BeanGateway® 4G

Version 1.8

BEANAIR®

BEANGATEWAY® 4G USER MANUAL

BeanAir

Rethinking Sensing Technology

2.4 GHz

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1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact ***Beanair Technical Support Center*** (BTSC) at:

tech-support@Beanair.com

For detailed information about where you can buy the Beanair equipment/software or for recommendations on accessories and components visit:

www.Beanair.com

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

Our aim is to make this user manual as helpful as possible. Keep us informed of your comments and suggestions for improvements.
Beanair appreciates feedback from the users of our information.

2. VISUAL SYMBOLS DEFINITION

Symbols	*Definition*
	***Caution or Warning** – Alerts the user with important information about Beanair wireless sensor networks (WSN), if this information is not followed, the equipment /software may fail or malfunction.*
	***Danger** – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.*
	***Tip or Information** – Provides advice and suggestions that may be useful when installing Beanair Wireless Sensor Networks.*

3. ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard
CCA	Clear Channel Assessment
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
GTS	Guaranteed Time-Slot
kSps	Kilo samples per second
LLC	Logical Link Control
LQI	Link quality indicator
LDCDA	Low duty cycle data acquisition
MAC	Media Access Control
PAN	Personal Area Network
PER	Packet error rate
RF	Radio Frequency
SD	Secure Digital
WSN	Wireless sensor Network

4. DOCUMENT ORGANIZATION

BeanGateway® 4G product presentation	• Details the BeanGateway® 4G product presentation
BeanGateway® 4G installation guidelines	• Details the installation guidelines of the BeanGateway® 4G
Starting your application	• Details the BeanGateway® supervision from the BeanScape®
Maintaining and supervising your BeanGateway®	• Details the BeanGateway® maintenance (for experienced user)
Troubleshooting	• BeanGateway® FAQ
Environnemental Constraints	• Describes environnemental constraints (temperature, humidity, mechanical chocs, vibration...)

5. BEANGATEWAY® 4G - PRODUCT PRESENTATION

- ✓ ***It is highly recommended to read all the user manual related to Beanair software & equipment (BeanScape® 2.4GHz, BeanGateway® 2.4GHz, BeanDevice® 2.4GHz) before getting start your BeanGateway®.***
- ✓ ***Use only accessories supplied by Beanair (power supply unit, and antenna). Use of other materials may damage the BeanGateway® 2.4GHz;***
- ✓ ***Only Beanair is qualified to make changes on the BeanGateway® 4G;***
- ✓ ***Don't try to remove the adhesive label on the product; it contains important information such as the MAC address***

5.1 PRODUCT OVERVIEW

The **BeanGateway® 4G** is used to build and manage Beanair wireless sensor networks. It can manage queues for every network element (BeanDevice®). As a gateway, it controls the external access to the network through a highly secured authenticated procedure. It supports the conversion of data exchanged, compression and IP connectivity with the network thereby reducing the intelligence required in these platforms, maintenance and therefore the associated cost.

It allows communication with the Wireless Sensors Network through IEEE 802.15.4 protocol.

It provides the following features:

- ✓ Design, configuration and supervision of the entire Wireless sensors network.
- ✓ Data Organization from the various sensors.
- ✓ Data Transmission to the BeanScape®.
- ✓ Backing up wireless sensors network mapping.
- ✓ Information processing continuously even during a power outage.

Figure 1: BeanGateway® 4G - product overview

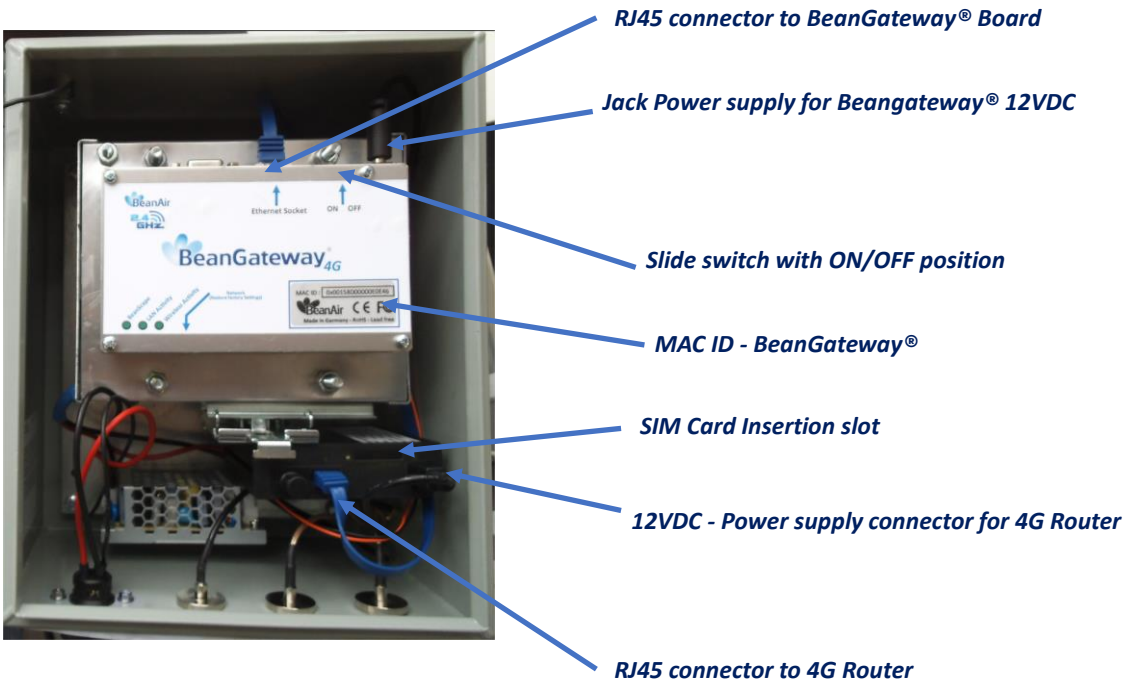


Figure 2: Inside the casing - description

5.2 OUTBOXING YOUR BEANGATEWAY® 4G

You should find the following accessories and options inside your box:

Specifications	Included accessories
4G Antenna	1 x 4G Antenna 12dBi - with pole mounting **Ref: WL-4G-HG-ANT-12DBI**
WIFI Antenna	1 x High Gain WiFi Antenna 9dBi - with pole mounting kit **Ref: HG-OMNI-OUT-7DBI**
External cable for WIFI Antenna	1 x N-Type cable, Cable Length: 1 meter **Ref: CBL-ANT-1M**
External cable for LTE Antenna	2 x N-Type cable, Cable Length: 1 meter **Ref: CBL-ANT-1M**
Waterproof Plug for AC Power Input (only for product Ref: BGTW-4G-MPWR-OUT)	1 x Circular Connector Hisrchmann CA 3LS, Waterproof IP67 **Ref: WL-CA3LS-PLUG**

5.3 TECHNICAL SPECIFICATIONS

Product reference	
BGTW-4G-**PWR**-OUT	BeanGateway Outoor with 3G/4G/LTE Connectivity
PWR - External Power supply	**SOLAR** - Power Supplied from external solar panel **MPWR** - Mains power supply (Input: 90 to 264VAC)
Examples	**BGTW-4G-SOLAR-OUT**, BeanGateway Outoor with 3G/4G/LTE connectivity, Power supplied from solar panel **BGTW-4G-MPWR-OUT**, BeanGateway Outoor with 3G/4G/LTE connectivity, Mains Power Supply

5.3.1 2.4GHz wireless coordinator

	Wireless Sensor Network Coordinator
Wireless Technology	Ultra-Power and license-free 2.4Ghz radio technology (IEEE 802.15.4E)
WSN Topology	Peer-to-peer/ Star
Raw data rate	250 Kbits/s
RF Characteristics	ISM 2.4GHz – 16 Channels
RF Transmit power	+18 dBm
Receiver sensitivity	-104 dBm
Maximum Radio Range	1 km (Line of Sight) , 70-150m (Non Line of Sight)
WSN Diagnostic tool	· Energy Scan for choosing a suitable RF Channel
	· BeanDevice® PER (Packet Error Rate) calculation
	· LQI (Link Quality Indicator) between the BeanGateway® and the BeanDevice®
	· RF channels Blacklist

5.3.2 3G/4G/LTE Modem

	3G/4G Connectivity specifications
LTE	■ LTE FDD: B1/B3/B5/B7/B8/B20 ■ LTE TDD: B38/B40/B41 ■ LTE CAT4 up to 70 Mbps DL ■ LTE CAT4 up to 50 Mbps UL ■ Class 3 (23dBm±2dB) for LTE FDD ■ Class 3 (23dBm±2dB) for LTE TDD
UMTS/DC-HSPA+	■ 850/900/2100 MHz ■ DC-HSPA+ mode: Max 42Mbps (DL) Max 5.76Mbps (UL) ■ UMTS mode: 384 kbps DL, 384 kbps UL ■ TD-SCDMA: Max 4.2Mbps (DL) Max 2.2Mbps (UL) ■ Power Class 3 (24dBm +1/-3dB) for UMTS bands ■ Class 3 (24dBm+1/-3dB) for TD-SCDMA
GSM/GPRS/EDGE	■ 900/1800 Mhz ■ GPRS/EDGE Multi-slot Class 12 ■ Power Class E2 (27dBm ±3dB) for GSM 900 ■ Power Class E2 (26dBm +3/-4dB) for DCS 1800 ■ Power Class 4 (33dBm ±2dB) for GSM 900 ■ Power Class 1 (30dBm ±2dB) for DCS 1800

5.3.3 2.4GHz High Gain Antenna

9dBi 2.4GHz antenna specifications

Electrical Parameters

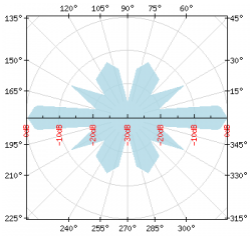
Frequency range	2400-2500MHz
Gain	9dBi
VSWR	< 1.2
Impedance	50 Ohm
Polarization	Vertical
Vertical plane	15°
Horizontal plane	360°
Protection	shorted for DC

Mechanical Parameters

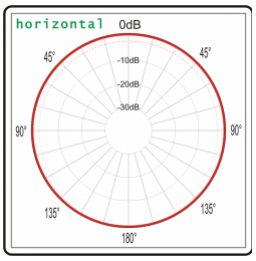
Dimensions	540x23 mm
Weight	0.61 kg
Connector	N female
Wind load (170km/h)	11 N

Patterns

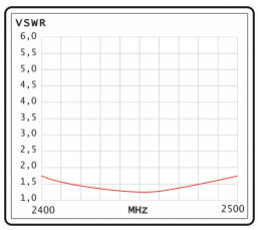
Vertical

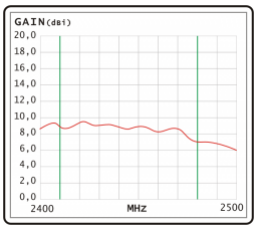


Horizontal



VSWR and GAIN





Beanair GmbH
Wolfener Straße 32 - 34
12681 Berlin – Germany
Email: info@beanair.com
www.beanair.com

Ref: HG-OMNI-OUT-9DBI

Antenna reference: HG-OMNI-OUT-9DBI

5.3.4 Dual LTE Antenna

Figure 3: Dual LTE Antenna with u-clamp mounting kit

The enclosure of this multiband 4G antenna is manufactured from robust, weather-resistant and UV-resistant plastic / PVC. This allows to use this 4G antenna for in- and outdoor appliances even under extreme weather conditions.

The antenna is designed for mast/pole or wall handle installation. A mounting kit (u-clamp for 30-50mm diameter handles) is included.

Omnidirectionnal 4G Antenna	Omnidirectional 4G Antenna (2x2 MIMO) Weather-resistant and UV-resistant plastic / PVC enclosure VSWR < 1.8 Impendance: 50 Ohm Beamwidth: 360° Horizontal - 20° Vertical Gain : 8dBi @ 800 MHz 12dBi @ 1800MHz 12dBi @ 2600MHz Frequency: 791-862 MHz (2G, 4G) 1700 - 2100 MHz (3G, 4G) 2500 - 2700 (4G) Connectors: 2 x N female Mounting Kit: U-clamp for 30-50mm diameter handles

5.3.5 Solar Panel power supply with UPS Battery (Ref: BGTW-4G-SOLAR-OUT)

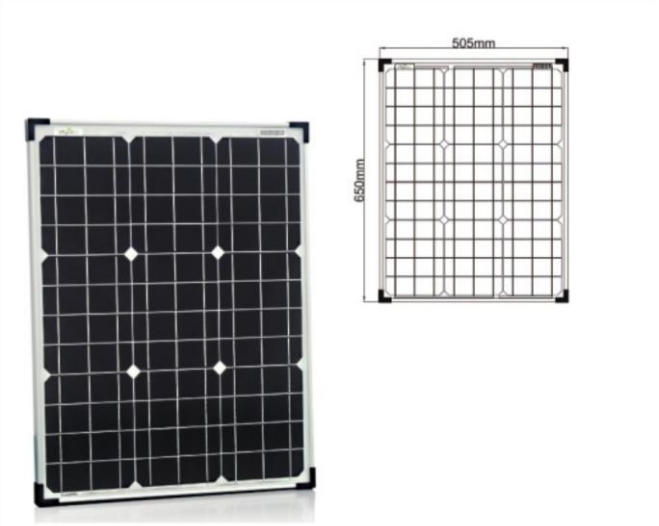


Figure 4: 50W solar panel

The 50W Solar panel is provided with 4 x brackets and 4 x M5 screws.

External mounting brackets enable the Solar Panel to be wall or panel mounted without opening the box.

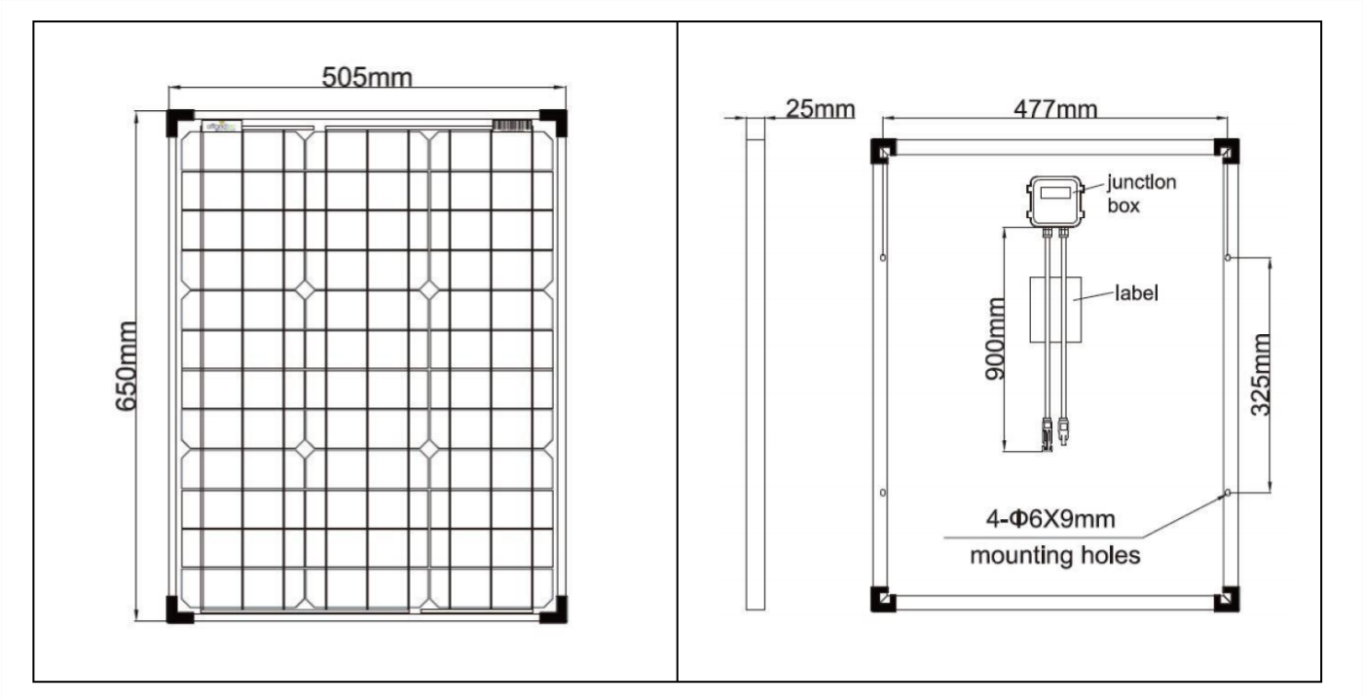


Figure 5: Solar Panel Drawing

	Solar Panel power supply with UPS Battery (Ref: BGTW-4G-SOLAR-OUT)
Battery	Valve Regulated Lead-Acid (VRLA) Capacity 12Ah
Solar panel technology	Monocristalline 50W, anodized aluminum frame. Surface protection with ESG solarglass. Dimensions (LxWxH): 650mm x 505mm x 30mm
Solar charging controller	Maximum Input current: 6A Power consumption < 2.5mA , Led switch on Nominal voltage :12VDC Led displays: battery full and charging
Socket for Solar Panel Connection	Industrial and Waterproof Socket Circular Socket CA 3 GD - Hirschmann Rated Voltage: 400VA Rated Current: 16A

5.3.6 AC power supply with UPS battery (Ref: BGTW-4G-MPWR-OUT)

	AC power supply with UPS battery (Ref: BGTW-4G-MPWR-OUT only)
Battery	Valve Regulated Lead-Acid (VRLA) Capacity 12Ah
Battery protection	Overvoltage/Overload/Short circuit/Battery low/Battery reverse polarity
AC Voltage Range (Input)	90 to 264VAC
AC Range (Input)	0.75A/115VAC 0.5A/230VAC
Frequency Range	47 ~ 63Hz
Inrush current	Cold Start 20A/115VAC, 40A/230VAC
Safety and EMC	Safety standards: UL60950-1, TUV EN60950-1 approved Withstand Voltage: I/P-O/P:3KVAC I/P-FG:2KVAC O/P-FG:0.5KVAC Isolation Resistance TANCE: I/P-O/P, I/P-FG, O/P-FG:100M Ohms / 500VDC / 25℃/ 70% RH EMC emission: Compliance to EN55032 (CISPR32) Class B, EN61000-3-2,-3 EMC immunity: Compliance to EN61000-4-2,3,4,5,6,8,11, EN55024, light industry level, criteria A
Socket for AC power supply	Industrial and Waterproof Socket Circular Socket CA 3 GD - Hirschmann Rated Voltage: 400VA Rated Current:16A

An integrated rechargeable Lead-Acid battery with a capacity of **12Ah** is used as an UPS battery (uninterruptible power supply). The internal battery provides instantaneous protection from external power supply interruptions, the wireless sensor network activity & Ethernet LAN activity are maintained during this time (***18h approximately***). The ***BeanGateway® 4G*** starts emitting a beep sound every 2 seconds. The beep sound will stop when the external power supply is restored.

Precautions:

- ✓ ***Do not try to change the internal battery. You will void the warranty of your BeanGateway® 4G.***
- ✓ ***Use the power supply wall plug-in provided by Beanair®.***

6. BEANGATEWAY® INSTALLATION GUIDELINES

6.1 HOW TO MOUNT THE BEANGATEWAY® 4G

Your BeanGateway® 4G should be mounted on the vertical position with the antenna socket pointing to the ground. Use a padlock to protect your BeanGateway® 4G casing against vandalism.

