BeanGateway®

Version 3.5.1

2year
Warranty

BEANAIR®	BEANGATEWAY® USER MANUAL

BeanAir
Rethinking Sensing Technology

2.4 GHz

DOCUMENT

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Author	Youssef Shahine, Embedded Software Engineer		
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Reader	Mohamed-Yosri Jaou.	✓	
Validation	Antje Jacob		✓

DIFFUSION

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Reader n°1	Maxime Obr., Embedded software engineer	✓	
Reader n°2	Mohamed-Yosri Jaou., Embedded software engineer	✓	

UPDATES

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2.2	16/10/2014	Aleksandr Drimitov	• BeanGateway® Picture changed • TimeSync function added
2.3	08/06/2015	Aleksandr Drimitov	• RS485, RS232 technical specifications added • ModBus® Protocol
2.4	17/11/2015	Aleksandr Drimitov	• New videos added • Removing a BeanDevice® from a WSN –process description
2.5	29/09/2016	Salah Riahi	• Installation with BeanScape software, more info added
2.6	22/12/2016	Salah Riahi	• Upload Cartography video added
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UPDATES			
2.8	05/07/2018	Youssef Shahine	• FAQ updated with Serial cable problems
2.9	02/08/2018	Aymen Jegham	• Vocabulary and screenshot update
3.0	27/11/2018	Fahd ESSID	• Screenshot's update • LAN configuration update • BeanGateway® profile update • User configurable parameters update • FAQ update
3.1	09/01/2019	Youssef Shahine	• More info about accessories added
3.1.1	29/04/2019	Mohamed Bechir Besbes	• Weblinks update
3.2	25/10/2019	Seddik ATTIG	• System configuration (diagnostic cycle) update • System configuration (PAN ID) update • Auto-reboot Further info
3.3	12/10/2019	Seddik ATTIG	• Restrictions with the Auto Reboot
3.4	01/06/2021	Seddik ATTIG	• BeanGateway specifications updated
3.5	16/07/2021	Seddik ATTIG	• Notice on the BeanGateway internal battery
3.5.1	15/11/2021	Seddik ATTIG	• Links Updated

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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. RELATED DOCUMENTS & VIDEOS

In addition to this User manual, please consult the related application notes, technical notes and videos:

4.1   APPLICATIONS NOTES

Document name (Click on the weblink)	Related product	Description
AN_RF_007 :" Beanair_WSN_Deployment"	All BeanAir products	Wireless sensor networks deployment guidelines
AN_RF_006 – „How to extend your wireless range"	All BeanAir products	A guideline very useful for extending your wireless range
AN_RF_005 – BeanGateway ® & Data Terminal Equipment Interface	BeanGateway ®	DTE interface Architecture on the BeanGateway ®
AN_RF_003 - "IEEE 802.15.4 2.4 GHz Vs 868 MHz"	All BeanAir products	Comparison between 868 MHz frequency band and a 2.4 GHz frequency band.
AN_RF_002 – "Structural Health monitoring on bridges"	All BeanAir products	The aim of this document is to overview Beanair® products suited for bridge monitoring, their deployment, as well as their capacity and limits by overviewing various Data acquisition modes available on each BeanDevice®.

4.2   TECHNICAL NOTES

Document name (Click on the weblink)	Related product	Description
TN_RF_013 – « OPC configuration »	BeanScape® Premium+	The aim of this document is to help deploying the OPC DA and all associated services.
TN_RF_012– « BeanDevice® battery life in streaming mode »	All the products	The aim of this document is to describe the autonomy performance of the BeanDevice® SmartSensor® and ProcessSensor® product line in streaming
TN_RF_011 – « Coexistence of Beanair WSN at 2.4GHz »	All the products	This document aims to highlight the issues affecting co-existence of Beanair WSN (IEEE 802.15.4) in the presence of interference.
TN_RF_010 – « BeanDevice® Power Management »	All the BeanDevice®	This technical note describes the sleeping & active power mode on the BeanDevice®.
TN_RF_009 – « BeanGateway ® management on LAN infrastructure »	BeanGateway ®	BeanGateway ® integration on a LAN infrastructure
TN_RF_008 – "Data acquisition modes available on the BeanDevice®"	All the BeanDevice®	Data acquisition modes available on the BeanDevice®
TN_RF_007 – "BeanDevice® DataLogger User Guide "	All the BeanDevice®	This document presents the DataLogger feature on the BeanDevice®
TN_RF_006 – "WSN Association process"	All the BeanDevice®	Description of the BeanDevice® network association
TN_RF_005 – "Pulse counter & binary Data acquisition on the BeanDevice® SUN-BN"	BeanDevice® SUN-BN	This document presents Pulse counter (ex: energy metering application) and binary Data acquisition features on the BeanDevice® SUN-BN.
RF_TN_003- "Aggregation capacity of wireless sensor networks"	All the products	Network capacity characterization of Beanair Wireless Sensor Networks
RF_TN_002 V1.0 - Current consumption in active & sleeping mode	BeanDevice®	Current consumption estimation of the BeanDevice in active and sleeping mode
RF_TN_001 V1.0- Wireless range benchmarking	BeanDevice®	Wireless range benchmarking of the BeanDevice®

4.3   RELATED VIDEOS

 All the videos are available on our YouTube channel

Beanair video link (YouTube)	Related products
Company Presentation	All
BeanGateway ® - Ethernet Outdoor version introduction	BeanGateway ® - Ethernet Outdoor version introduction
BeanGateway ® – Ethernet Indoor version presentation	BeanGateway ® Ethernet Indoor version
BeanDevice® AN-XX wireless range demonstration	BeanDevice® AN-XX & BeanDevice® AN-XX Extender
BeanDevice® AN-XX presentation	BeanDevice® AN-XX & BeanDevice® AN-XX Extender
BeanDevice® AX-3D presentation	BeanDevice® AX-3D
BeanDevice® HI-INC presentation	BeanDevice® HI-INC
BeanDevice® AX-3DS presentation	BeanDevice® AX-3DS
BeanScape® – WSN supervision software	BeanScape®
BeanGateway ® Ethernet/LAN Configuration, directly connected to the Laptop/PC	BeanGateway ®
Wireless sensors profile deletion from the BeanGateway ® Database	All

5. DOCUMENT ORGANIZATION

BeanGateway® product presentation	• Details the BeanGateway® product presentation
BeanGateway® installation guidelines	• Details the installation guidelines of the BeanGateway®
Start 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…)

6. PRODUCT PRESENTATION

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

6.1   PRODUCT OVERVIEW
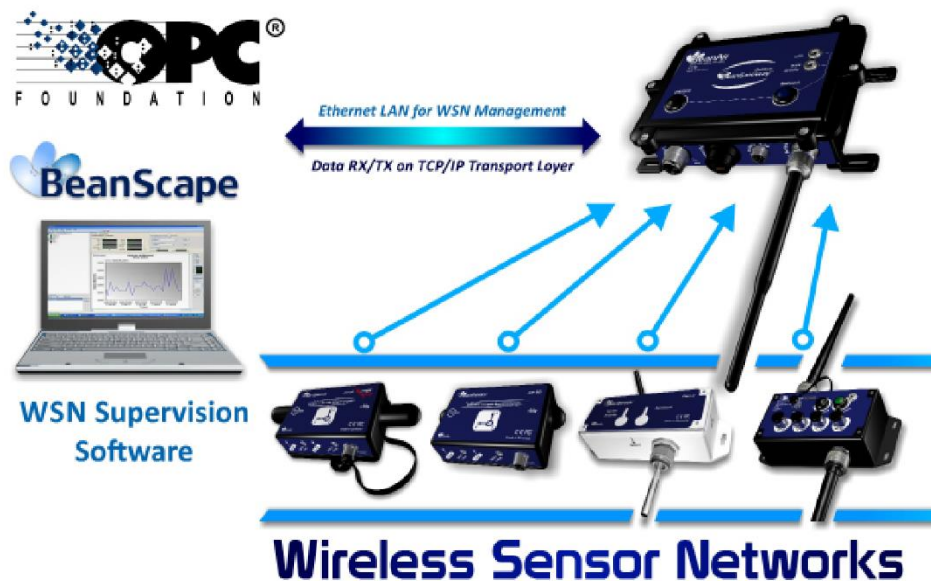
The BeanGateway® is used to build and manage Beanair wireless sensor networks. It can manage queues for every network element (BeanDevice®). As a gateway, it controls the external access to the network through a highly secured authenticated procedure. It supports the conversion of data exchanged, compression 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. The BeanGateway® provides standard protocols for a better communication with a SCADA supervision software:

- ✓ *LAN/Ethernet*
- ✓ *Modbus TCP/RS485/RS232*

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.
- ✓ Data recording on Micro-SD card (option)
- ✓ BeanGateway® Technical specifications

6.1.1 Common specifications

These specifications are common to all the BeanGateway® version.

6.1.1.1 Wireless sensor network coordinator

Wireless Sensor Network Coordinator	
Wireless Technology	Ultra-Low-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

6.1.1.2 Ethernet/LAN Network

Ethernet/LAN Network	
Network/Transport Protocol	Client TCP/IP, UDP, DNS, DHCP
Data Link Protocol	Ethernet / Fast-Ethernet with auto-uplink (MDI/MDI-X auto) - IEEE 802.3x
IP Addressing	Dynamic (DHCP) or static
IP configuration	LAN parameters (DNS, DHCP, Keep Alive…) are configurable from the BeanScape® (UDP/Ethernet Interface).

6.1.1.3 Power supply

Power Supply	
Power Consumption	250 mA to 300 mA during wireless RX/TX and Ethernet activated
External power supply	8-28 VDC , integrated Lithium-Ion battery charger with high-precision battery monitoring
Integrated Lithium-Ion Battery with UPS function	Lithium-Ion rechargeable battery 950 mAh (reference BAT0.95DMG)
	In case of external power supply failure, the BeanGateway® can switch on the internal battery.

6.2   CASING DESCRIPTION

The BeanGateway® casing comes in two versions:

	Indoor Version	Outdoor version
Enclosure	 Aluminum Alloy casing, IP40	 Aluminum alloy ADC12 black finish, IP67
Dimension	✓ 155.4mm x 87mm x 46.4mm	✓ 202mm x 142mm x 55mm
Applications	✓ Indoor application only, the product is not waterproof	✓ Remote sites (wind, water pipe, gas, mountains …) ✓ Wireless Sensor Networks deployment in outdoor over long distances.

6.2.1   BeanGateway® Indoor Version

Click on the following web link to see the video: **BeanGateway® – Ethernet Indoor version presentation**

The BeanGateway® indoor has many buttons and connectors, let's see their meaning with illustrations

6.2.1.1   New Design front view

Front View
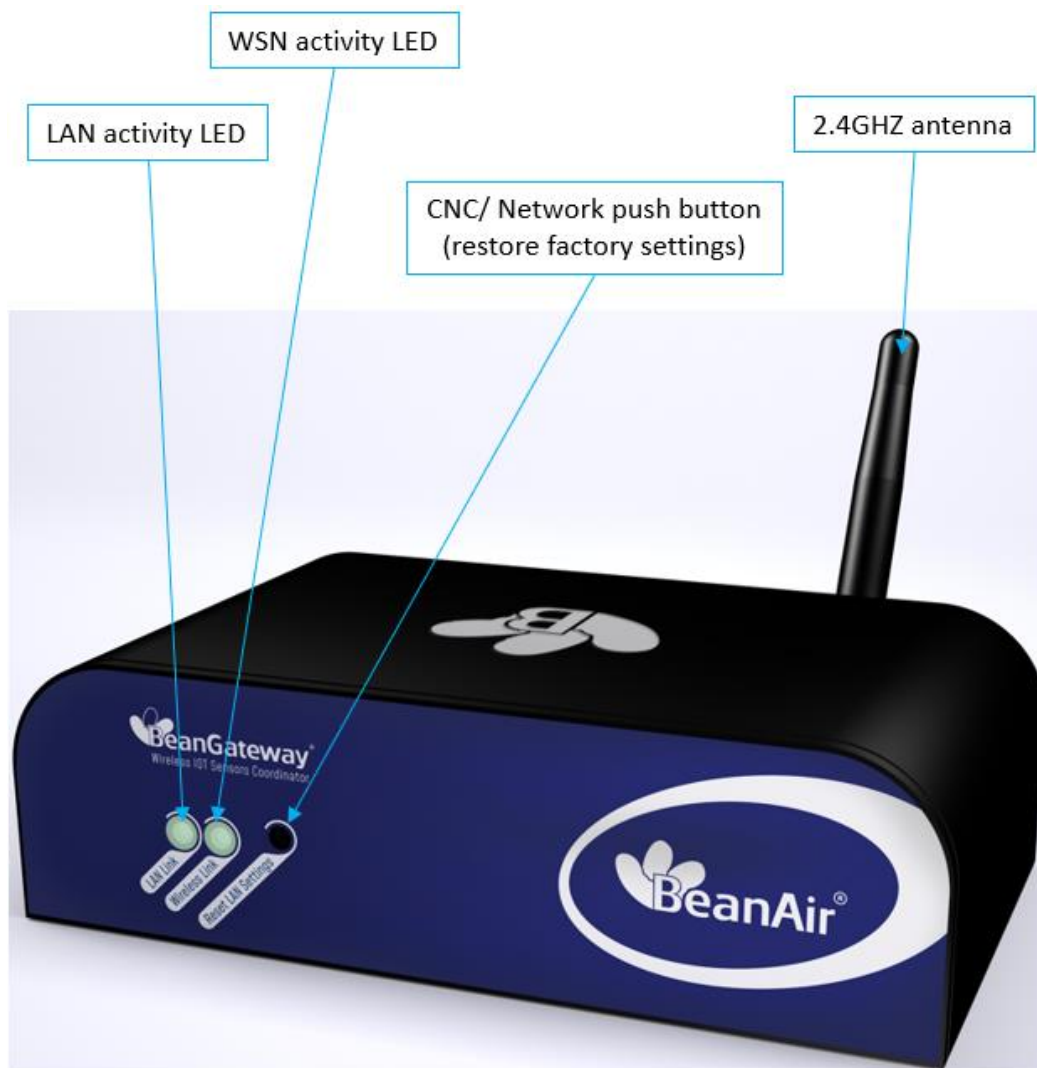
Figure 1: BeanGateway® Indoor version new design Front view

6.2.1.2   Old Design front view
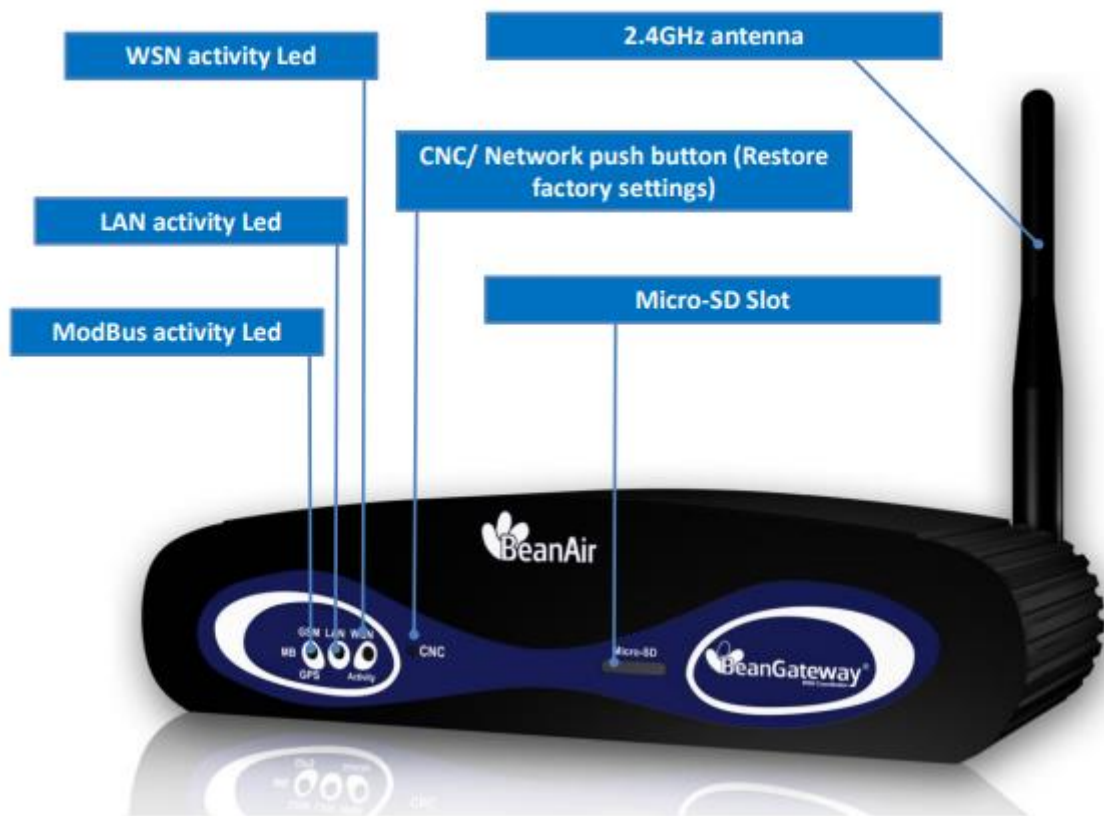
Figure 2: BeanGateway® Indoor version Old Design Front view

6.2.1.3   New Design rear view

The BeanGateway® Indoor with the new design comes with a reboot push button on the backside.

Rear View
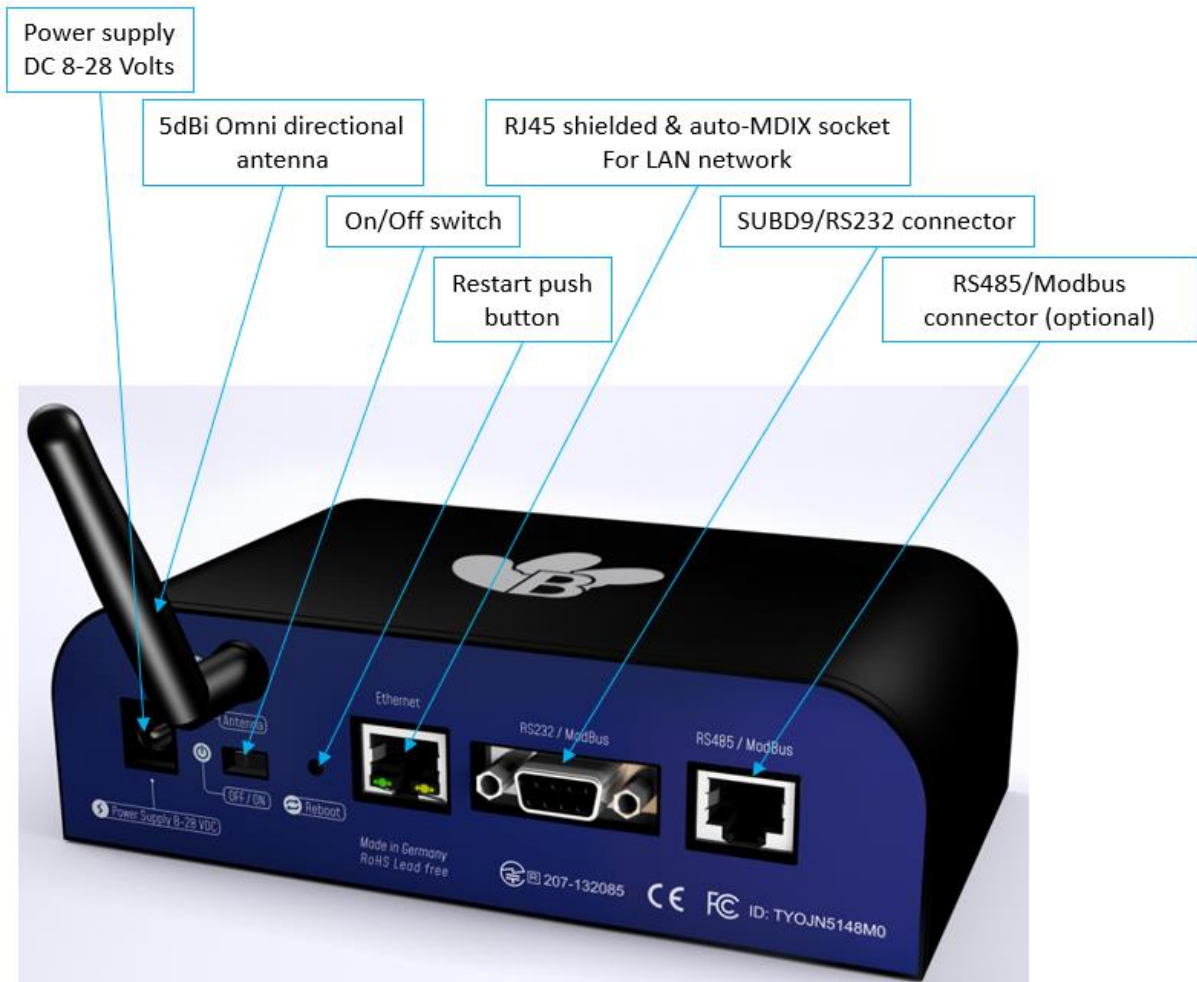
Figure 3: BeanGateway® Indoor version new design Rear view

