BeanGateway®

BEANAIR® BEANGATEWAY® USER MANUAL

DOCUMENT

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Such changes will, nevertheless be incorporated into new editions of this document.

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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 and streaming packet mode.
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®
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...)

6. BEANGATEWAY® - 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)

6.2 BEANGATEWAY® TECHNICAL SPECIFICATIONS

6.2.1 Common specifications

These specifications are common to all the BeanGateway® version.

6.2.1.1 Wireless sensor network coordinator

Specifications	Wireless Sensor Network Coordinator	
Wireless Stack	IEEE 802.15.4	
WSN Topology	**IEEE 802.15.4**	Peer-to-peer/ Star
Antenna Diversity	Self-managed antenna diversity function	
Data rate	250 Kbits/s	
RF Characteristics	ISM 2.4GHz – 16 Channels	
RF Transmit power	18 dBm	
Receiver sensitivity	-95,5 dBm to -101 dBm	
Encryption	AES 128 bits (integrated AES coprocessor)	
Maximum Radio Range	1 km (L.O.S.)	
WSN Diagnostic tool	· Energy Scan for choosing a suitable RF Channel · BeanDevice® PER (Packet Error Rate) calculation · LQI (Link Quality Indicator) between the BeanGateway® GSM/GPRS and the BeanDevice® · RF channels Blacklist	

6.2.1.2 Ethernet/LAN Network

Specifications	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® (RS232 Interface or UDP/Ethernet Interface).

6.2.1.3 Power supply

Specifications	Power Supply
Power Consumption	250 mA to 300 mA during wireless RX/TX and Ethernet activated
External power supply	+9V to +28 V , integrated Lithium-Ion battery charger with high-precision battery monitoring
Integrated Lithium-Ion Battery	Lithium-Ion rechargeable battery 950 mAh (reference BAT0.95DMG) In case of external power supply failure, the ***BeanGateway®*** can switch on the internal battery.

6.2.1.4 Embedded file system on Micro-SD® -Options

Specifications	Option(s)
Embedded File System on Micro-SD®	All the User data are stored on an external memory (Micro-SD® technology): · Measurement storage for Wireless Sensor Network (network configuration, measurement, alarms notifications …) ; · Maximum storage capacity (2Go) · CSV files management (for exporting data on Excel® and Access®)

6.3 CASING DESCRIPTION

The BeanGateway® casing comes in two versions:

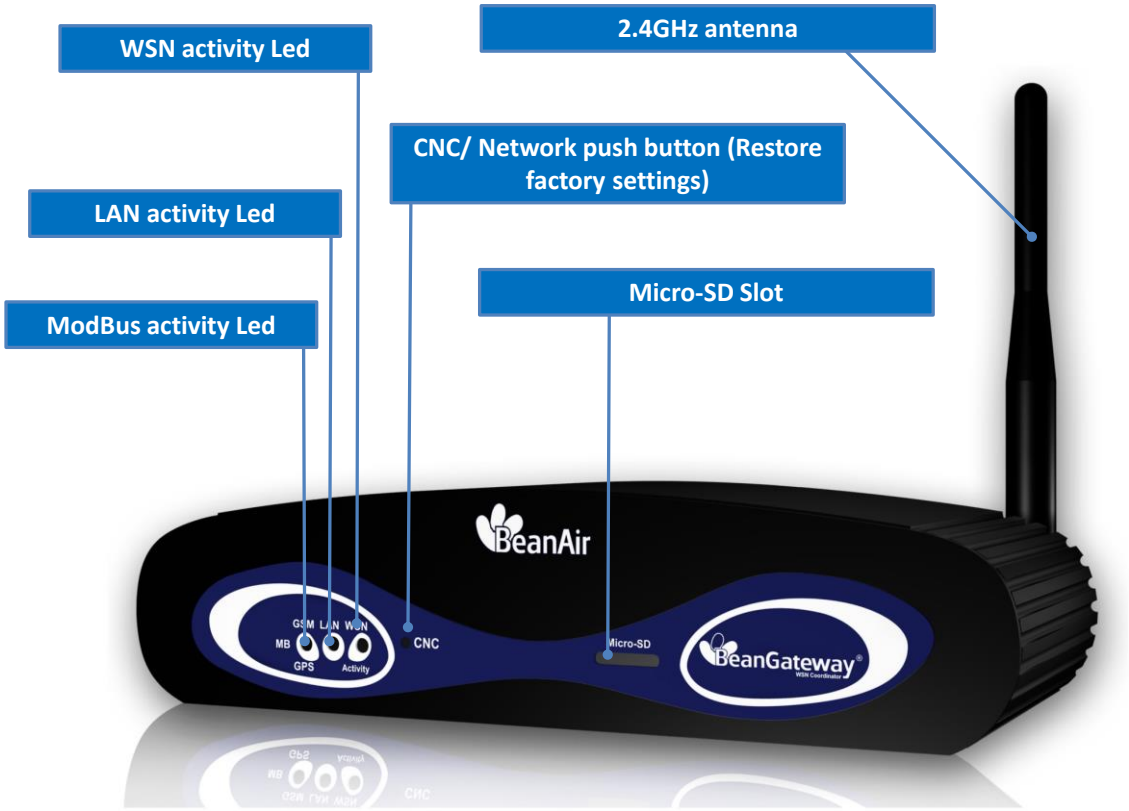
	Indoor Version	*Outdoor version*
Enclosure		
Applications	✓ Indoor application only, the product is not waterproof	✓ Remote sites (wind, water pipe, gas, mountains ...) ✓ Wireless Sensor Networks deployment in outdoor over long distances.

6.3.1 BeanGateway® Indoor Version

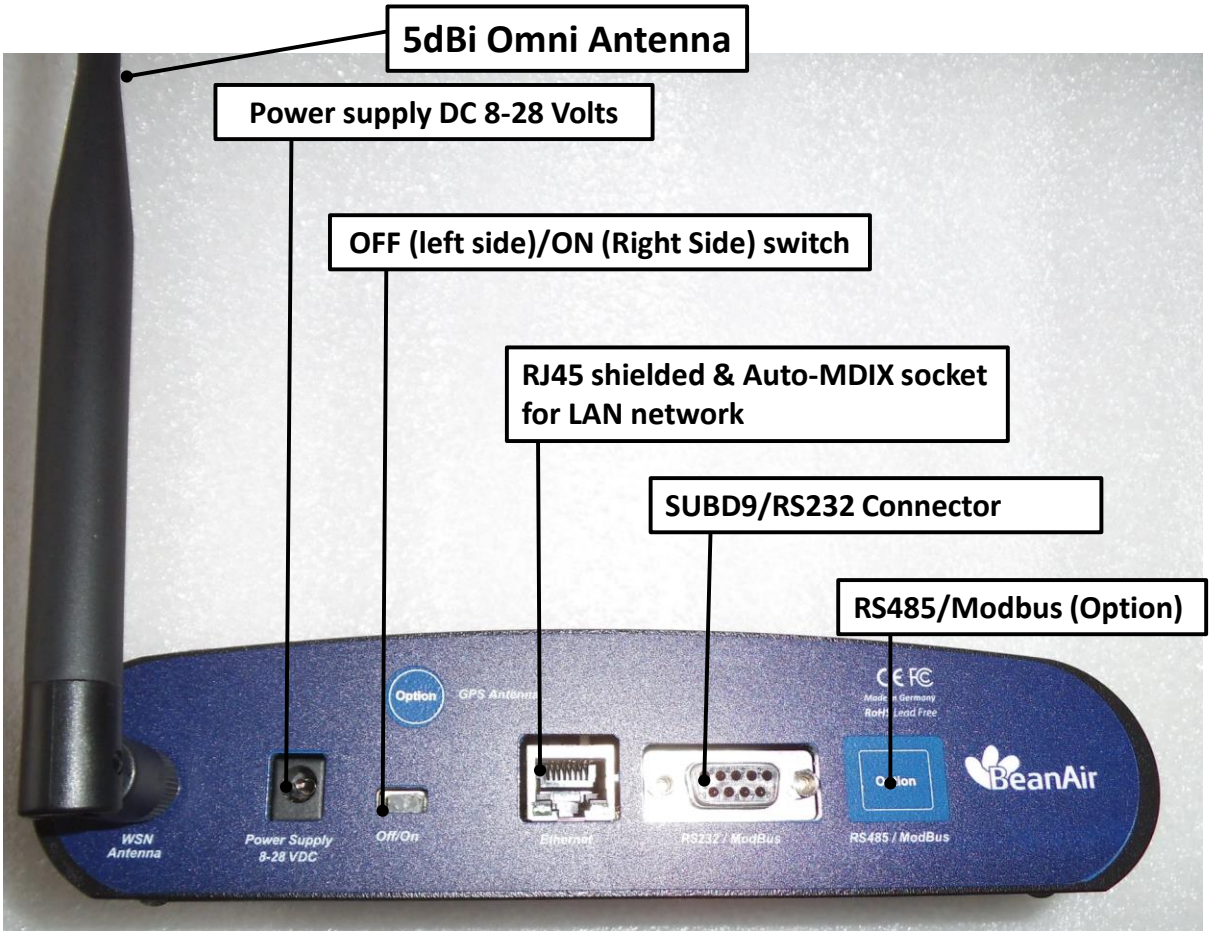
Click on the following web link to see the video: **BeanGateway® – Ethernet Indoor version presentation**