6.2 HOW TO MOUNT THE SOLAR PANEL

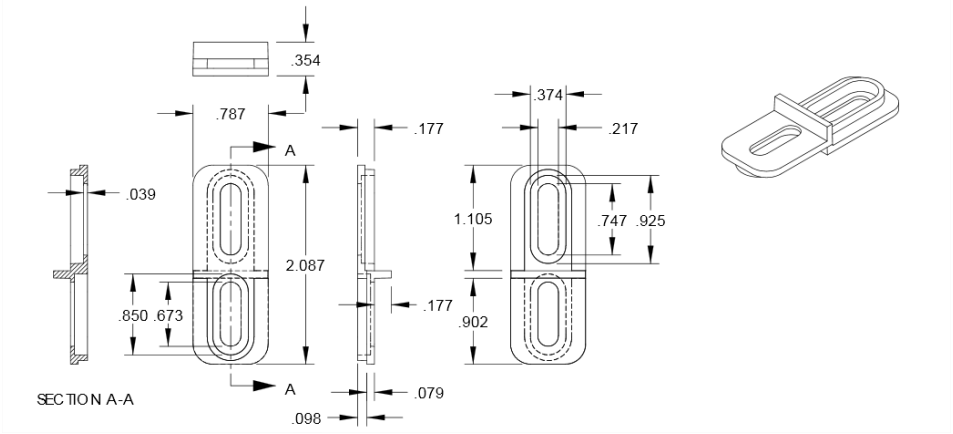


Figure 6: Solar Panel Drawing

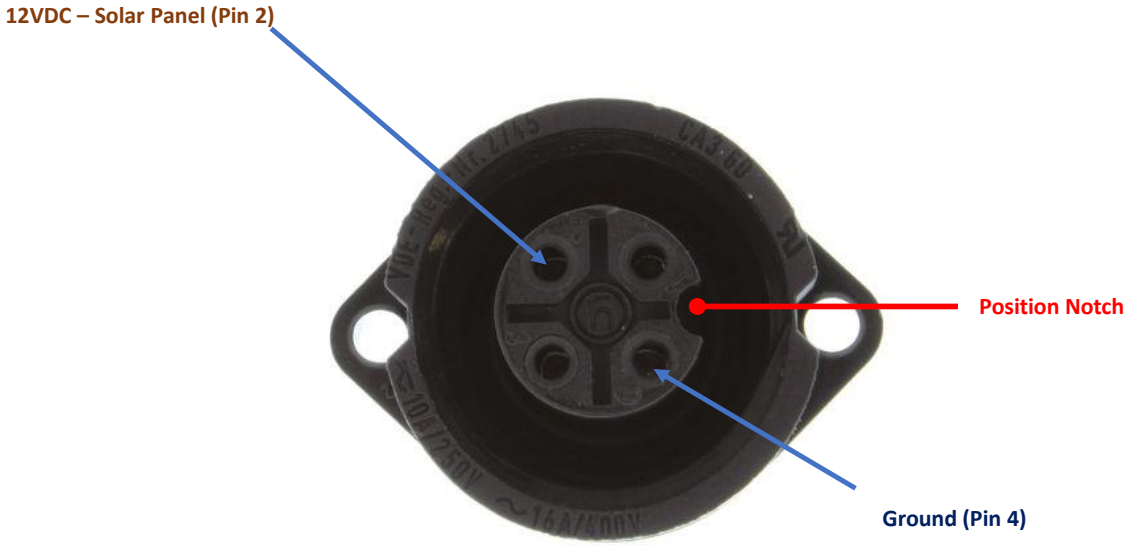
6.3 POWER SUPPLY

Socket Ref: 932321100 , Provider: Hirschmann

6.3.1 Solar Power supply (Ref: BGTW-4G-SOLAR-OUT)

Socket for solar power supply

BEANGATEWAY-4G-SOLAR-OUT



Ref: 932321100 , Provider: Hirschmann

Figure 7 : Solar Panel – wiring code

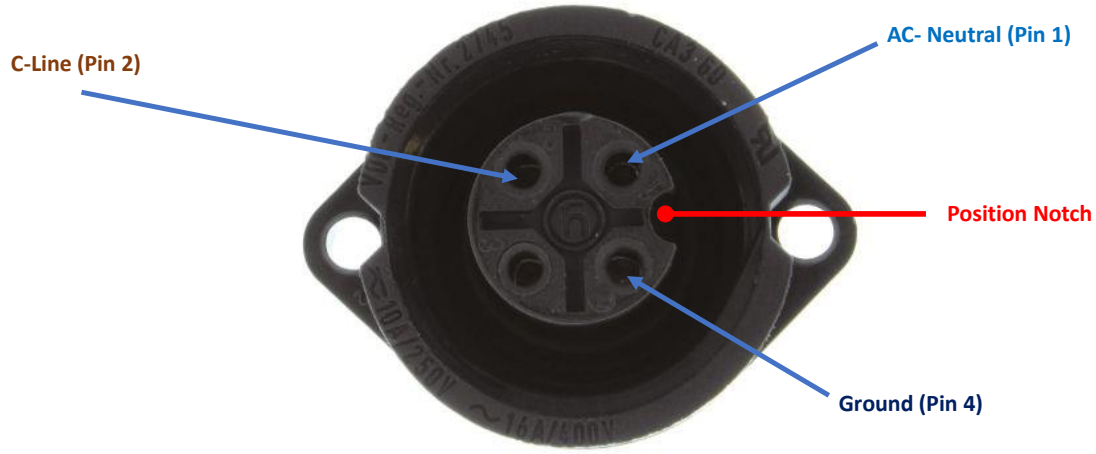
DC Power:

The solar power controller can work between **13VDC to 20VDC**, user can use an **AC/DC power adapter** in this voltage rating.

If the DC Voltage is less than 13VDC, the provided voltage will not be enough to power the Solar Power Manager

6.3.2 Mains power supply (Ref: BGTW-4G-MPWR-OUT)

Socket for Mains Power supply ***BEANGATEWAY-4G-MPWR-OUT***



Ref: 932321100 , Provider: Hirschmann

Figure 8 : Mains power supply – wiring code

Figure 9: Waterproof Plug

Plug Ref: 934124100, provider: Hirschmann

7. HOW TO SETUP A REMOTE ACCESS USING ADSL ROUTER?

7.1 REMOTE ACCESS OVERVIEW

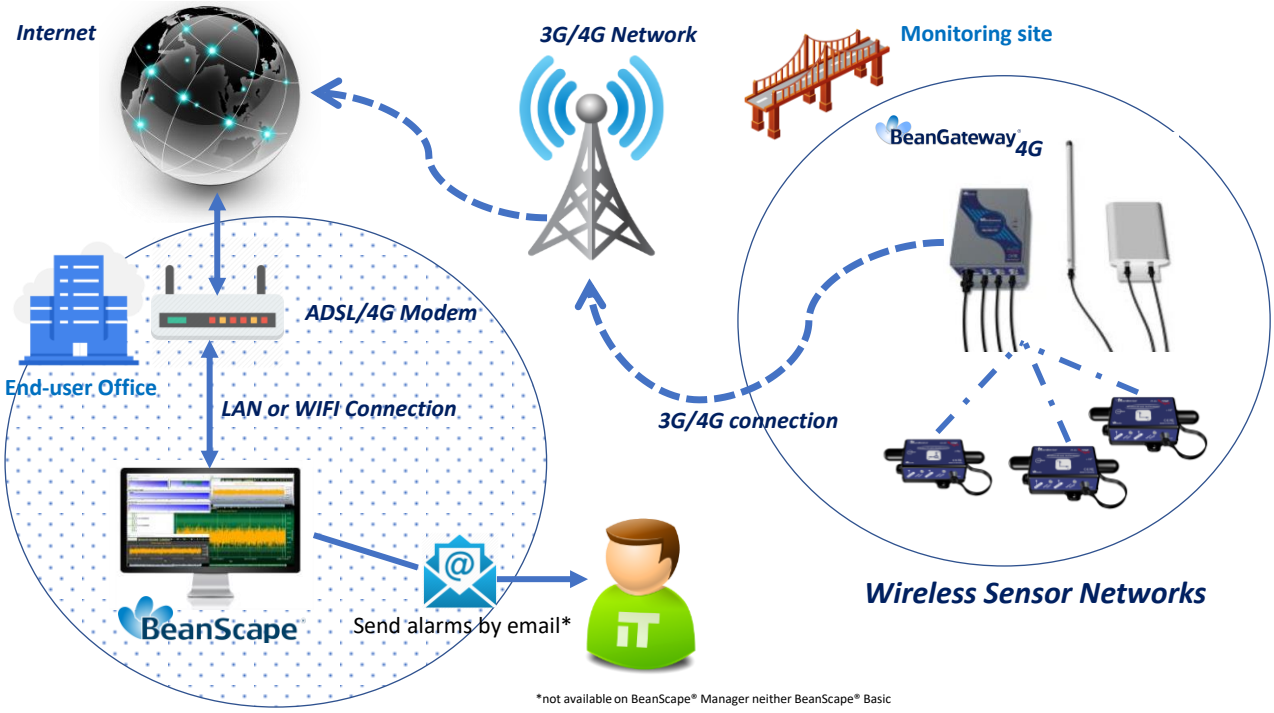


Figure 10: Remote access to monitoring site

Before to start to configure your remote access, make sure your Office router/ASDL Box should come with Fixed Public IP address to avoid losing the BeanGateway® whenever it reboots for any reason.

How to get a fixed public IP:

- ***If you are using an ADSL Router at your office: you can ask to your ADSL Router provider to allocate you a fixed public IP.***
- ***You can purchase a Data SIM card with fixed public IP from your ISP (Example: Olivia Wireless) . If you are using a standard SIM card, some PORTS can be blocked by the ISP.***

It's not mandatory to use a SIM card with fixed public IP on the monitoring site.

7.2 BEFORE TO START YOUR SYSTEM CONFIGURATION

We suggest you using a laptop to configure both 3G/4G Router and your wireless coordinator (BeanGateway®), in our case we will use Teltonika Router RUT240. Make sure to uninstall or disable any firewall/antivirus which can block the communication between the PC and these two devices.

There is a flat ethernet cable which is connecting the 4G Router to the wireless coordinator, use this cable for your configuration.

Install your BeanScape® 2.4GHz software on both Monitoring PC and your configuration Laptop.

It's highly recommended to configure and test all your equipment before to bring it on your monitoring site.

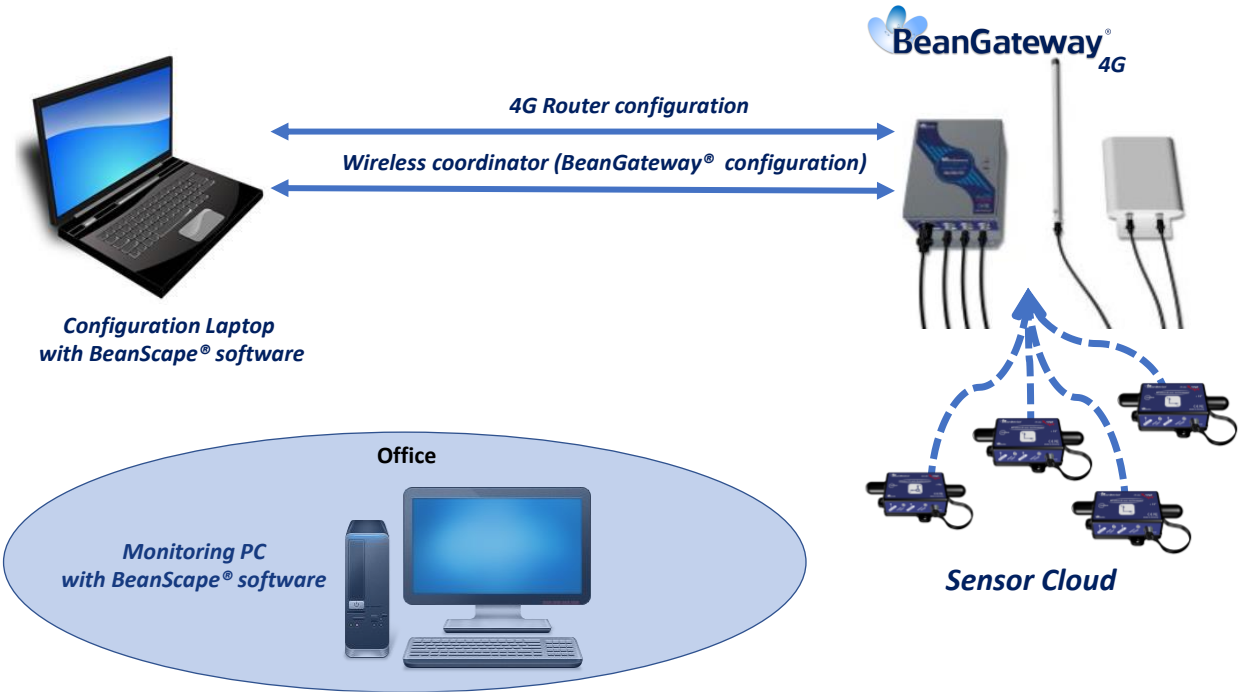


Figure 11: 4G Router and Wireless coordinators configuration

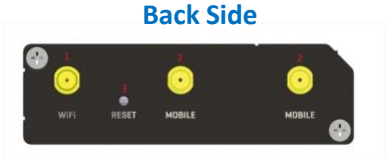
7.3 3G/4G ROUTER CONFIGURATION

7.3.1 Front and Back sides description

Front Side

Location	Description
1	LAN Ethernet Port
2	**WAN/LAN Ethernet Port (Covered, do not use)**
3	LAN LED
4	WAN LED
5	Power connector
6	Power LED
7	Signal strength indication LEDS
8	SIM card holder

Back Side



Location	Description
1	**WIFI Antenna connector (do not use)**
2	LTE Antenna connector
3	Reset Button

Figure 12: Front and Back panel description

- **WAN/LAN Ethernet Port should not be used. Don't try to connect your RJ45 Cable to this port**
- **WIFI Antenna connector should not be used, by default WIFI function is disabled on your 4G Router**

7.3.2 Connection status LED

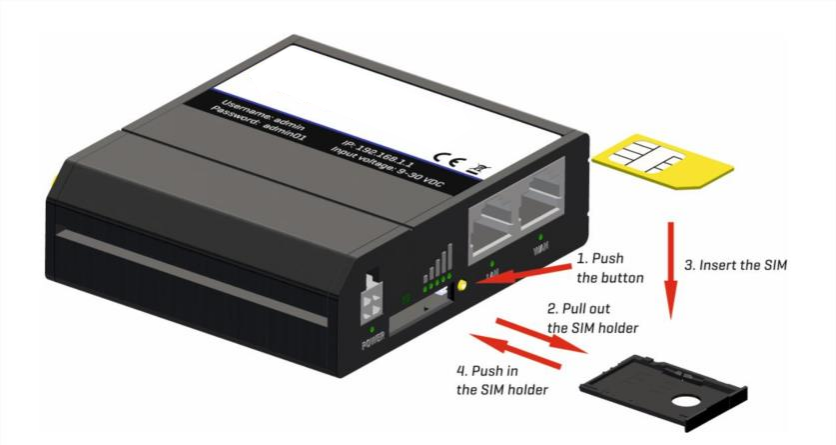
LEDS Display	Description
Signal strength status LEDS Turned on	Router is turning on
2G and 3G LED's constant blinking every 1sec	No SIM card or wrong SIM card
2G/3G LED's blinking every 1 sec	2G/3G connected but no data session established
Blinking from 2G LED to 3G LED repeatedly	SIM holder not inserted
2G/3G LED turned on	Connected 2G/3G with data session
2G/3G LED blinking rapidly	Connected 2G/3G with data session and data is being transferred

Figure 13 : 4G Router LEDS Status

7.3.3 SIM card Insertion

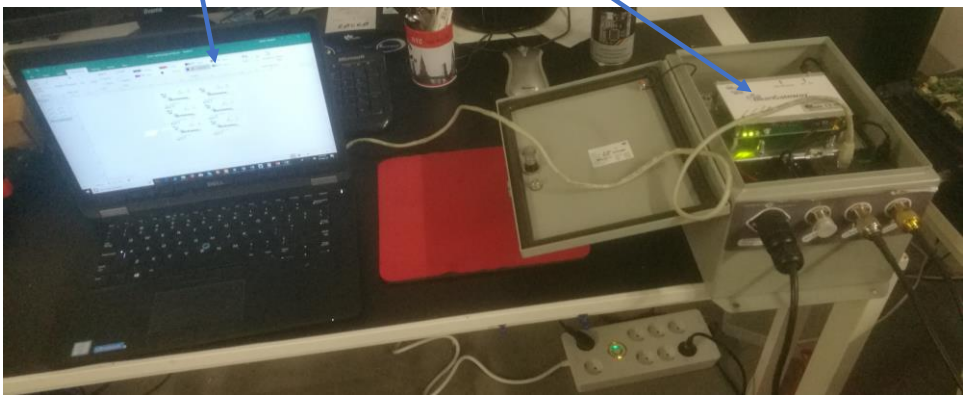
Insert SIM card provided by your ISP (Internet Service provider). Correct SIM card orientation is shown on the following picture:

Sim Card insertion



7.3.4 Logging to your 4G Router

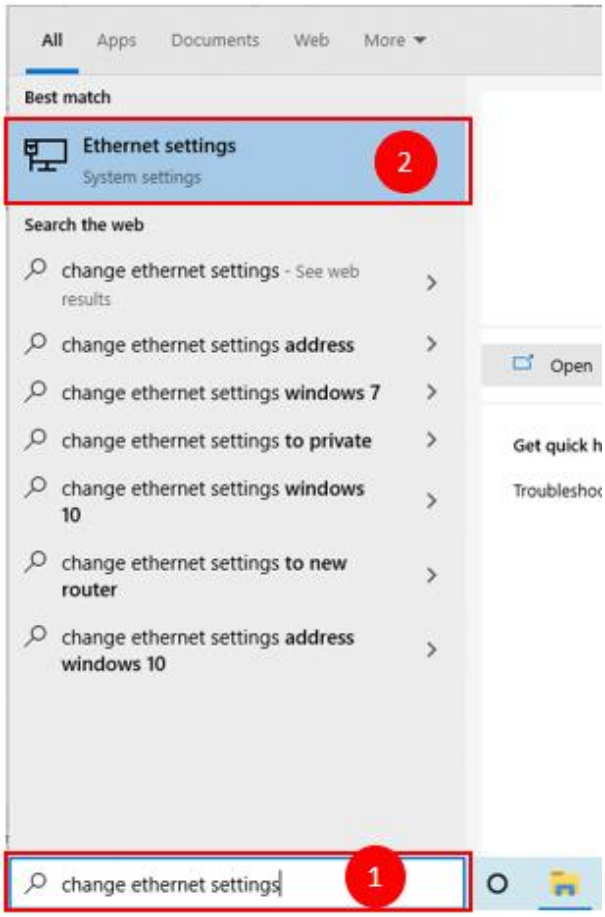
Plug the power adapter to your 4G Router, then use an Ethernet cable and plug it into the LAN Ethernet port of your Configuration PC