6.2.1.4   Old Design rear view

Rear View

5dBi Omni Antenna

Power supply DC 8-28 Volts

OFF (left side)/ON (Right Side) switch

RJ45 shielded & Auto-MDIX socket for LAN network

SUBD9/RS232 Connector

RS485/Modbus (Option)
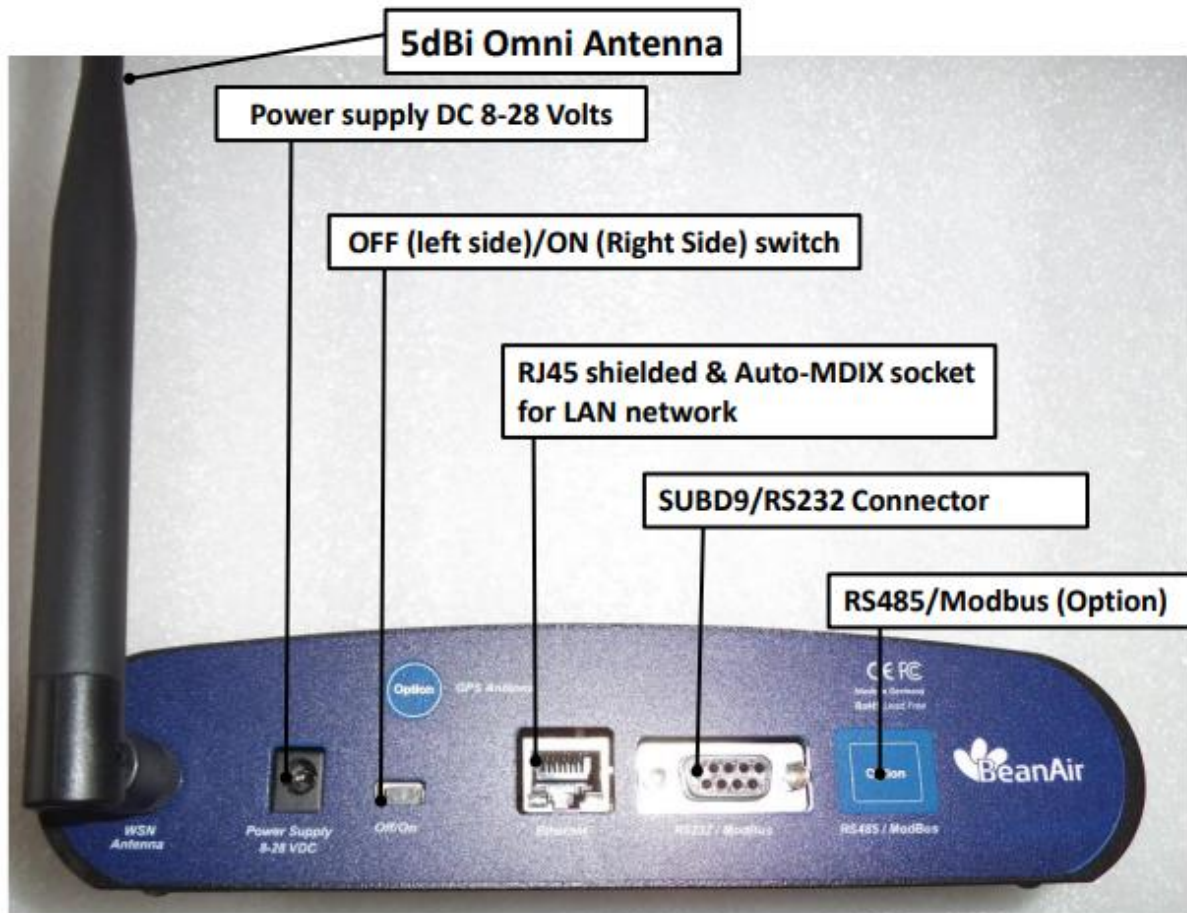
Figure 4: BeanGateway® Indoor version old design rear view

6.2.2   BeanGateway® Outdoor version

*Click on the following web link to see the video: **BeanGateway® - Ethernet Outdoor version introduction***

Front view

"Network" Push Button – push and maintain this push button more than 10s to restore factory IP settings

LAN network activity LED

Wireless sensor networks LED

ON/OFF "Latching" Push Button

Figure 5: BeanGateway® Outdoor version Front view

Function	Description
Network push button	"**Network**" push button will only restore the factory IP settings. **It will not:** • Delete BeanDevice® profiles managed by the BeanGateway® • Restore RF parameters (Authorized RF channels, RF Channel, PAN ID) Hold this button more than 10 seconds, factory IP settings are restored when WSN activity Led starts to blink in red color.
LAN network activity Led	This bi-color **GREEN** / **RED Led** represents the LAN activity
WSN activity Led	This bi-color **GREEN** / **RED Led** represents the WSN activity
ON/OFF Button	Allows to power up/power off the BeanGateway®

Rear view

Figure 6: BeanGateway® Outdoor version Rear view

⚠️ *To ensure an excellent seal of the BeanGateway® casing, please make sure that the following conditions are met:*

- ✔ *During transportation, cable connections and locknuts could loosen, make sure they are tight*
- ✔ *Do not overtighten or exert force on your RJ45 cable or power cable*
- ✔ *If the external power supply is not used, make sure the power supply cap is present on the M8 socket;*
- ✔ *Make sure that all the N-Type antennas are tightly screwed;*
- ✔ *The external switch-mode power supply is not watertight;*

ℹ️ *The BeanGateway® outdoor is delivered with a 2-meters length LAN/RJ45 cable. If the cable length is not enough for your application, use a RJ45 coupler (not provided with our material).*

6.2.3 Led Description

Action	WSN Activity LED	LAN Network activity LED with DataLogging on Micro-SD® activated	GSM/GPRS Activity LED	Results / Impact
BeanGateway® Power ON	LED is flashing green	LED is fixed red and turn off by an interval of 15s and then turns back	LED is flashing green	The BeanGateway® is initialized and set up the mapping of its wireless network sensors
Press the RESET button	LED is flashing green	LED is fixed green and it turn off by an interval of 15s and then turns back	LED is flashing green	The coordinator is initialized (same action as above)
Data's reception from wireless sensor network	LED is flashing green	fixed green	LED is flashing green	Memorization, organization and data transmission to the network supervisor control monitor
Reception of configuration information from the BeanScape®	LED is flashing green	fixed green	LED is flashing green	Transmission of configuration information to the WSN
DataLogging on the Micro-SD	/	LED is flashing RED	/	/

6.3   ANTENNA SPECIFICATIONS

6.3.1   2.4 GHz – Indoor Antenna

Figure 7: Indoor antenna

RF antenna specifications	
Power Gain	5.5 dBi
V.S.W.R.	<2.0
Connector type	RP-SMA (female)
Impedance	50 Ohm
Polarization	Vertical
Dimensions (Length & Diameter in mm)	200 x 14

6.3.1   2.4 GHz – Outdoor Antenna
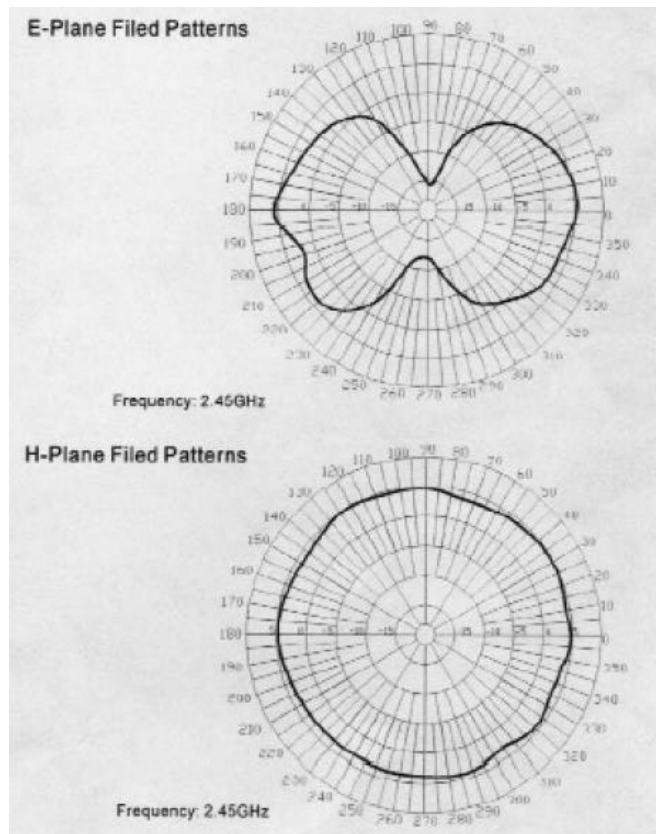
Figure 8: Outdoor Antenna

RF antenna specifications	
Power Gain	5.5 dBi
V.S.W.R.	<2.0
Connector type	N-Type male
Impedance	50 Ohm
Resistance to wind	180 mph
Sealing	IP67
Polarization	Vertical
Dimensions (Length & Diameter in mm)	95 x 19

6.4 INTEGRATED UPS (UNINTERUPTIBLE POWER SUPPLY)

The BeanGateway® operates with an external power supply (DC 8-28V). An integrated rechargeable battery with a capacity of *950mAh* 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 (*3h00 to 3h30 approximately*). The *BeanGateway®* starts emitting a beep sound every 2 seconds. The beep sound will stop when the external power supply is restored.
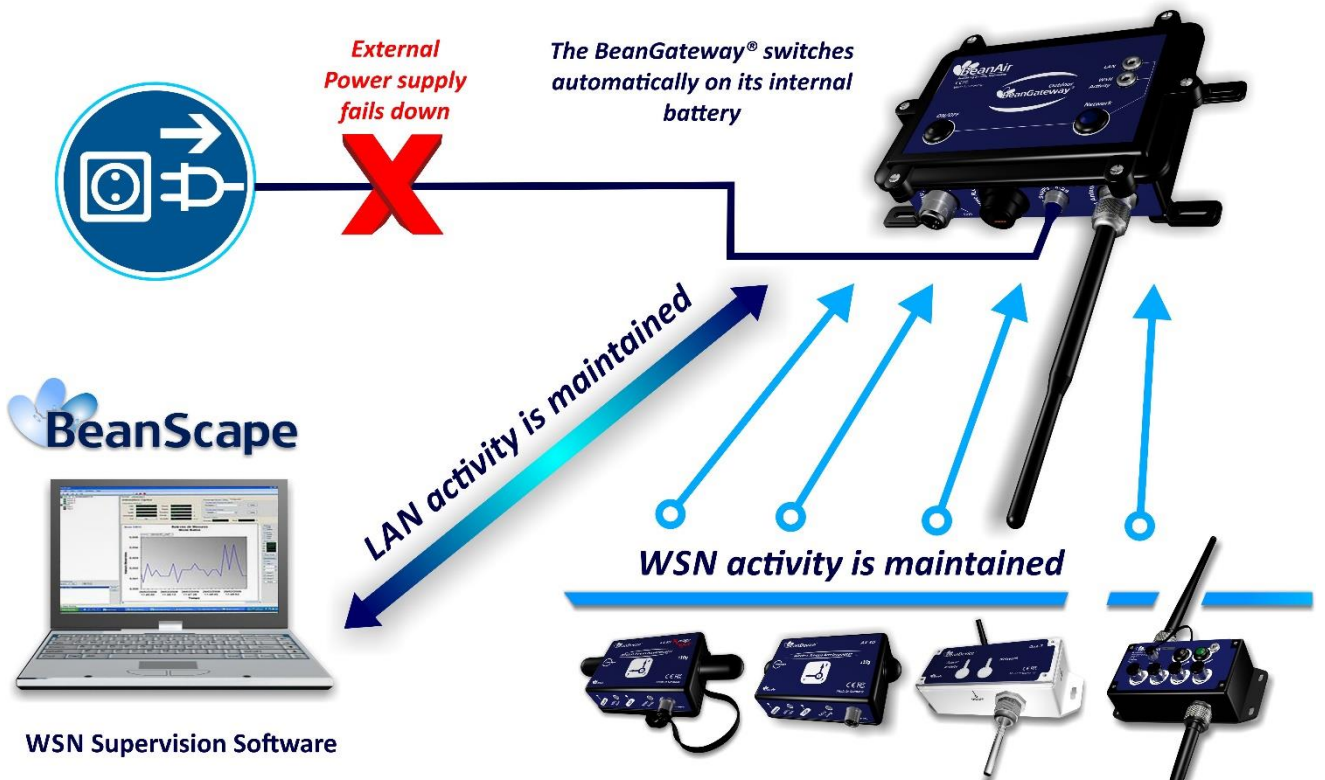
Precautions:

- ✓ *Do not try to change the internal battery. You will void the warranty of your BeanGateway®.*

- ✓ *Use the power supply wall plug-in provided by Beanair®.*

Beep sound is only available on the BeanGateway® Indoor version

7. SERIAL LINE SPECIFICATIONS (RS232/RS485) FOR MODBUS COMMUNICATION

7.1   RS232 LINE (BEANGATEWAY® INDOOR ONLY)

7.1.1   Technical features

RS232 is only available on the BeanGateway® Indoor, this feature is not available on the BeanGateway® Outdoor

Features	Description
Baud Rate	Default Value: 19,2 Kbps Minimum value: TBD Maximum value: 115,2 Kbps Configurable from the BeanScape® software
Connector	SUBD9
Percent error between desired and actual baud rate.	0% - between 50Hz and 4800 bauds <0,16% -- between 7200Hz and 115,2 Kbauds
ESD Protection	+15kV

7.1.2   Wiring code

Figure 9: Serial line wiring code (RS232/RS485)

Features	Description
PIN 1	Not used
PIN 2	RX Data (DTE), TX Data (DCE)
PIN 3	TX Data (DTE), RX Data (DCE)
PIN 4	Not used
PIN 5	Signal ground
PIN 6	Not used
PIN 7	Not used
PIN 8	Not used
PIN 9	Not used

- *RTS and CTS signals are not used*

- *Each TXD must be wired with RXD of the other device*

- *RTS may be wired with CTS of the other device,*

- *DTR may be wired with DSR of the other device.*

## 7.2   RS485 LINE

7.2.1   Technical features

Features	Description	
Data Rate	Default Value: 19,2 Kbps Minimum value: 9,6 kbps Maximum value: 115,2 Kbps Configurable from the BeanScape® Manager or Modbus Command	
Baud Rate accuracy	1% in transmission situation Accept 2% in reception situation	
Connector type	BeanGateway® Indoor	RJ45
	BeanGateway® Outdoor	M12 – 4 Pins (Waterproof IP67)
Switchable Termination	120 Ohm termination resistor	
ESD Protection	+15kV	

7.2.2 Switchable termination

Proper cable termination is very important for good signal fidelity. If the cable is not terminated with its characteristic impedance, reflections will result in distorted waveforms.

The RS485 Bus on the BeanGateway® integrates a switchable termination resistor on the receiver input pins. This provides the advantage of being able to easily change, through logic control, the line termination for optimal performance when configuring your Modbus network.

### 7.2.3 RJ45 Wiring code (BeanGateway® Indoor version)
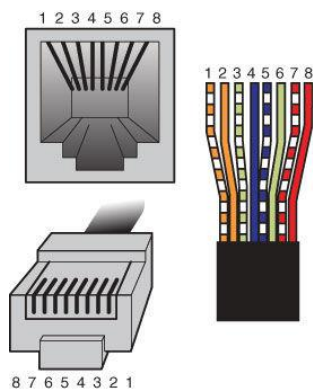
Pin Number	Wire color	Function
PIN1	Orange/White	Data-
PIN2	Orange	Data+
PIN3	Green/White	Not used
PIN4	Blue	Not used
PIN5	Blue/White	Not used
PIN6	Green	Not used
PIN7	Brown/White	Not used
PIN8	Brown	Ground

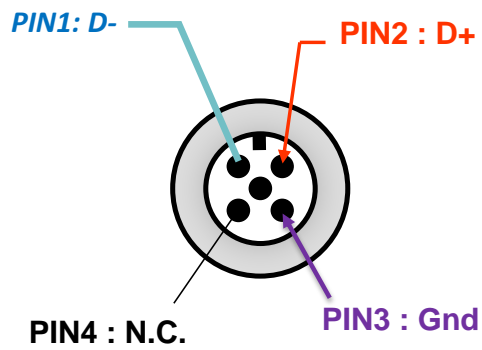### 7.2.4 M12-4 Pins Plug Wiring code (BeanGateway® Outdoor version)

A M12 Plug is provided with your BeanGateway® outdoor (if RS485 option is selected), Pin assignation follows M12 standard.

Pin Number	Function	Label name displayed	Description
PIN1	D-	Rx	Data -
PIN2	D+	Tx	Data +
PIN3	Gnd	Gnd	Electrical Ground
PIN4	Not connected	N.A.	N.A.

Wiring Code - M12-4Pins Plug View

External view

PIN2 : D+
PIN1: D-
PIN3 : Gnd
PIN4 : N.C.

M12-4pins plug (A Coding)
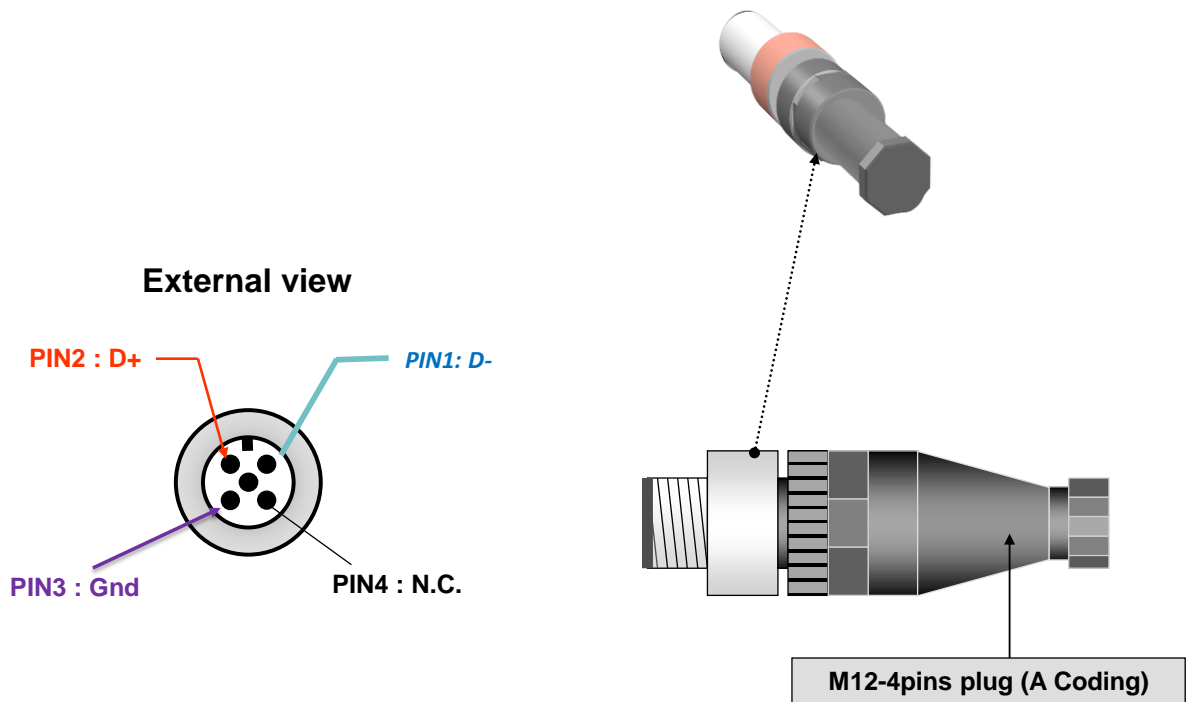
Wiring Code - M12-4Pins « Socket » View

PIN1: D-
PIN2 : D+
PIN4 : N.C.
PIN3 : Gnd

8. BEANGATEWAY® INSTALLATION GUIDELINES

8.1   HOW TO INSTALL THE BEANGATEWAY®

8.1.1   Wall mounting

For a better wireless link, we recommend mounting the BeanGateway® on a wall/mast above 2-3meters from the ground.

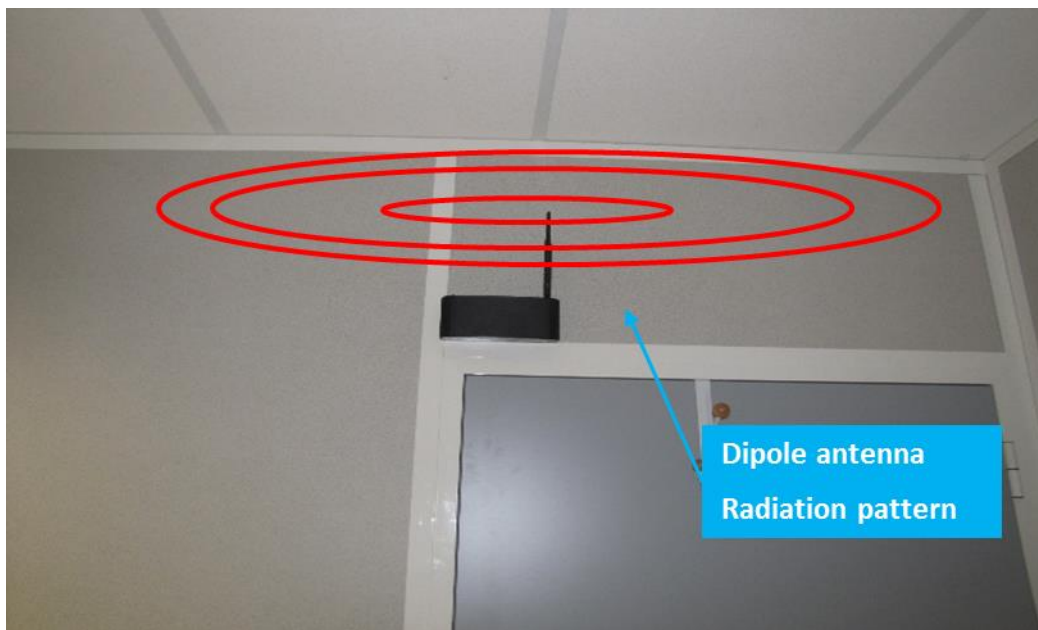If your WSN is deployed on the same floor, the RF antenna should be mounted vertically.

Figure 10: A BeanGateway® indoor mounted on a wall

If your WSN is deployed on the same floor, a horizontal position of the antenna will decrease the RF signal.

Figure 11: A BeanGateway® indoor mounted on a wall

For further information about WSN deployment guideline, Read the following technical note: TN_RF_009 – « BeanGateway® management on LAN infrastructure »

8.1.2   Desktop installation

The BeanGateway® indoor version can also be installed on your desktop, the RF Antenna should be mounted vertically.