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

Front View



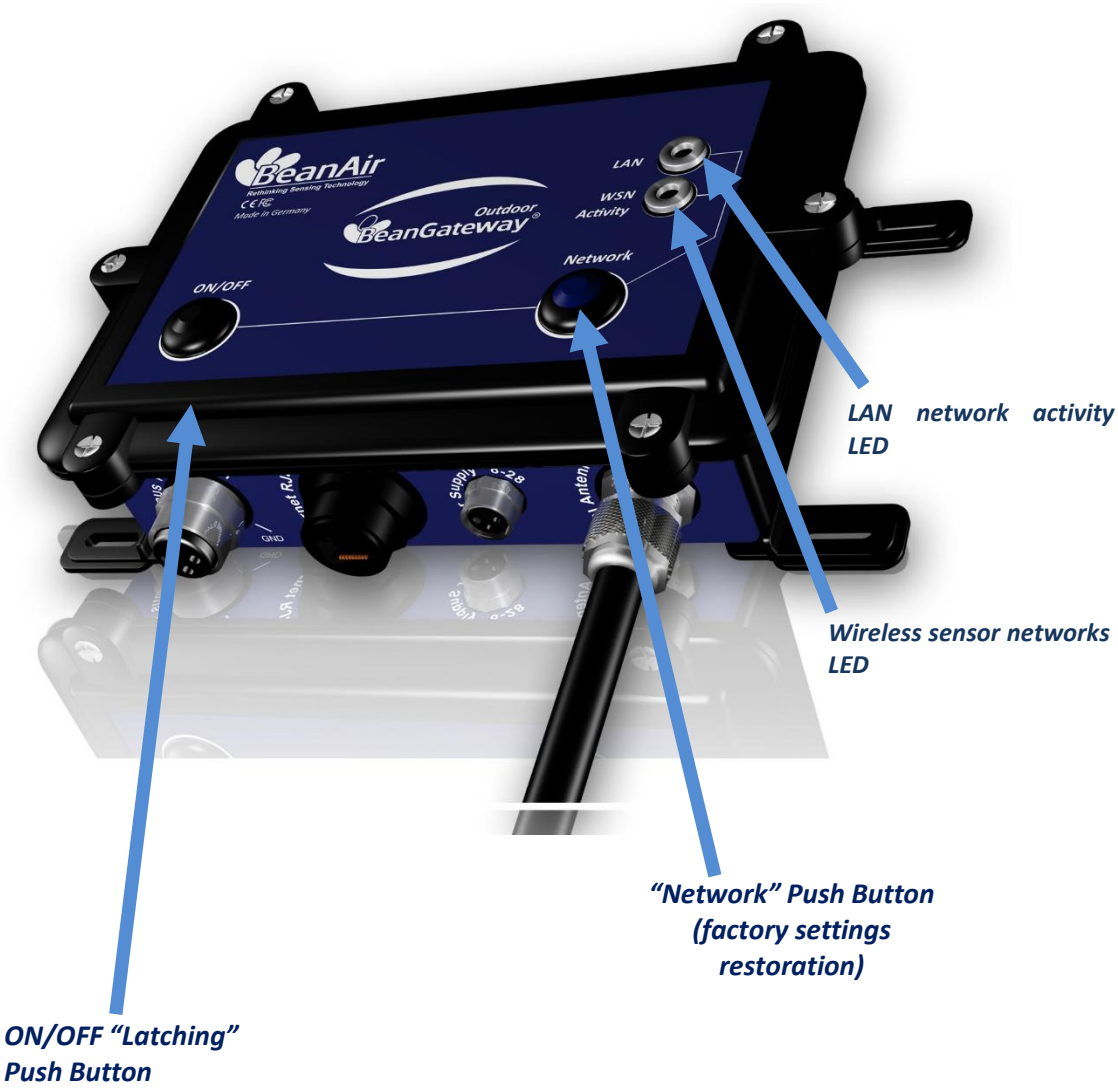
Rear View


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)
WSN Antenna
Power Supply 8-28 VDC
Off/On
Ethernet
RS232 / ModBus
RS485 / ModBus
BeanAir

6.3.2 BeanGateway® Outdoor version

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

Front view



Function	Description
Network push button	"**Network**" push button restores the factory settings. • 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 Hold this button more than 10 seconds, factory 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

N-Type RF Socket

M8-3Pins power supply socket (DC 8-28 Volts)

RJ45 connector integrated in a cable gland (IP67 Weatherproof)

RS485 (ModBus RS485 option only)

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;***

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).

6.3.3 Led Description

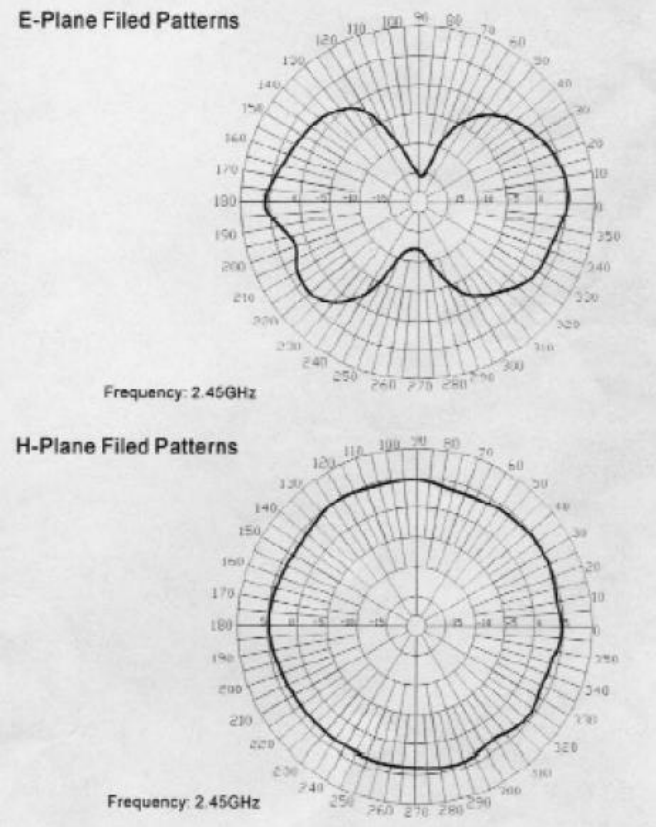
Action	WSN Activity LED	LAN Network activity LED with DataLogging on Micro-SD® activtaed	GSM/GPRS Activity LED	Results / Impact
BeanGateway® Power ON	LED is flashing green	LED is fixed red and turn off by an interval of 15s and then turns back	LED is flashing green	The BeanGateway® is initialized and 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	/	/