The Default 4G Gateway® IP address is **192.168.1.243**

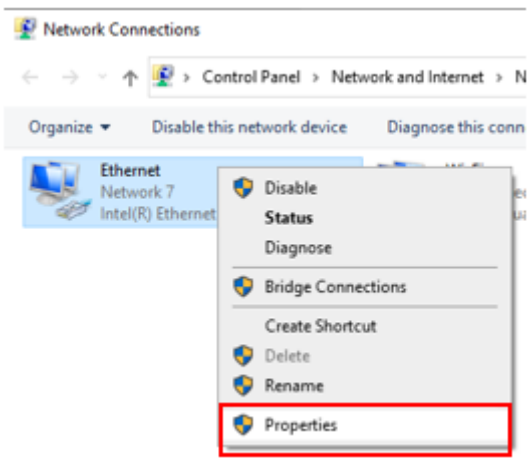
Assign a static IP address to your PC within the same subnetwork as your BeanGateway®

- In the search bar tap change ethernet settings, the click on open

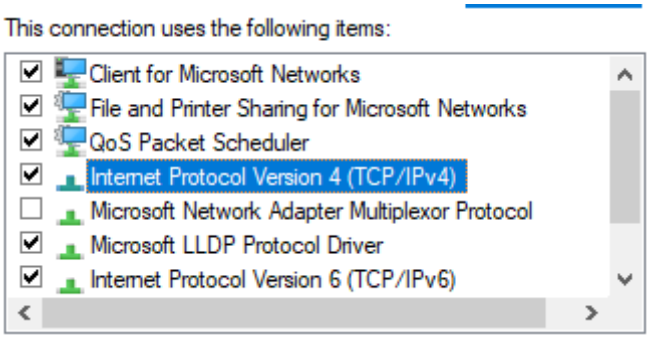


- Click on change Adapter settings

- Right click on the Ethernet device with is connected to your Gateway®, choose Properties

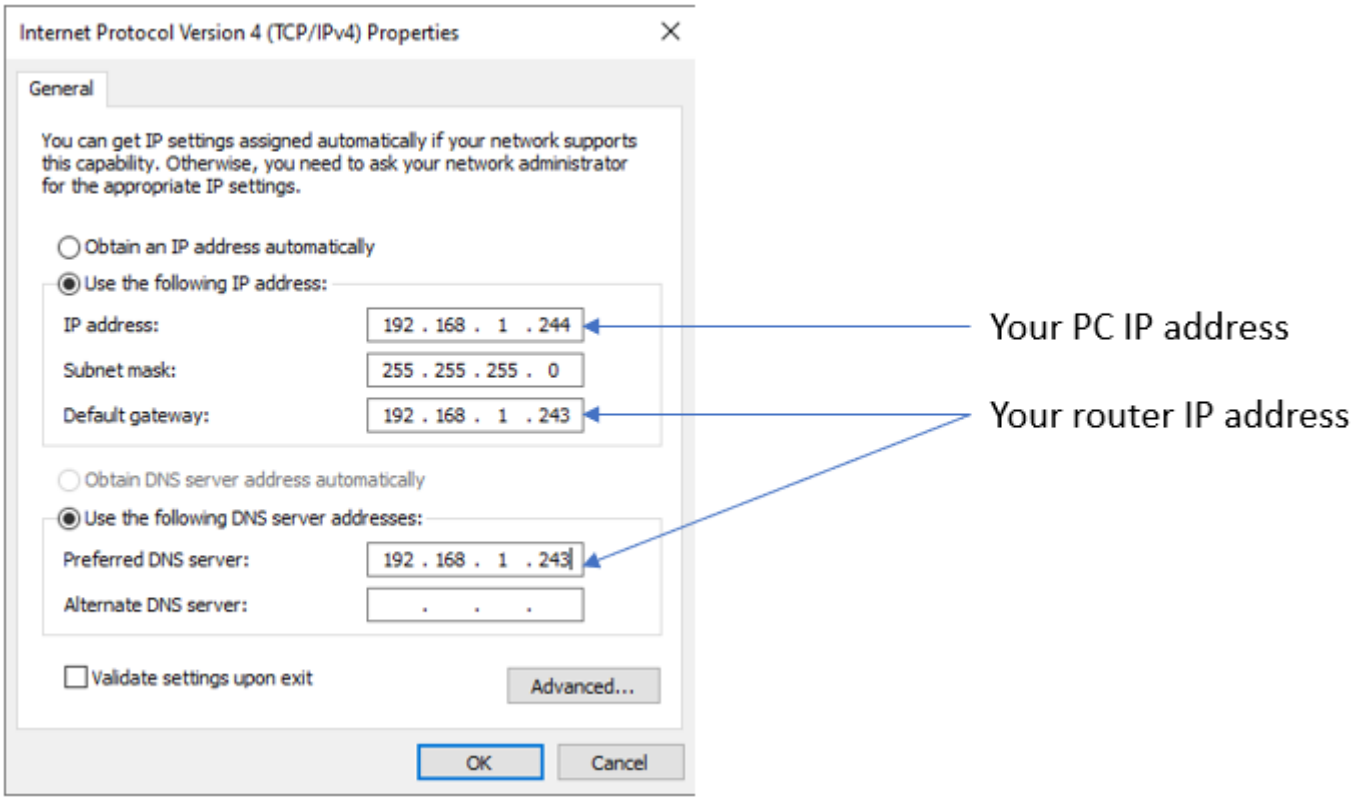


- Double click on Internet Protocol Version4 (TCP/IPv4)



- Enter the flowing settings:

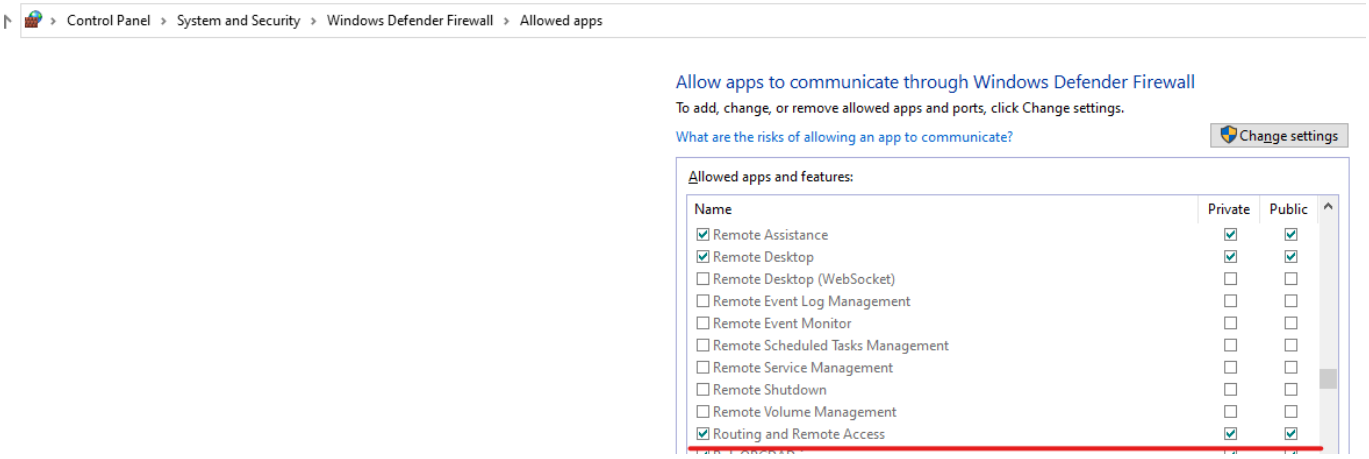
  - ✓ Enter any ip in the form of **192.168.1.XXX** where **XXX** is a number from **2** to **254** **(except 243 which is the router IP address).**
  - ✓ Enter 255.255.255.0 for your subnet mask
  - ✓ The default 4G gateway must come with the same IP address that your 4G Router **192.168.1.243**
  - ✓ Finally enter primary DNS server IP , the same than your 4G Router IP **192.168.1.243**
  - ✓ Click on OK validate your configuration



Once your PC and the 4G Gaetway® are connected to the same network, you can easily have access to the router.

7.4 STEP 1: AT YOUR OFFICE, CONFIGURE YOUR FIREWALL FOR REMOTE ACCESS

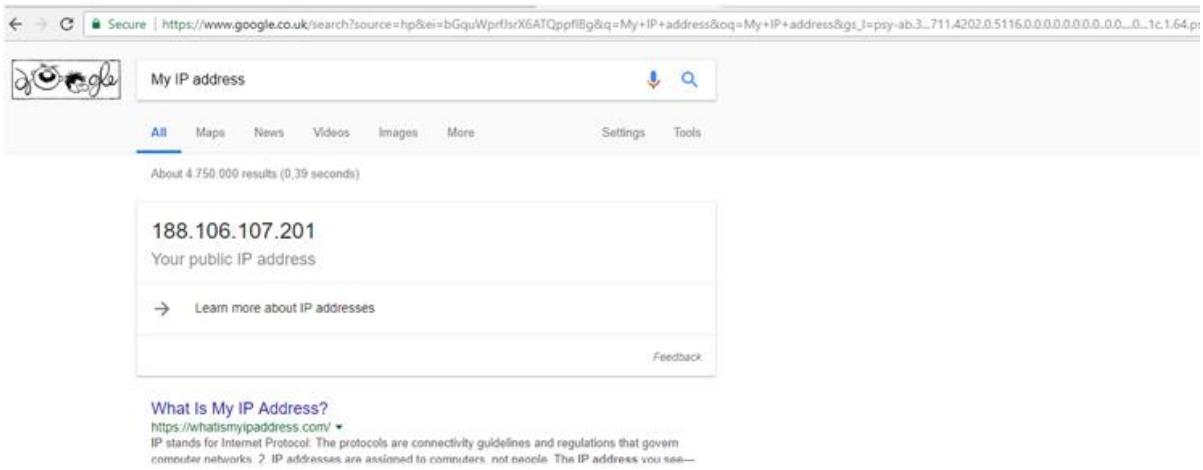
You have to enable Routing and Remote Access option for both Private and Public networks, communication through the firewall.



7.5 STEP 2: AT YOUR OFFICE, CONFIGURE IP FORWARDING RULES

7.5.1 Example with ADSL MODEM (NAT ROUTER Configuration)

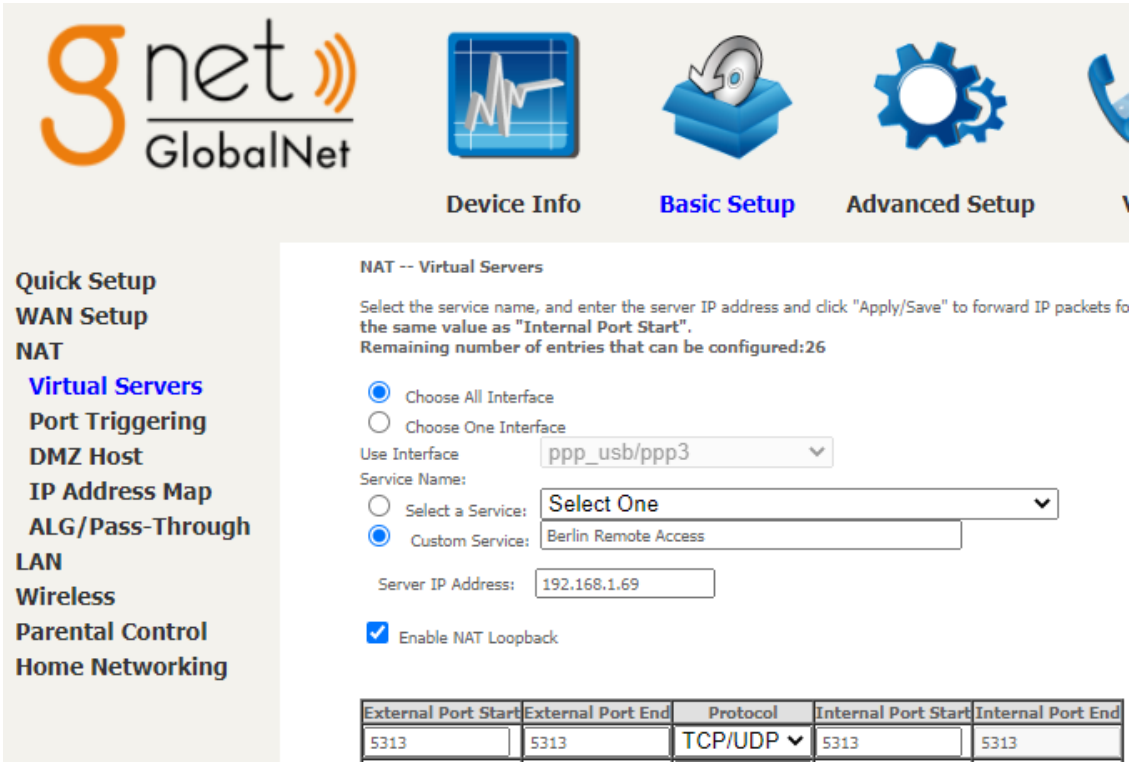
1. From your Office PC, search for your Public IP address (ex: search for MyIP on Google).



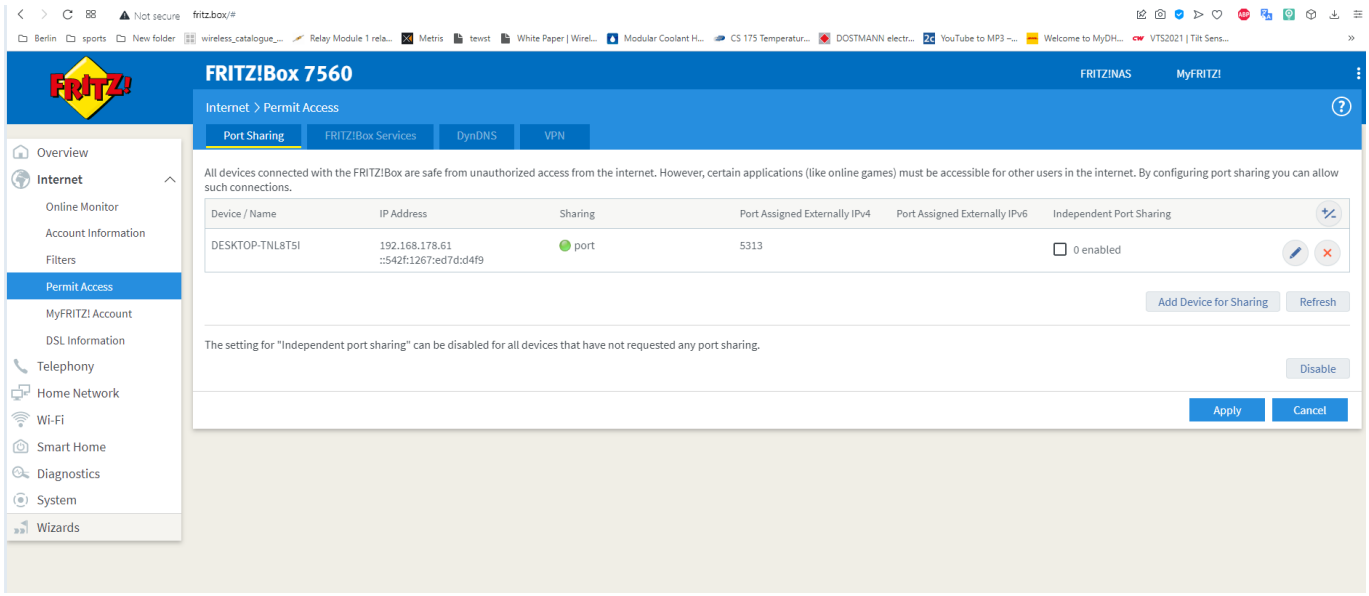
Make sure that no antivirus/firewall is blocking the Network activity between the BeanGateway® 2.4GHz and the BeanScape® 2.4GHz

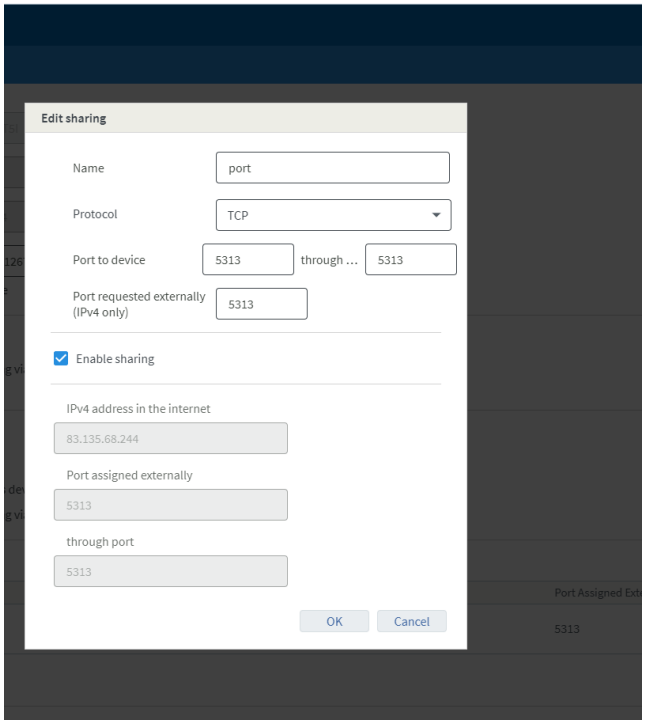
2. Setup a Port Forwarding configuration on your Router (each router brand has its own configuration interface).

Example 1: GlobalNet ADSL Router Webserver configuration (North Africa)



Example 2 : Fritze Box (Germany)





Please be aware if the public IP Address of your ADSL Box is not fixed, you will lose the connection between the BeanGateway® and your Monitoring PC (at the office), whenever the router reboots. If you are not sure to have a fixed public IP, we suggest you use a 4G Router and a SIM Card with a fixed public IP.

7.5.2 Example of 4G Router (SIM CARD Provider Olivia wireless)

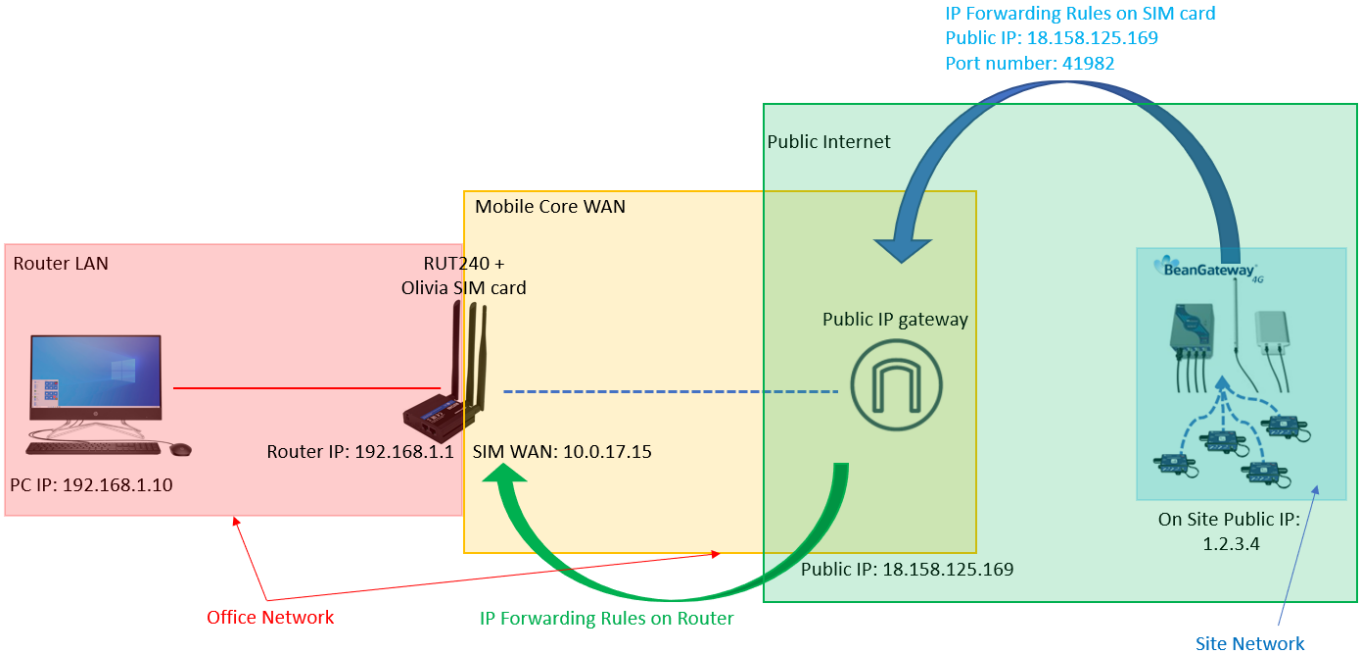
if you have a 4G router with a SIM card at your office, make sure that the SIM card comes with a Fixed Public IP address and your ISP provider doesn't restrict any port numbers.