Figure 12: A BeanGateway® indoor installed on a desktop

If your WSN is deployed on the same floor, a horizontal position of the antenna will decrease the RF signal.

Figure 13: A BeanGateway® indoor installed on a desktop

8.1.3 Wall mounting on the BeanGateway® Indoor Version:

Then BeanGateway® indoor version comes with two slots on the backside for wall mounting.

Figure 14: Slots for wall mounting

8.1.4   Wall mounting kit for the BeanGateway® outdoor

The BeanGateway® outdoor is provided with die cast external mounting brackets (4 x brackets and 4 x M5 attaching screws)

External mounting brackets enable the BeanGateway® outdoor to be wall or panel mounted without opening the box.
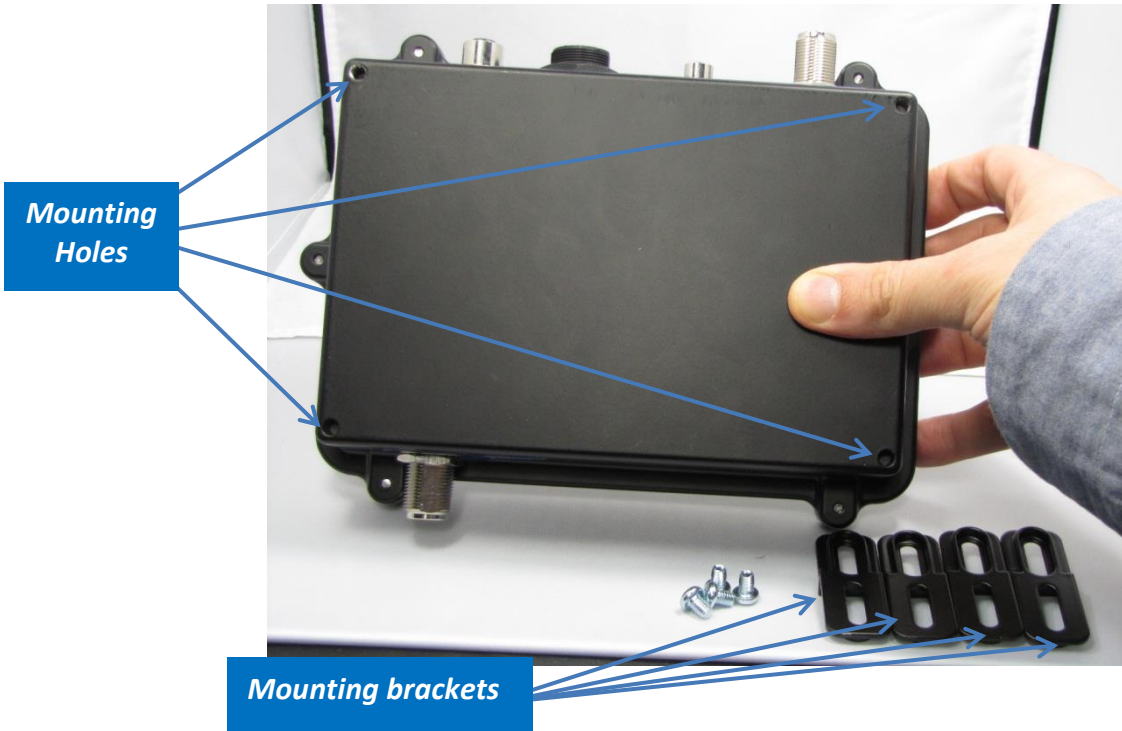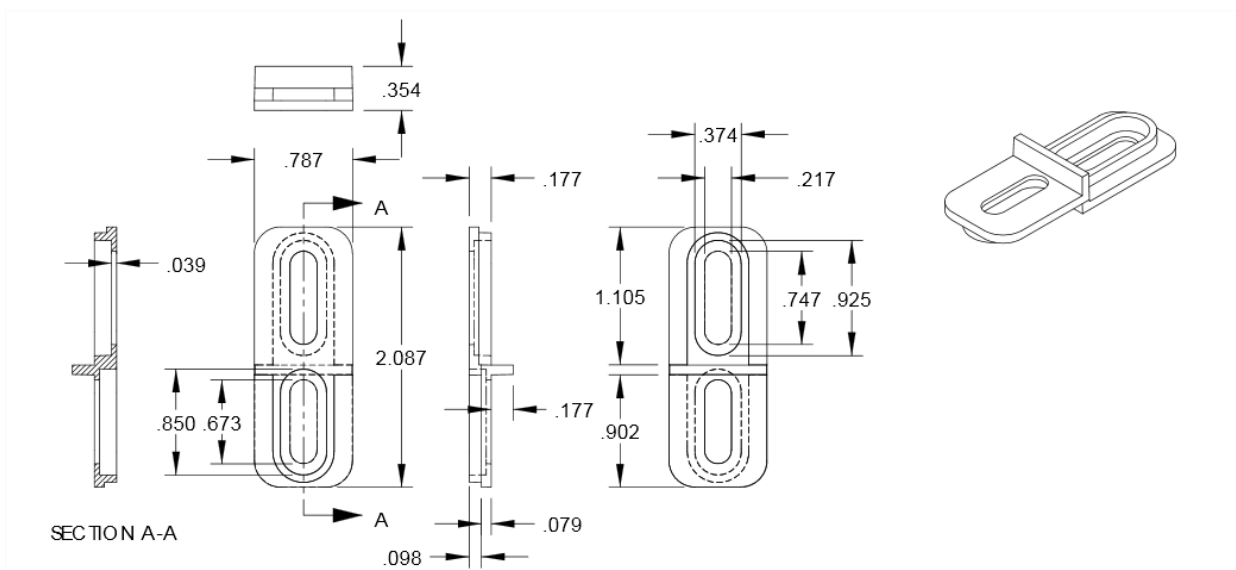

Figure 15: Wall monitoring kit
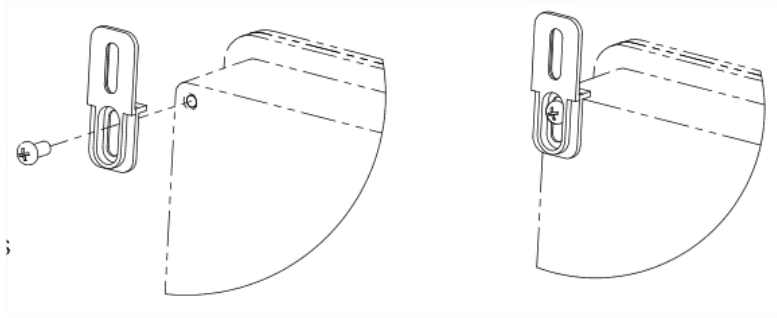
8.1.5   Mounting brackets design

Figure 16: Mounting brackets design

8.1.6   Plug the 2.4GHz antenna

✓ *The BeanScape® provides a Wireless Network Diagnostic tool (Real-Time PER & LQI estimation, Energy Scan on RF Channels) allowing the user to evaluate the RF Link between the BeanDevice® and the BeanGateway®.*

The antenna socket used on the BeanGateway® (indoor) is a RPSMA (Reverse polarity SMA) type, this type of antenna is a standard for indoor application.

Plug your RF antenna on the antenna socket of your BeanGateway® (clockwise). Do not force on the connectors.

Figure 17: Antenna socket (RPSMA)

 Don't try to plug another type of antenna on your BeanGateway®, you will damage the connectors.

8.1.6.1   BeanGateway® outdoor version

Click on the following web link to see the video: BeanGateway® - Ethernet Outdoor version introduction

The antenna socket used on the BeanGateway® is a N-Type antenna, this type of antenna is a standard for outdoor application.

Plug your RF antenna on the antenna socket of your BeanGateway® (clockwise). Do not force on the connectors.
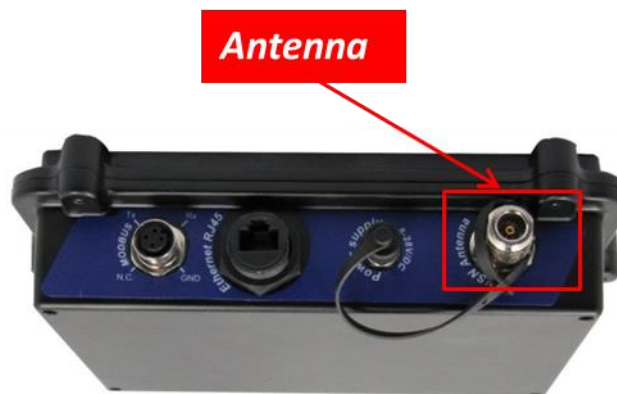

Figure 18: N-Type antenna Outdoor version

Don't try to plug another type of antenna on your BeanGateway®, you will damage the connectors.

8.2   POWER SUPPLY SOCKET WIRING

The *BeanGateway®* operates with an external power supply (DC 8-28V). An integrated rechargeable battery with a capacity of *950mAh* 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 (*3h00 to 3h30 approximately*).
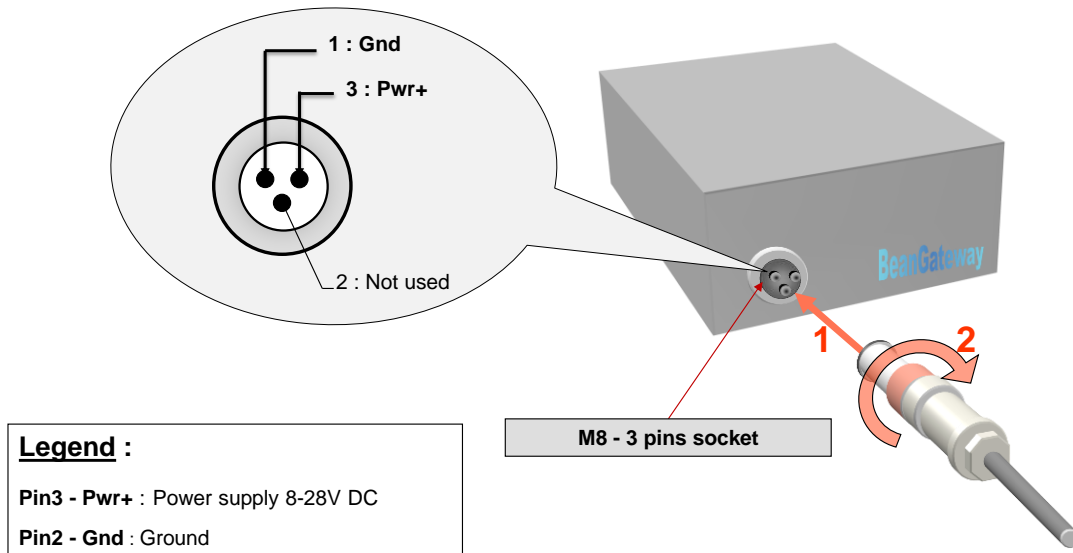
If you use another type of DC power supply, you will damage your BeanGateway®:

   ✔ *If you inverse the power supply polarity;*

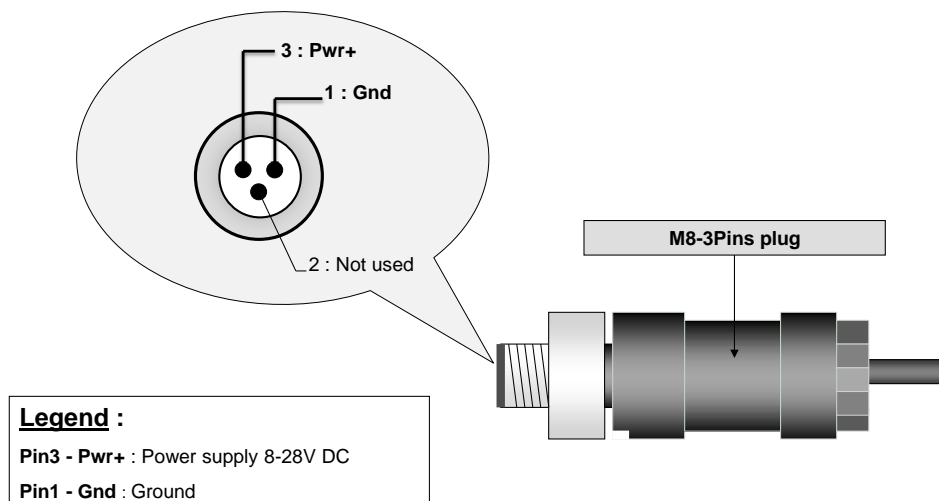   ✔ *If the maximum supply voltage value is exceeded (28V);*

8.2.1   BeanGateway® outdoor - power supply

The BeanGateway® Outdoor integrates a M8-3P socket. The AC-DC power supply adapter is provided with a M8-3P plug.

External power supply wiring code
(BeanGateway® casing side)

1 : Gnd

3 : Pwr+

2 : Not used

M8 - 3 pins socket

Legend :

Pin3 - Pwr+ : Power supply 8-28V DC

Pin2 - Gnd : Ground

External power supply wiring code

(M8 Plug Side)

3 : Pwr+

1 : Gnd

2 : Not used

M8-3Pins plug

Legend :

Pin3 - Pwr+ : Power supply 8-28V DC

Pin1 - Gnd : Ground

If you are using a molded M8 cable (Ref: CBL-M8-2M, CBL-M8-5M, CBL-M8-10M) the wiring code and color will be as follow:

Pin Number	Description	Color code
PIN3	Pwr+ : Power supply 8-28VDC	Blue
PIN1	Ground	Brown

 Reversing the power supply polarity may damage your BeanDevice®/BeanGateway® product

8.2.2   BeanGateway® indoor power supply

It's highly recommended to use your BeanGateway® with the DC power supply adapter provided with the BeanGateway®.

If it's needed to power supply the BeanGateway® with another type of DC power supply, the user must refer to the polarity:

Jack connector 2,1mm (Int) / 5.1 mm (ext)

Figure 19 : External power supply – BeanGateway® Indoor

The BeanGateway® comes with an internal rechargeable battery which will work as a UPS in case of external power cut or failure, however the BeanGateway® is not designed to work on its internal battery because the battery is used like a UPS and a temporary solution in case of power cut to maintain the work flow.

Do not use the BeanGateway® on its internal battery without any external power supply this may damage the BeanGateway® and can causes other issues.

Always use the BeanGateway® with an external power supply to work in the right conditions, In case of a power cut the BeanGateway® will switch to work on its internal battery as a second and a temporary solution until the power comes back again.

9. START YOUR APPLICATION

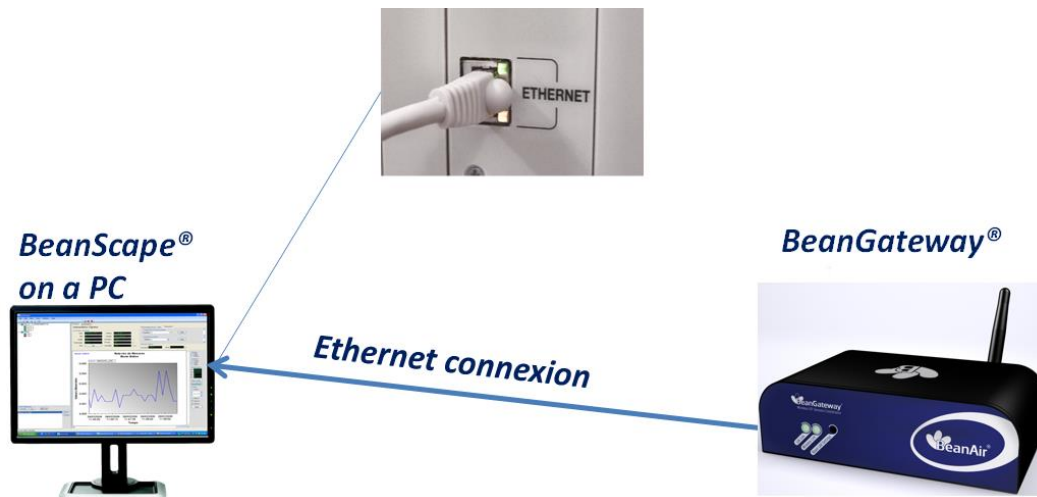### 9.1   CONNECT YOUR BEANGATEWAY® TO YOUR PC/LAPTOP

For further information about LAN Network configuration:

- *Read the following technical note: TN_RF_009 – « BeanGateway® management on LAN infrastructure »*

- *Click on the following web link to see the video: BeanGateway® Ethernet/LAN Configuration, directly connected to the Laptop/PC*

To view the entire wireless sensor network from your *BeanScape®*, you must firstly connect your *BeanGateway®* to a PC where the *BeanScape®* is already installed. Connection is established through an Ethernet cable.

Make sure:

- ✓ Ethernet cable is connected to both your PC and *BeanGateway®*
- ✓ *BeanGateway®* is powered and in "ON" position.
- ✓ *BeanScape®* is installed on your PC
- ✓ *No antivirus/firewall is blocking the Network activity between the BeanGateway® and the BeanScape®*

For further information on how to install the BeanScape®, please read the BeanScape® User Manual.

9.2   LAN CONFIGURATION ON YOUR PC

Using windows 10, we will configure the network connection on your computer/workstation.

If you are running other distribution of Windows (Windows Vista or 7), you can easily go to the **control Panel**, select **Network and Sharing Center** then select the option **Change adapter settings**.

To configure the network on your computer/workstation:
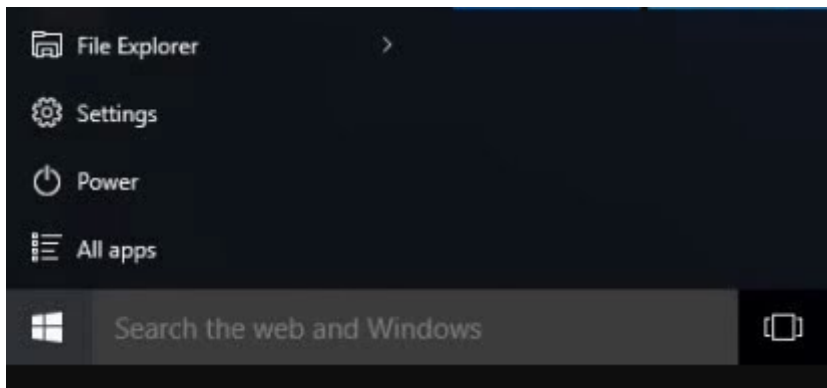
✓   Click on Start or use the Quick search input

Figure 20: Start Menu (Windows 10)

✓   Go to Settings

✓   Select Network and Internet

✓   Select Ethernet

✓   Select Change adapter options

Figure 21: Change adapter options

✓ A new window appears displaying your Ethernet card, Right click on it and select Properties
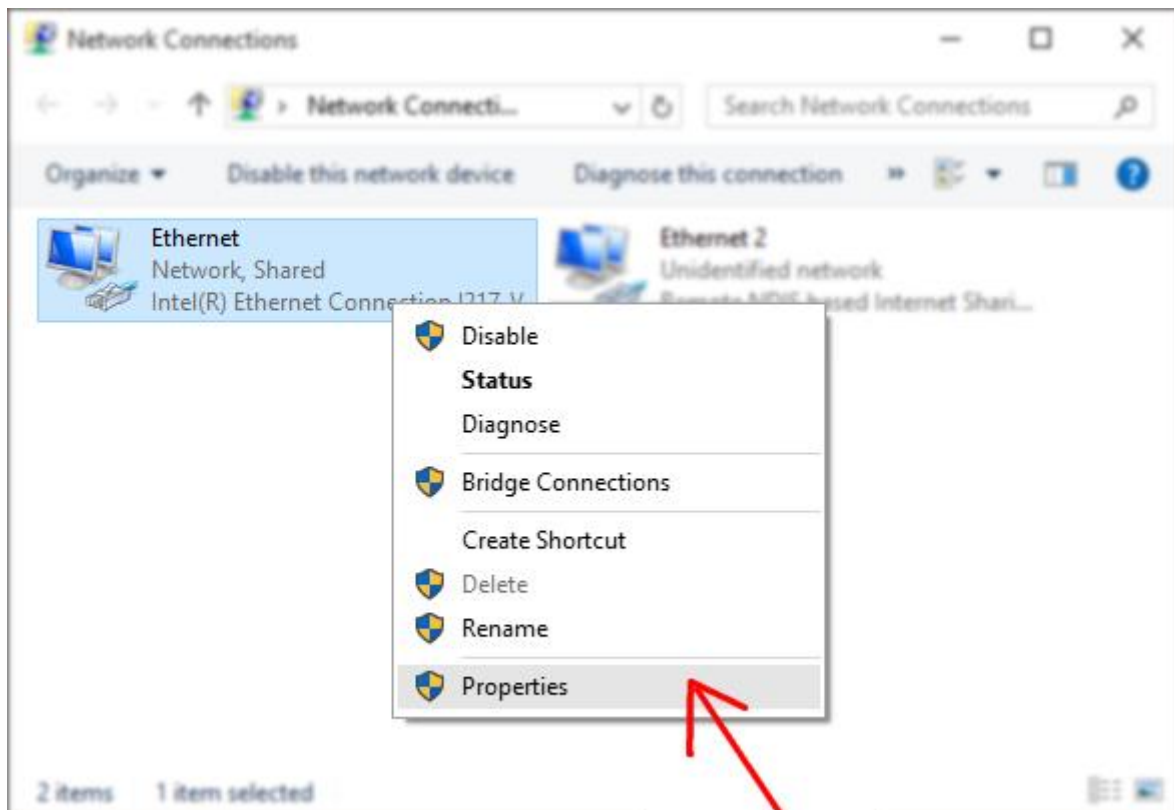

Figure 22: Ethernet adapter Properties option

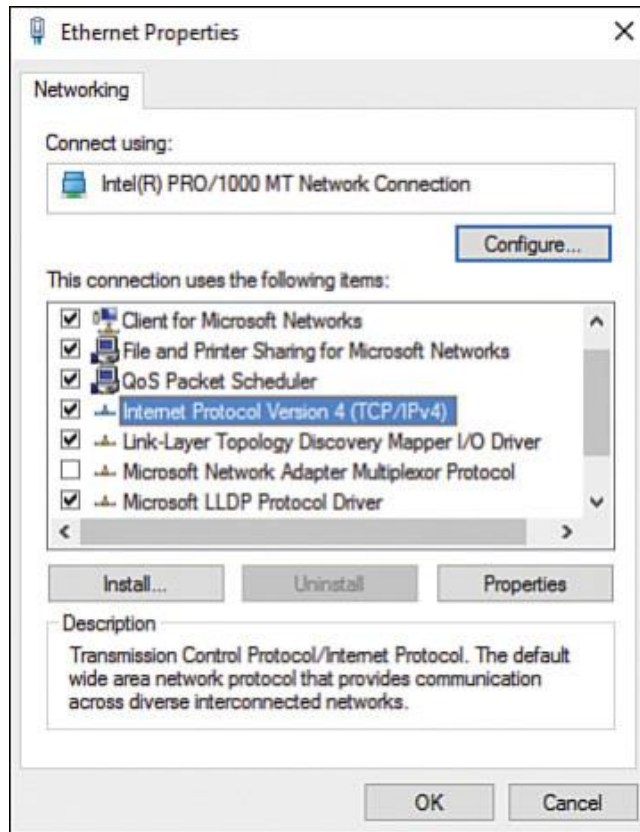✓ From the new window Double-click on the option **Internet Protocol Version 4 (TCP/IPv4)**

Figure 23: Ethernet configuration window

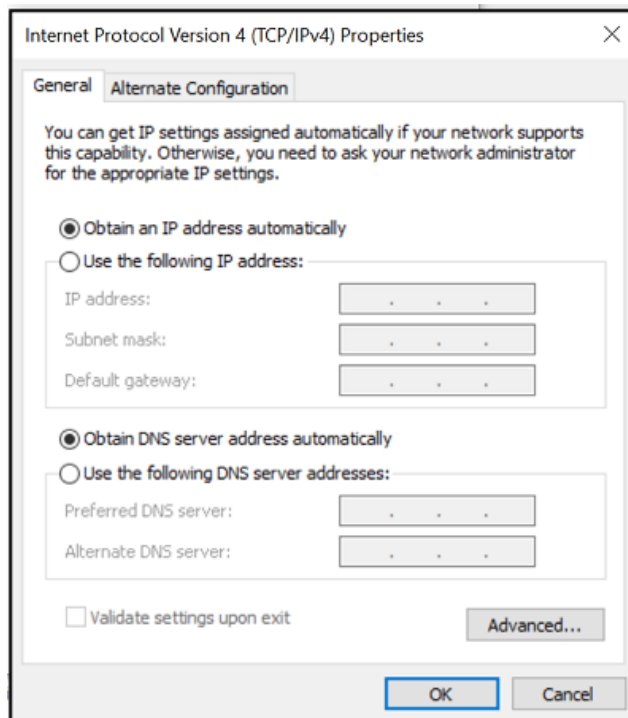✓ On the new window, activate the option Use the following IP addresse, to give your computer a static IP address.