6.4 ANTENNA SPECIFICATIONS

6.4.1 2.4 GHz – 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*

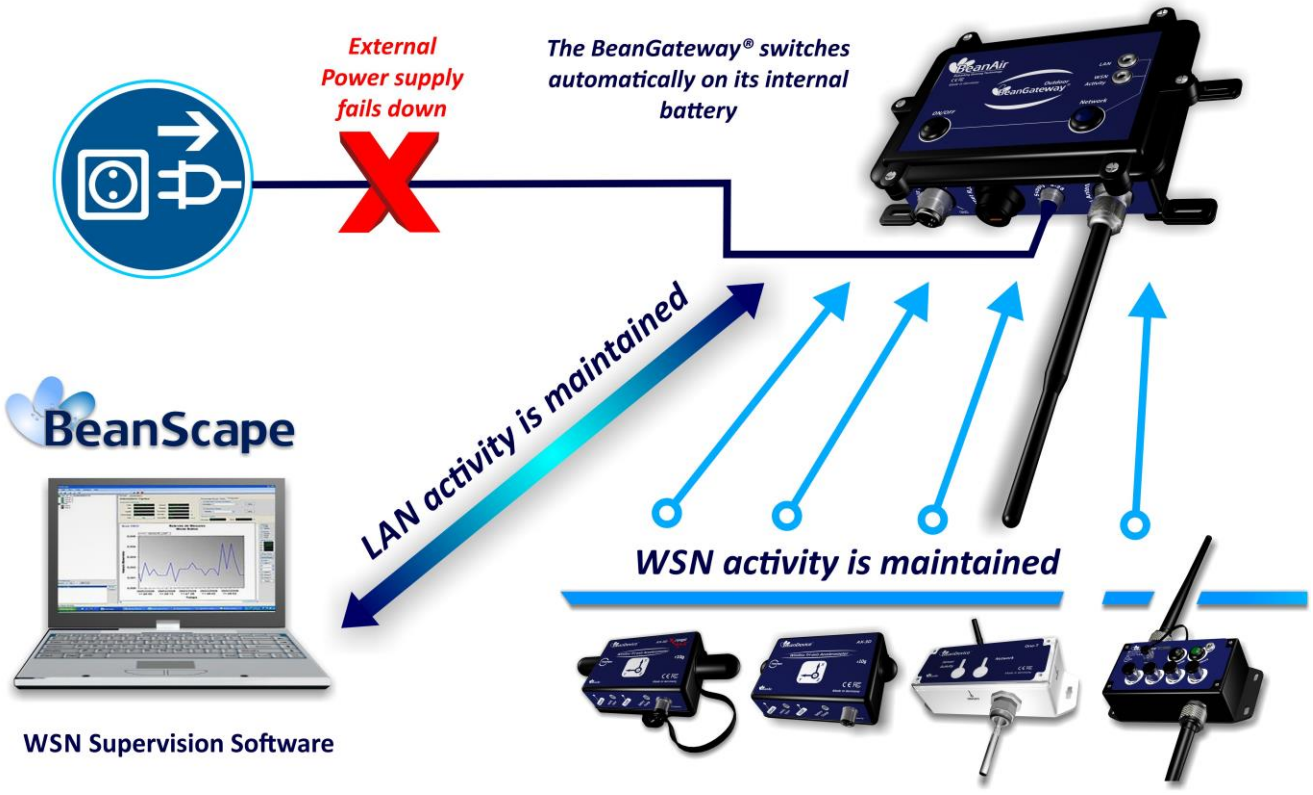
6.4.1 2.4 GHz – Outdoor Antenna



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

6.5 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)

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 baudrate.	0% - between 50Hz and 4800 bauds <0,16% -- between 7200Hz and 115,2 Kbauds
ESD Protection	+15kV

7.1.2 Wiring code

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

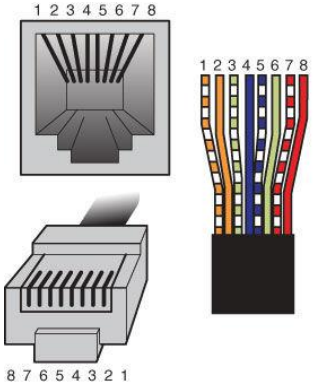
7.2.1 Technical features

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 resistors 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)



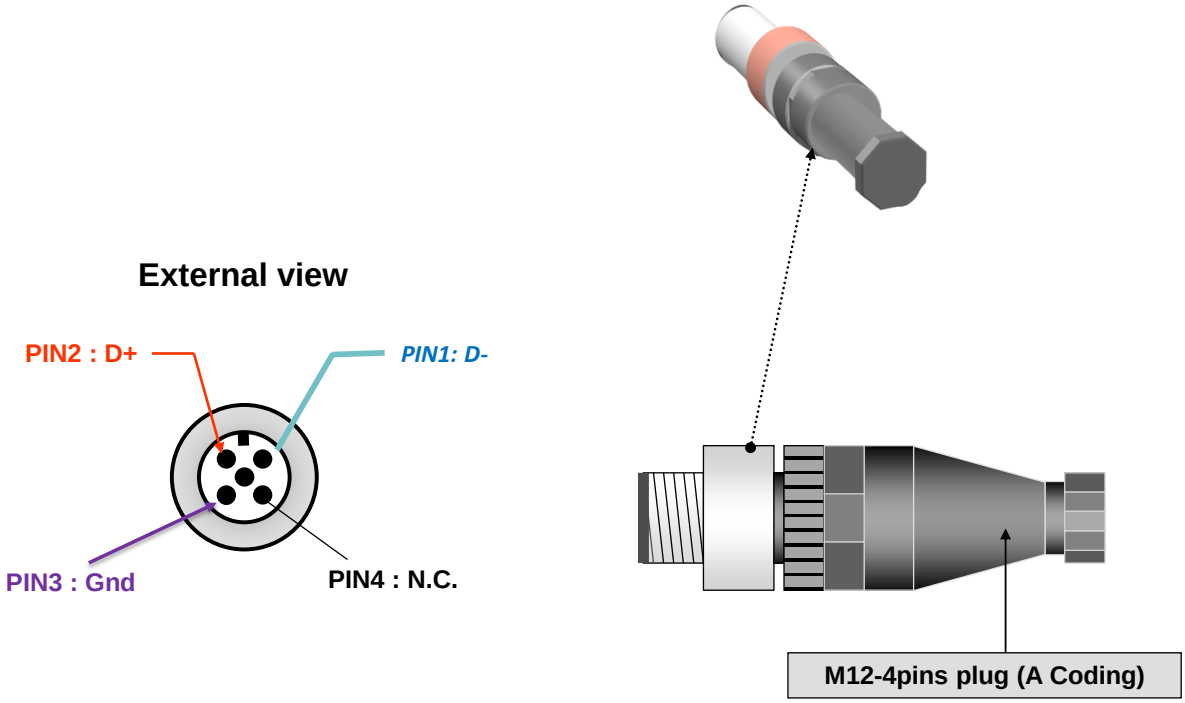
Pin Number	*Wire color*	*Function*
PIN1	Orange/White	Data-
PIN2	Orange	Data+
PIN3	Green/White	Not used
PIN4	Blue	Not used
PIN5	Blue/White	Not used
PIN6	Green	Not used
PIN7	Brown/White	Not used
PIN8	Brown	Ground

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

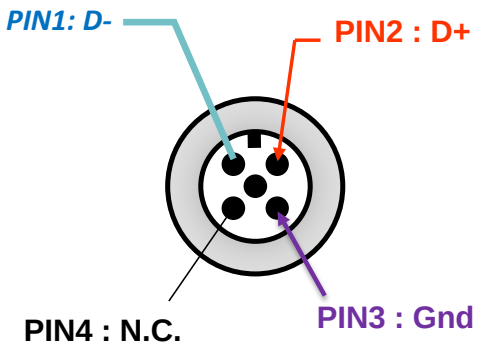
A M12 Plug is provided with your BeanGateway® outdoor (if RS485 option is selected), Pin assignation follows M12 standard.

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

Wiring Code - M12-4Pins Plug View



Wiring Code - M12-4Pins « Socket » View



8. DATA LOGGER MODULE (MICRO-SD®)

8.1 INTRODUCTION

The Micro SD® option on the BeanGateway® can record measurements from the BeanGateway® on a micro SD Card. This function is useful in applications where the user cannot afford to lose measurement data, or in case of a temporary loss of network connection (local or remote) the measurement data is stored on the optional MicroSD of the BeanGateway®. In other embedded applications, where there are no possibilities of connecting your devices with an IT Environment, this will become a mandatory feature.

The Micro SD Data Logger on the BeanGateway® should not be confused with the embedded Data Logger on the BeanDevice®.

Data logging on Micro-SD® is not compatible with the following data acquisition mode:

- ✓ ***Streaming Packet Mode***
- ✓ ***SSD (Smart shock detection)***

8.2 HOW TO INSERT A MICRO-SD® CARD ON YOUR BEANGATEWAY®?

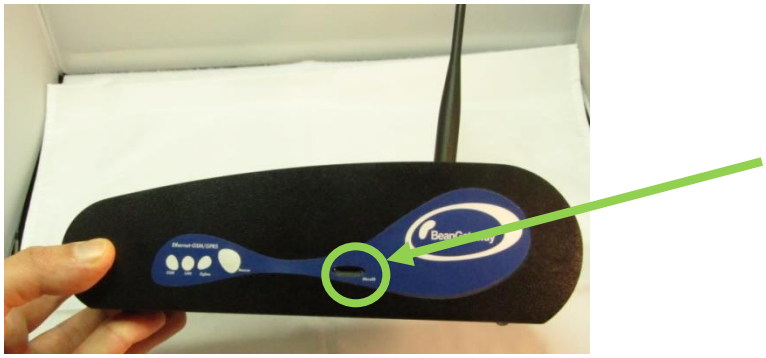
A Micro-SD® card is provided with the BeanGateway® (the max capacity is 2Go), and a card adapter.

Micro-SD® card and its SD adaptor

Use only Micro-SD® card. Don't try to insert SD Card on your BeanGateway®. You risk to damage your BeanGateway®.