In this example we will work with Olivia Wireless SIM card which comes with a Fixed public IP address.

7.5.2.1 System Architecture

Olivia is using a Public Gateway in its system architecture, in order to allow users on the internet to reach the SIM directly.

The Public Gateway is simply a port forward service that's why you have to create a port forwarding rules on both **SIM Card platform** and also on **your office router**.

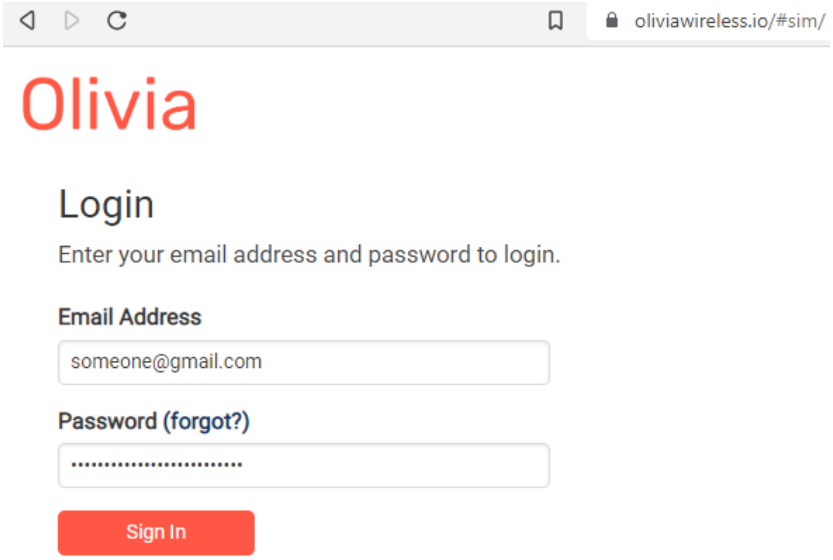


Please follow these steps to correctly configure the system.

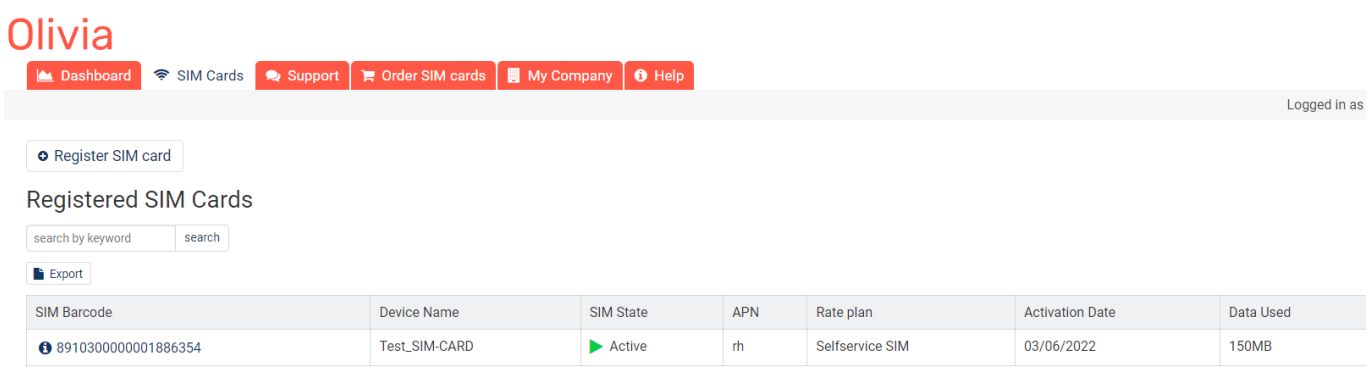
- **Step 1: Verify that Public IP routes service is enabled on your SIM card**

We assume that you have already purchased the Fixed public IP service when you set up the payment method.

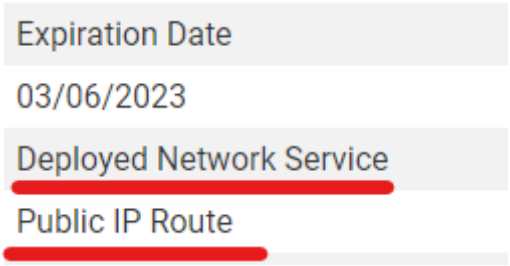
To verify that the Fixed Public IP address service is enabled, please login to your SIM Card platform



Then go to the tab SIM Cards.



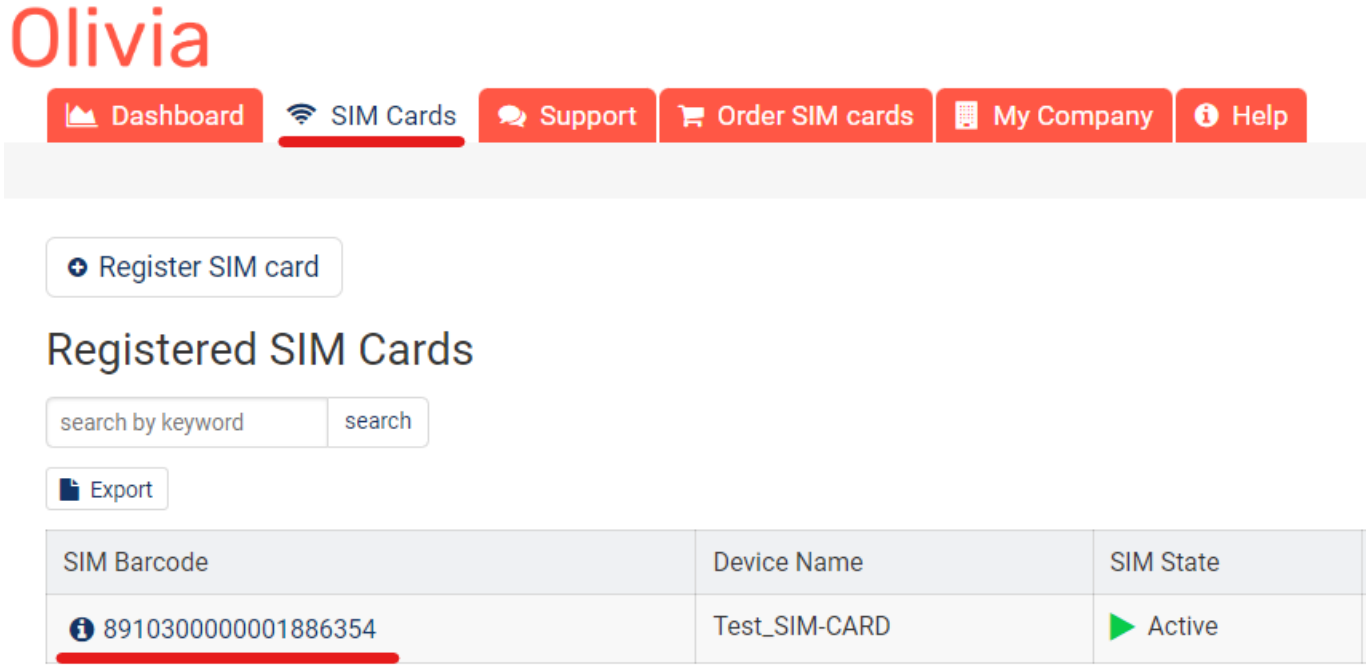
You should see "Public IP Route" noted under "Deployed Network Service" on the SIM cards details page.



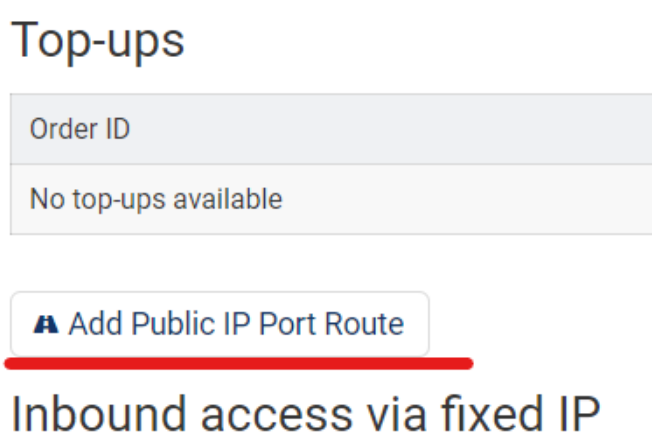
If it's not the case you have to enable it before proceeding.

- **<u>Step 2: Setup Port Forwarding on the Public IP Gateway (SIM Card)</u>**

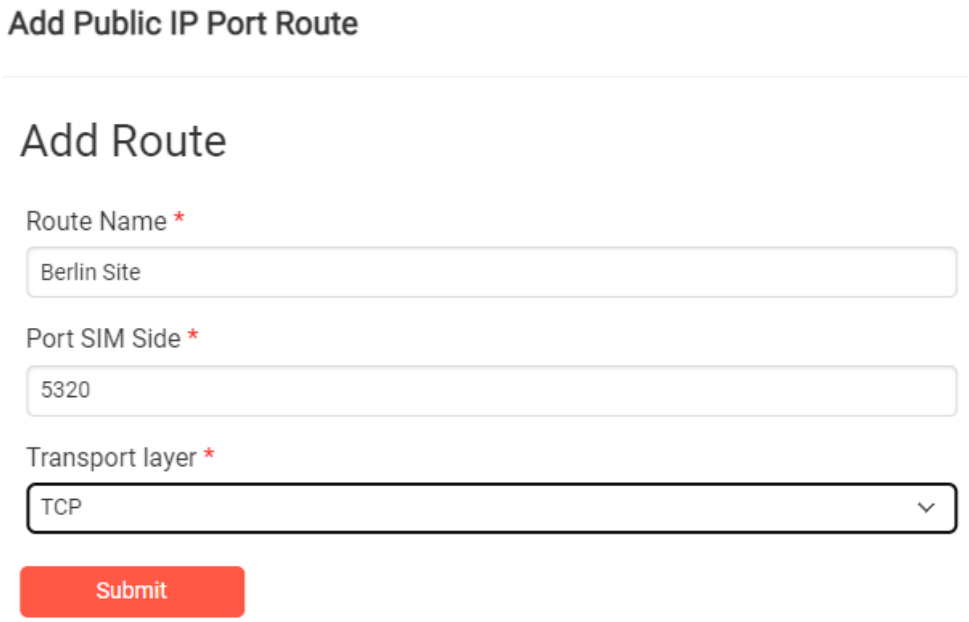
Navigate to "SIM card" and click on the SIM barcode



Then click on ADD Public IP Route



- Give your route a recognizable name, Enter the port you would like to reach on the SIM/Router then select the protocol (usually TCP) and click 'Submit'.
- Create the PORT ID of your SIM card **(avoid ports 22, 80 and 443)**



A random port on the gateway will now be locked to be used with your SIM card

Routes Name	SIM IP	Port SIM Side	Public IP:Port	Delete
Berlin Site	10.0.17.15	5320	18.158.125.169:41988	

IMPORTANT :

- **The PORT ID of your SIM card will be used to create the IP Forwarding rules on your LTE Router running at the office.**
- ***Note the Public IP and the PORT number, it will be used during your BeanGateway® configuration on your monitoring site.***

- **Install the SIM Card on the router and Configure the Mobile Network**

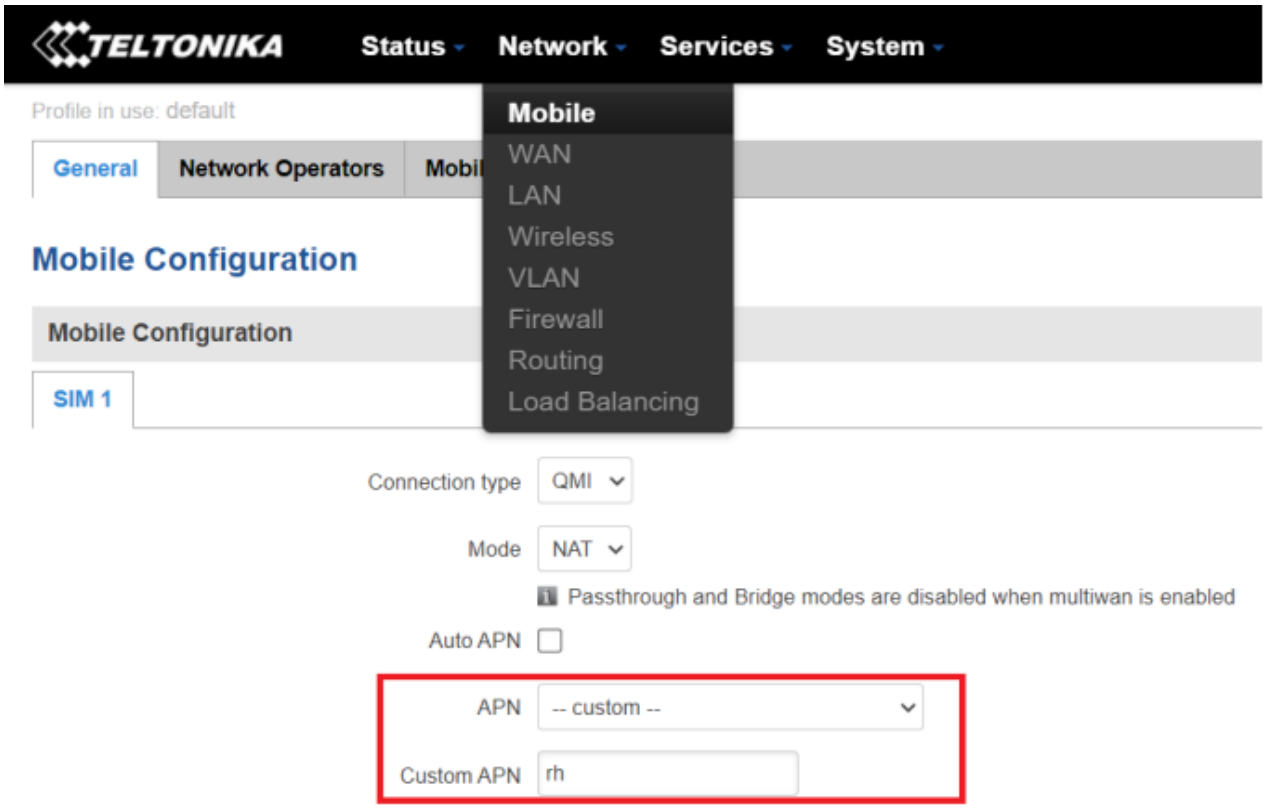
In this example we are using Teltonika Router RUT240, but the steps are similar for different types of routers.

Insert the SIM Card into your Router then use the corresponding User Name and Password to log in.

Then Navigate to Network → Mobile, then Enter the following configuration

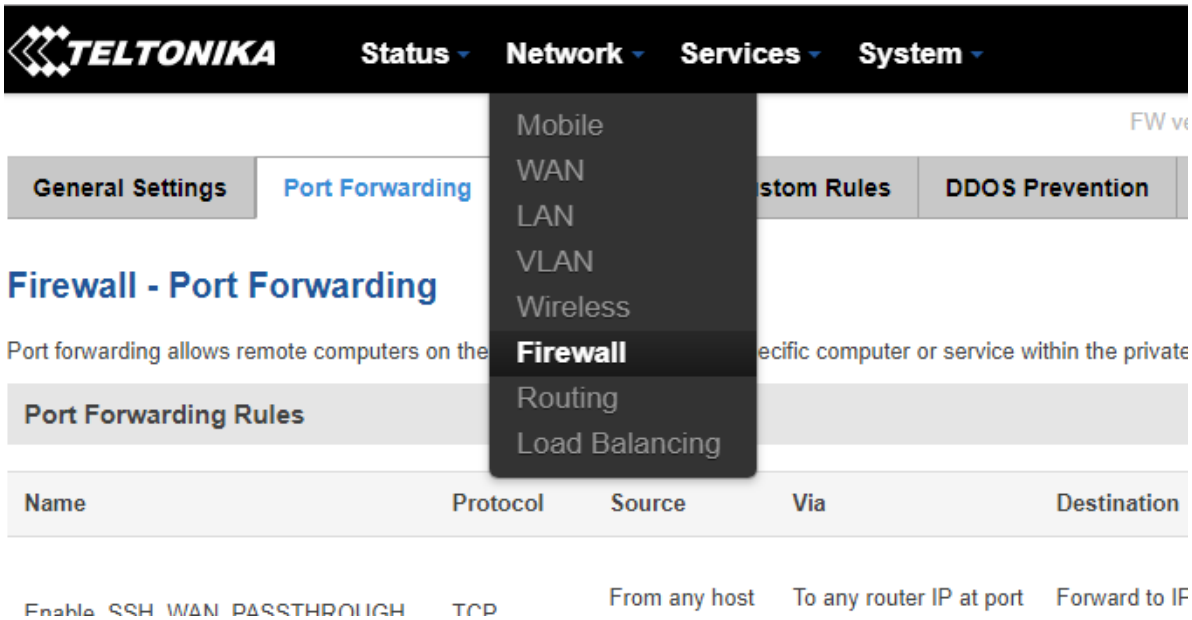
- APN: --custom–
- Custom APN: rh

And Keep all the other settings on default then click on save.