Figure 24: IP (TCP/IPv4) window

✓ We will use a basic setting:

IP address: 192.168.4.2

Subnet mask: 255.255.255.0

Figure 25: IP settings

✓ Click "OK" to confirm.

✓ Your computer is now connected to your wireless sensor networks. In order to facilitate these exchanges, you must give commands from BeanScape®.

For this example, the BeanGateway® IP address is set as 192.168.4.123 with the DHCP disabled. The BeanGateway® is considered as a client by the BeanScape® (server) having the IP address by default set to 192.168.4.2.

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

9.3   CONNECTING YOUR BEANGATEWAY® TO YOUR BEANSCAPE®

Click on the following web link to see the video: BeanGateway® Ethernet/LAN Configuration, directly connected to the Laptop/PC

Please check your Network settings before you make any changes.

By default, the BeanGateway® is configured with a static IP address: **192.168.4.123**. This allows the user to quickly connect the BeanGateway® to a PC.

If you want to set the BeanGateway® IP on your business network and get a dynamic IP address (via DHCP), you can configure the BeanGateway® via a serial port or via the Ethernet.

Go on your BeanGateway® profile and click on Tools, then click on "**BeanGateway® Ethernet/LAN config**".
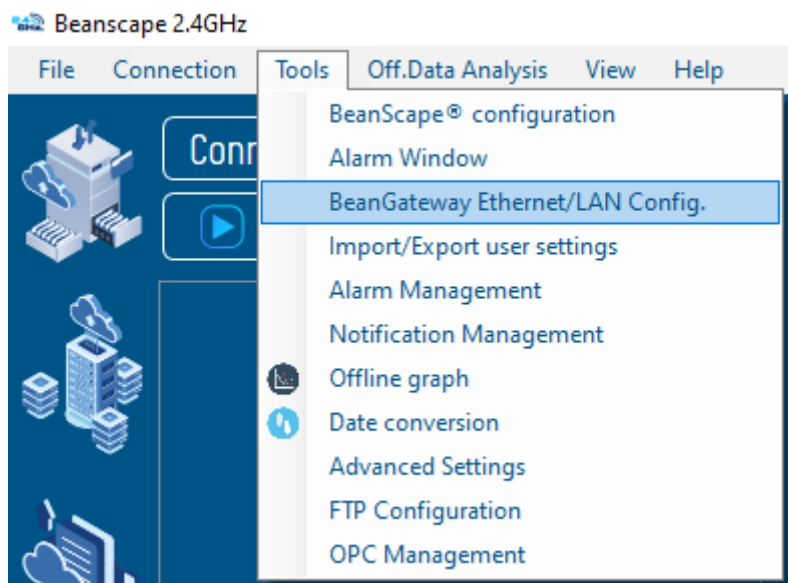

Figure 26: BeanGateway® Ethernet config option

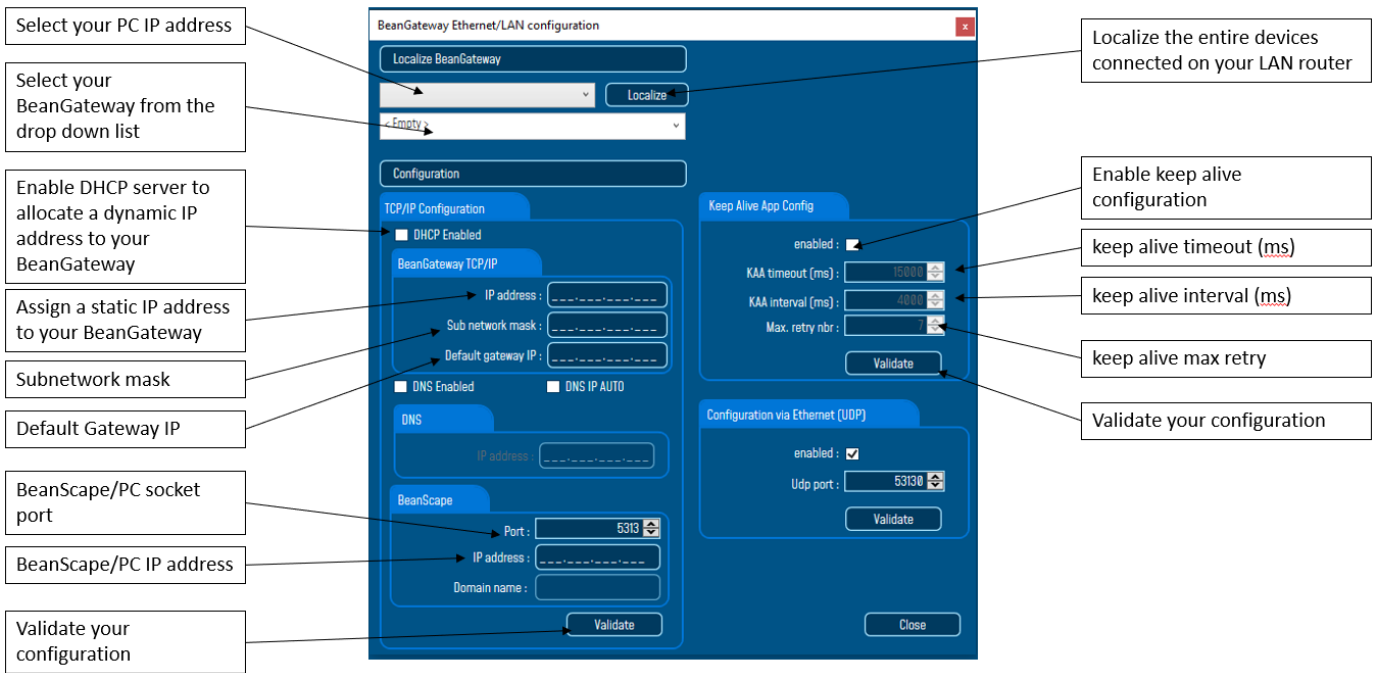A new window will open "**BeanGateway® Ethernet/LAN configuration**"

Figure 27: BeanGateway® Ethernet/LAN configuration window on BeanScape®

- **DHCP Enabled**: Check this case if you want to enable the DHCP. For further information about DHCP read the *Technical Note* "*BeanGateway® management on your Local Area Network infrastructure".*

- *If DHCP is not activated, the user must configure the BeanGateway® IP parameters:*

    o **IP Address:** BeanGateway IP Address. The BeanGateway® IP address should have the following form: "X.Y.Z.B". With A, B, X, Y and Z numbers between 0 and 255

    o **Subnet Network mask:** The subnet mask is set to "255.255.255.0" by default

    o **Gateway IP Address:** Subnet network mask

- **DNS Enabled**: Check this case if you want to enable the DNS. For further information about DNS read the *Technical Note* "*BeanGateway® management on your Local Area Network infrastructure".*

- The gateway IP address subnet is the default "X.Y.Z.1"

- **Port**: By default, the communication port used is "5313". This port is generally free, if not choose another Socket Port.

For further information, please read the following technical note– TN_RF_009 – « BeanGateway® management on LAN infrastructure »

9.4   START THE BEANSCAPE®

- To Start the server, go to the Server option on the main menu bar and select Start Server or easily click

    directly on the Start button [image] on the menu bar.

Figure 28: Start Server

The BeanScape® server starts and creates the BeanDevice® mapping based.
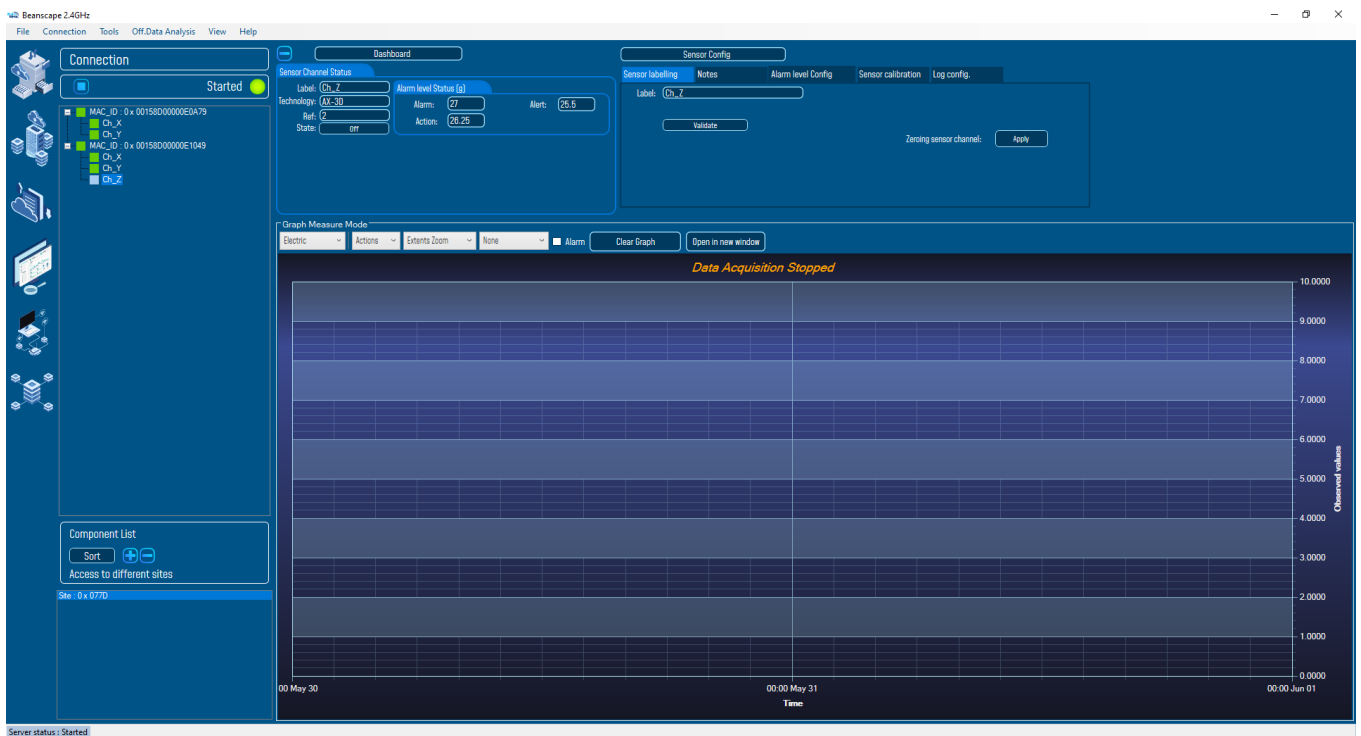
Figure 29: Overview: BeanScape®

9.5 BEANGATEWAY® PROFILE

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

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

Figure 30: BeanGateway® coordinator on BeanScape®

✓ This will be the BeanGateway® Profile window:

Figure 31: BeanGateway® profile

The BeanGateway® profile is divided into two frames:

- ✓ Profile status
- ✓ Profile configuration parameters

9.5.1 Status description

Figure 32: BeanGateway® Profile Frames

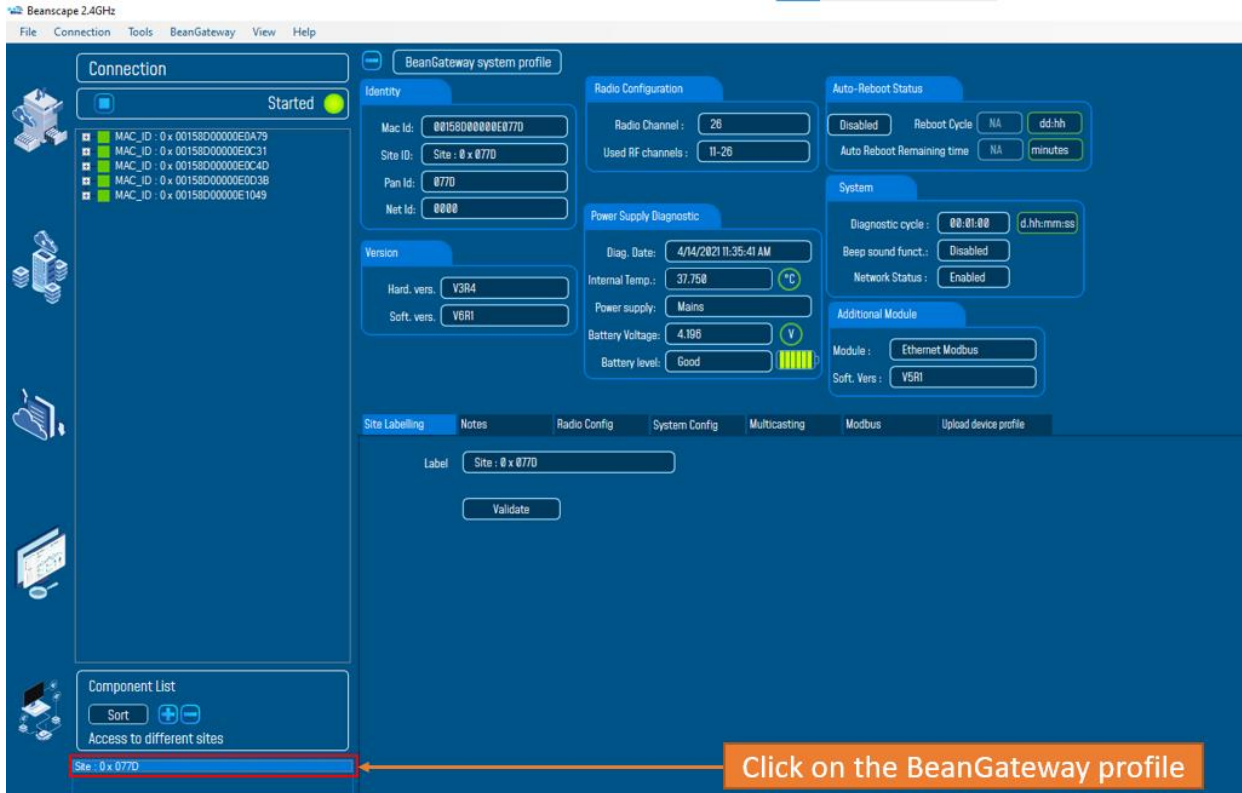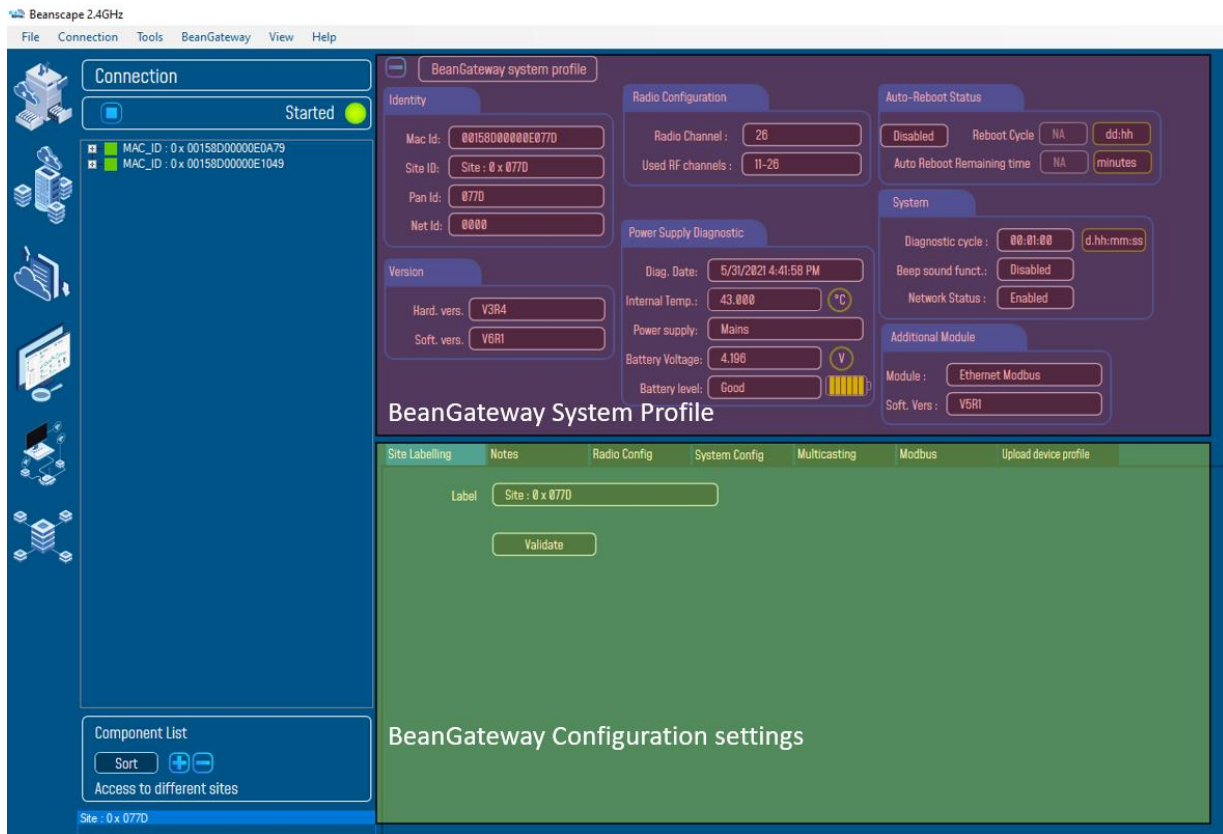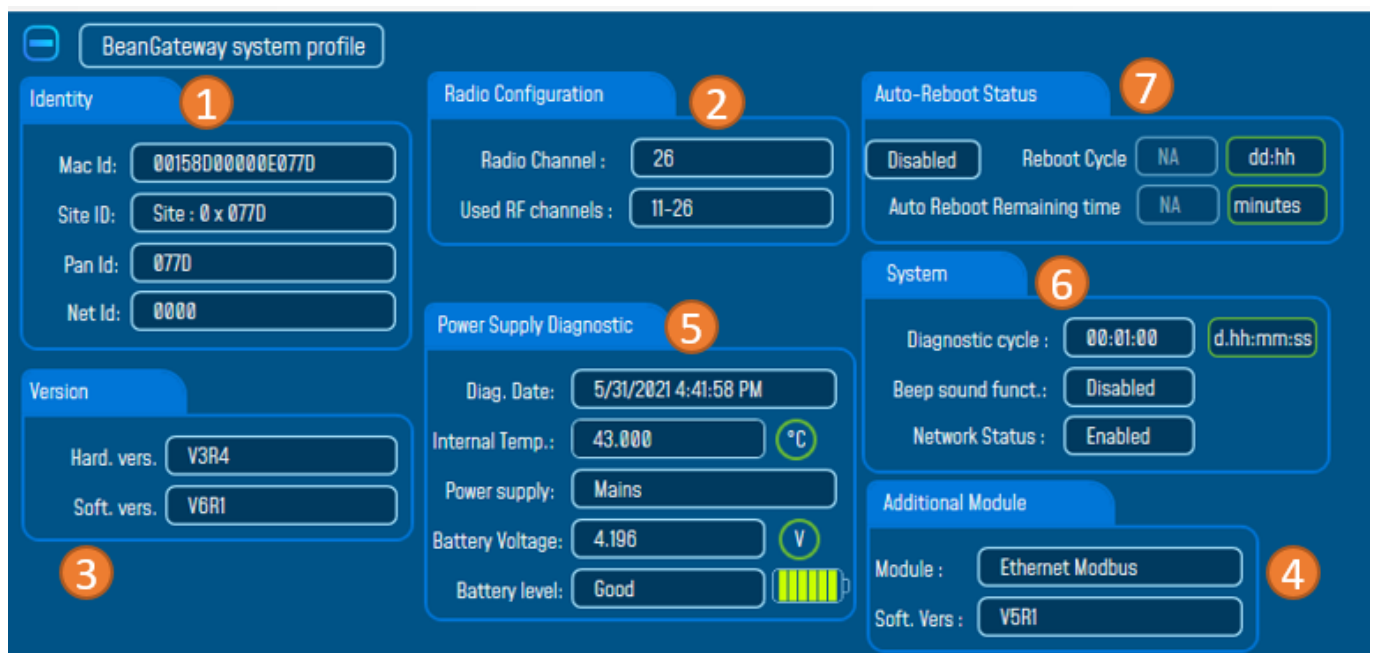|	
1	This frame displays all the ID allocated to the BeanGateway®: • **MAC Address (encoded on 64-bits): MAC Address (encoded on 64-bits):** The Media Access Control address is a unique identifier assigned to the BeanDevice® by the manufacturer for identification. • *PAN Address (encoded on 16-bits):* 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 •
	Additional module frame: • *Module:* Additional module information (BeanGateway® type) • *Soft. version:* Software version of the additional module
5	Power Supply Diagnostic frame: • *Temperature*: Internal temperature of the BeanDevice® with a resolution of 0,125°C • *Power supply Status*: Main or Battery • *Power mode*: active / sleep / 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
6	• *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
7	• *Enable/Disable:* Reboot status (disabled or enabled) • *Reboot cycle:* whenever the BeanGateway® reaches the cycle, it will restart automatically • *Auto-reboot remaining time:* count down from 10 min