SD® Card *Micro-SD® Card*

The Micro-SD® slot is on the front side of the BeanGateway® case:



The following steps show how to insert a Micro-SD® card and to start DataLogging on your BeanGateway®:

Step 1
- Power off the BeanGateway®
- Slide the Micro-SD® card into the card slot, with the label side face up.

Step 2
- Power-On your BeanGateway®
- Start the BeanScape® and get to the Logger window

Step 3
- To configure the Logger on your BeanGateway®, go to the chapter "DataLogging on MicroSD"

When DataLogging is enabled on your BeanGateway®, don't try to remove the Micro-SD® card. You will lose all the data recorded on your Micro-SD® during a write/read operation. If you want to remove properly the Micro-SD® card, firstly power off your BeanGateway®.

Do not expose your Micro-SD® card in a place subject to electro-static discharge and/or electrical noise.

If your Micro-SD® card is damaged, you should change it. The BeanGateway® cannot read/write on Micro-SD® HC Card which is generally used on Digital Camera video (High Capacity).

8.3 FUNCTIONS

The BeanGateway® logger, allows backing up of your measurement data on an optional memory card (micro SD Card).

When the logger mode is enabled, all the measurement data transmitted by the BeanDevice® are stored on the memory card.

This option is not available with the Streaming Packet and SSD (Smart shock detection) measurement mode.

8.4 COMMON FILES ON THE MEMORY CARD

8.4.1 Organization of Files

A file is created by your BeanDevice® in the root directory of the memory card. The format of the file name is: "MXXXXXX.blg" where X are the last six characters forming the corresponding MacID of your BeanDevice®.

Example: for a BeanDevice® MacID which is "0x00158D00000AAA02" then the created file on the memory card will be "M0AAA02.BLG"

8.4.2 Type of file created on the memory card

Data stored on the memory card is formatted as raw data. That is to say that the generated files are not directly readable as it is. An application is required to convert them into text file.

This application is the "raw BeanGateway log parser."

8.5 USING THE DATA CONVERTER APPLICATION (FROM RAW FILE TO TEXT FILE)

8.5.1 Location of the converter

The conversion application can be found in the directory where the executable BeanScape "BeanScape.exe" file is found.

By default, the install location path would be "C: \ Program Files \ BeanScape."

The executable file can be identified by the name "AppliBeanRawLogConverter.exe."

The complete path is "C: \ Program Files \ BeanScape \ AppliBeanRawLogConverter.exe" (if it is a default installation).

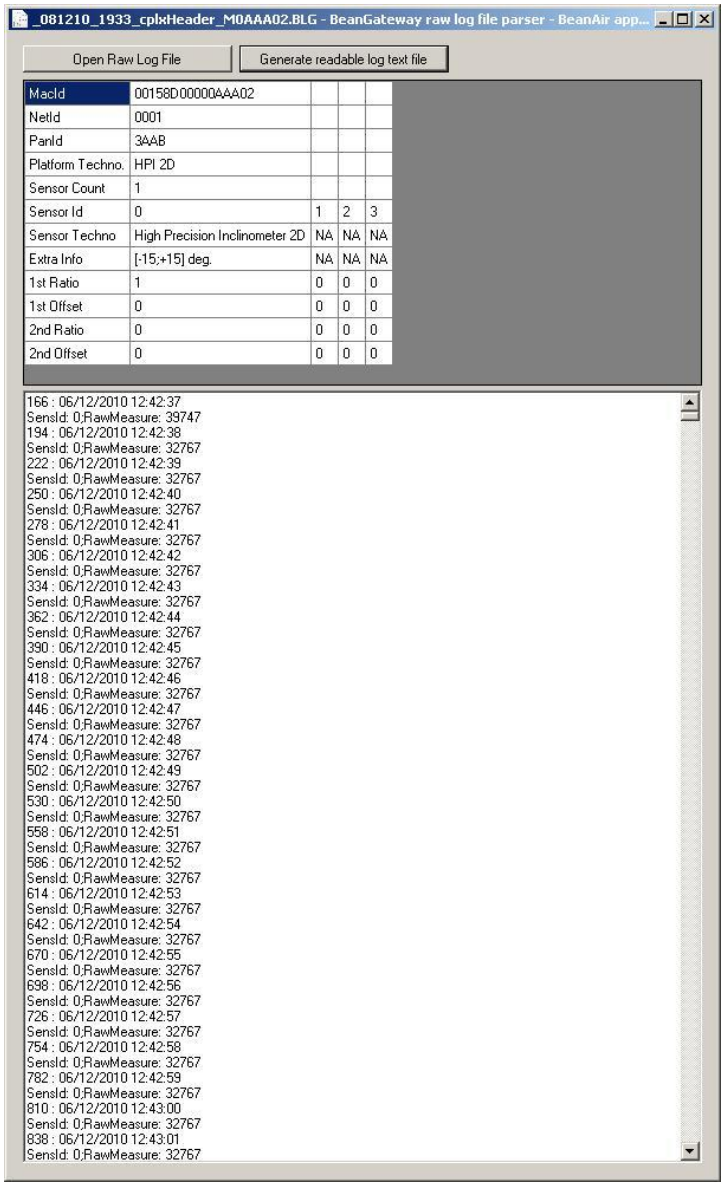
8.5.2 How to use the conversion application?

Once the application is launched, it is very easy to use:

- ✓ Click on "Open Raw Log File" (to open the raw log file)
- ✓ A dialog box prompts you to select the log file from the SD card of the BeanGateway (file ending with the extension "*. blg")
- ✓ Once done, the first information displayed in the application window
    - At the top (table) are the general information about the BeanDevice and sensors connected to it. (MacID, number of sensors, sensor technology, measuring range, ...)
    - In the lower part (text box) are the unconverted measurements and the dates involved, and at the end of the text are information on the data of extraction
    - This is an optional information.
- ✓ The last step is to generate log files ending in text format by clicking on the button "Generate readable log text file"
- ✓ A dialog box prompts you to select the destination folder where the files will be created text log. ().
- ✓ A message prompts you saying that the operation is complete.

Warning: Newly generated files will overwrite the old files in case they have the same name.

Application for conversing raw logs



8.6 LOG TEXT FILES GENERATED BY THE APPLICATION

The log text files generated by the application are those generated by the BeanScape. Individual log files are created for each sensor. The format of the file name is: "0xXXXXXXXXXXXXXXXX_Y.txt" where X represents the character 16 characters of the MacID BeanDevice, and character Y is the sensor ID question.

Once the logs are processed, the measurements are converted into their own unit, for example in the case of a temperature sensor, the measure will be expressed in degrees Celsius (° C).

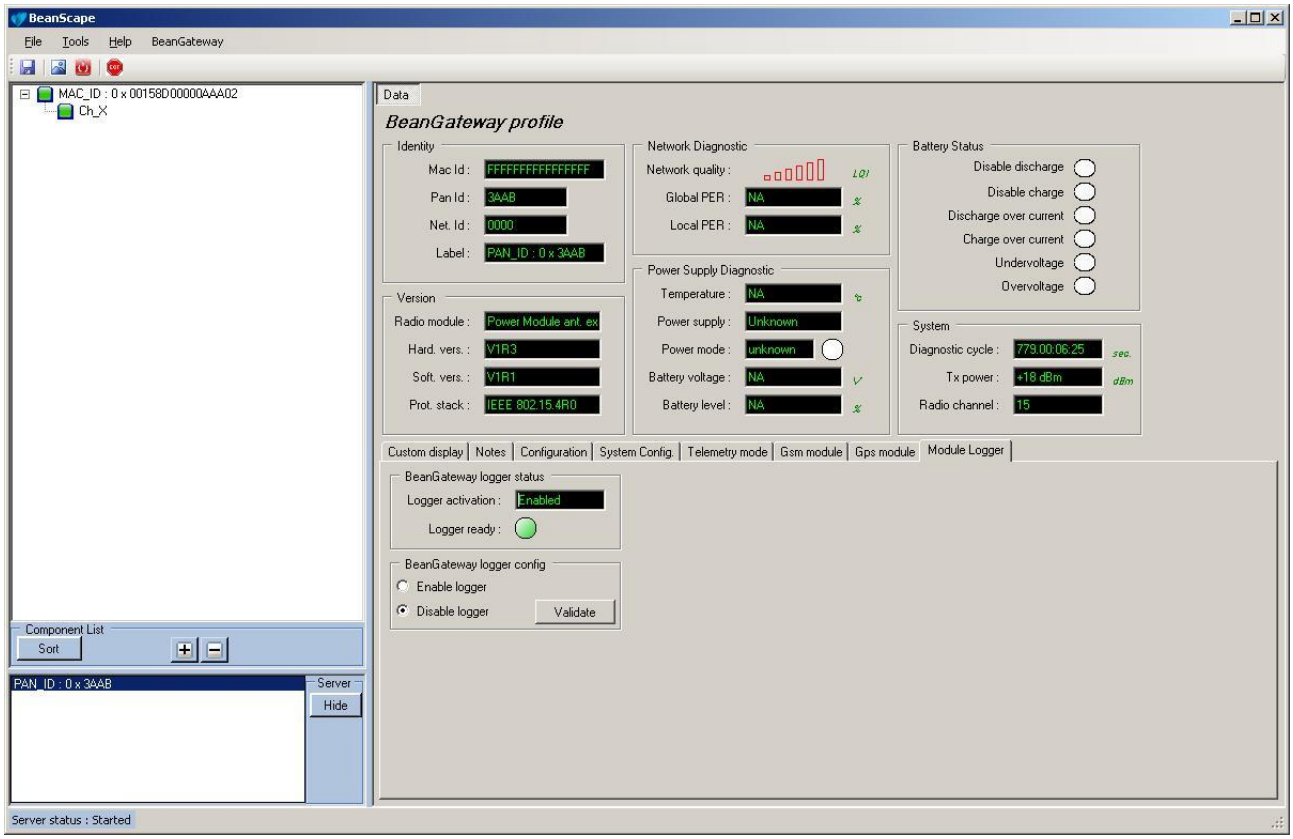
Example: A BeanDevice TH (humidity - temperature) having sensors attached: a humidity sensor and a temperature sensor, the MacID is "0x0011223344556677" Ids and associated sensors are respectively "0" and "1". After the log of several measures of the BeanDevice on the memory card of the BeanGateway, you will see that the file generated with the name "M556677.blg." Once this file is converted by the conversion application, two log files are generated in text format. "0x0011223344556677_0.txt" the log file of the humidity sensor and "0x0011223344556677_1.txt" the log file of the temperature sensor .