- **Step 4: Setup Port Forwarding on the router**

Login to your router, then navigate to Network → Firewall → Port Forward

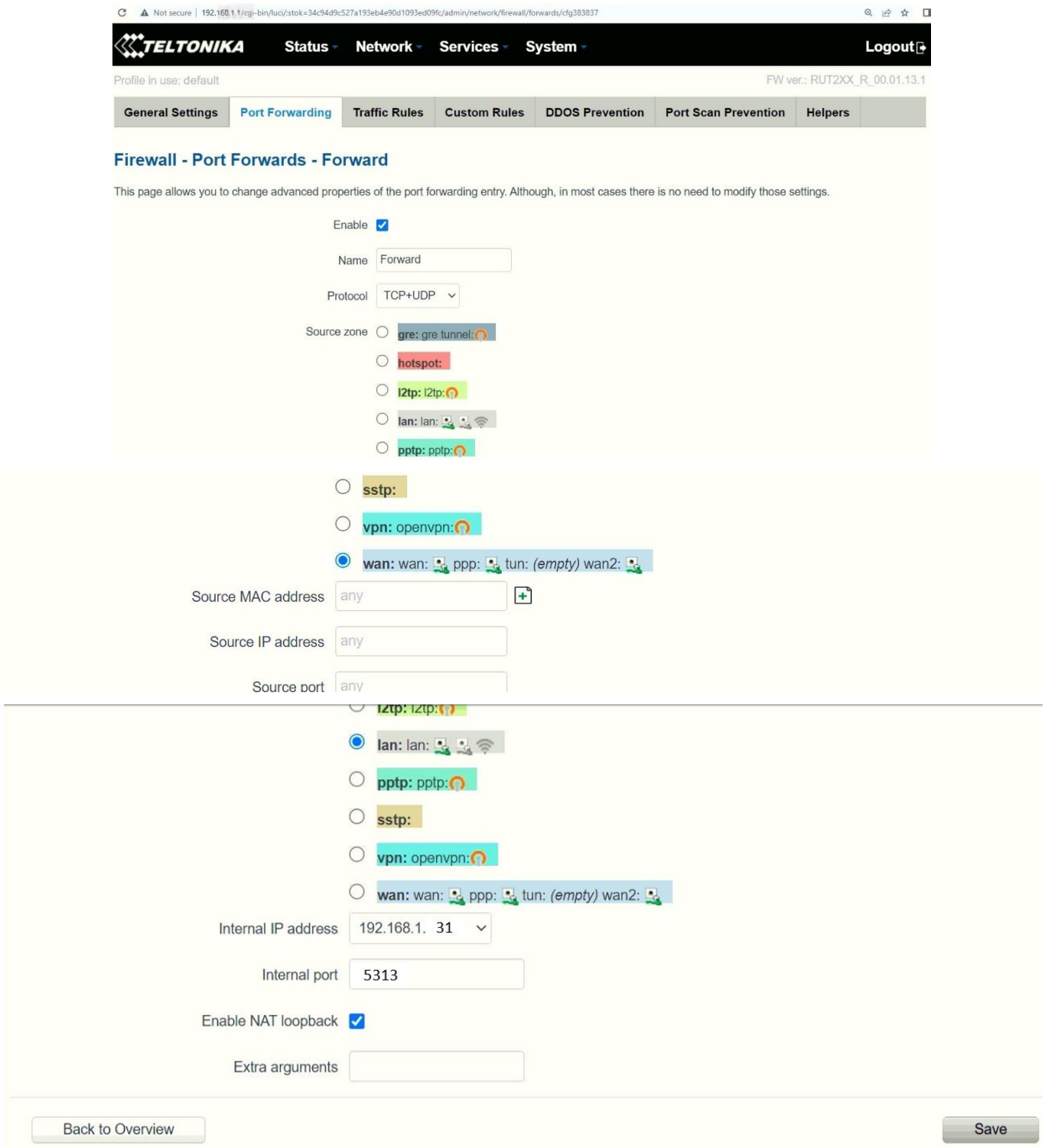


Scroll down to New Port Forward Rule and set the following

- Name: Any recognizable name
- Protocol: **TCP+UDP**
- **External port** (s): **SIM Card PORT ID** in our case **5320 (avoid ports 22, 80 and 443)**
- Internal IP: Select the IP of your PC
- **Internal port** (s): Any port on which you want to access (Port used on BeanScape software) **5313**

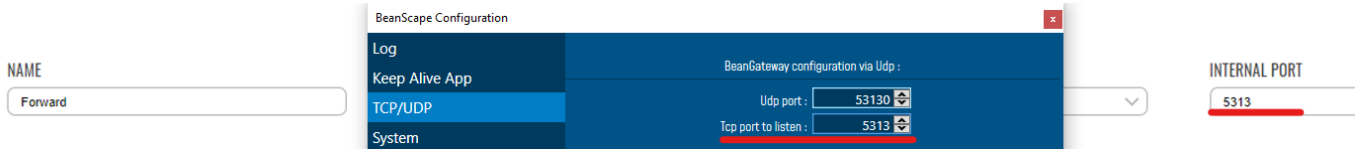
You can click on **edit** to see the configuration details.

Make sure that the port forwarding rule is configured from WAN: External Port (or Sourec Zone) to LAN: Internal Port.



7.6 STEP 3: AT YOUR OFFICE, CONFIGURE THE PORT NUMBER ON YOUR BEANSCAPE®

On your office PC don't forget to put the BeanScape TCP port number the same as the internal Port TCP number chosen in the router port forwarding configuration rule.



If you change the default TCP port on BeanScape software to another port number different than 5313, you have to restart the server to establish the connection with the monitoring site.

7.7 STEP 4 : BEANGATEWAY® CONFIGURATION ON THE MONITORING SITE

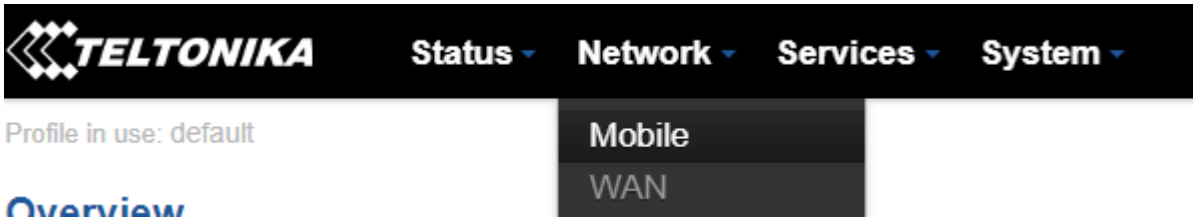
Now that you have your Public Fixed IP of your BeanScape® software running at your office. You can start to configure your BeanGateway® and LTE Router running on the monitoring site.

7.7.1 Sim card configuration

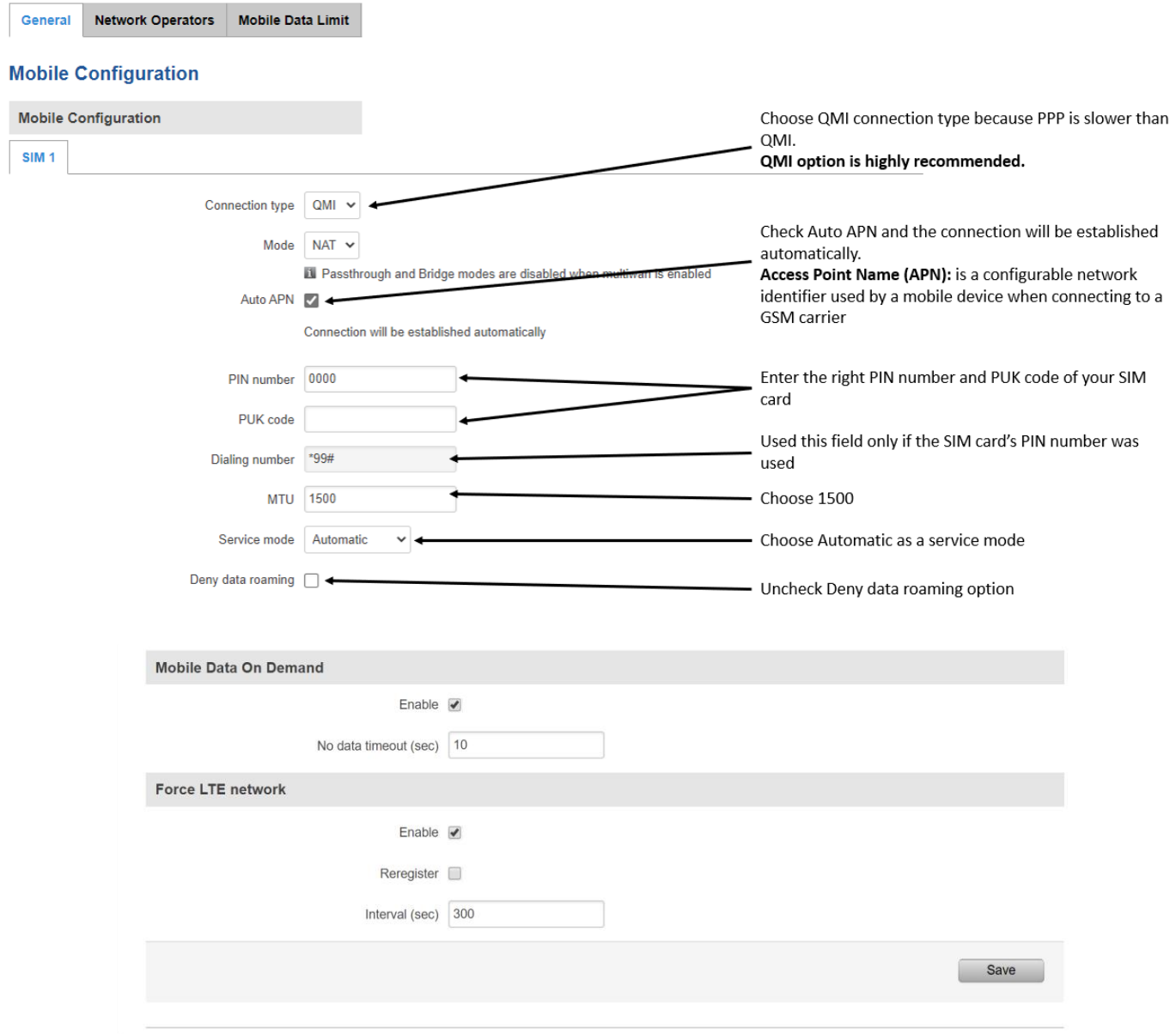
Use your browser on your PC and log in to the router using the following settings:

- IP address: 192.168.1.243 (tap it in google search bar)
- Username: admin | password: Beanair2020!

To configure your 4G/LTE Router go on **Network** then Click on **Mobile**



Now configure your mobile settings as follow

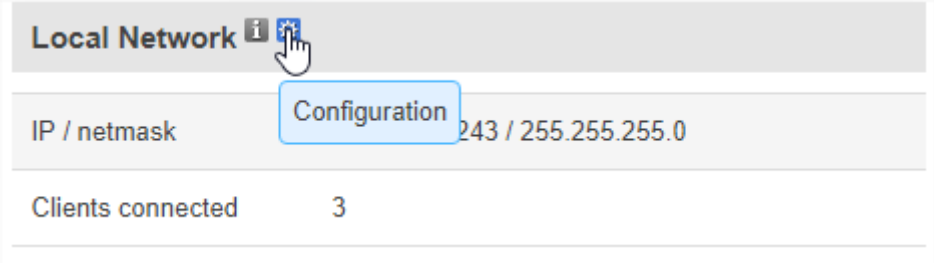


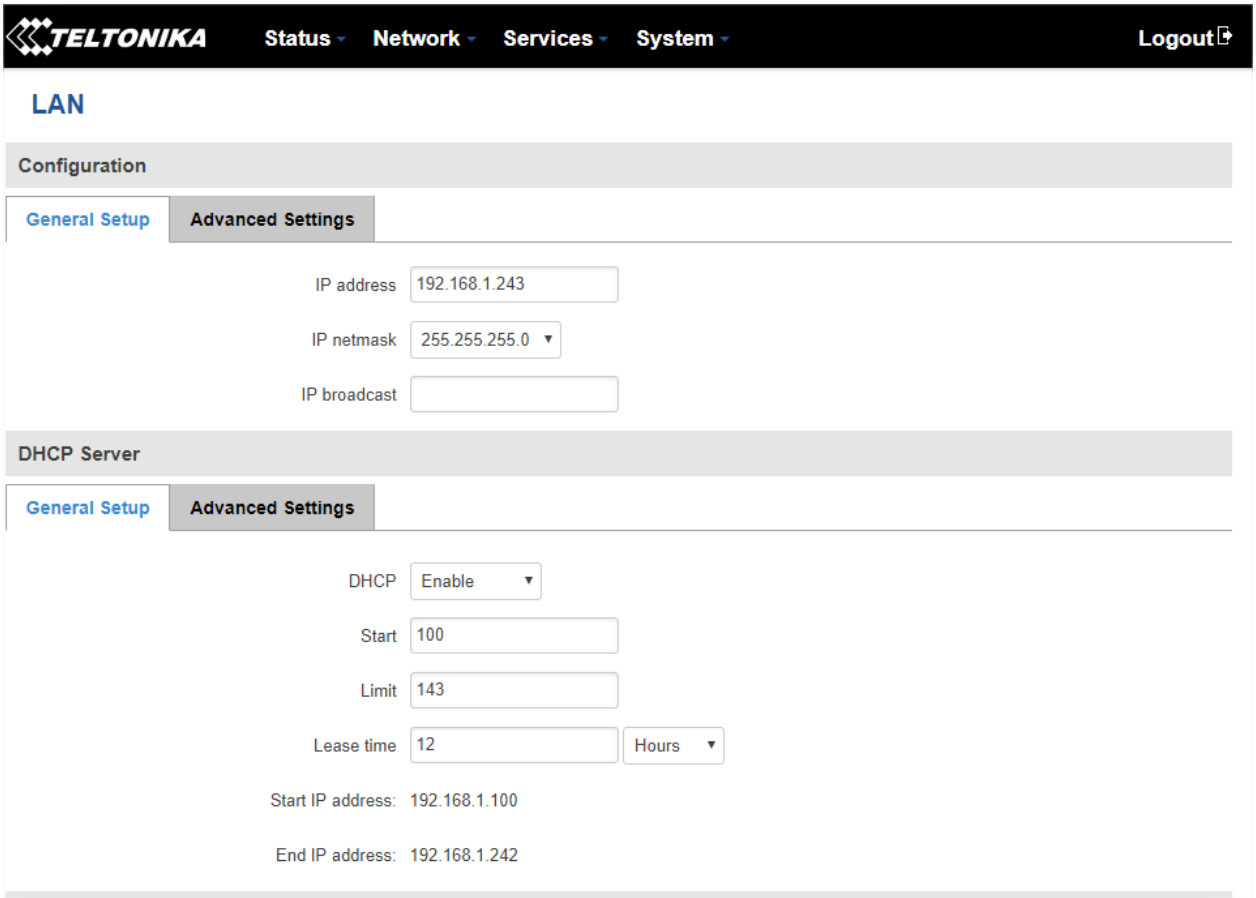
You can get the APN ID from your telecom operator provider

If an invalid PIN number was entered (i.e. the entered PIN does not match the one that was used to protect the SIM card), your SIM card will get blocked. To avoid such mishaps, it is highly advised to use an unprotected SIM. If you happen to insert a protected SIM and the PIN number is incorrect, your card won't get blocked immediately, although after a couple of reboots OR configuration saves it will.

7.7.2 Make sure the DHCP is enabled on your LTE router

LAN IP address should be 192.168.1.243 by default and if this is not the case for whatever reason ,you will need to set it back to 192.168.1.243 in the configuration panel you can find in the overview page



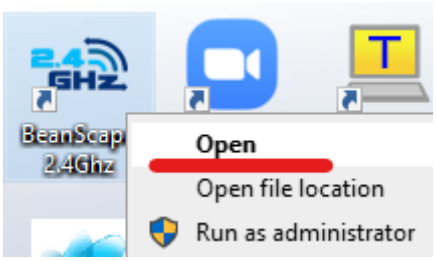


7.7.3 BeanGateway® 2.4GHz configuration with Public IP of your Office PC

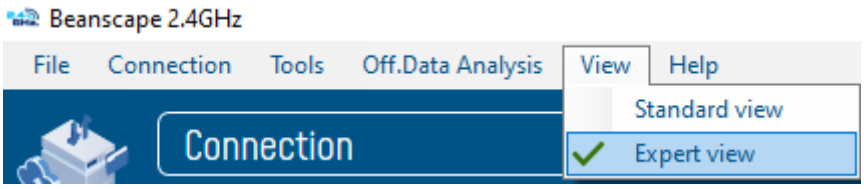
Now that your LTE Router is configured with your SIM card, it's time to configure correctly your BeanGateway® 2.4GHz.

Right after connecting your BeanGateway® 2.4GHz to your PC via the LAN cable,

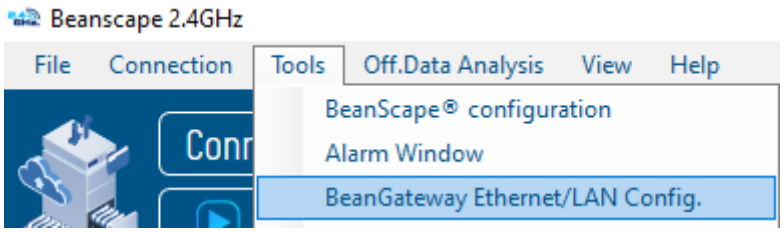
1. Right click on your BeanScape® software icon then click on Open



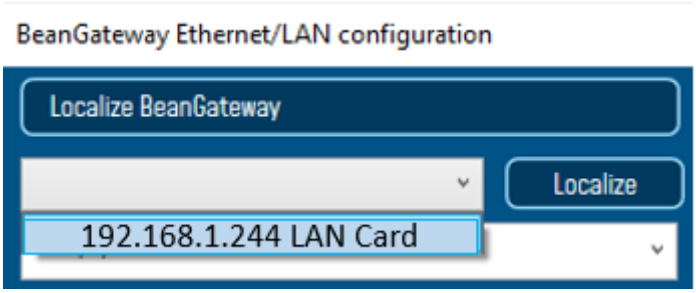
2. Switch to Expert view



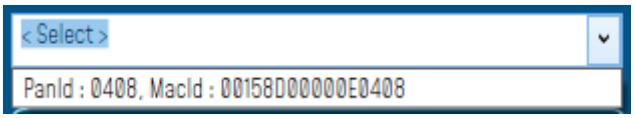
3. Navigate to Tools → BeanGateway Ethernet/LAN config



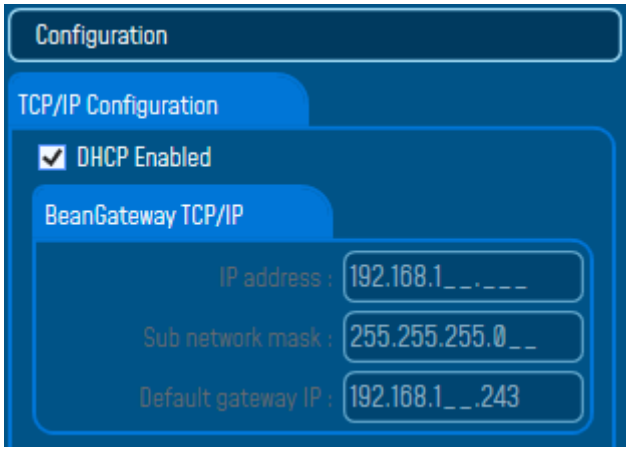
4. Select your LAN card IP Address (192.168.1.244), then click on Localize