9.5.2   User-configurable parameters
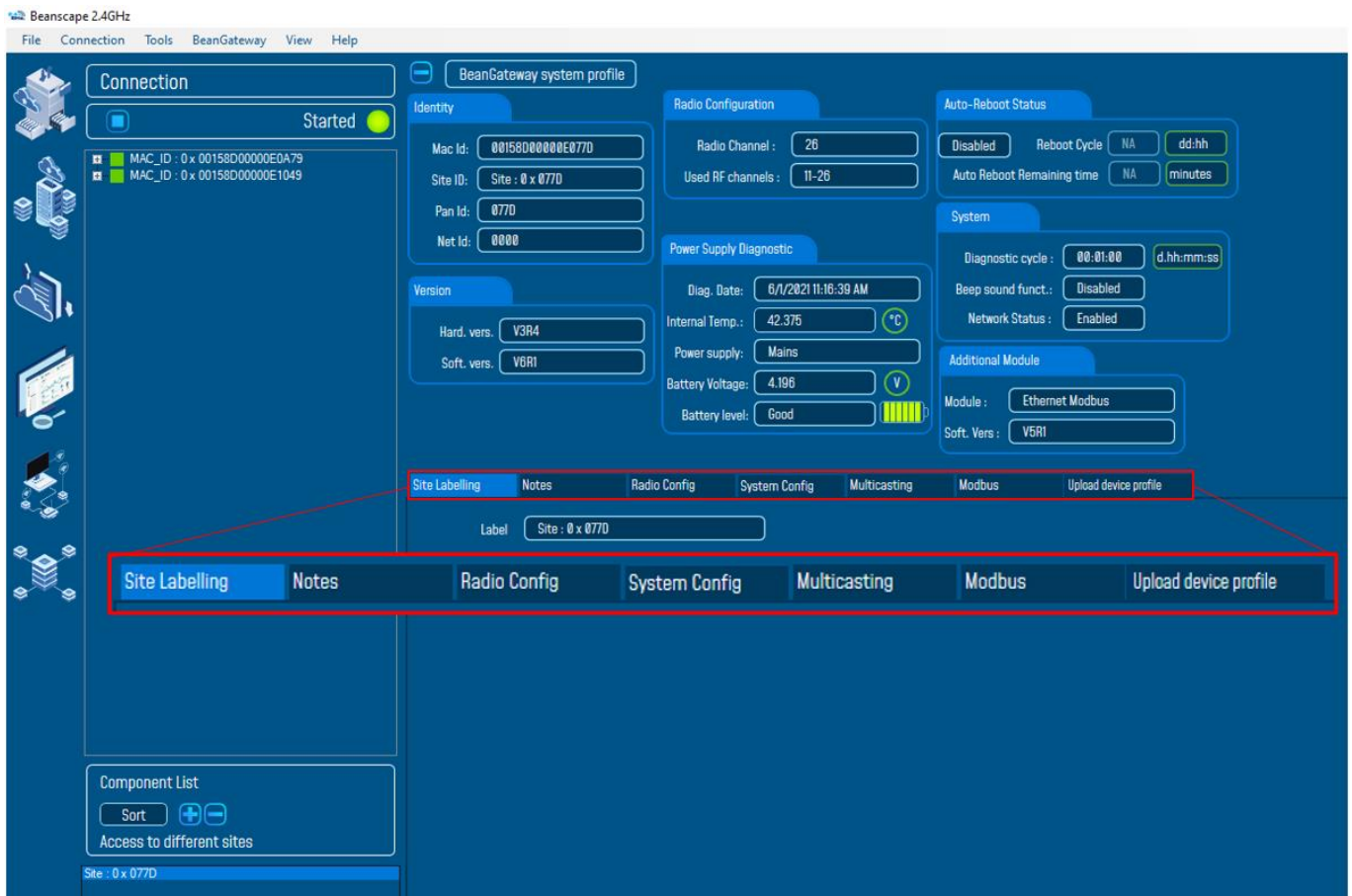
Figure 33: BeanGateway® User-configurable parameter tabs

Frame	Description
Site labeling	Customize the BeanGateway® label
Notes	This tab contains the notes related to the BeanGateway®.
Radio Config.	Radio parameters configuration (RF channels, Energy Scan, PAN ID….)
System config.	System configuration (Diagnostic cycle, Nwk deletion, Post system clock…)
Modbus	This tab allows to configure Modbus setting (if available on the BeanGateway®)
Multicasting	This tab allows to configure Multicasting
Upload BeanDevice profile	Allows to update BeanDevice® via uploading the suitable file

9.5.2.1 Custom Display
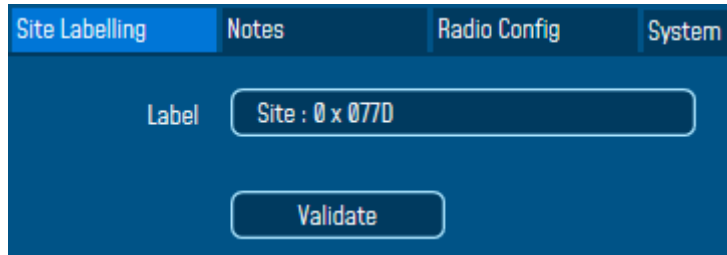
Figure 34: Custom dispaly tab

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).

9.5.2.2 Notes

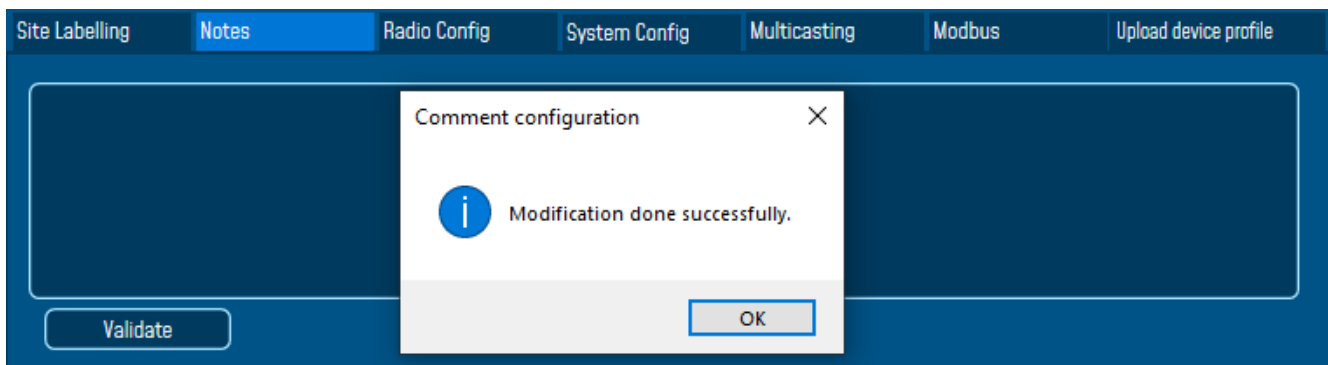This area contains the notes related to the BeanGateway®. To edit this field, enter data to save and click on "Validate".

Figure 35: Tab: Notes

9.5.2.3   Radio Configuration
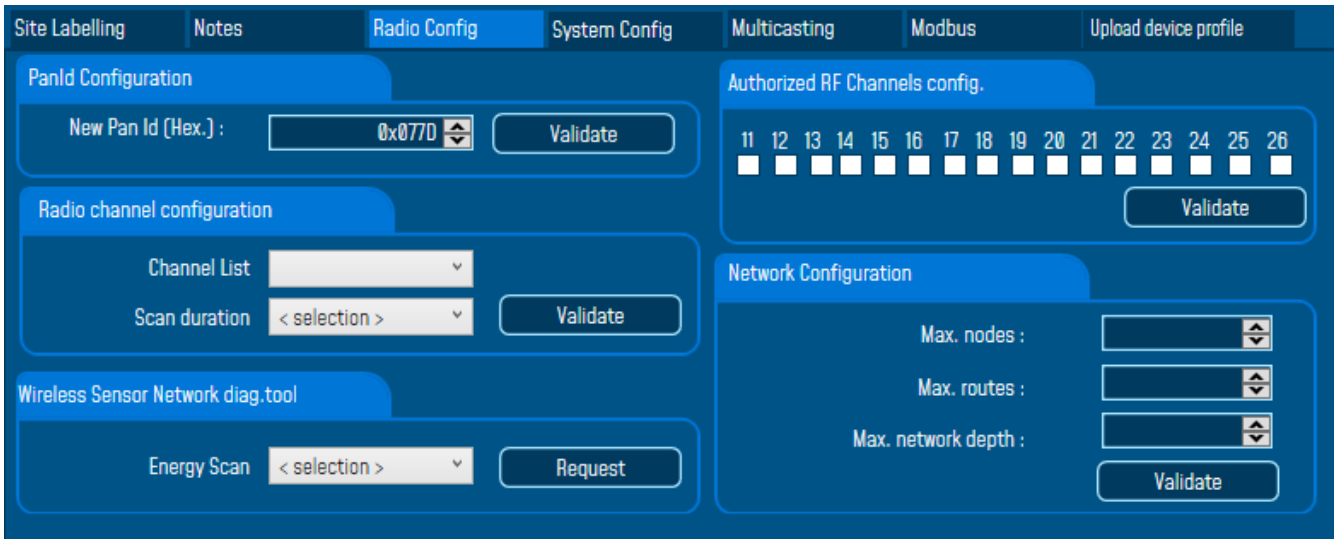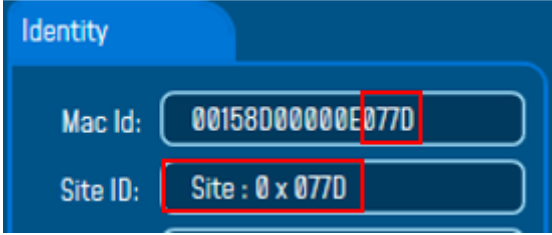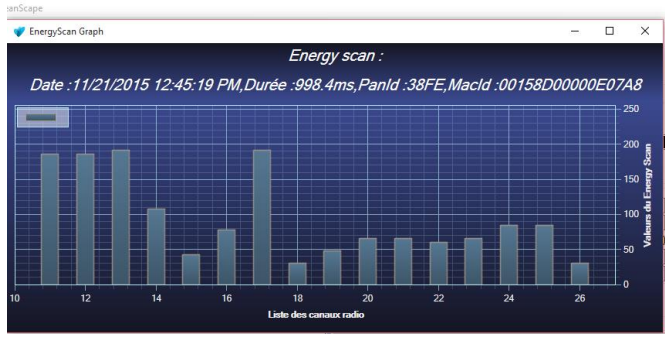
Figure 36: Radio Config tab

Setting	Description	Watch the short technical Video (Click on the Icon)
PAN ID Configuration	From the software version V6R0, PAN ID is based on the latest characters of the BeanGateway® MAC ID. User still can change the PAN ID from this section and there are no restrictions	
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.	
Wireless Sensor Network diagnostic tool	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. 	
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.	

Select RF channels with the least detected activity.
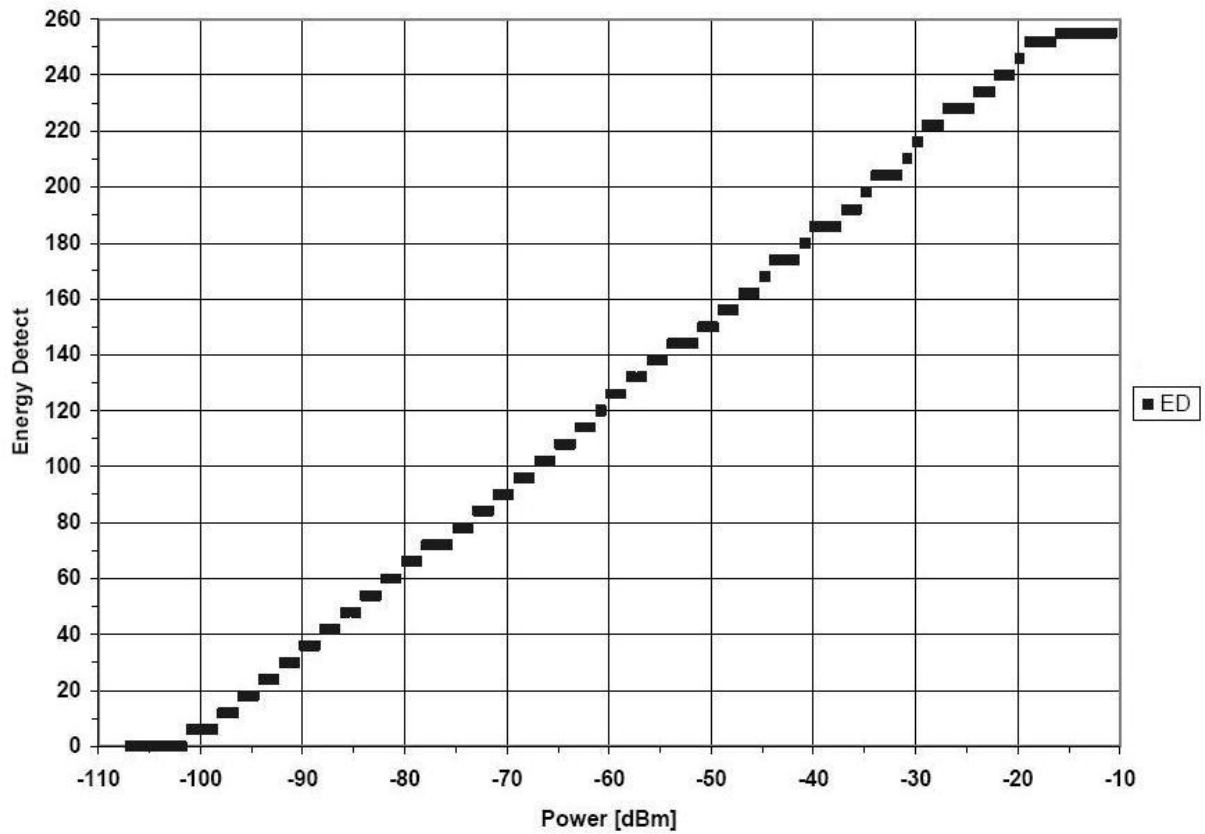
Figure 37 : Conversion table - Energy Scan power in dBm

9.5.2.4   System Configuration
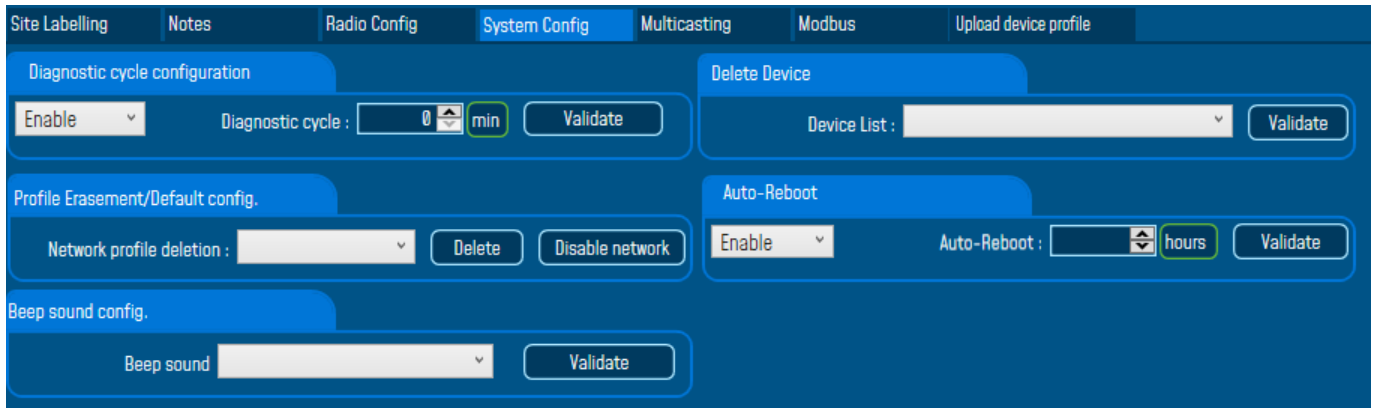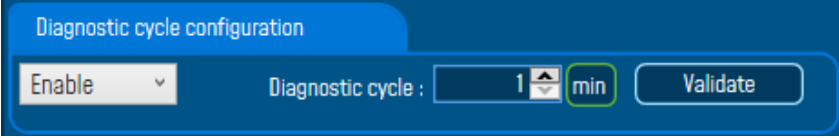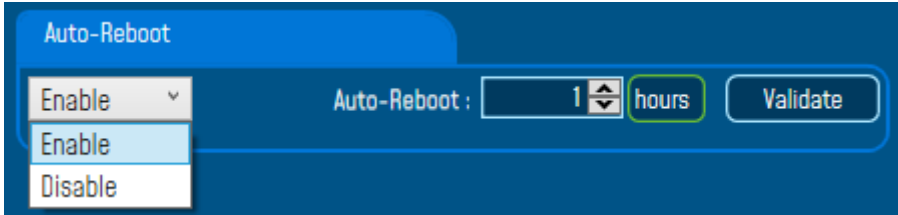
Figure 38: System Config. tab

Setting	Description	Watch the short technical Video (Click on the Icon)
Diagnostic cycle	You can set the BeanGateway® diagnostic cycle (Battery status). From the Software version V6R0 the minimum diagnostic cycle is 1 min, user cannot use a lower value. 	
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.	
Auto-Reboot	with the auto-reboot function user can have the option to setup a BeanGateway auto-reboot at a prescheduled time he selects. Select from the scrolled menu Enable and enter your suitable prescheduled time from 1h up to 255h, then click on validate button. User have the ability to disable Auto-reboot function at any moment simply just by selecting disable option and validate.	

9.5.2.5 Auto-Reboot Further info

Why is rebooting so important?

The very nature of technology makes a device prone to a memory leak. Memory leaks occur when your system's RAM becomes overloaded, causing your BeanGateway to move at a sluggish rate or even more, a freezing system.

And by sampling rebooting your BeanGateway, you are allowing the overloaded data to reset, essentially giving the BeanGateway a fresh start.