8.7 CONTROLLING THE MICROSD DATA LOGGER OF THE BEANGATEWAY USING THE BEANSCAPE

From the BeanGateway profile, you can access the tab "Logger Module." Under that you will find two fields.

- The first field identifies the current state of embedded logger:
  - ✓ The field "Logger status" indicates whether the logger is currently enabled or not.
  - ✓ The field "Logger ready" indicates whether the logger is currently operational (green when operational, if not red). The LED will be red if no memory card is present in the BeanGateway, or if the module initialization logger is not yet complete.
- The second field allows you to enable or disable the on-board logger:
  - ✓ Select "Enable log" and click "Validate" to activate the logger.
  - ✓ Select "Disable log" and click "Validate" to disable the logger.

BeanScape Application : "Logger Module" Tab



Once the Logger mode is enabled, do not remove your Micro-SD® before switching off your BeanGateway®. If you remove your card Micro-SD® during the writing phase, the Micro SD may get corrupted and you may lose all the measurements stored in it.

9. GATEWAY® INSTALLATION GUIDELINES

9.1 HOW TO INSTALL THE BEANGATEWAY®

9.1.1 Wall mounting

For a better wireless link, we recommend to mount 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.

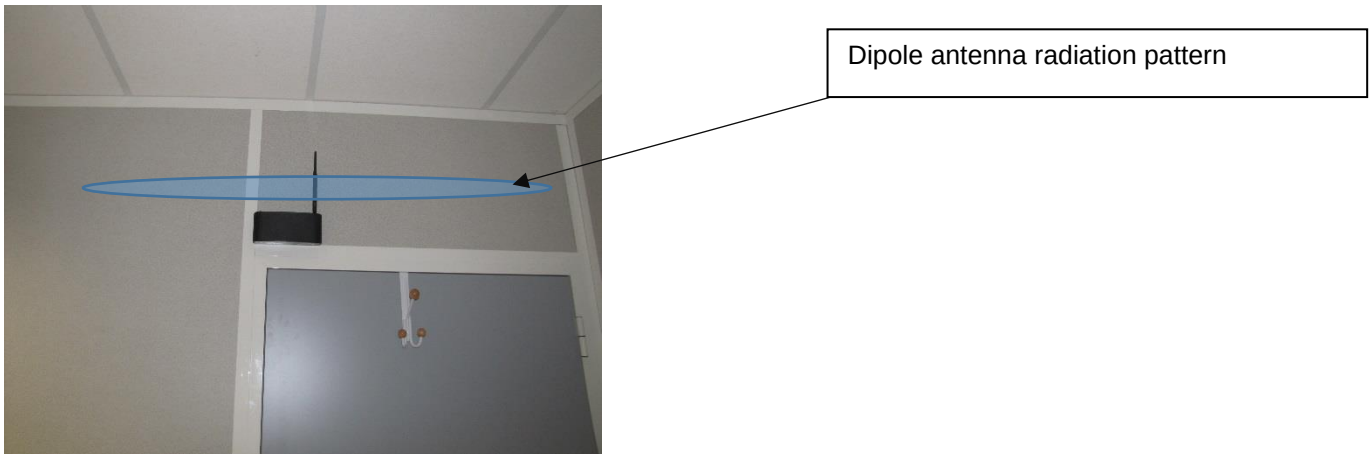
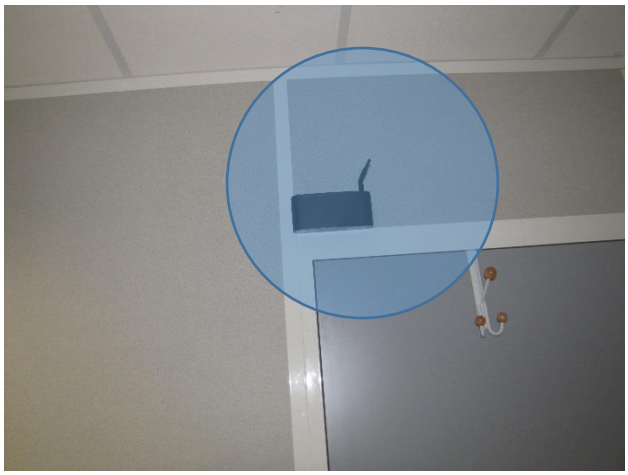


Figure 1: A BeanGateway® indoor mounted on a wall

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



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

9.1.2 Desktop installation

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

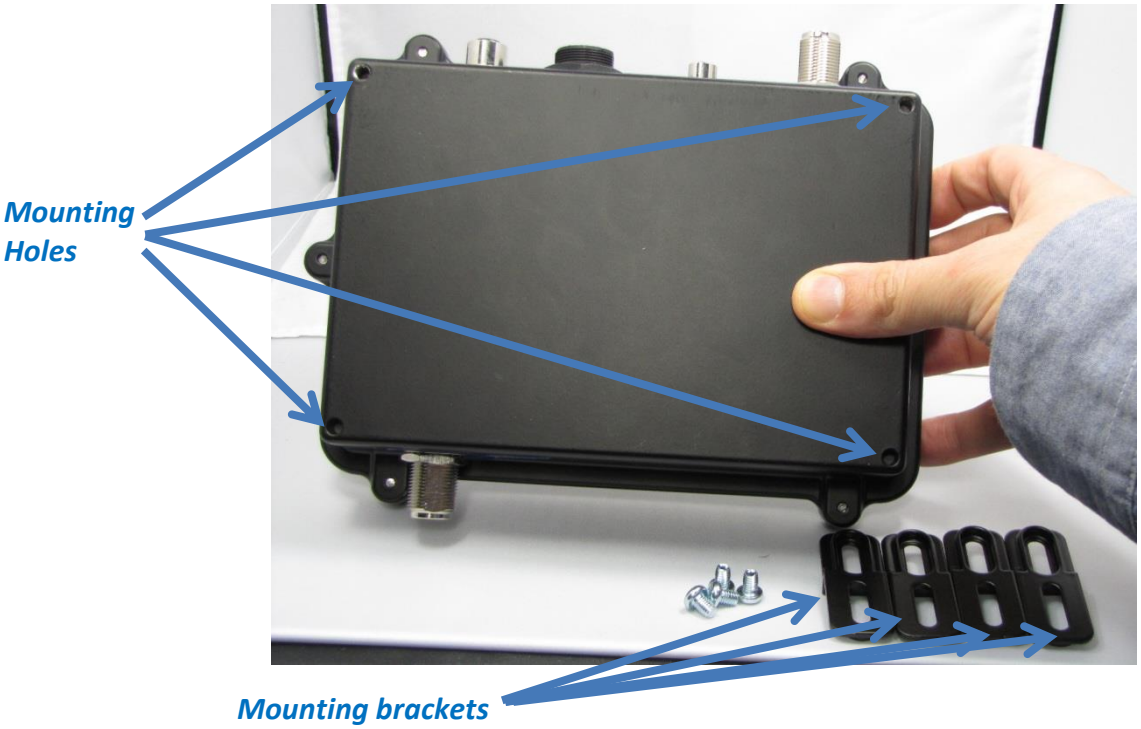
If your WSN is deployed on the same floor, a horizontal position of the antenna will decrease the RF signal.