5. After Localization process, select your 4G BeanGateway® MAC ID



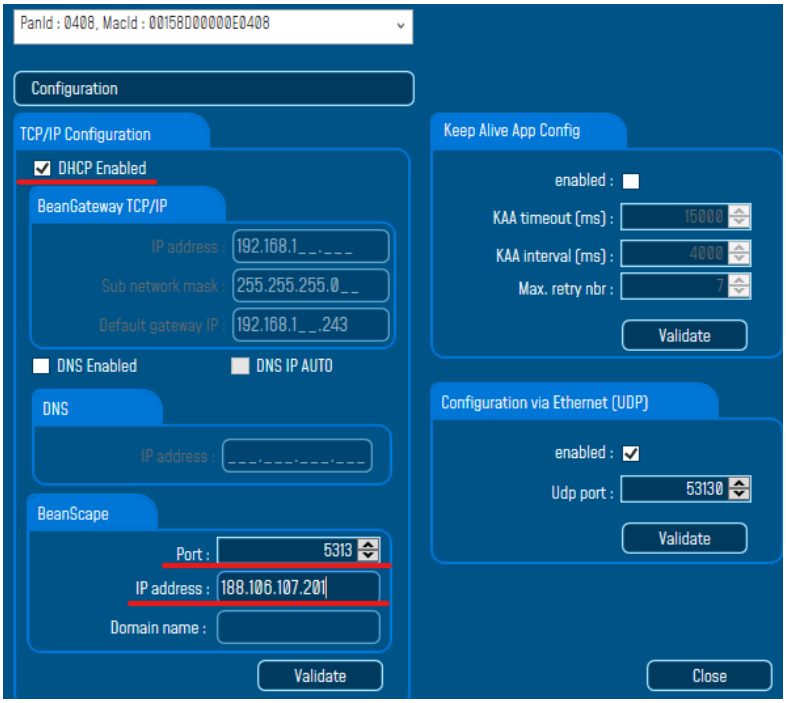
6. Check DHCP option to assign an automatic IP address to your BeanGateway®, then click on validate



7. On BeanScape® frame:

- **Case 1 - If you are using a ADSL Router at your office**

Make sure to allocate the Public IP of the PC Hosting Beanscape software (you will get your Public IP from step 2) . In this case the Public IP is 188.106.107.201

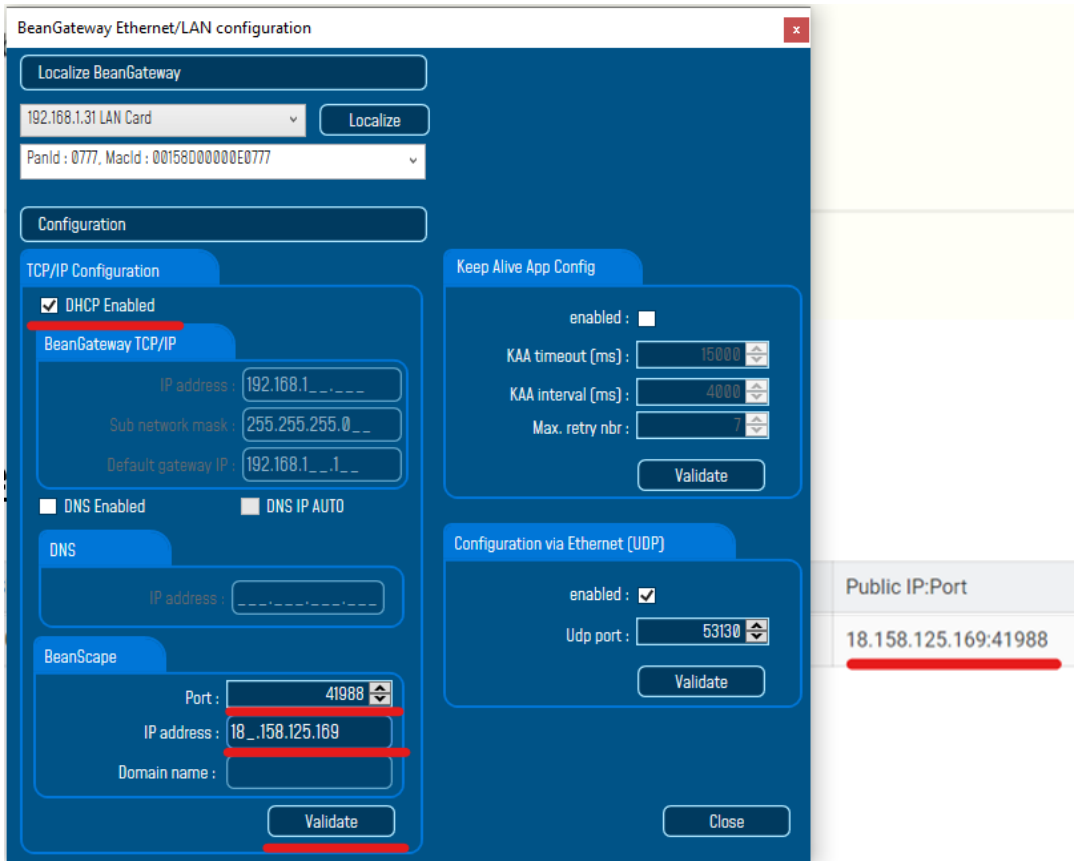


<u>Case 2 - If you are using a LTE Router with a Data SIM CARD (example of Olivia Wireless SIM CARD)</u>

To forward data communication of your BeanGateway® to your Office PC, enter the **Fixed Public IP address which was created on the SIM Card** before and **its corresponding TCP Port number**.

Example of IP forwarding Rules created on the Router

Routes Name	SIM IP	Port SIM Side	Public IP:Port	Delete
Berlin Site	10.0.17.15	5320	18.158.125.169:41988	



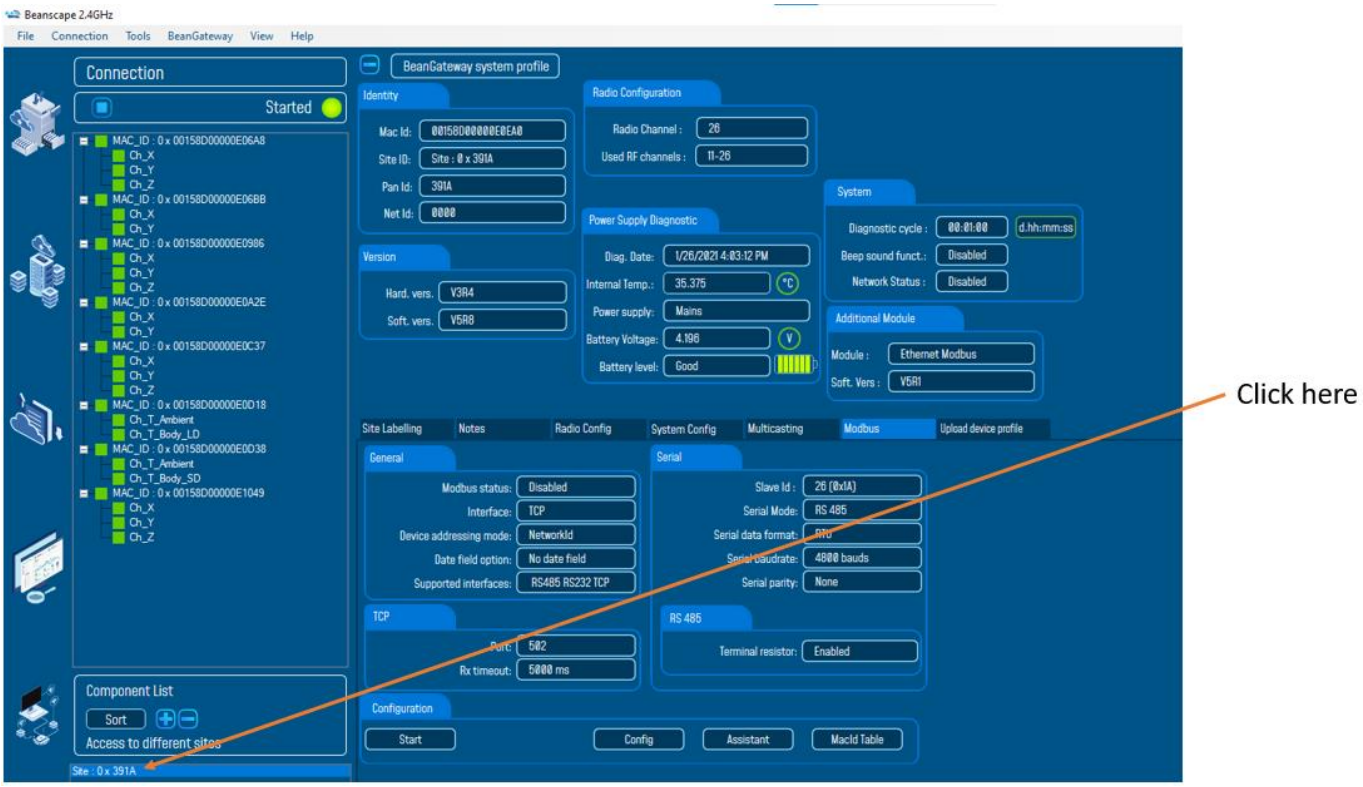
Make sure to use the Fixed Public IP address and the TCP Port number which are created on the SIM Card rule.

Do Not use Google to search for your Public IP address, it will give you the IP address of the roaming ISP provider and the remote configuration will not work.

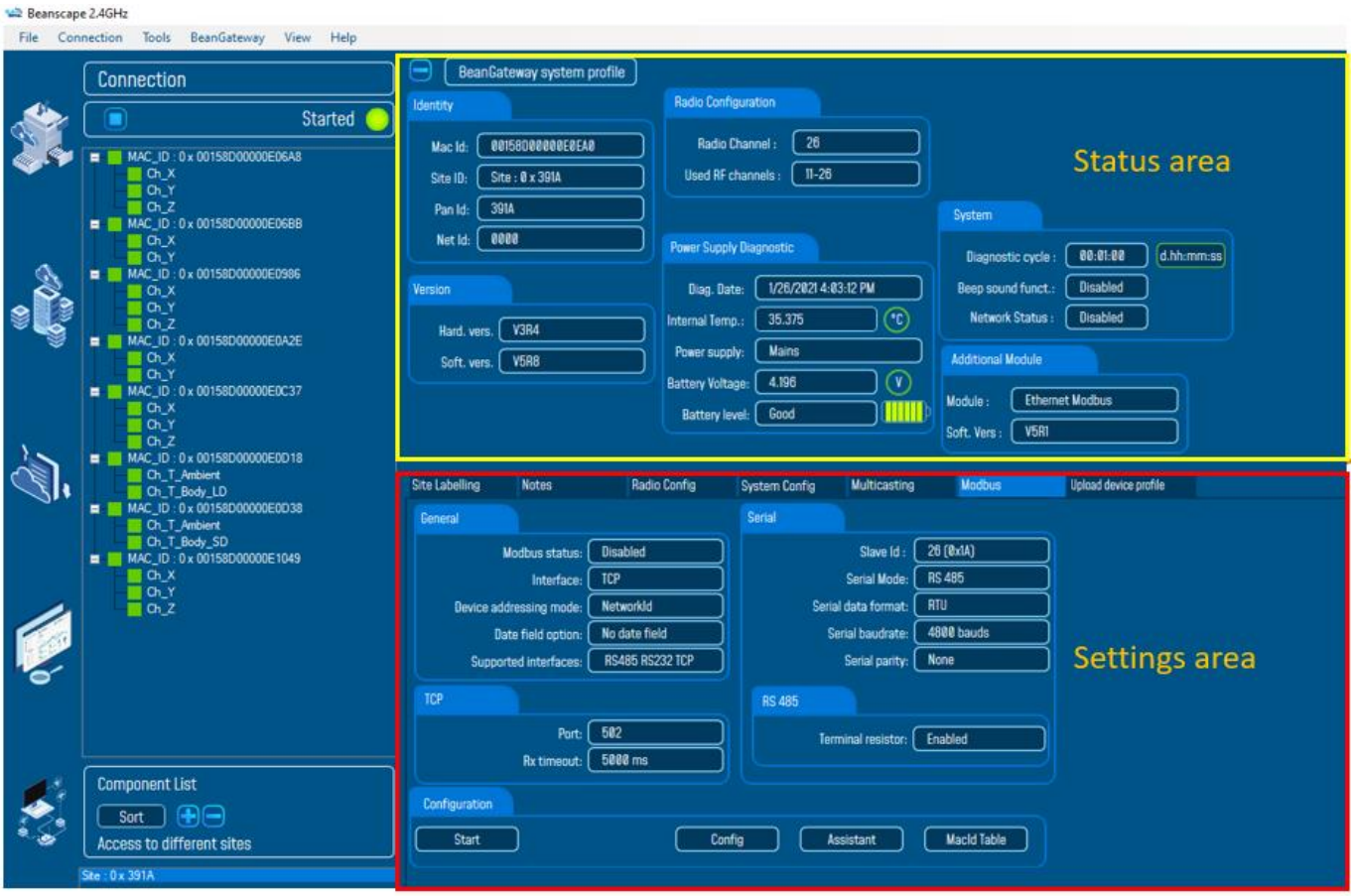
8. BEANGATEWAY®- WIRELESS COORDINATOR PROFILE DESCRIPTION

Click on a ***BeanGateway® 4G*** network coordinator located on the lower left window.

The ***BeanGateway® 4G*** is identified by its PAN ID.



✓ You will see the following window:



The BeanGateway® 4G profile is divided into two frames:

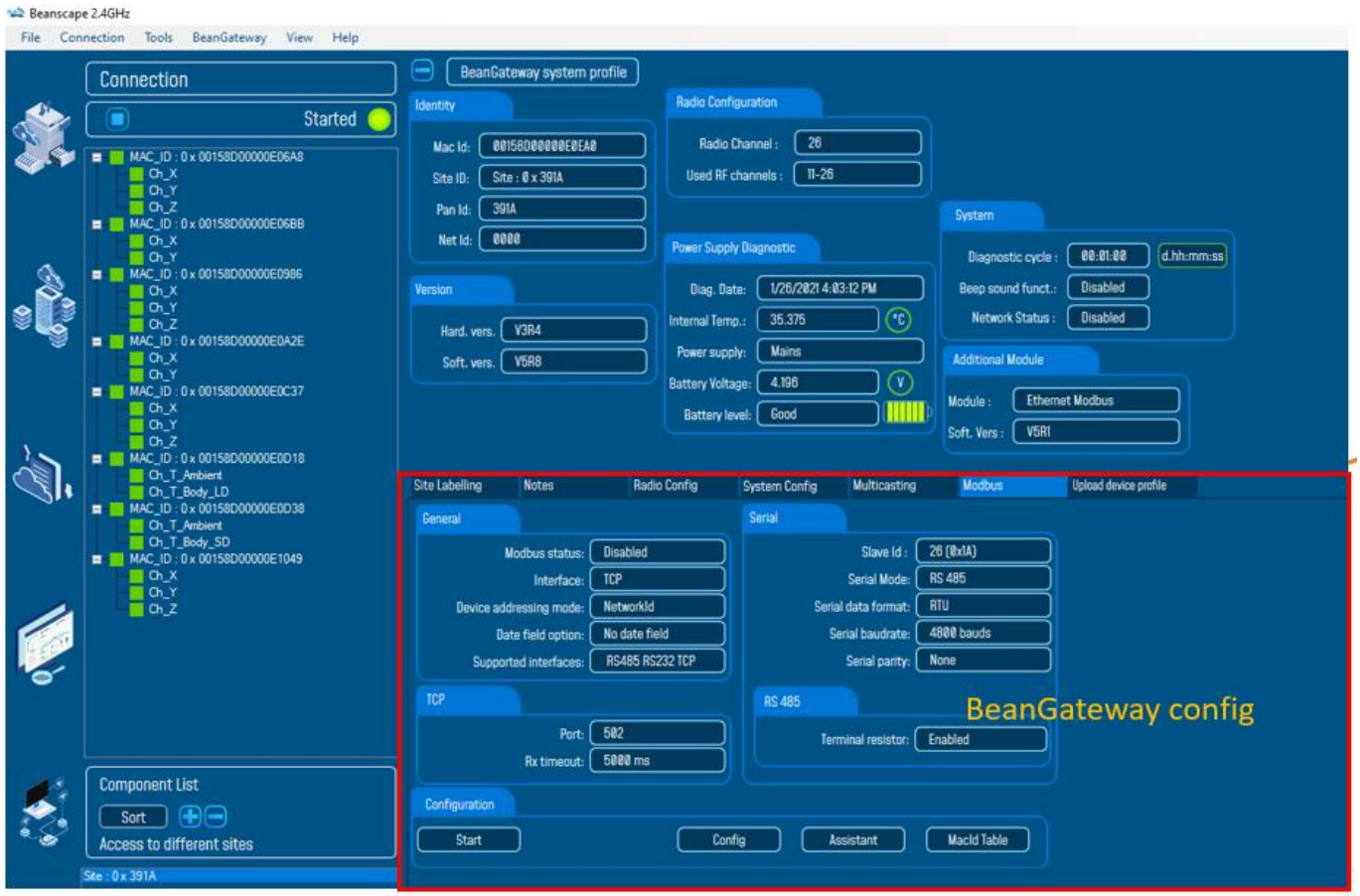
- ✓ Profile Area
- ✓ Settings area

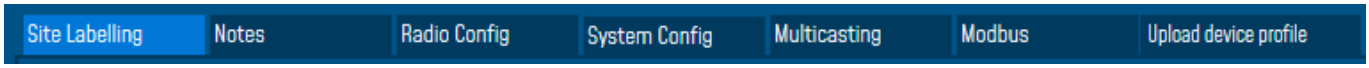
8.1 STATUS DESCRIPTION

1	This frame displays all the ID allocated to the BeanGateway®: • **MAC Address (encoded on 64-bits): MAC Address (encoded on 64-bits):** The Media Access Control address is a unique identifier assigned to the BeanDevice® by the manufacturer for identification. • ***PAN Address (encoded on 16-bits):*** Personal Area Network address. • **Network Address on 16-bits:** This address is allocated by the BeanGateway® when you start the network. • **Label:** By default the MAC address is registered as a Label. This label can be changed by the user.
2	***Radio configuration:*** • ***TX power:*** Displays Radio TX Power in dBm (antenna power is not included) • ***Radio channel:*** used (Radio Channel between 11 and 26) • ***Used Radio Channels***: Authorized RF Channels are displayed here;
3	This frame displays the BeanGateway® version: • ***Hardware version***: BeanGateway® hardware version • ***Software version:*** BeanGateway® software version • ***Module:*** Additional module • ***Soft. version:*** Software version of the additional module
4	Battery status frame. See next section.
5	• ***Diagnostic Cycle***: **Displays diagnostic cycle in seconds (battery charge status, internal temperature, LQI, PER…).** • ***Beep sound funct.***: Displays buzzer status • ***Network Status.***: Displays network status
6	• ***Temperature***: Internal temperature of the BeanDevice® with a resolution of 0,125°C • ***Power supply Status***: Main or Battery • ***Power mode***: active / sleep with network listening / down • ***Battery voltage***: Battery voltage in Volts • ***Battery level***: Battery charge level, 0 to 100% with a resolution of 0, 01% • ***Diag Date***: Displays the last diagnostic date

Figure 14: Status Description

8.2 USER-CONFIGURABLE PARAMETERS

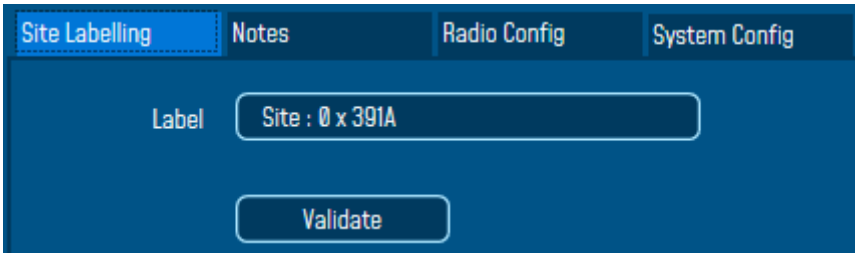




Frame	Description
Site Labelling	Customize the BeanGateway® label
Notes	This area contains the notes related to the BeanGateway®.
Radio Configuration	Radio parameters configuration (RF channels, Energy Scan, PAN ID….)
System configuration	System configuration (Diagnostic cycle, Nwk deletion, Post system clock…)
Multicasting	Multicast groupe
Modbus	Modbus module
Upload BeanDevice	Retrieve your BeanDevice®