Right after clicking on validate button the new configuration will be displayed on the Auto-Reboot status frame under BeanGateway Status frame.
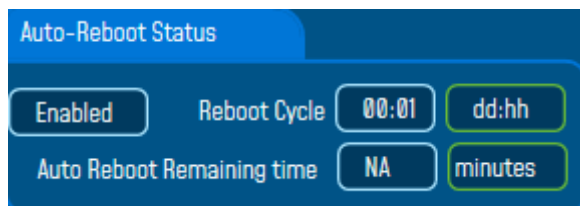
By configuring the Auto-reboot function an Auto-reboot log file will be created under log_beanscape folder which contains the BeanGateway auto-reboot history logfile.
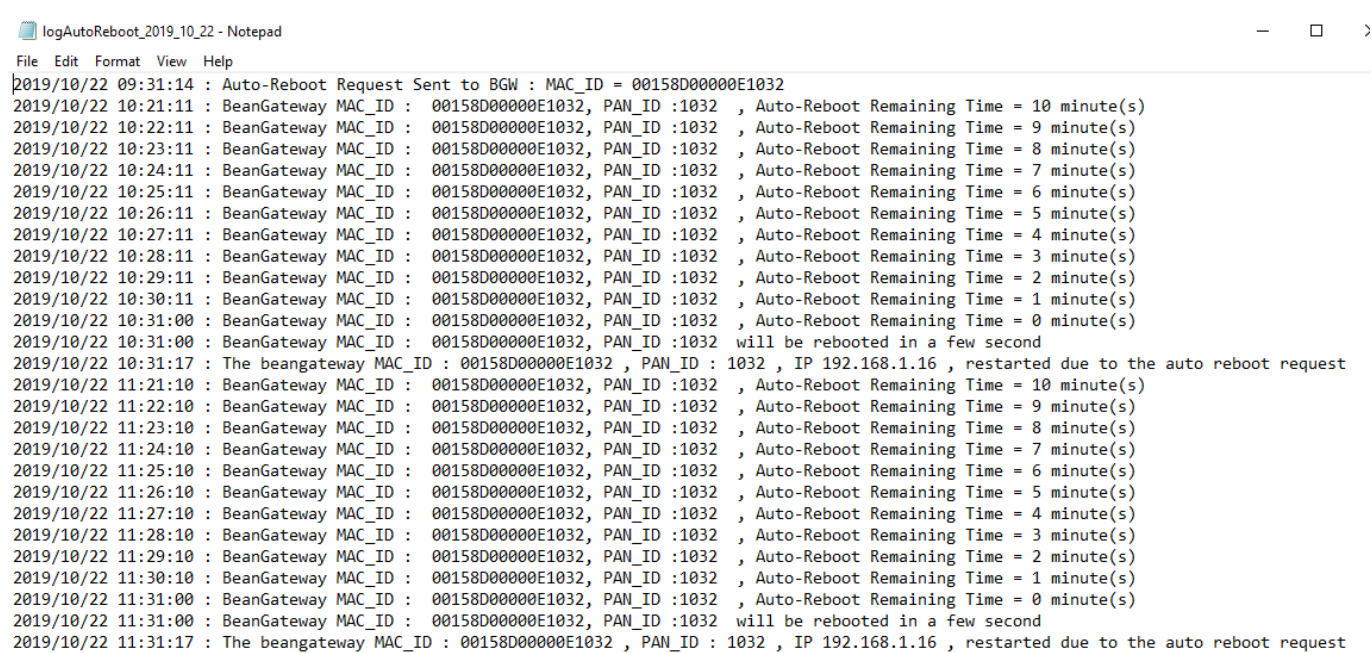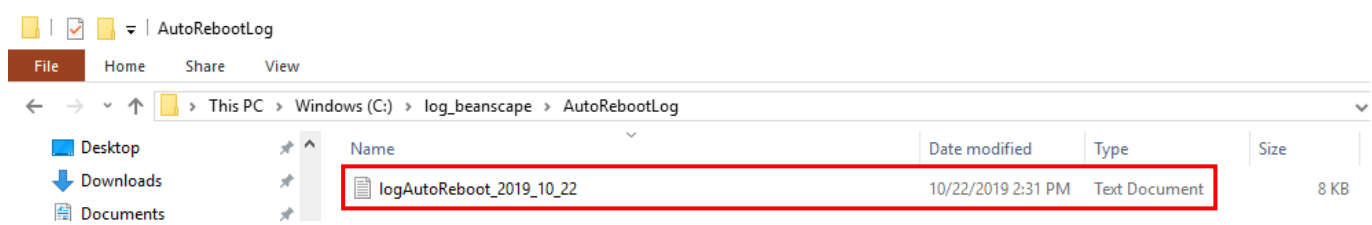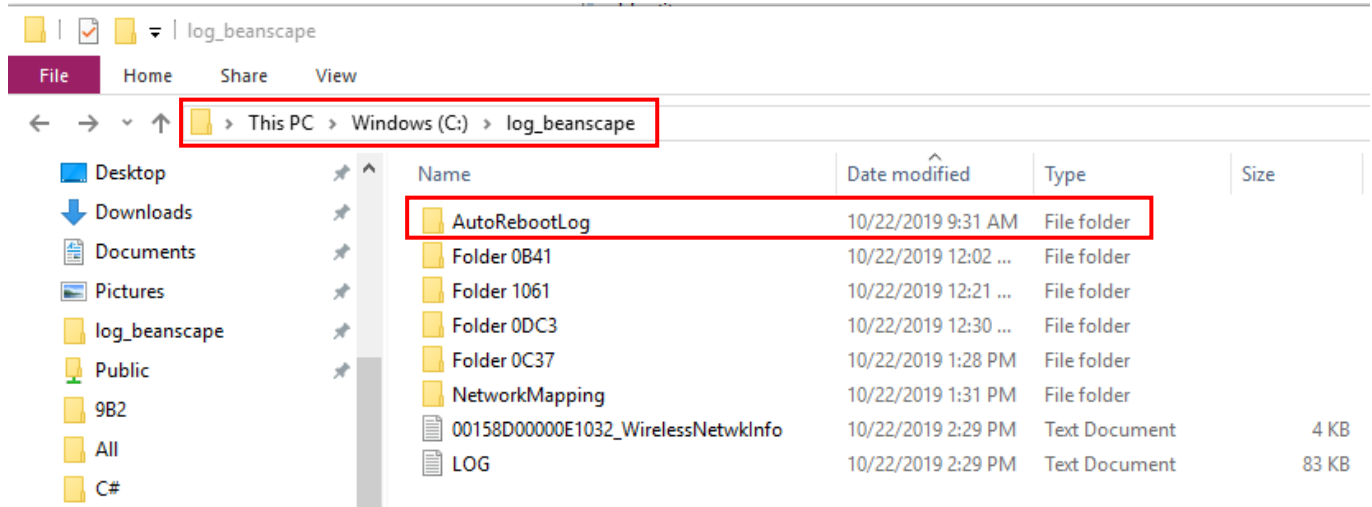
9.5.2.6   Restrictions with the Auto Reboot

Auto-Reboot count-down starts from 10 minutes and it's refreshed every minute. The count-down is encapsulated in the diagnostic frame and transmitted every minute.
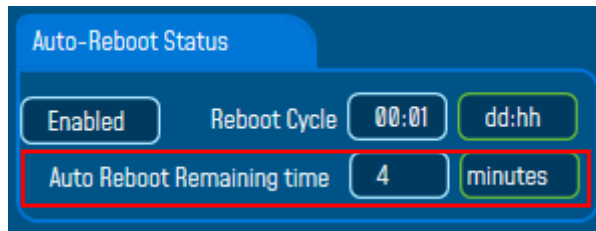
During the count-down, a notification message will pop-up on the screen every minute.
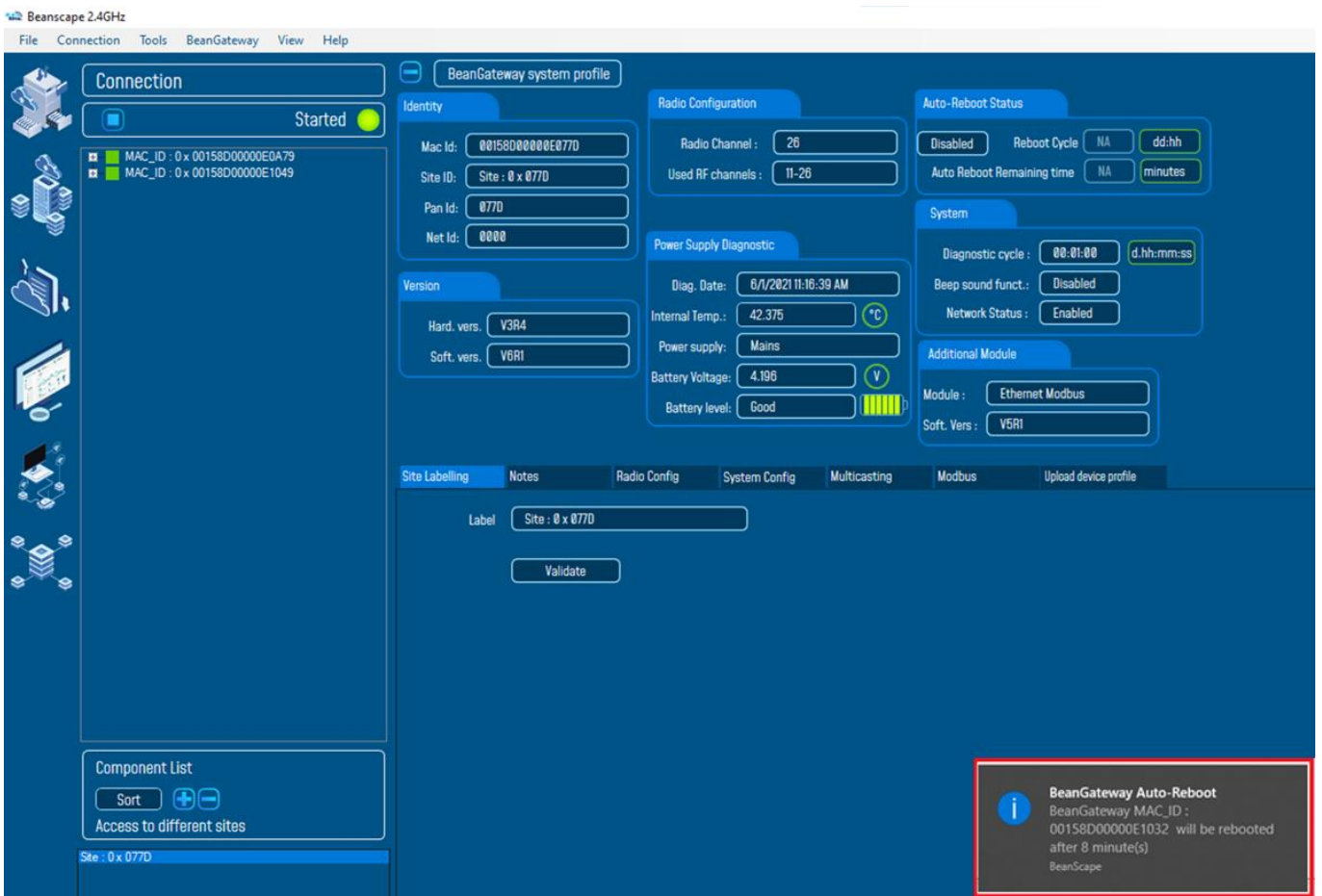
When using a multicasting configuration, user will be recommended to disable the auto reboot option before starting a download process.
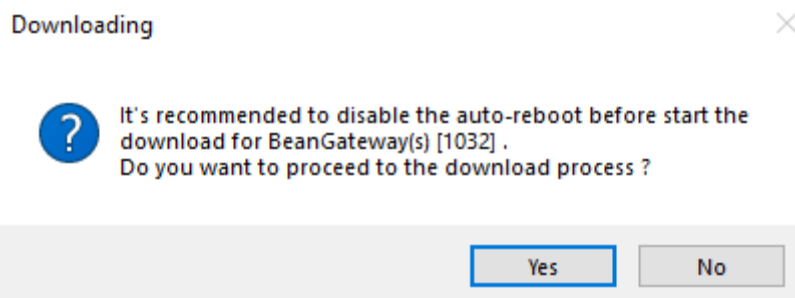
During the count-down, user is not allowed to start a download process to the logfiles from the BeanDevice DataLogger.

During the last minute of the count-down, user cannot configure the BeanGateway neither download the logfiles from the BeanDevice DataLogger.

if user use a multicasting configuration and the count-down is reached while a downloading process,

The downloading operation Will be canceled for the rest of the BeanDevices used on the multicasting group.

9.5.2.7   Upload BeanDevice profile

Figure 39: Upload BeanDevice profile tab

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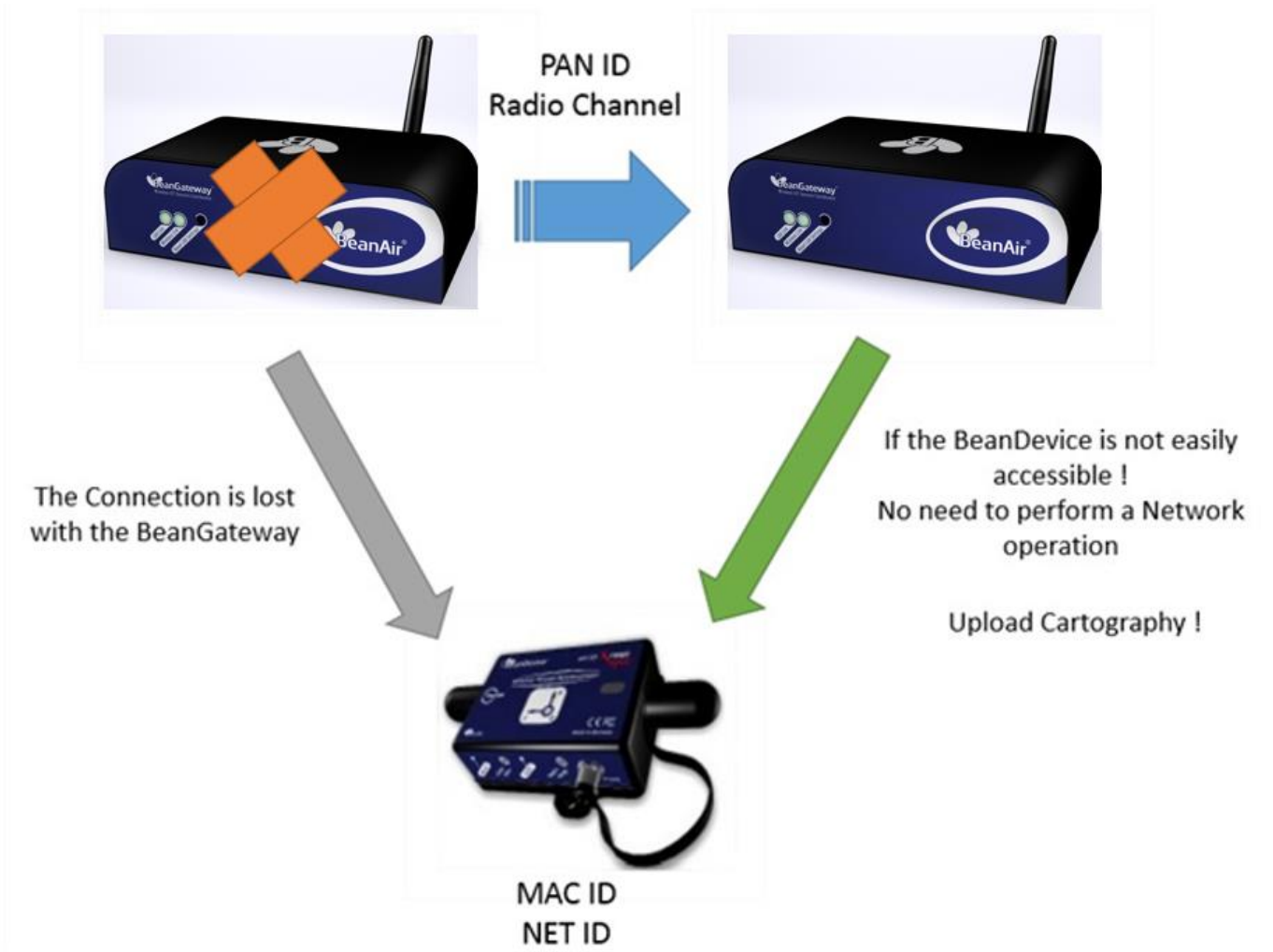
This function is assimilated to a BeanGateway cloning operation in order to make the BeanDevice believe that the second BeanGateway is the first one.

See "Export & Import BeanDevice Profile" Youtube video

9.6   LOG FILE ORGANIZATION

9.6.1   Log file system overview
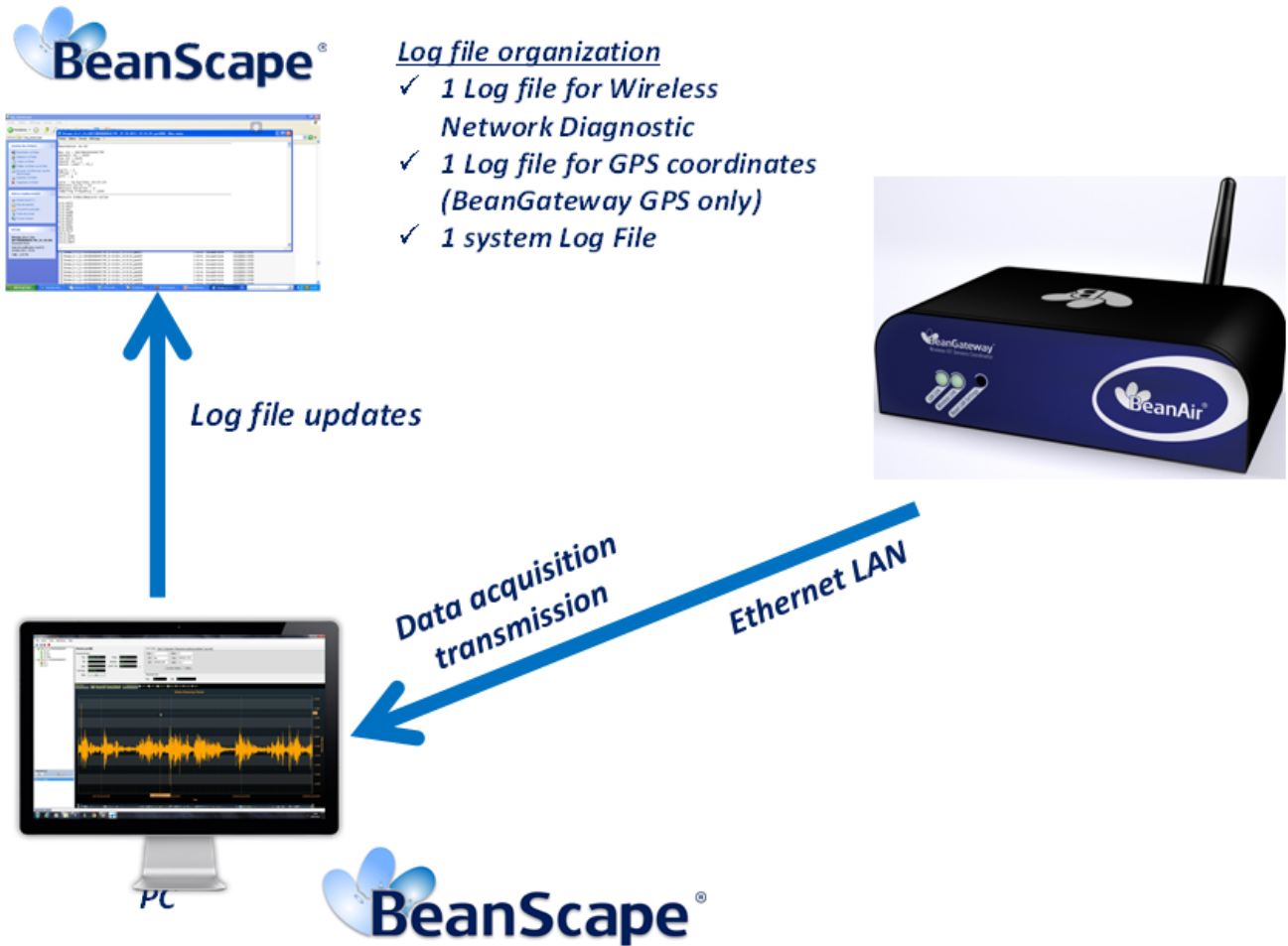
Figure 40 : Log file system overview

9.6.2   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®*:
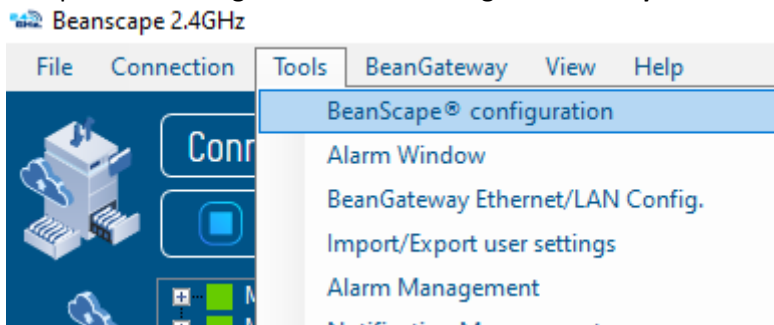
Figure 41: BeanScape® Configuration option

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

    ✓   You will see the following window:
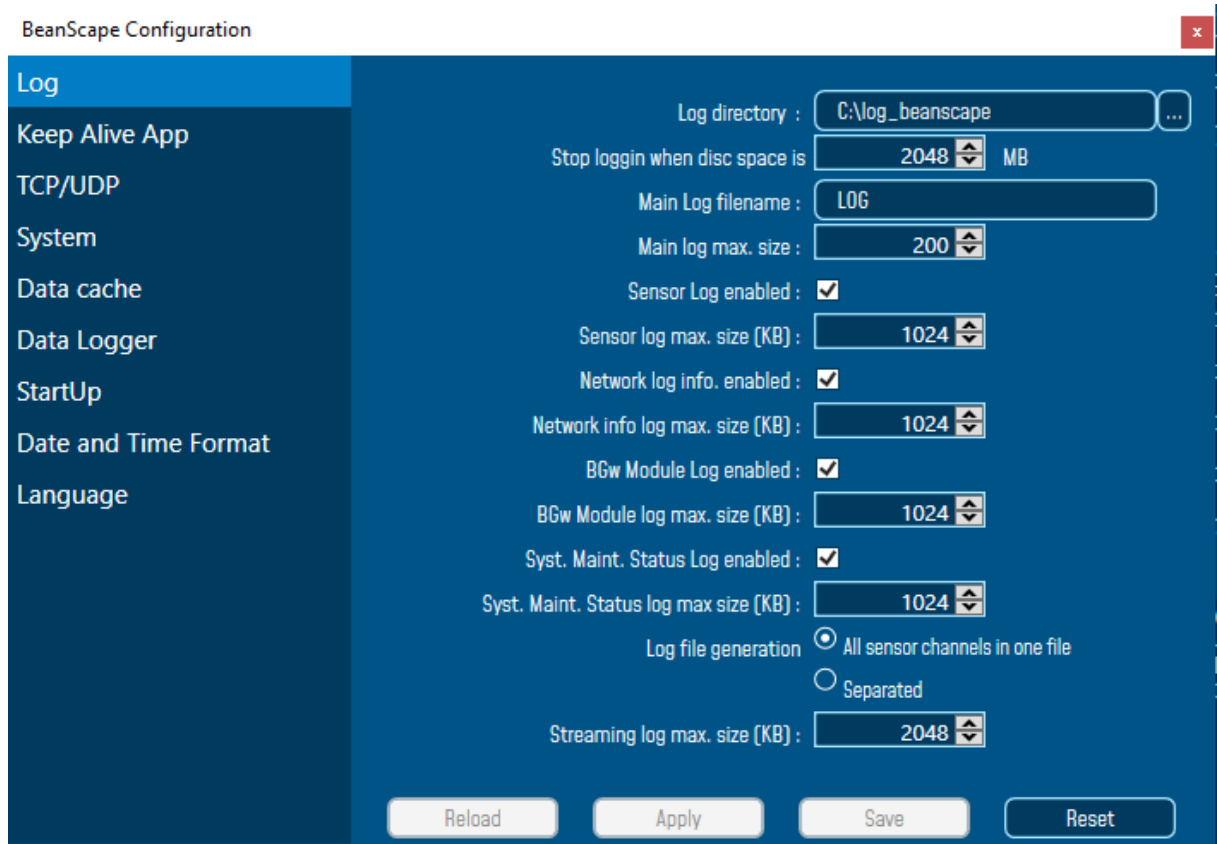
Figure 42: BeanScape® configuration window