9.1.3 Wall mounting kit for the BeanGateway® outdoor

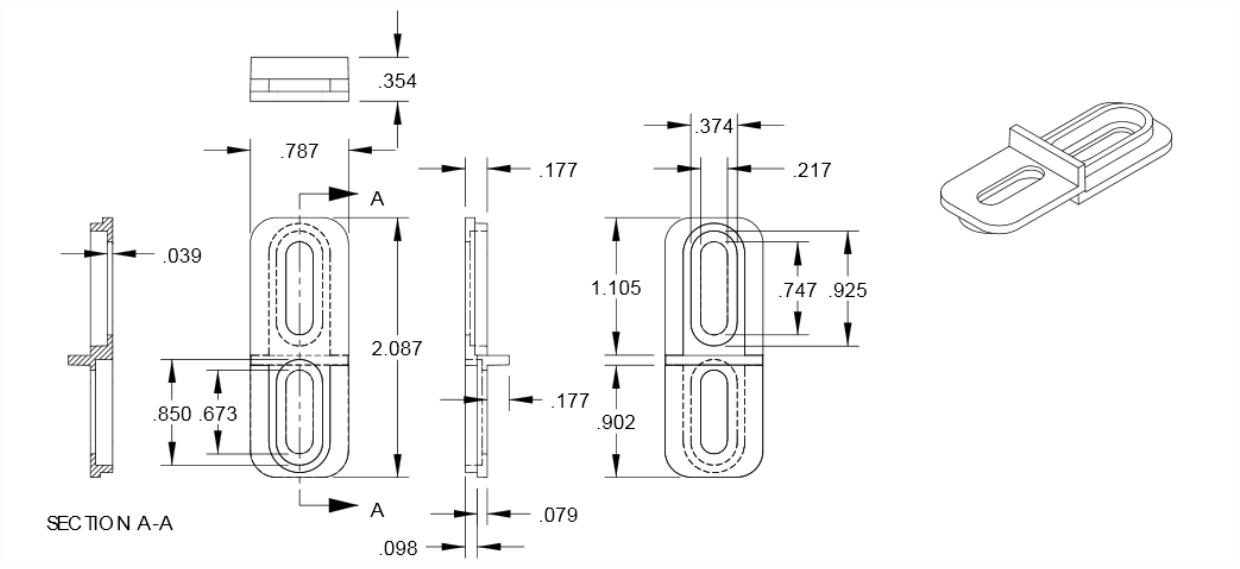
9.1.3.1 Die cast external mounting brackets

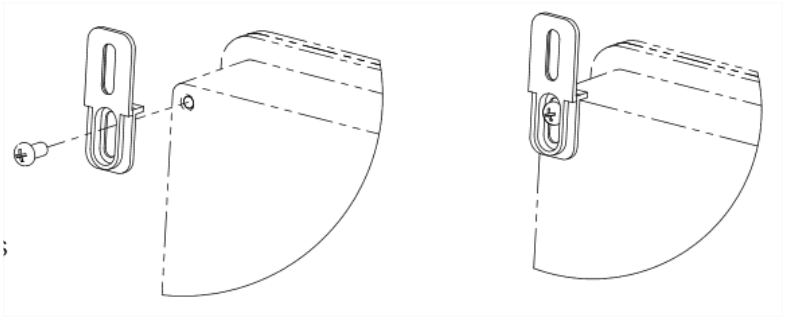
The BeanGateway® outdoor is provided with die cast external mounting brackets (4 x brackets and 4 x M5 attaching screws)

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



9.1.4 Mounting brackets design





9.1.5 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®.***
- ✓ ***Only the hardware version V3.4 of the BeanGateway® comes with antenna diversity.***

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.

Antenna socket (RPSMA)

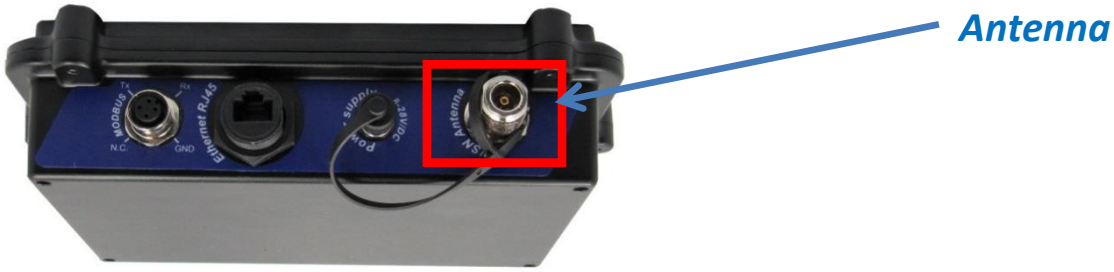
Don't try to plug another type of antenna on your Beangateway®, you will damage the connectors.

9.1.5.1 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.



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

9.2 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***).

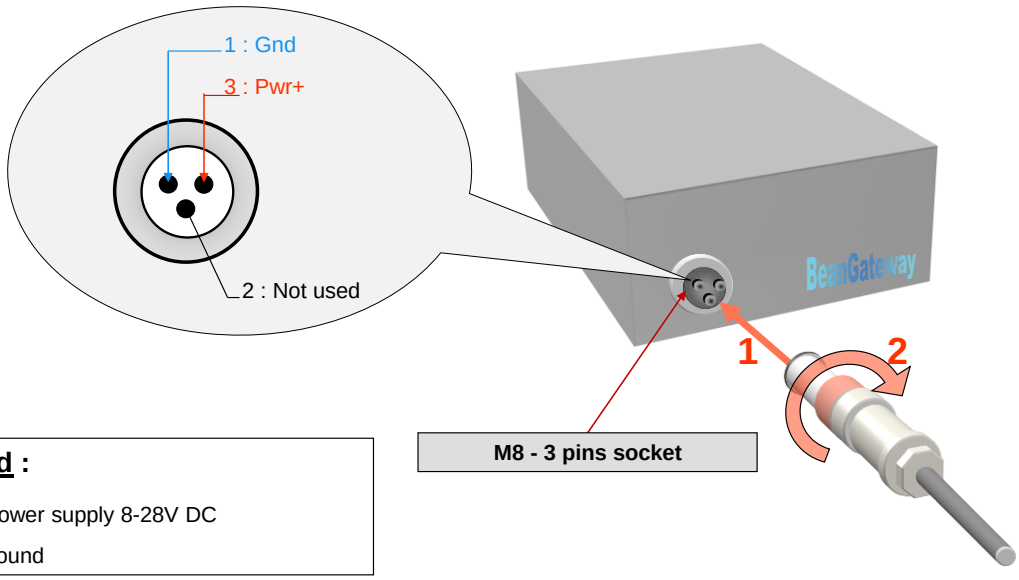
If you use another type of DC power supply, you will damage your BeanGateway®:

- ✓ ***If you inverse the power supply polarity;***
- ✓ ***If the maximum supply voltage value is exceeded (28V);***

9.2.1 BeanGateway® outdoor power supply

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

External power supply wiring code



Legend :

