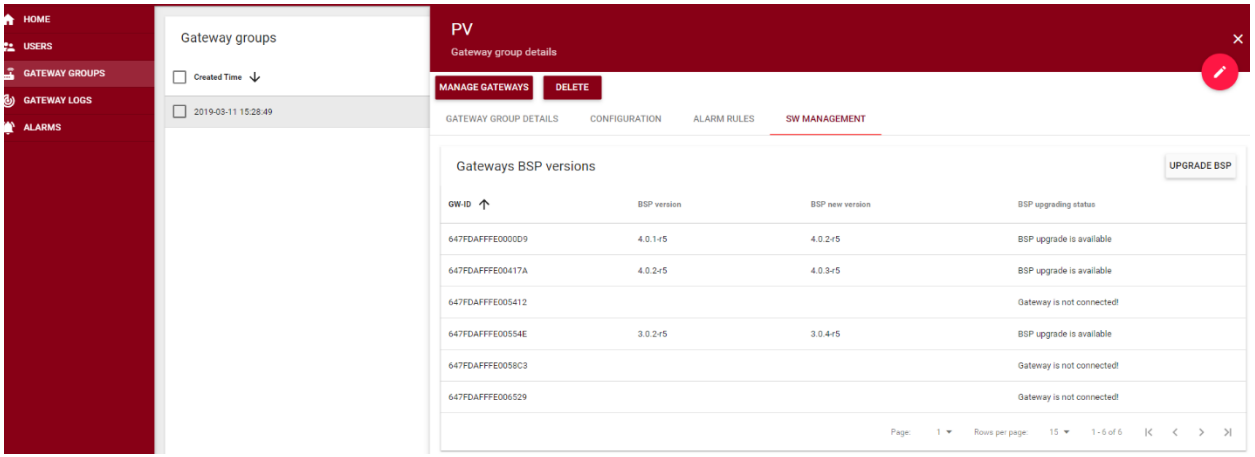
This feature would allow users to do Bulk BSP Upgrade for their GWs. To do that, Go to Gateway Groups where users have their GWs registered.



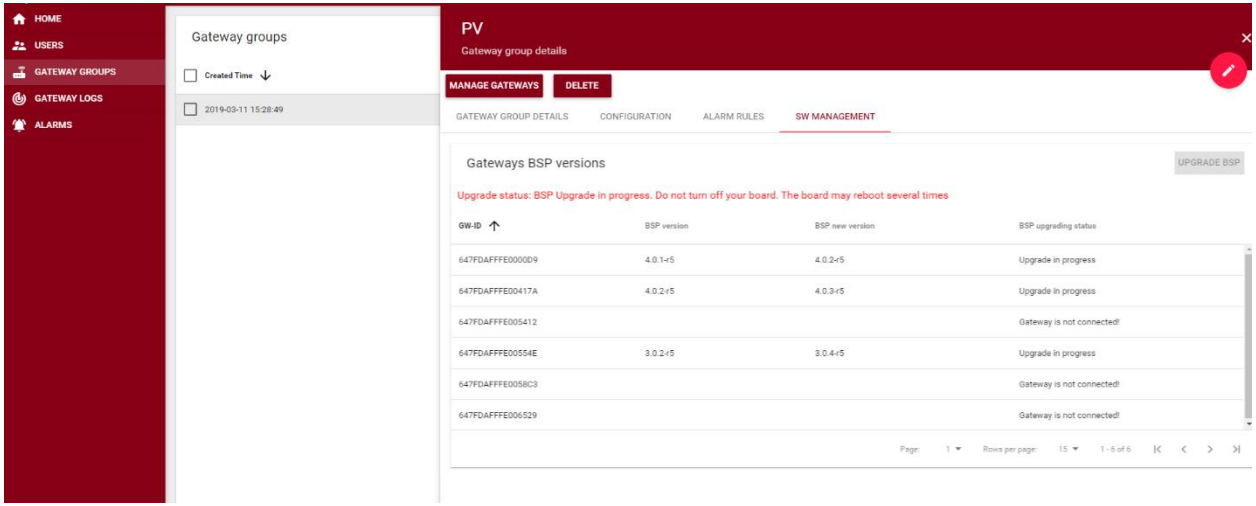
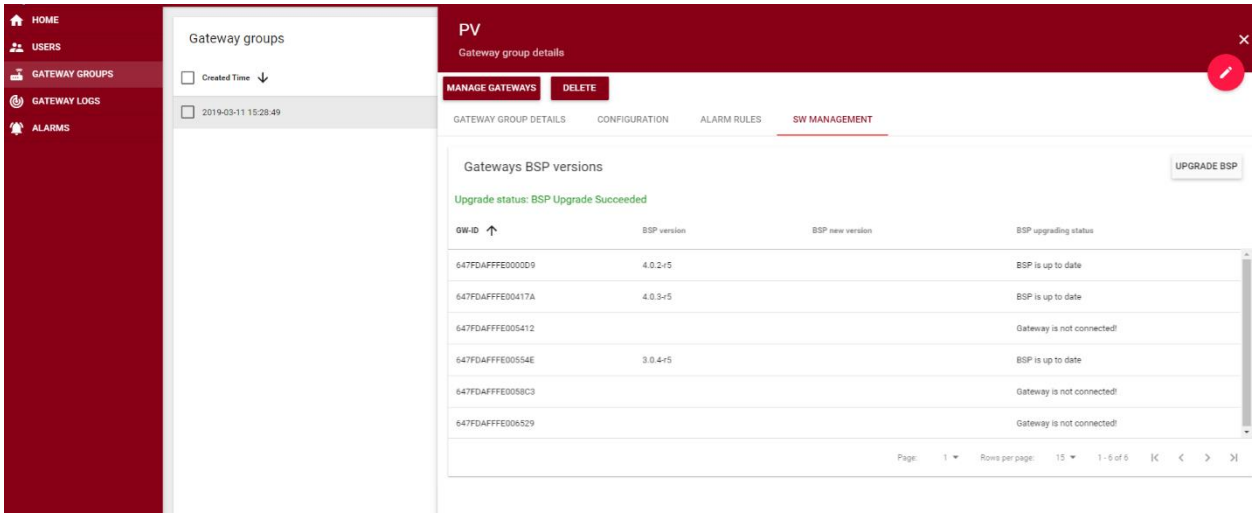


Then Select Gateway Groups. Then go to Software Management tab. This tab would list all the GWs registered under this Gateway Groups. And also, it would give information about whether BSP is Up to Date or New BSP is available. In order to see the new BSP is available status, User should copy the BSP image into GW (/lib/firmware directory) and update the Server information (Please see section 2.7) before hand.





Then select the Upgrade BSP button. Once the BSP upgrade is started then it would display the following message. “Upgrade Status: BSP Upgrade in progress. Do not turn off your board. The board may reboot several times.”



Once the BSP upgrade is successful, it would display “Upgrade Status: BSP Upgrade Succeeded” message.