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

10. MULTI-WSN CONFIGURATION
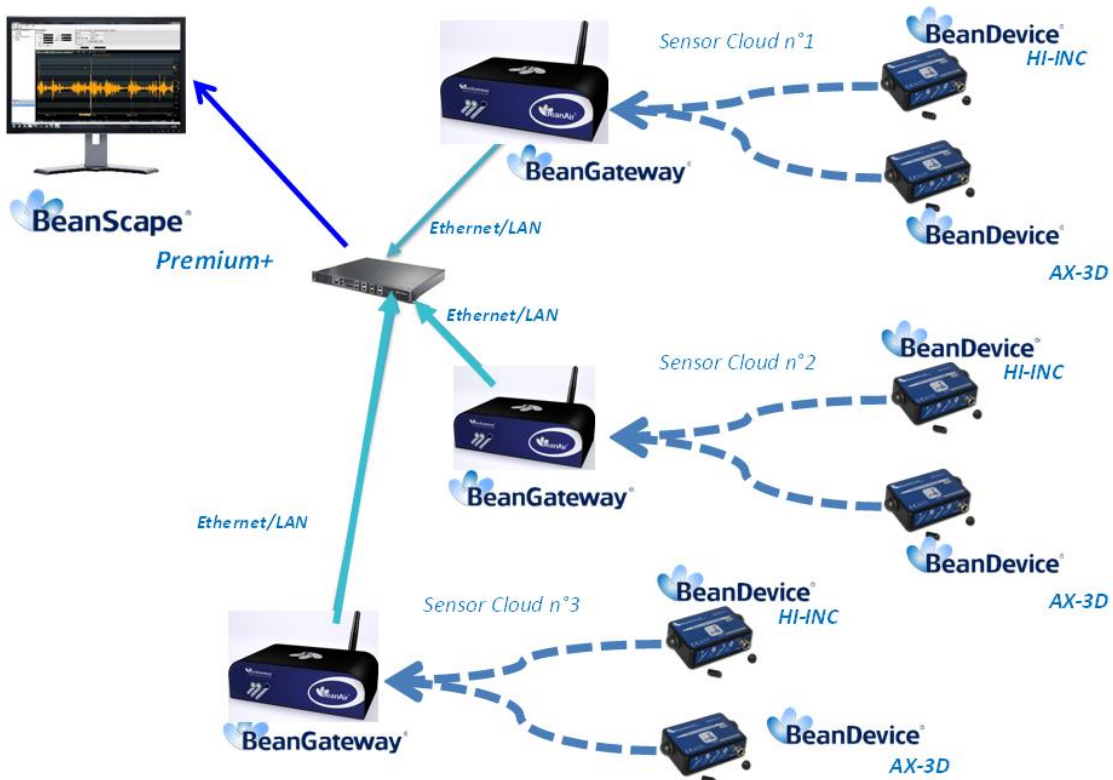
Figure 43 : A multi-WSN architecture

These settings are mandatory:

- PAN ID should be different between each BeanGateway®

These settings are highly recommended:

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

11. AUTO-REBOOT FUNCTION

Users now have the option to setup a BeanGateway auto-reboot at a prescheduled time they select.

11.1 WHY IS REBOOTING SO IMPORTANT?

The very nature of technology makes a device prone to a memory leak. Memory leaks occur when your system's RAM becomes overloaded, causing your BeanGateway to move at a sluggish rate or even more, a freezing system.

And by sampling rebooting your BeanGateway, you are allowing the overloaded data to reset, essentially giving the BeanGateway a fresh start.

11.2 HOW TO SET YOUR BEANGATEWAY TO AUTOMATICALLY REBOOT

User can set this function up by following these steps:

Click on the BeanGateway profile and navigate to the System Config. tab, and select from the scrolled menu Enable to enable Auto-reboot function and enter your prescheduled time from 1h up to 255h, then click on validate.

Also, you can configure the BeanGateway diagnostic cycle from 1 min up to 1 day.

Figure 44: Auto-Reboot Configuration

Right after clicking on validate button the new configuration will be displayed under the Auto-Reboot status frame under BeanGateway Status frame.


By configuring the Auto-reboot function an Auto-reboot log file will be created under log_beanscape folder which contains the BeanGateway auto-reboot history logfile.



```
logAutoReboot_2019_10_22 - Notepad
File  Edit  Format  View  Help
2019/10/22 09:31:14 : Auto-Reboot Request Sent to BGW : MAC_ID = 00158D00000E1032
2019/10/22 10:21:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 10 minute(s)
2019/10/22 10:22:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 9 minute(s)
2019/10/22 10:23:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 8 minute(s)
2019/10/22 10:24:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 7 minute(s)
2019/10/22 10:25:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 6 minute(s)
2019/10/22 10:26:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 5 minute(s)
2019/10/22 10:27:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 4 minute(s)
2019/10/22 10:28:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 3 minute(s)
2019/10/22 10:29:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 2 minute(s)
2019/10/22 10:30:11 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 1 minute(s)
2019/10/22 10:31:00 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 0 minute(s)
2019/10/22 10:31:00 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  will be rebooted in a few second
2019/10/22 10:31:17 : The beangateway MAC_ID : 00158D00000E1032 , PAN_ID : 1032 , IP 192.168.1.16 , restarted due to the auto reboot request
2019/10/22 11:21:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 10 minute(s)
2019/10/22 11:22:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 9 minute(s)
2019/10/22 11:23:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 8 minute(s)
2019/10/22 11:24:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 7 minute(s)
2019/10/22 11:25:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 6 minute(s)
2019/10/22 11:26:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 5 minute(s)
2019/10/22 11:27:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 4 minute(s)
2019/10/22 11:28:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 3 minute(s)
2019/10/22 11:29:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 2 minute(s)
2019/10/22 11:30:10 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 1 minute(s)
2019/10/22 11:31:00 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  , Auto-Reboot Remaining Time = 0 minute(s)
2019/10/22 11:31:00 : BeanGateway MAC_ID :  00158D00000E1032, PAN_ID :1032  will be rebooted in a few second
2019/10/22 11:31:17 : The beangateway MAC_ID : 00158D00000E1032 , PAN_ID : 1032 , IP 192.168.1.16 , restarted due to the auto reboot request
```
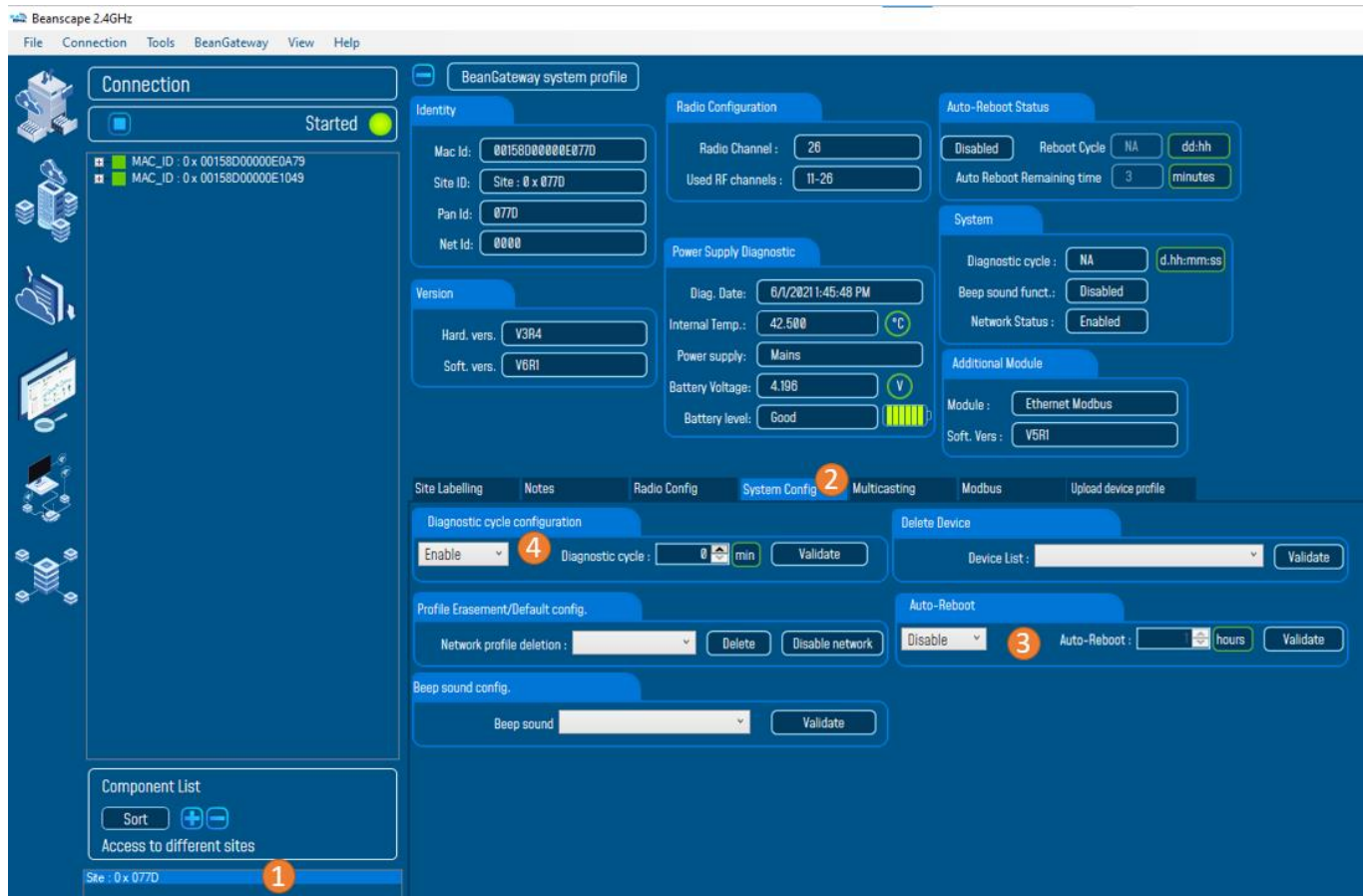
11.3 WHAT'S NEW WITH AUTO-REBOOT FUNCTION

- By default, PAN ID will be based on the 4 latest characters of the BeanGateway MAC ID

User still can change the PAN ID and there are no restrictions

- The minimum Diagnostic cycle is 1 minute, user cannot use a lower value
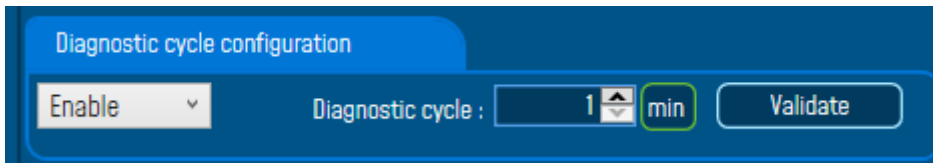
- User have the ability to disable Auto-reboot function at any moment simply just by selecting disable option and validate.

- Auto-reboot count-down starts from 10 minutes and it's refreshed every minute. The count-down is encapsulated in the diagnostic frame and transmitted every minute.
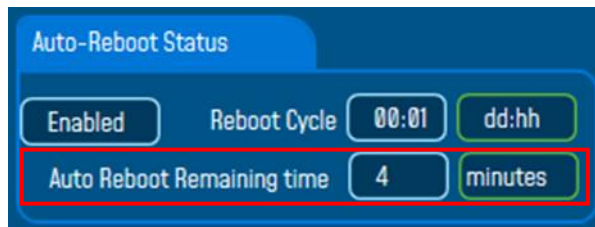
During the count-down, a notification message will pop-up on the screen.

During the latest minutes of the count-down, cannot be able nor to send an OTAC command to the BeanGateway neither to download the logfiles from the BeanDevice DataLogger.

12. ENVIRONNEMENTAL CONSTRAINTS

12.1 SEALING

BeanGateway® Indoor version is provided with a protection rating IP40.

BeanGateway® outdoor product is provided with a protection rating *IP67*.

Do not place the BeanGateway ® in a maritime environment with high turbulence.

Avoid accumulation and infiltration of water through the back cover of the BeanGateway® 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® operating temperature is -20 ° C to +65 ° C.

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

12.4 HUMIDITY

BeanGateway® outdoor version 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 ® 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 & VIBRATIONS

BeanGateway® can withstand the shocks of intensity exceeding 2g. Avoid dropping the BeanGateway ®. Secure the BeanGateway ® to a wall, pole or on a DIN rail.

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®, 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 possible transmission and receive over a wide area.

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

13. FREQUENTLY ASKED QUESTIONS

13.1 HOW THE CONNECTION IS ESTABLISHED BETWEEN THE BEANGATEWAY® AND THE BEANSCAPE®?

Step 1: Socket connexion

- When the BeanScape® is launched , as a server it starts with listening for a socket connexion
- When you power up the BeanGateway®, a request for socket connexion is established between the Beanscape® and the BeanGaterway®
- If this request is accepted by the BeanScape®, an ACK is transmitted to the BeanGateway®
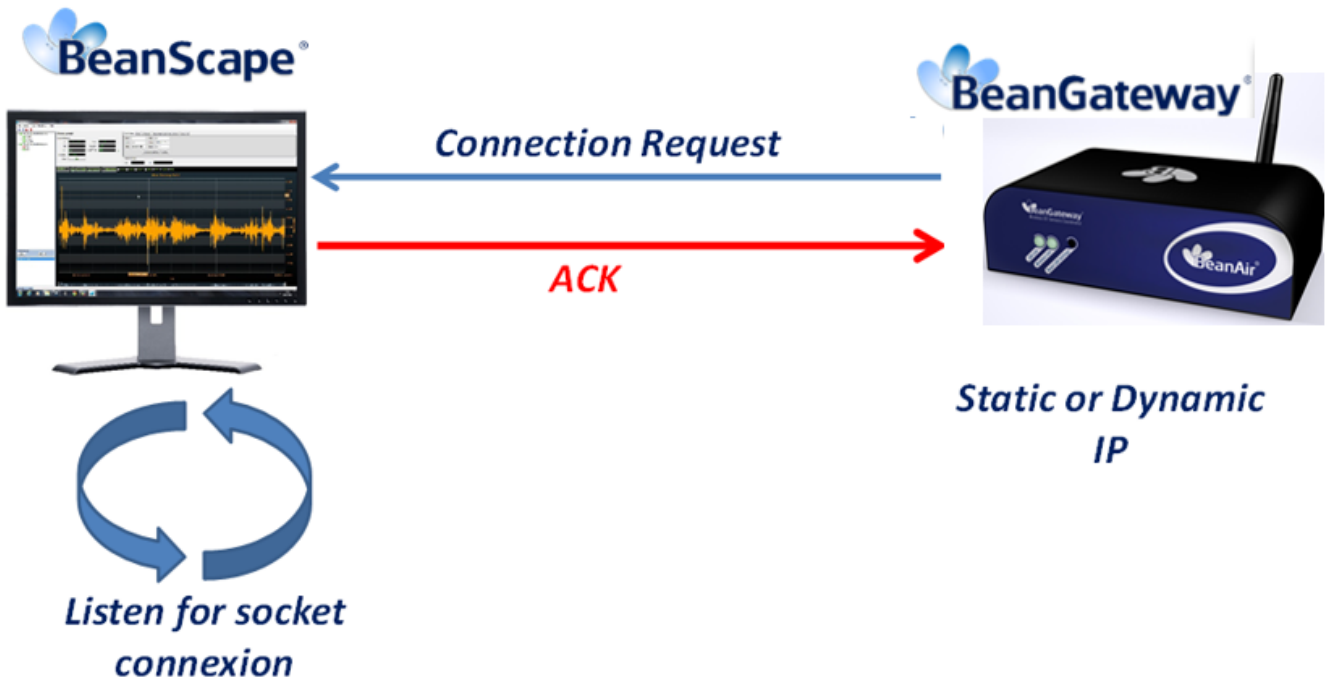
Step 2:
BeanGateway®
Profile
Transmission

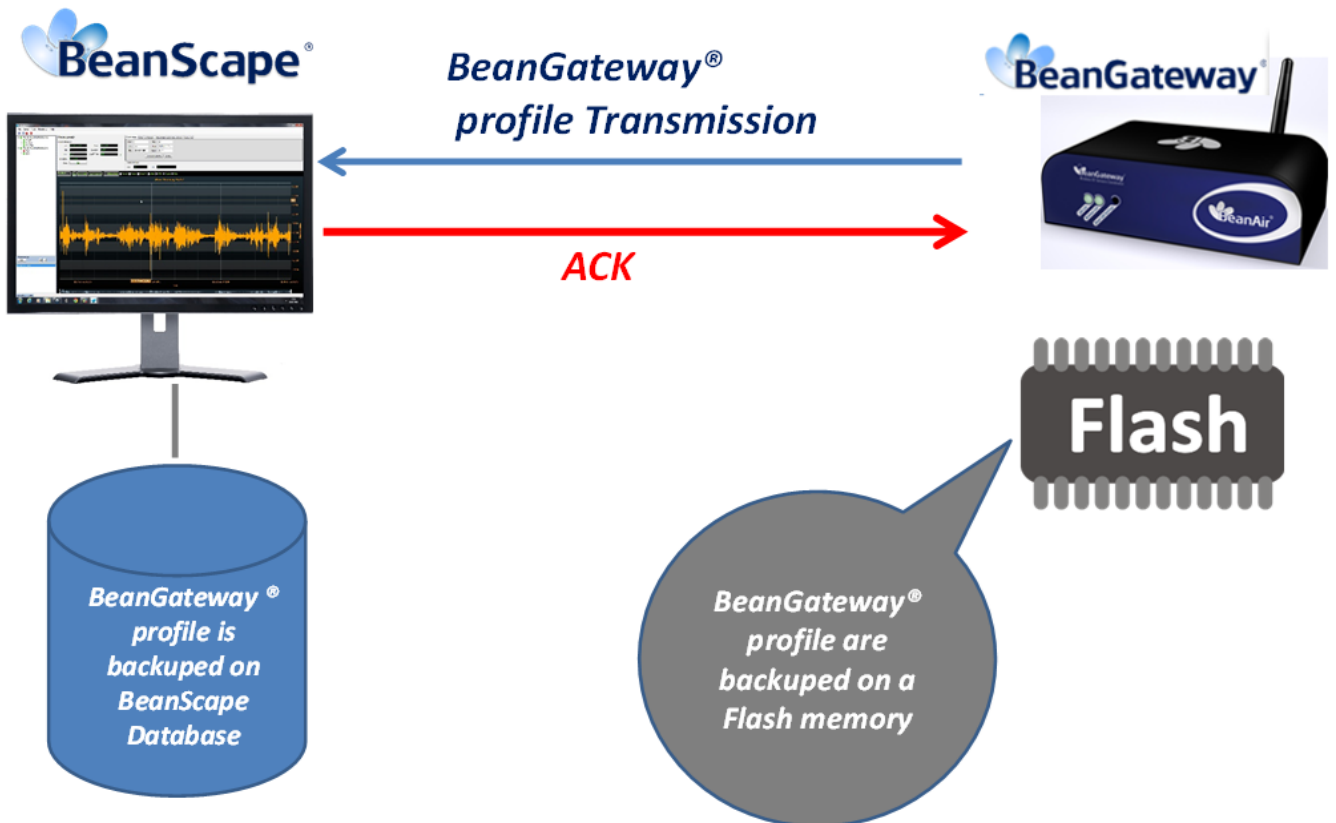- The *BeanGateway®* profile is retained on its flash memory. This profile contains are the informations about the BeanGateway® ID (NWK Add, PAN ID, MAC ID, IP...) , versions ID (Hardware, embedded software, stack...), Radio Management parameters (Radio channel, TX Power, ...);
- The *BeanGateway®* profile is transmitted to the BeanScape®;

BeanScape

**BeanGateway®
profile Transmission**

ACK

BeanGateway

Flash

**BeanGateway ®
profile is
backuped on
BeanScape
Database**

**BeanGateway®
profile are
backuped on a
Flash memory**

Step 3: WSN Mapping transmission

- The WSNmapping concerns all the Beandevice® profile. The WSN mapping is backuped on the BeanGateway® flash memory. When a new BeanDevice® joins a WSN, its profile is transmitted to the BeanGateway® and the BeanScape®.
- The BeanScape® displays the WSN Mapping with the BeanDevice® profile;
- WSN Mapping is backuped on the BeanScape® Database.