Figure 15: User-configurable parameters

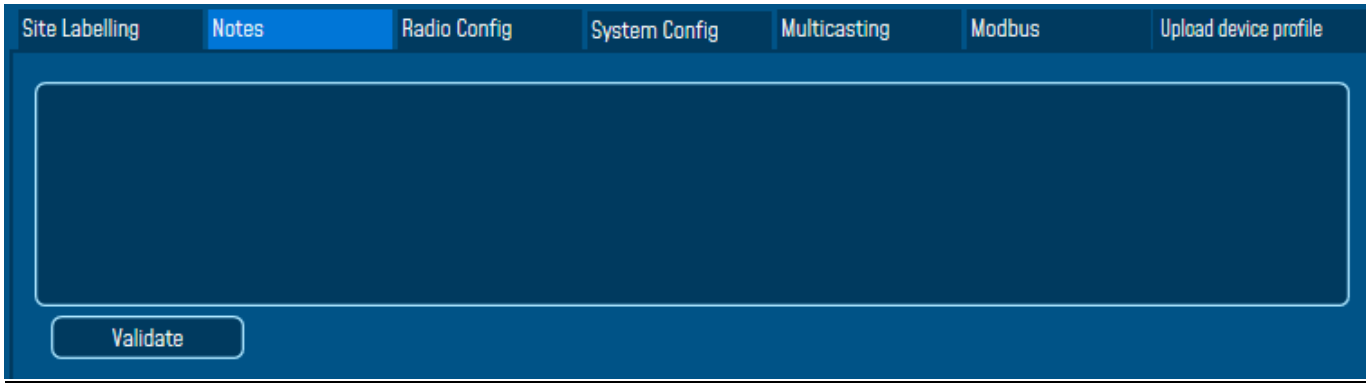
custom Display



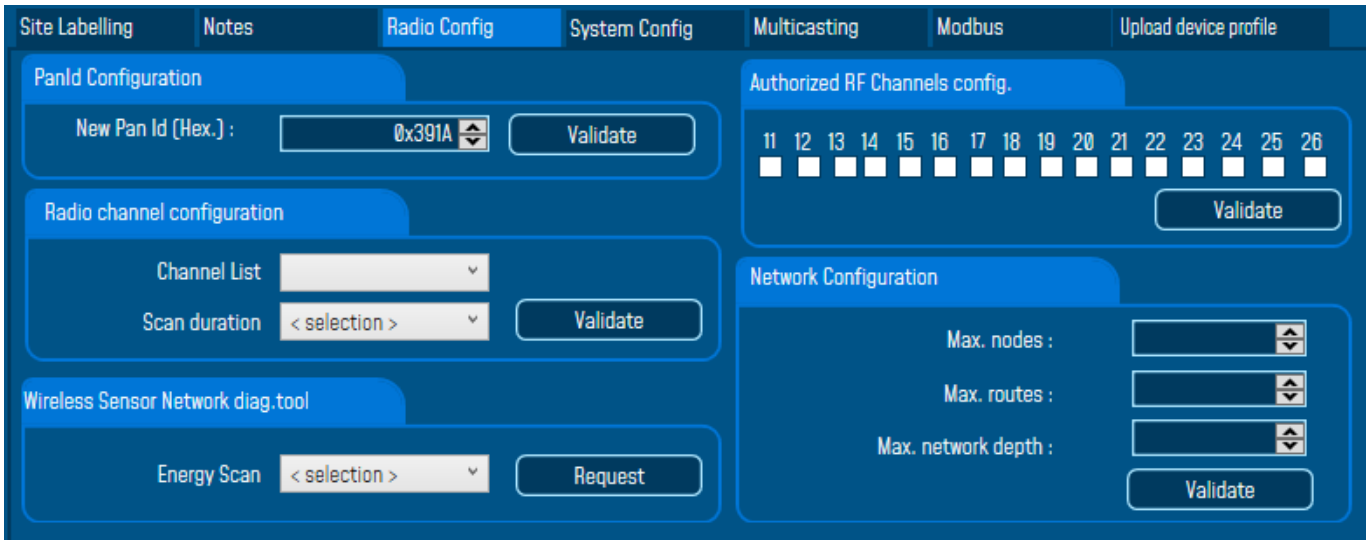
Parameter	*Description*
Label	You can assign any sort of Label to your BeanGateway ®. Therefore, the user can easily associate the BeanGateway® with its equipment or environment (example: Nwk_Room_1, Nwk_Room_2).

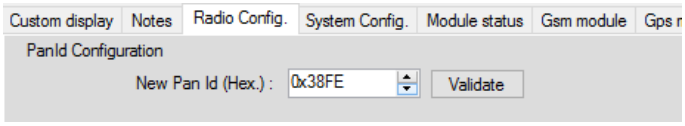
8.2.1 Notes

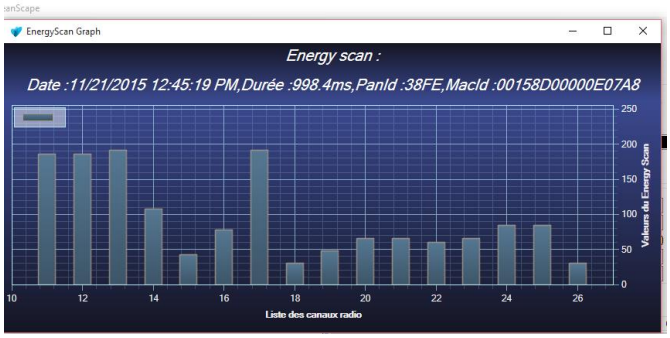
This area contains the notes related to the BeanGateway®. To edit this field, enter data to save and click on "Validate".



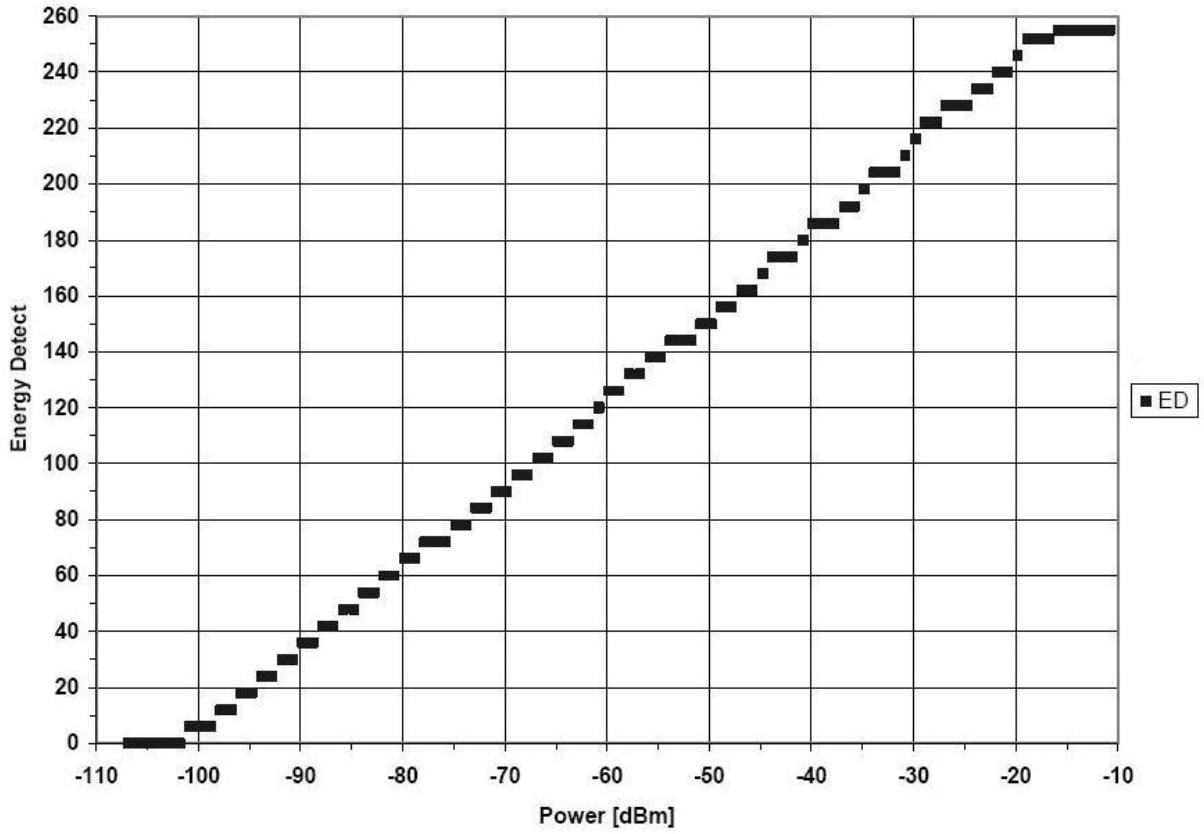
8.2.2 Radio Configuration



Setting	*Description*	*Watch the short technical Video (Click on the Icon)*
PAN ID Configuration	Select a PAN ID value between 0 to 3FFE. If you select a value > 3FFF , the value will not be assigned. Enter a value without “0x”. Example: 03AB , 3DC2.  In the case if you have several networks In the case if you have several WSN connected to your BeanScape®	
Radio Channel configuration	List of channels on which the component can be set. The maximum number of RF channels is 16. The user can select a RF channel manually or automatically. Blacklisted RF channels will not appear in this list. « ***Ch_Auto***» is an automatic detection of the most effective channel between channel 11 and channel 26. To change this area, select a value from the list and click the “Validate” button to save the base area. If an automatic detection is selected, the user can select the scanning duration on each channel.	 Automatic RF channel selection Manual RF Channel selection

	It is strongly recommended to select Automatic channel selection if you have few information about radio activities on your site.	
Energy Scan (Diagnostic)	The Energy Scan allows the user to know the network quality on each Radio channel. This operation allows the user to choose the appropriate RF channel on a site where the WSN is deployed. This value can vary between 0 (excellent) and 255 (poor). You can configure the scanning time means of each radio channel, by selecting the tab the scan time in ms and confirm it by pressing the "validate" button. A new energy scan is performed by clicking on the "Validate" button. 	 Energy Scan
Authorized channel selection	Select the RF channels which must be used. The RF channels which are not selected are blacklisted from the energy scan process & automatic RF channel selection.	 Authorized RF Channel selection

Select RF channels with the least detected activity.



RF

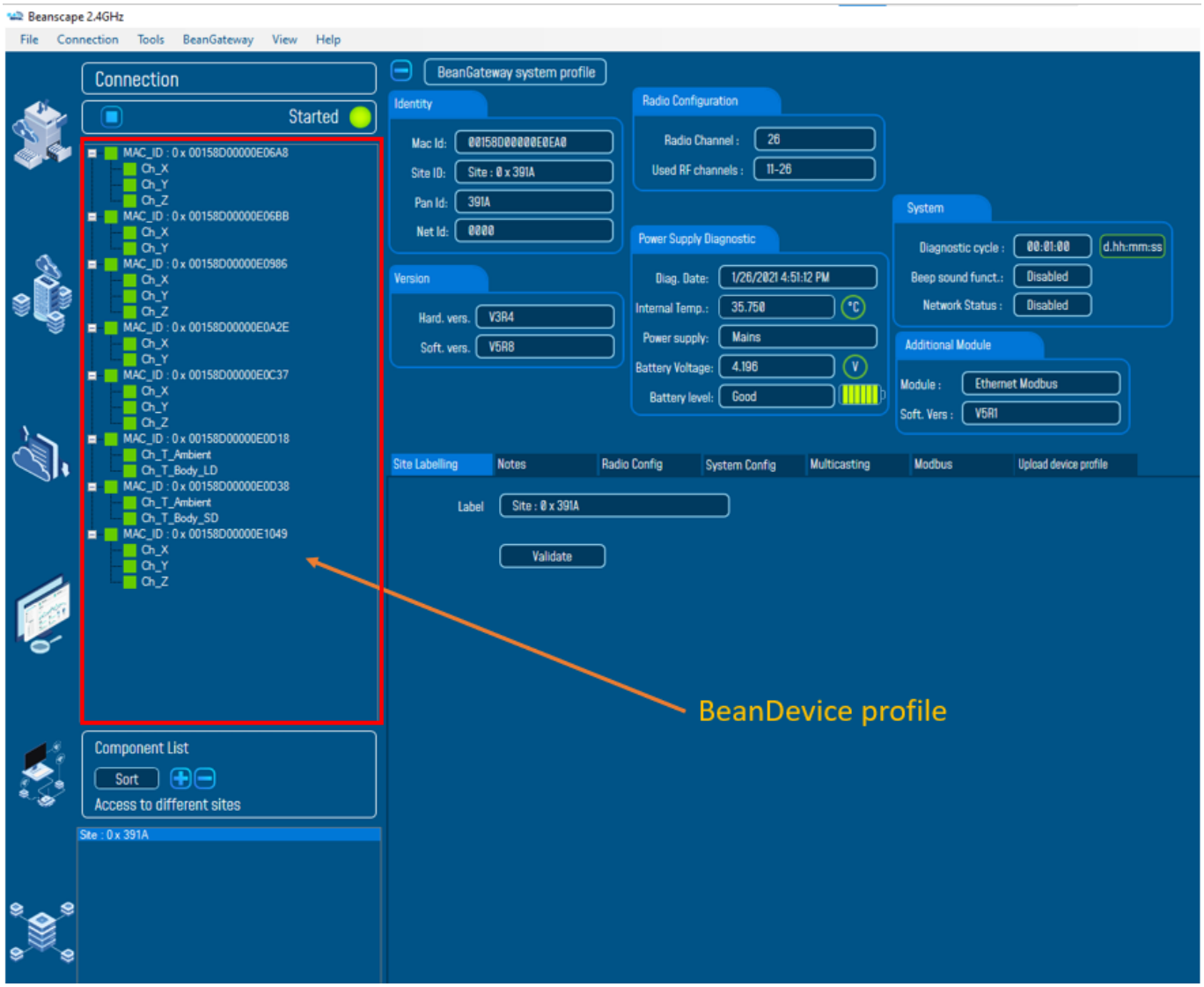
Figure 16 : Conversion table - Energy Scan power in dBm

8.2.3 System Configuration

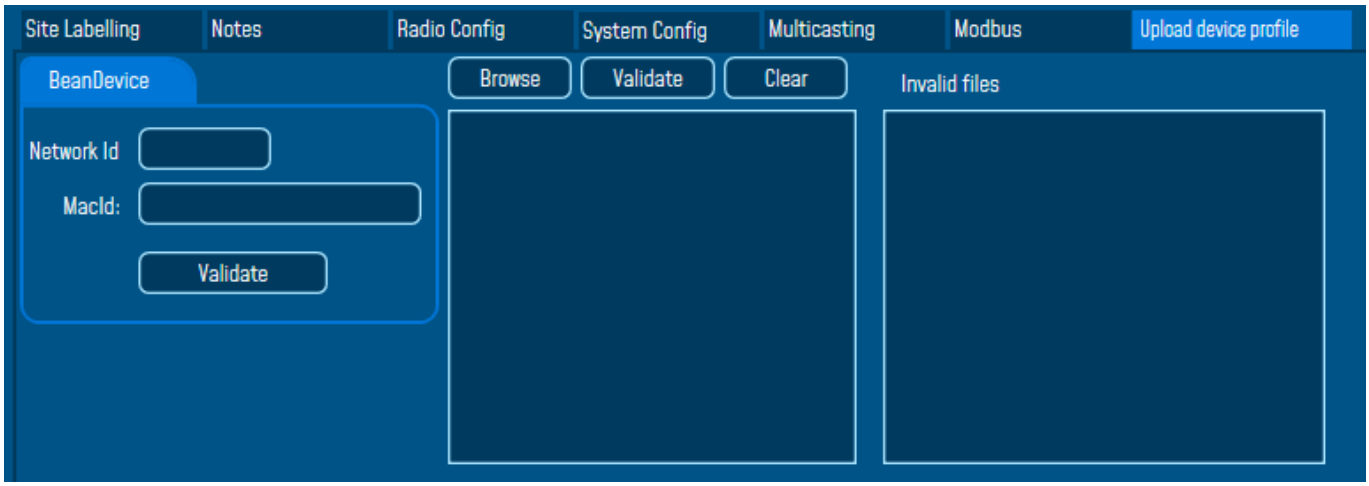
Figure 17: System configuration Tab

Setting	*Description*	*Watch the short technical Video (Click on the Icon)*
Diagnostic cycle	You can set the BeanGateway® diagnostic cycle (Battery status).	*Diagnostic cycle*
Profile erasing/ Back to default/ Network button	This field is used for BeanDevice® profile erasing or factor settings restoration. ***Network profile deletion***: BeanDevice® profiles are deleted from the BeanGateway® Database **&** RF	

	parameters are restored to the factory settings (TX power, Authorized RF channels, RF Channel). ***Full:*** BeanDevice® profiles are deleted **&** RF parameters are restored to the factory settings (TX power, Authorized RF channels, RF Channel) **&** LAN/Ethernet parameters are restored to the factory settings Click on ***Delete*** ***Network enable/disable***: You can enable and disable the "Network" button on your BeanGateway from BeanScape with "Nwk disable/enable". This function is useful when you want to eliminate the risk of losing your BeanDevices profiles by accidentally pushing the Network button on the BeanGateway.	
Beep sound configuration	***Only available on the BeanGateway Indoor*** Configure the Buzzer alarm: ***Disabled***: Buzzer is disabled ***Battery alarm event***: The BeanGateway® emits a beep sound every 2 seconds if the external power supply is disconnected ***Localize***: A beep sound allows to localize your BeanGateway®	
Delete Device	***Remove a BeanDevice® from your network*** You can use "Delete Device" function in order to remove a BeanDevice from the list.	 ***Profile erasing***


Beanscape 2.4GHz
File Connection Tools BeanGateway View Help
Connection
Started
MAC_ID : 0 x 00158D00000E06A8
Ch_X
Ch_Y
Ch_Z
MAC_ID : 0 x 00158D00000E06BB
Ch_X
Ch_Y
MAC_ID : 0 x 00158D00000E0986
Ch_X
Ch_Y
Ch_Z
MAC_ID : 0 x 00158D00000E0A2E
Ch_X
Ch_Y
MAC_ID : 0 x 00158D00000E0C37
Ch_X
Ch_Y
Ch_Z
MAC_ID : 0 x 00158D00000E0D18
Ch_T_Ambient
Ch_T_Body_LD
MAC_ID : 0 x 00158D00000E0D38
Ch_T_Ambient
Ch_T_Body_SD
MAC_ID : 0 x 00158D00000E1049
Ch_X
Ch_Y
Ch_Z
Component List
Sort
Access to different sites
Site : 0 x 391A
BeanGateway system profile
Identity
Mac Id: 00158D00000E0EA0
Site ID: Site : 0 x 391A
Pan Id: 391A
Net Id: 0000
Version
Hard. vers. V3R4
Soft. vers. V5R8
Radio Configuration
Radio Channel : 26
Used RF channels : 11-26
Power Supply Diagnostic
Diag. Date: 1/26/2021 4:51:12 PM
Internal Temp.: 35.750 °C
Power supply: Mains
Battery Voltage: 4.196 V
Battery level: Good
System
Diagnostic cycle : 00:01:00 d.hh:mm:ss
Beep sound funct.: Disabled
Network Status : Disabled
Additional Module
Module : Ethernet Modbus
Soft. Vers : V5R1
Site Labelling
Notes
Radio Config
System Config
Multicasting
Modbus
Upload device profile
Label Site : 0 x 391A
Validate
BeanDevice profile

8.2.4 Upload Cartography

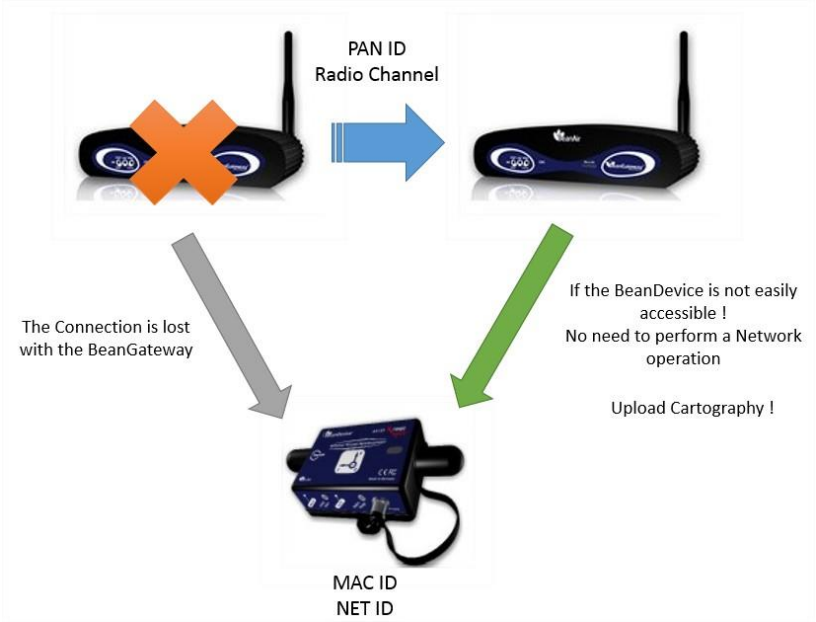


The module above is used for connecting another BeanDevice operating on a different BeanGateway to this BeanGateway.

This function is useful if you've lost connection with a BeanGateway and need to connect the BeanDevices to a different one without performing a Network operation on the BeanDevices (let's suppose that access to BeanDevices is not easy).

To upload the cartography of the BeanDevice on a different BeanGateway, please follow the instructions below:

- Put the PAN ID of your previous BeanGateway
- Select the Radio Channel of your previous BeanGateway
- Write down the Network ID and MAC ID of your BeanDevice
- If your BeanDevice requires restart, you can use the restart button from BeanScape in System Config.



This function is assimilated to a BeanGateway cloning operation in order to make the BeanDevice believe that the second BeanGateway is the first one.

See “Export & Import BeanDevice Profile” YouTube video

8.3 LOG FILE ORGANIZATION

8.3.1 Log file system overview

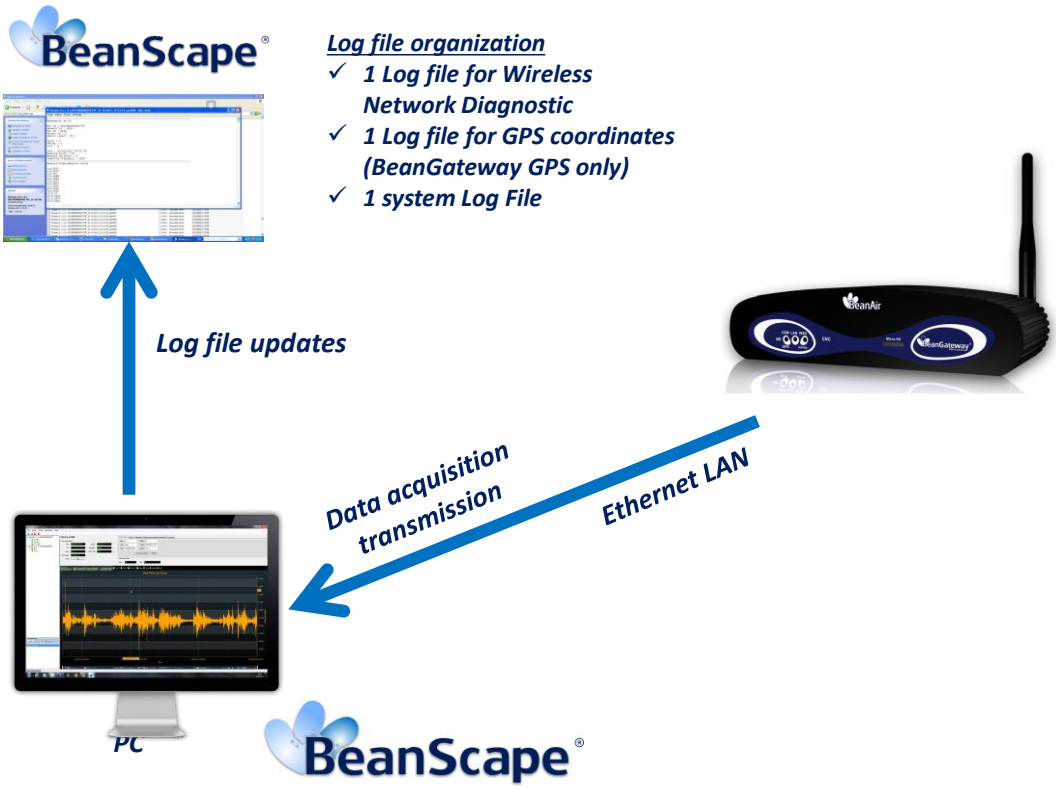
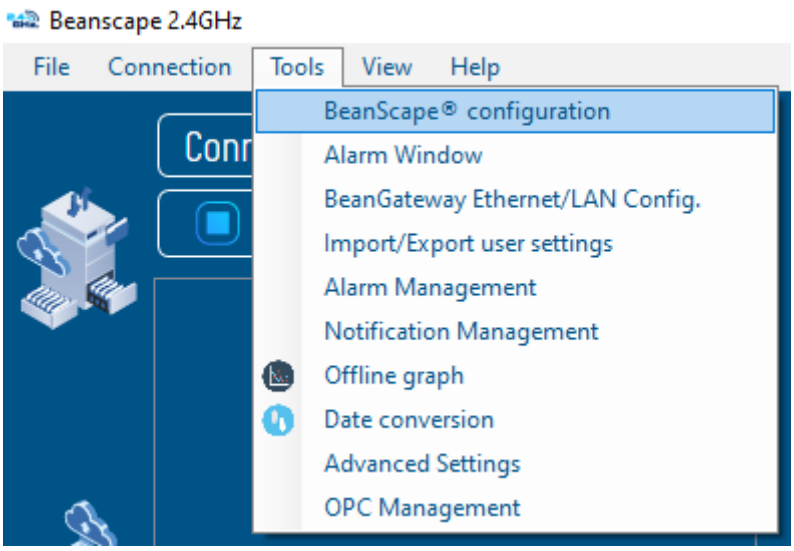


Figure 18 : Log file system overview

8.3.2 Log file directory

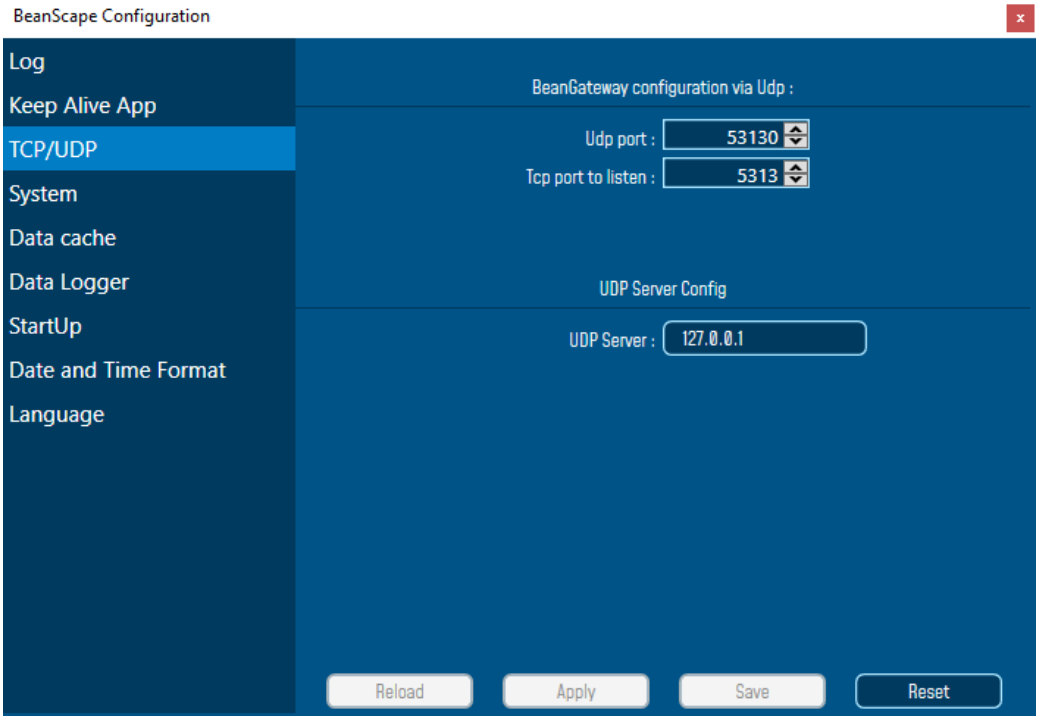
By default the Log file directory is: ***C:\log_beanscape***

Click on the tab Tools then Options to configure advanced settings in ***BeanScape®***:



This window lets you configure the logs, and the data cache.

✓ You will see the following window:



For further information about the BeanScape® configuration, please read the BeanScape® User Manual.

9. MULTI-WSN CONFIGURATION

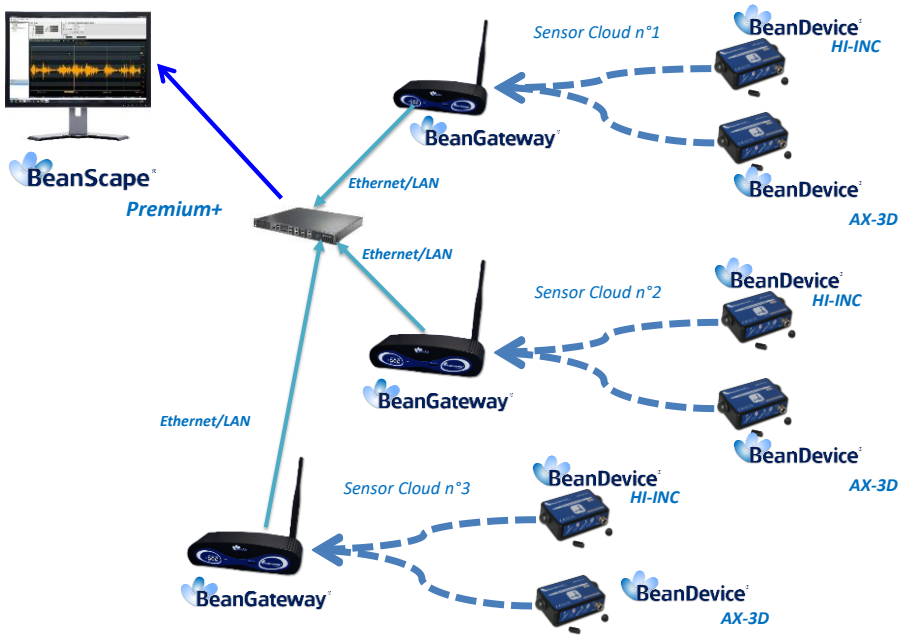


Figure 19 : A multi-WSN architecture

These settings are mandatory:

- ***PAN ID should be different between each BeanGateway®***
- ***If your PAN is not different you will have a network conflict between the different WSN***

These settings are highly recommended:

- The distance between each BeanGateway® should be at least 2 meters
- Different Radio channel should be used

10. MAINTAINING AND SUPERVISING BEANGATEWAY®

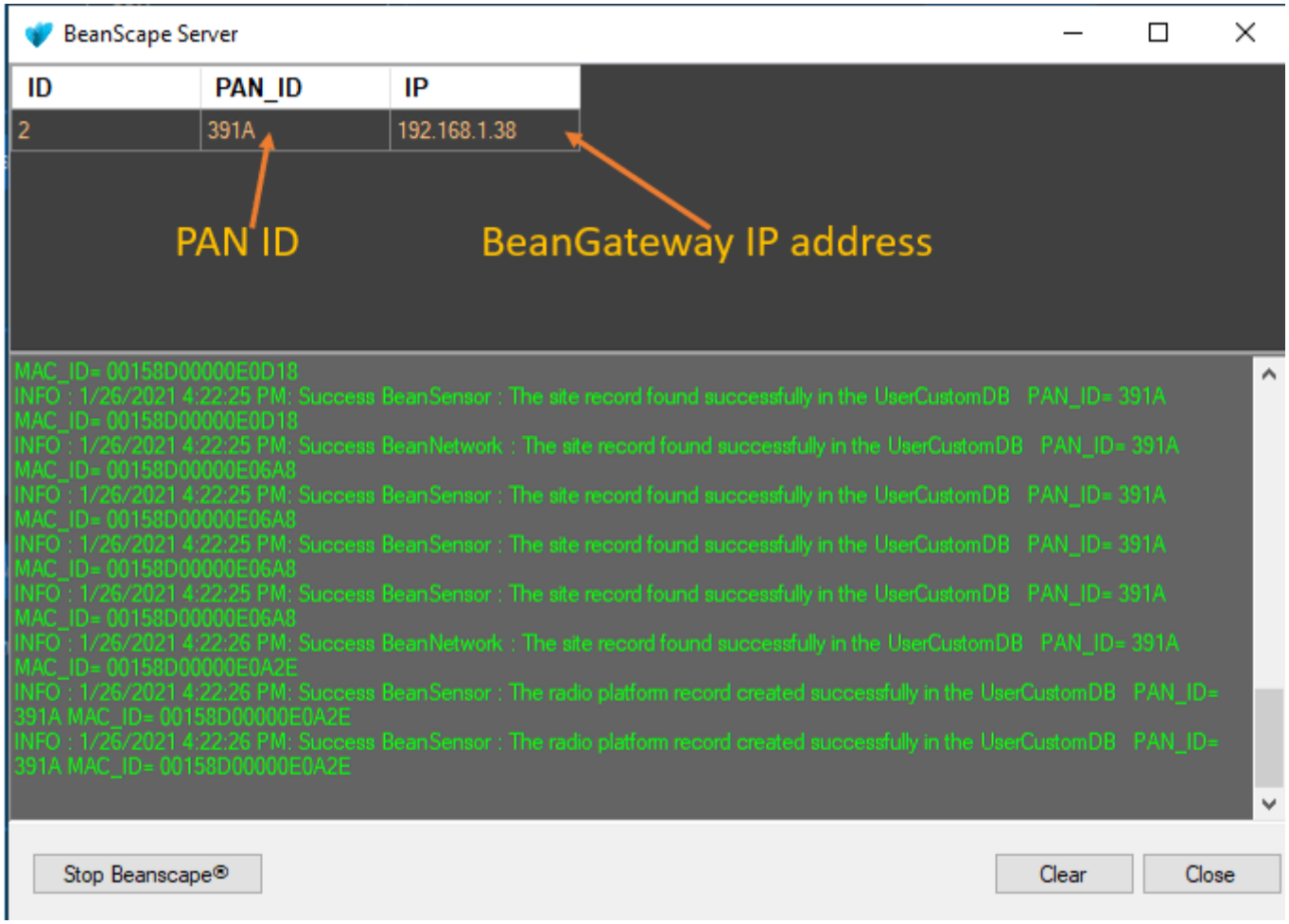
10.1 DIAGNOSIS USING BEANSCAPE®

Using the BeanScape® software, BeanScape® diagnostic information and self-monitoring can be visualized.

10.1.1 Knowing the PAN ID and IP address of your BeanGateway®

To find the IP address and ID PAN BeanGateway® network click "hide" in the window at the bottom left of BeanScape ®.

You see the following window:



This window is the **BeanScape®** control server.

11. TROUBLESHOOTING BEANGATEWAY®: FAQ

- I am not able to see the **BeanGateway®** status on the left side pane, why?

Check the bottom left server status **BeanScape®**.

“Status” means that the server is not running.

- Check the Ethernet connection. (Network and Cable settings)
- Make sure that the BeanGateway® is connected and the switch is “on”.
- Make sure that the LED flashes
- Restart the server

12. ENVIRONMENTAL CONSTRAINTS

12.1 SEALING

BeanGateway® 4G Outdoor product is provided with a protection rating ***IP66***. Do not place the BeanGateway ® in a maritime environment with high turbulence. Avoid accumulation and infiltration of water through the front cover of the BeanGateway® 4G casing. Tighten all connections that may interfere with the seal.

12.2 SENSITIVITY TO RADIO FREQUENCY

For further information, please refer to the application note: AN_RF_007 :" Beanair_WSN_Deployment"

12.3 TEMPERATURE

The **BeanGateway® 4G** operating temperature is **-15°C to 50°C**

It is recommended not to exceed these ranges. This could permanently damage the **BeanGateway® 4G.**

12.4 HUMIDITY

BeanGateway® 4G can operate in a ***90%*** humid environment.

However, the IEEE 802.15.4 radio waves may deteriorate in the presence of water. Avoid placing the **BeanGateway® 4G** in an enclosure surrounded by water, almost bushy plants (plants are composed of 90% water).

12.5 REFLECTIONS, OBSTRUCTIONS AND MULTIPATH

For further information, please refer to the application note: AN_RF_007 :" Beanair_WSN_Deployment"

12.6 SHOCKS AND VIBRATIONS

BeanGateway® 4G can withstand the shocks of intensity exceeding 2g. Avoid dropping the **BeanGateway® 4G**. Secure the **BeanGateway® 4G** to a wall or a pole.

Do not force on the connections.

12.7 ANTENNA

Depending on the type of antenna (omnidirectional, bidirectional), orient it in a particular position so that the emitted field is optimal. (See field emission 1.2.1)

When you move the **BeanGateway® 4G**, make several tests by changing the orientation of the antenna and get the best arrangement.

For further information, please refer to the application note: AN_RF_007 :" Beanair_WSN_Deployment"

12.8 OTHER FEATURES

While having the highest **BeanGateway® 4G** possible transmission and receive over a wide area.

Do not take off the blue labels pasted on **BeanGateway® 4G** products

13. APPENDICES

13.1 APPENDICE 1: WHICH SIM CARD TO USE?

On your BeanGateway® 4G, using a SIM card with dynamic public IP will not be a problem. We suggest a data SIM card dedicated to M2M application.

If you are not sure that your ADSL Modem running at the office will come with a Public fixed IP, you should use a 4G Router with a 4G Data SIM Card with fixed PUBLIC IP:

- For UK customers: Click on the following weblink
- For German customers: Click on the following weblink