BeanScape®

BeanDevice®
profile Transmission

ACK

BeanGateway®

Flash

BeanDevice®
profile are
backuped on
BeanScape®
Database

BeanDevice®
profile are
backuped on a
Flash memory
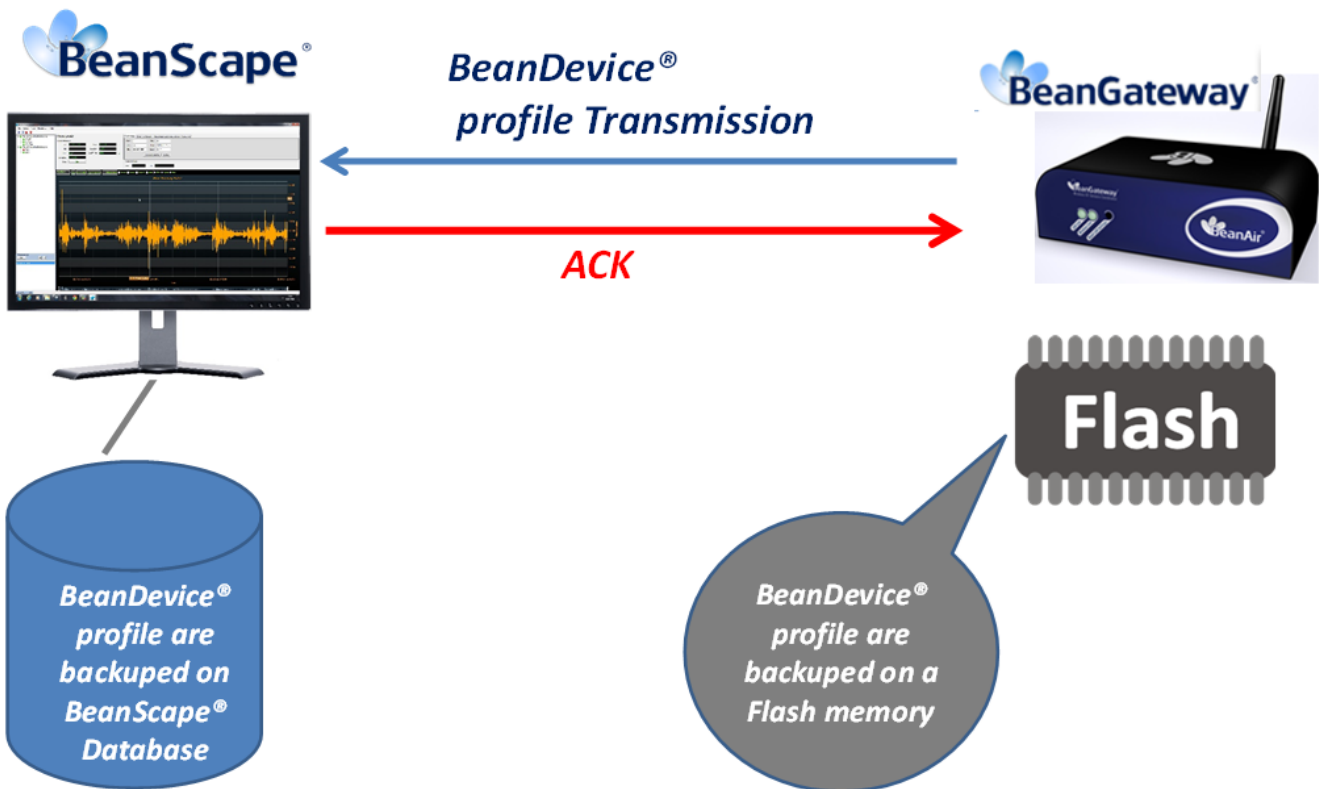
Step 4: Time & Date update

• Date transmission by NTP (Net-Time Protocole)

•Time & Date are updated on the BeanGateway instantly

• The BeanGateway integrates a Real-Time-Clock directly powered by th internal battery which allows to maintain the Time and Date if the BeanGateway® is power donw

BeanScape®

Time transmission through NTP (Net Time protocol)

ACK

BeanGateway®

Computer time and date must be updated

BeanGateway® Time and Date is synhcronized with your PC
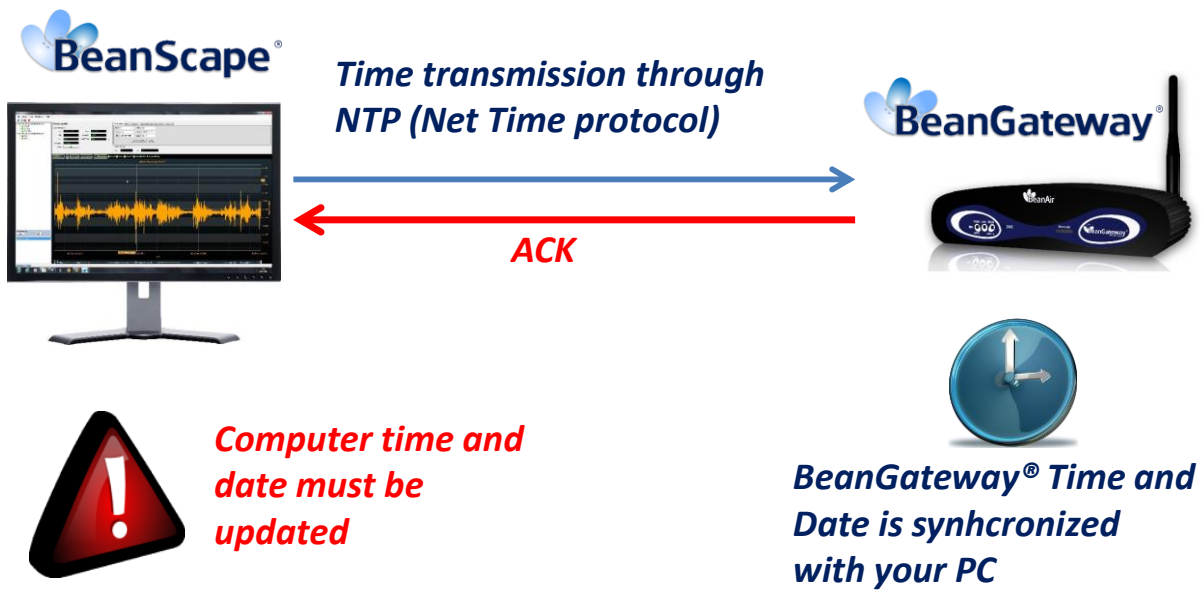
The WSN Time & Date are synchronized with your PC. The User must make sure that the Time & Date on his computer are correct.

13.2 HOW TO FIND IP ADDRESS AND PAN ID

To find the IP address and the PAN ID of the BeanGateway®, select Server menu then Server Window option or select the Lansdscape icon from the menu bar
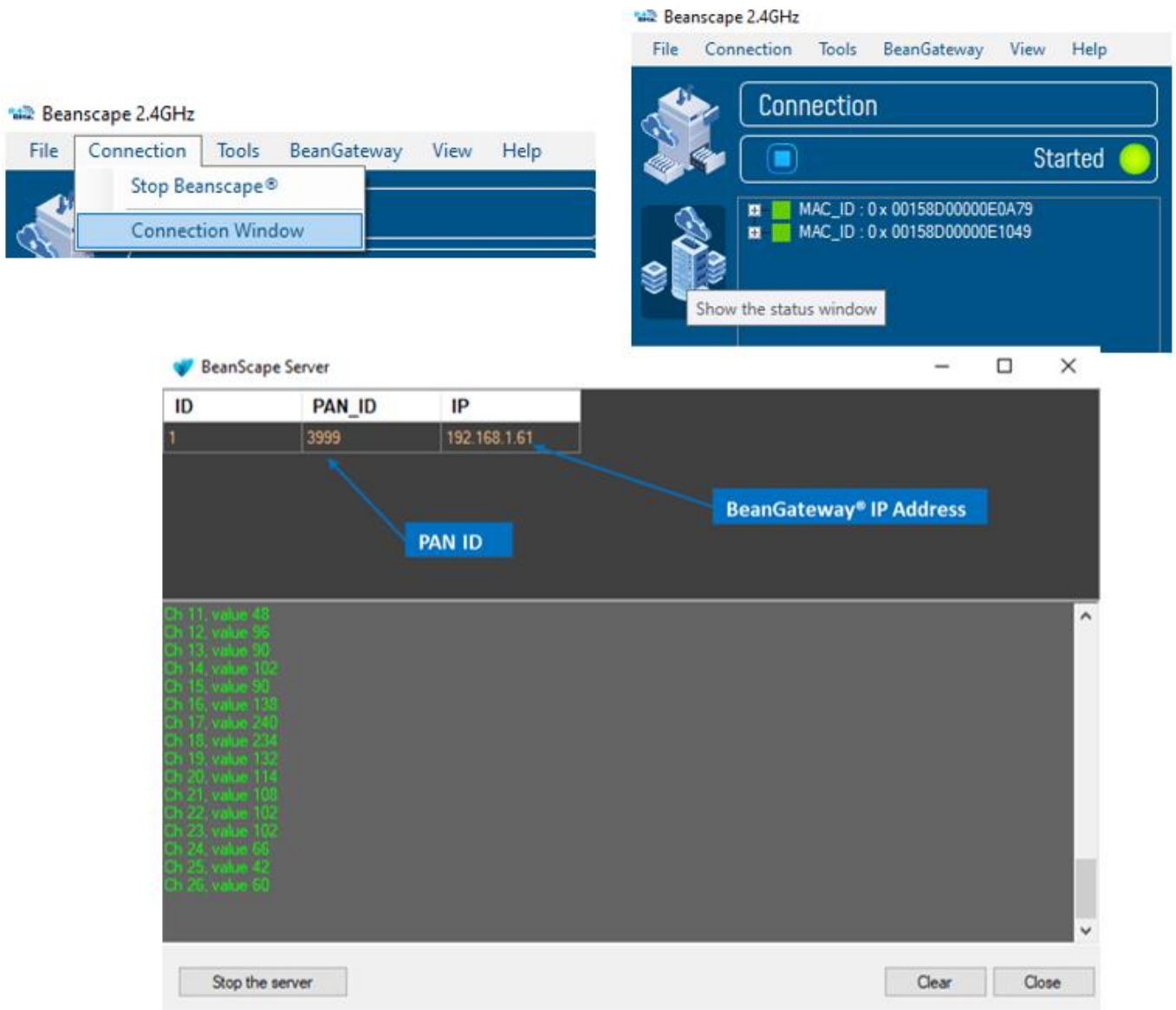

Figure 45: Server Window option

This window presents the BeanScape® control server.

13.3 HOW TO HANDLE PROBLEMS WITH USB TO SERIAL ADAPTER?

There are three types of problems that you may encounter when using a USB to RS-232 adapter:

- Driver issues
- Hardware issues
- Performance issues

13.3.1 Driver issue

For USB to RS-232 chips, there are two primary manufacturers: Prolific and FTDI. Because off-brand chips with poor drivers are unreliable, Campbell Scientific recommends and currently sells a cable using an FTDI chip (part number 17394). We chose this cable because it uses a chip that has a certified driver available on Windows Update. (The older cables were silver in color and did not have a driver available for Windows beyond version 7.)

Tip: Test your USB adapters in the office with your field computer. When you are in the field, your computer won't have an Internet connection to automatically download and install the driver.

If the driver for your adapter is not automatically installed or cannot be installed from a CD, you will need to identify the chip in your cable and locate the driver on the Internet. Some manufacturers identify on their packaging which chip is used inside their cable. You can also identify a cable's chip from the Windows Device Manager by following these steps:

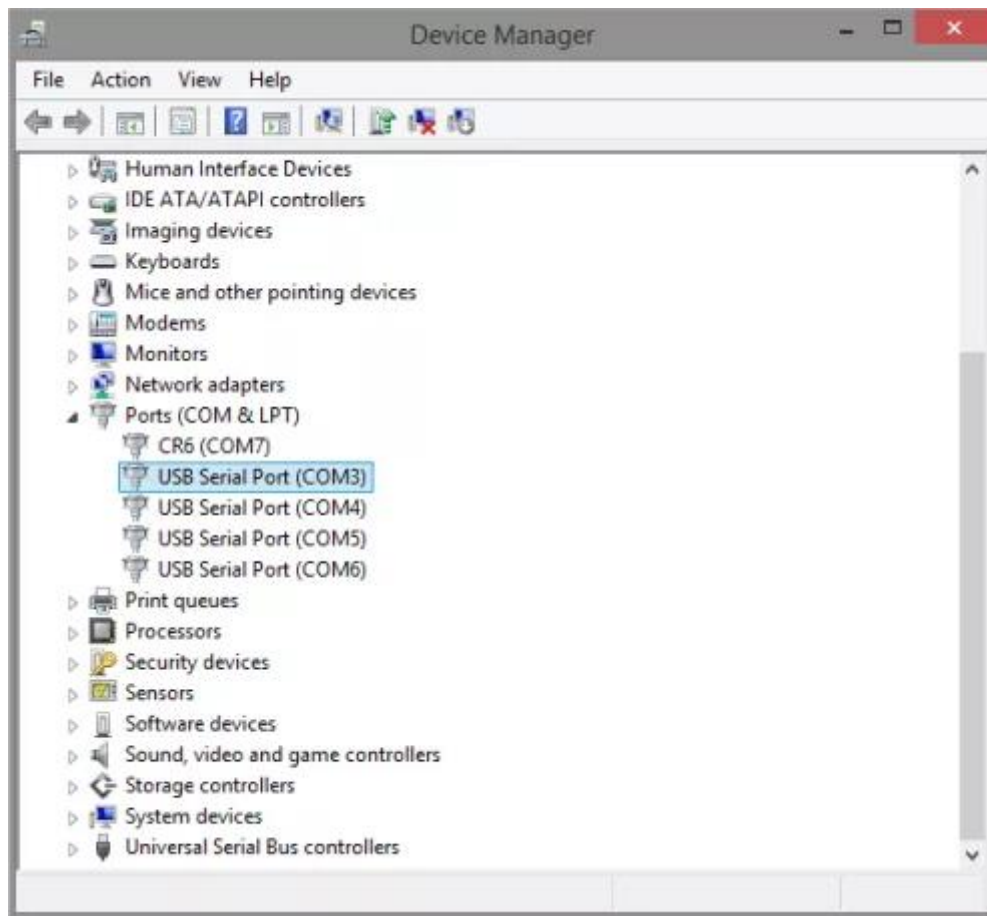1. In the Windows Device Manager, right-click your device from the list.

Figure 46: Windows Device Manager

1. In the drop-down menu that opens, select **Properties**.
2. In the Properties dialog box, select the **Details** tab.
3. In the Property field, select **Hardware Ids** from the drop-down menu.
4. In the Value field, there is both a VID (Vendor ID) and a PID (Product ID). These IDs respectively indicate the manufacturer and the model number of the chip.
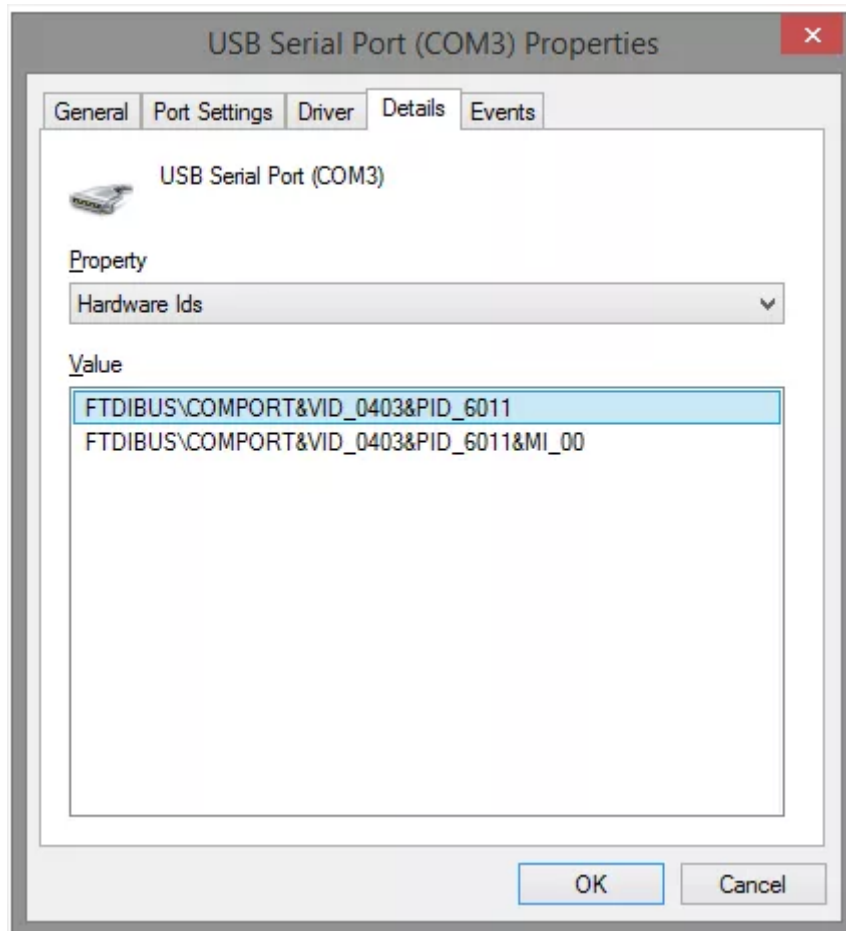
Figure 47: USB Serial Port COM3 Properties

1. In the example above, I did a quick Internet search for VID 0403 PID 6011, which revealed to me that the chip is an FT4232 manufactured by FTDI.
2. After you know your chip type and manufacturer, you can locate and download the correct driver for your version of Windows.

13.3.2 Hardware problem

USB to RS-232 adapters are commodity pieces of computer equipment. As much as we all wish that everything was as reliable as the CR1000, all adapter cables eventually fail.

Although there are two primary companies that manufacture USB to RS-232 adapter chips, there are many cable manufacturers who offer varying levels of cable quality.

- Higher-quality, industrial models should last longer, but they wear out over time—just like any field tool.
- A poorly constructed cable could have components that fail in a short period of time—perhaps even by the time you receive the cable.

I have seen several cases where old cables could no longer handle 115200 baud, but the cables still worked on low baud rates. There have been many more cases where a USB cable stopped working half-way through a day in the field.

Tip: If your field site is far from your office, take two USB to RS-232 cables with you. Lost time in the field can be a lot more costly than the purchase price of a second cable.

13.3.3 Performance problems

As mentioned previously, USB uses a shared data bus with packetized communication. The packetized communication introduced some latency (data transfer time) that wasn't present with built-in RS-232 ports. Unfortunately, latency makes a noticeable difference when you download large amounts of data or upload a new operating system.

The driver for FTDI chips allows you to lower the latency time on packets. To do this, you can use the Latency Timer field, which is accessed through the Windows Device Manager. Follow these steps:

1. From the Windows Device Manager, right-click your device from the list.
2. In the drop-down menu that opens, select **Properties**.
3. Click the **Port Settings** tab.
4. Click the **Advanced…** button.
5. In the Advanced Settings window, navigate to the Latency Timer field, and reduce the setting to **1**for best performance.
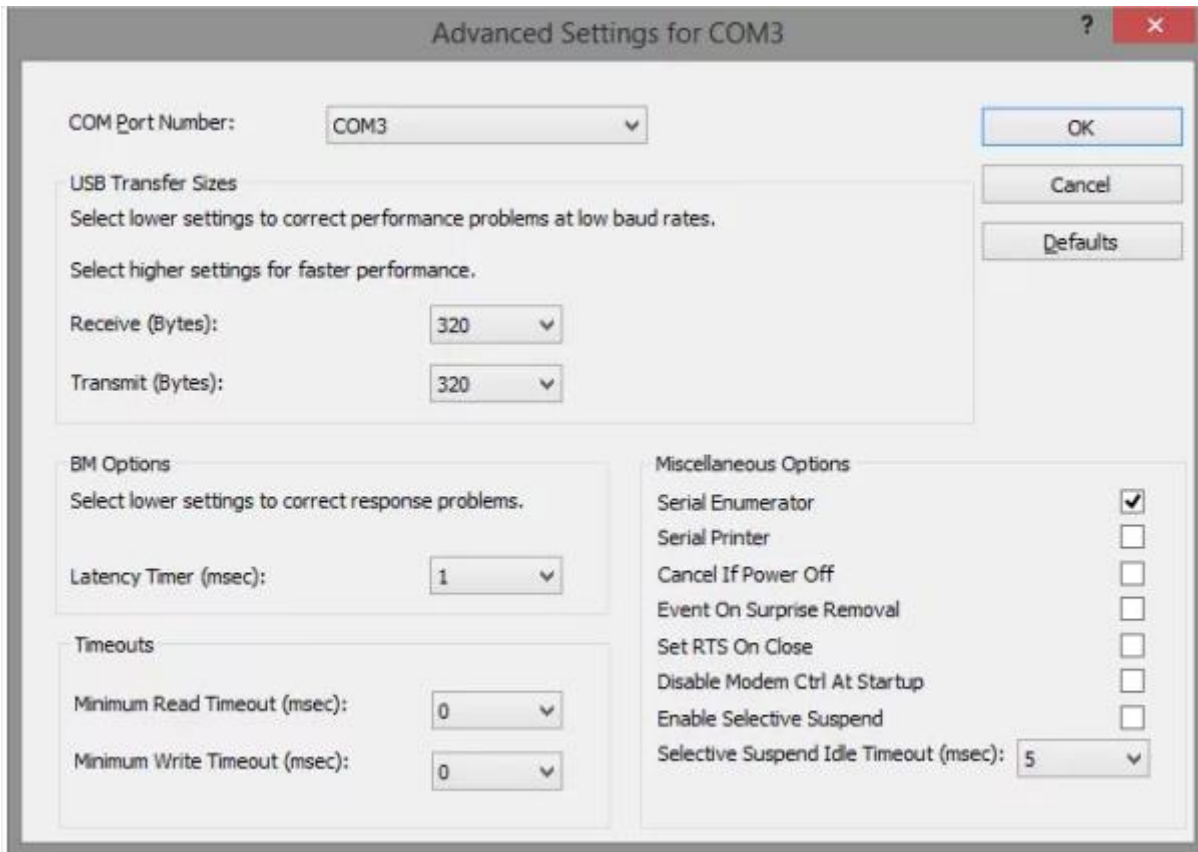
Figure 48: Advanced COM3 Settings

In addition to lowering your latency time, I also recommend disabling the Selective Suspend option for your cable. The Selective Suspend option allows Windows to put your hardware to sleep, which can result in corrupt data packets. To disable the Selective, suspend option, clear the checkbox for the **Enable Selective Suspend** field on the Advanced Settings window for your device.

Note: The Selective Suspend option is already disabled by default in the FTDI driver.