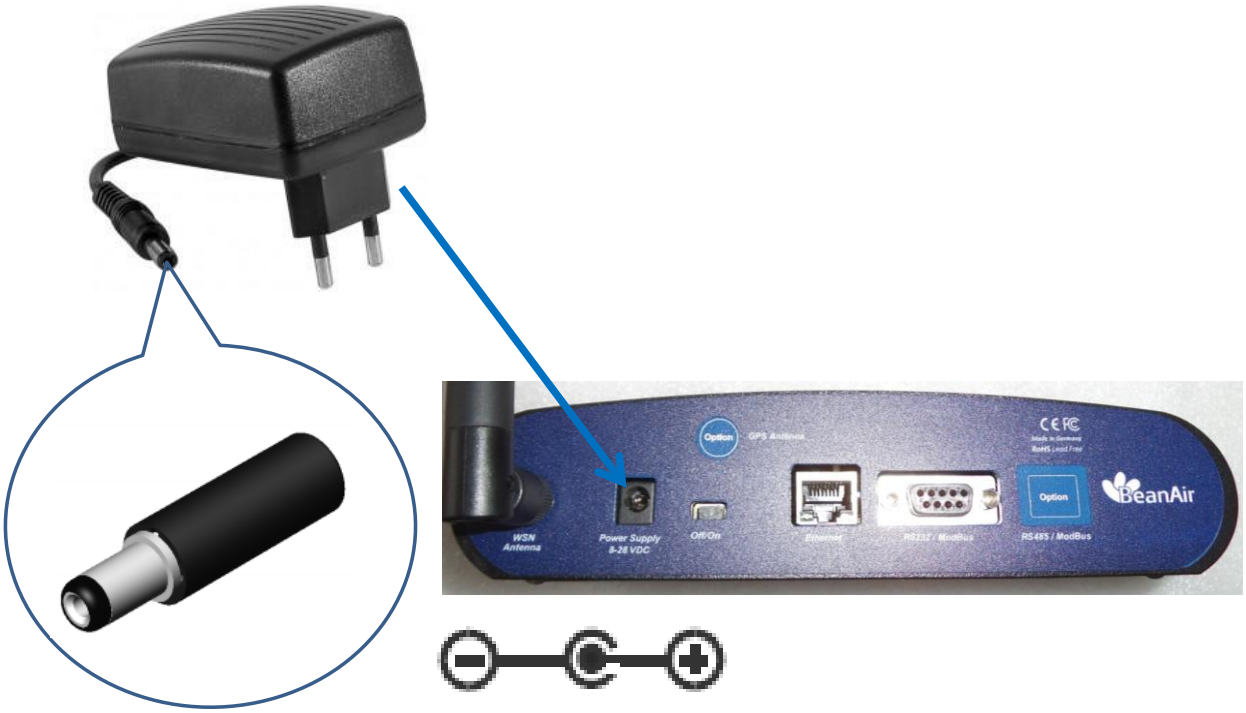
Pwr+ : Power supply 8-28V DC

Gnd : Ground

9.2.2 BeanGateway® indoor power supply

It's highly recommended to use your BeanGateway® with the DC power supply bloc 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)

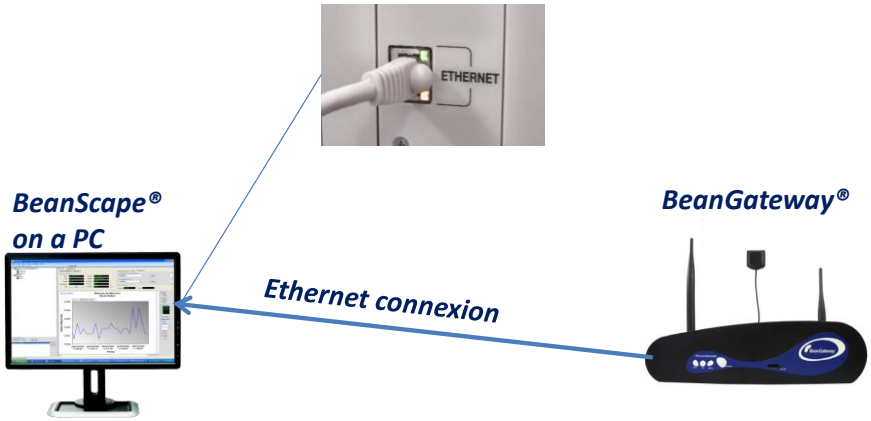
Figure 2 : External power supply - BeanGateway Indoor

10. START YOUR APPLICATION

10.1 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.

10.2 SETTING UP A NETWORK ON YOUR COMPUTER

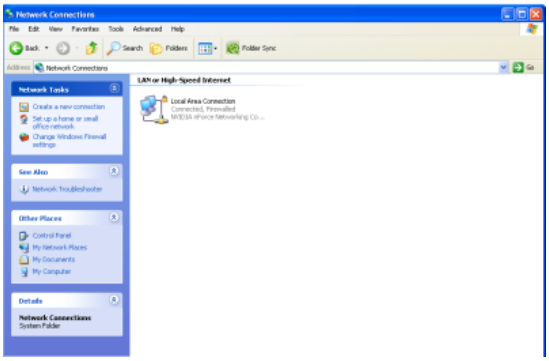
To configure the network on your computer/workstation:

- ✓ Click on 

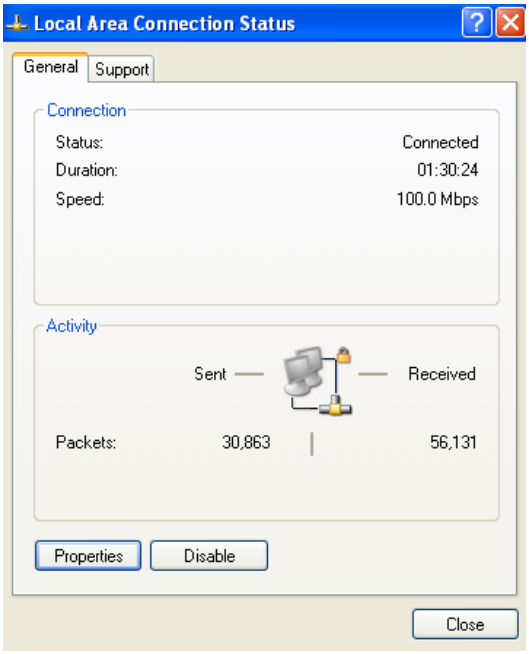
- ✓ Then on 

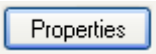
- ✓ Double-click on 

- ✓ You will see the following window

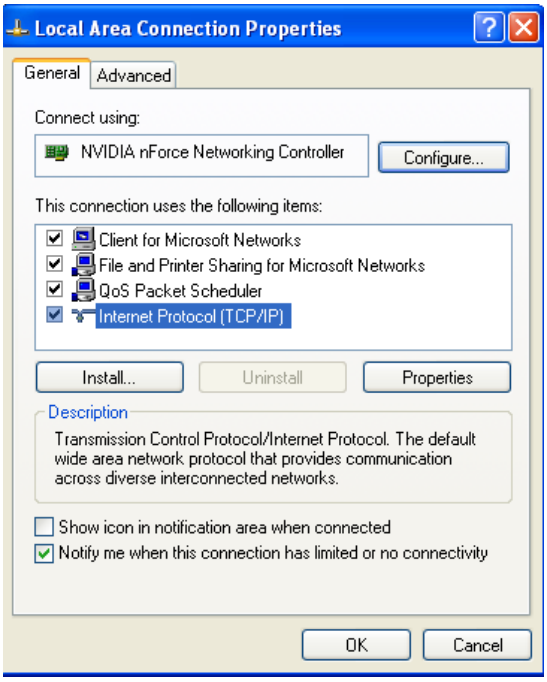


- ✓ Select the icon corresponding to the (NIC) network interface card on what you connected the BeanGateway® 
- ✓ Double-click the icon.
- ✓ You get the following window:



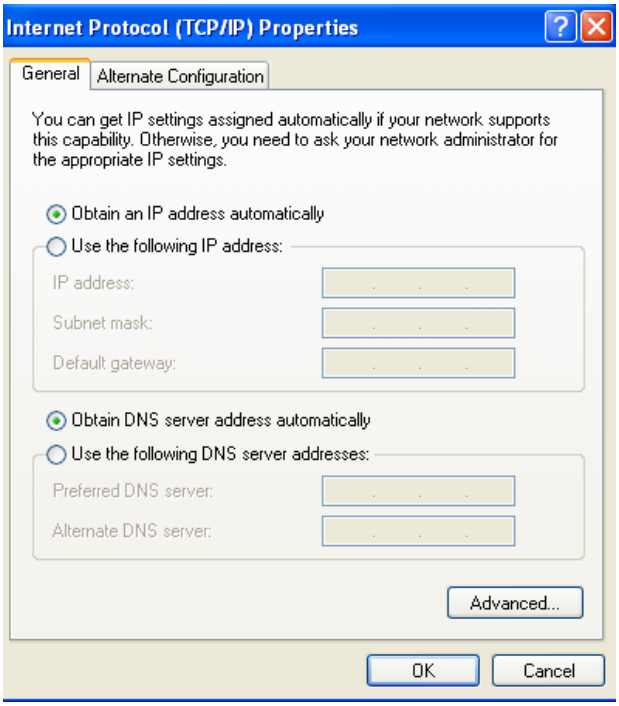
✓ Click 

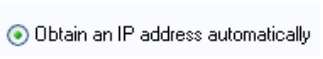
✓ You get the following window:



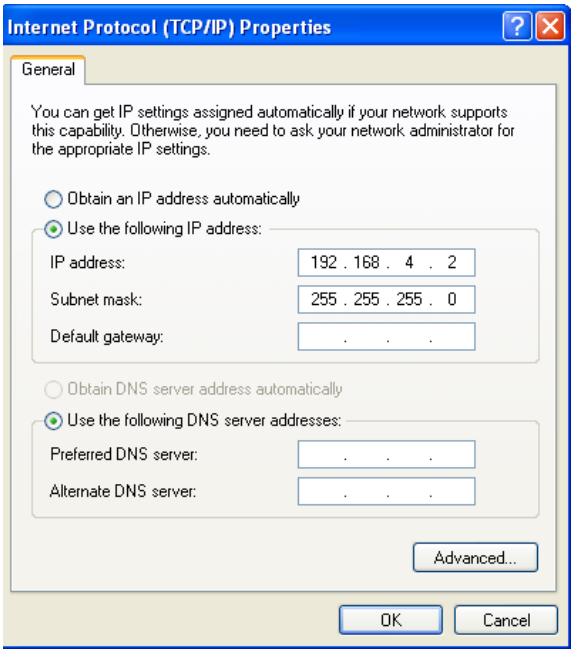
✓ Double-click 

✓ You get the following window:



- ✓ In case you set the DHCP active on your BeanGateway®, the BeanGateway® IP is directly obtained **by** the network**,** choose the option 

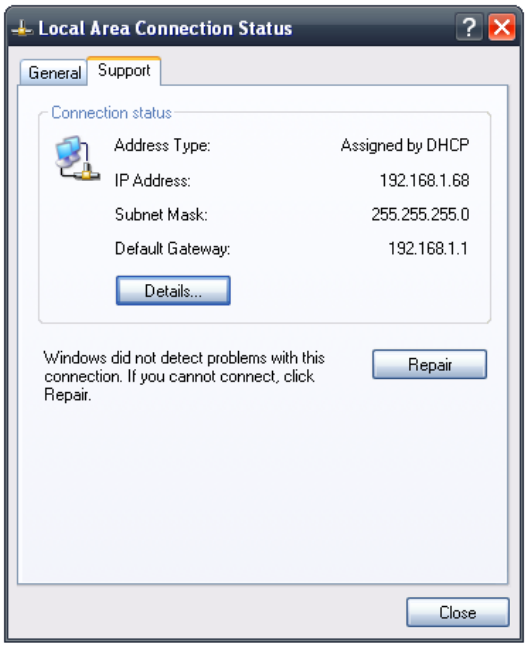
- ✓ If the DHCP option has not been activated, you must enter a static IP **192.168.4.2** on your PC with a subnet mask: 255.255.255.0.



- ✓ Click "OK" to confirm and safeguard your work.

- ✓ Your computer is now connected to your wireless sensor networks. In order facilitate these exchanges you must give commands from BeanScape®.
- ✓ Reach the "Start" menu in the bottom left of the computer screen.
- ✓ The above image shows the start menu. Select the folder named "Control Panel ".
- ✓ You will find more information by opening Windows "Local Area Network Connection" and clicking on the Support tab.

- ✓ You will see the following window:



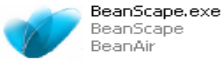
By default the BeanGateway® IP address is set at 192.168.4.123 with the DHCP disabled. The BeanGateway® is considered as a client by the BeanScape® (server) having the IP address by default set to 192.168.4.2.

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

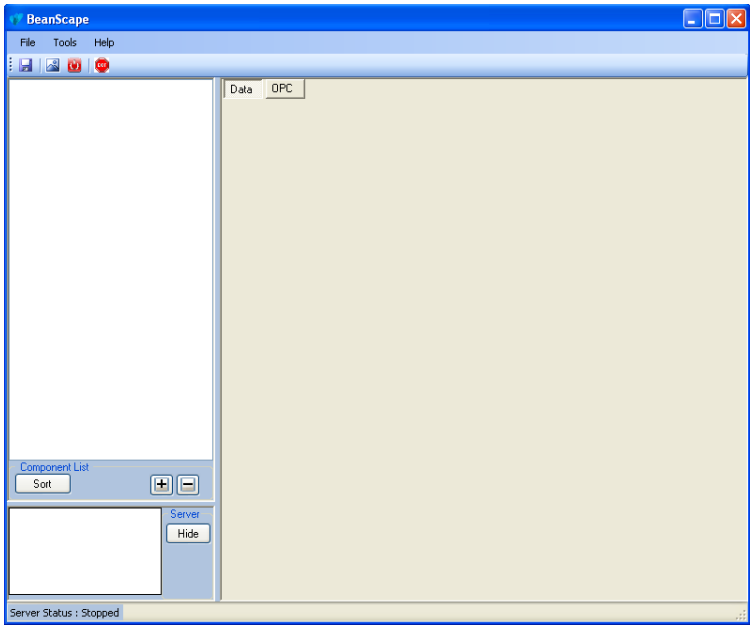
10.3 START THE BEANSCAPE®

To start BeanScape ®, please follow the instructions:

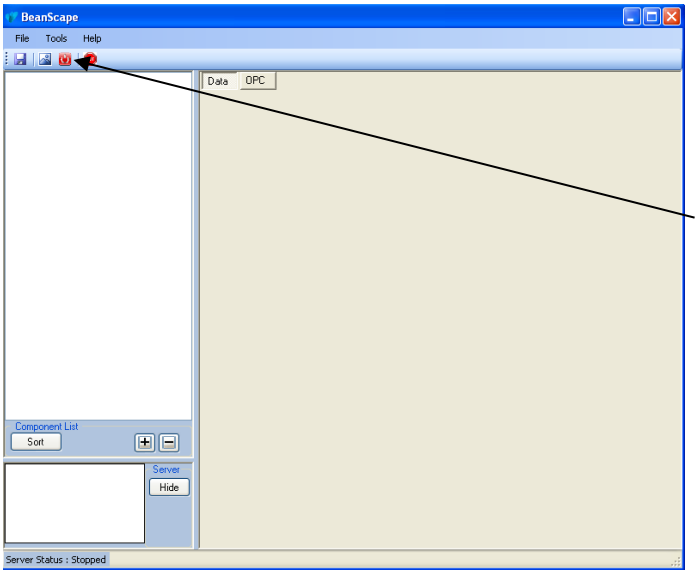
- Start BeanScape® by double-clicking the icon



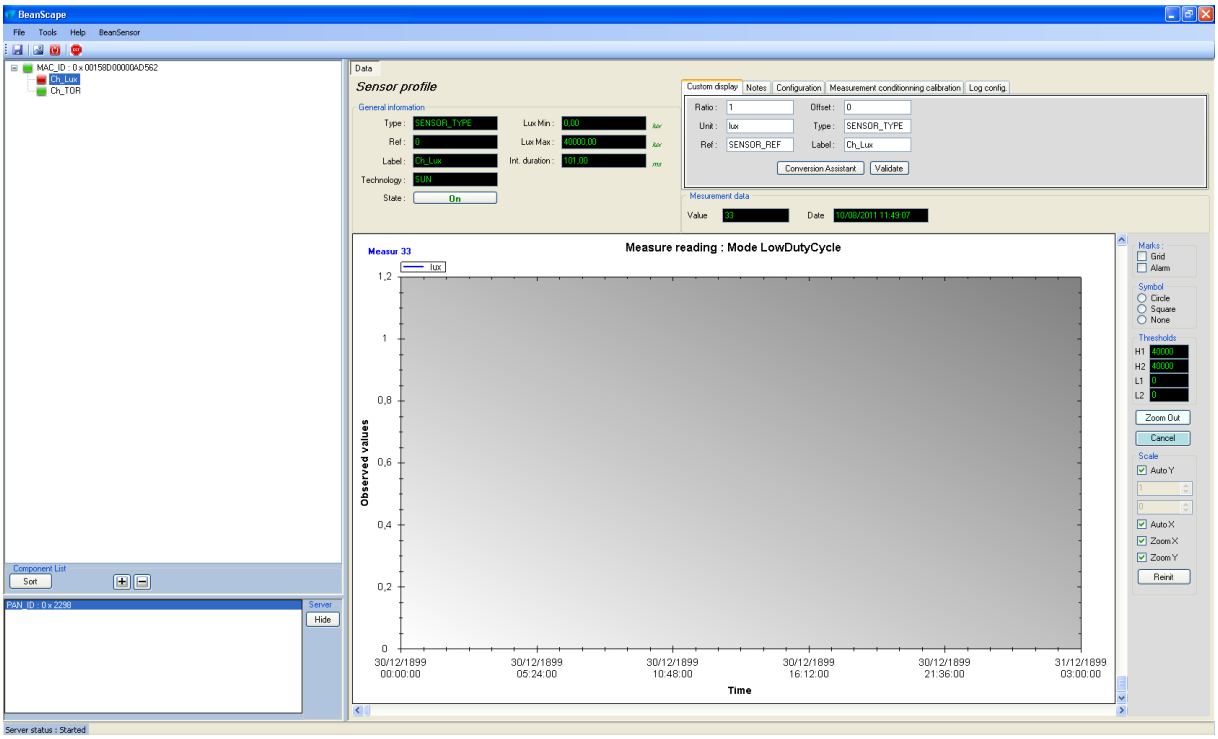
- You get the following screen:



- Start the server by clicking the Start button 



The BeanScape® server starts, and creates the BeanDevice® mapping based.



10.4 LAN/ETHERNET CONFIGURATION (FOR ADVANCED USER ONLY)

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

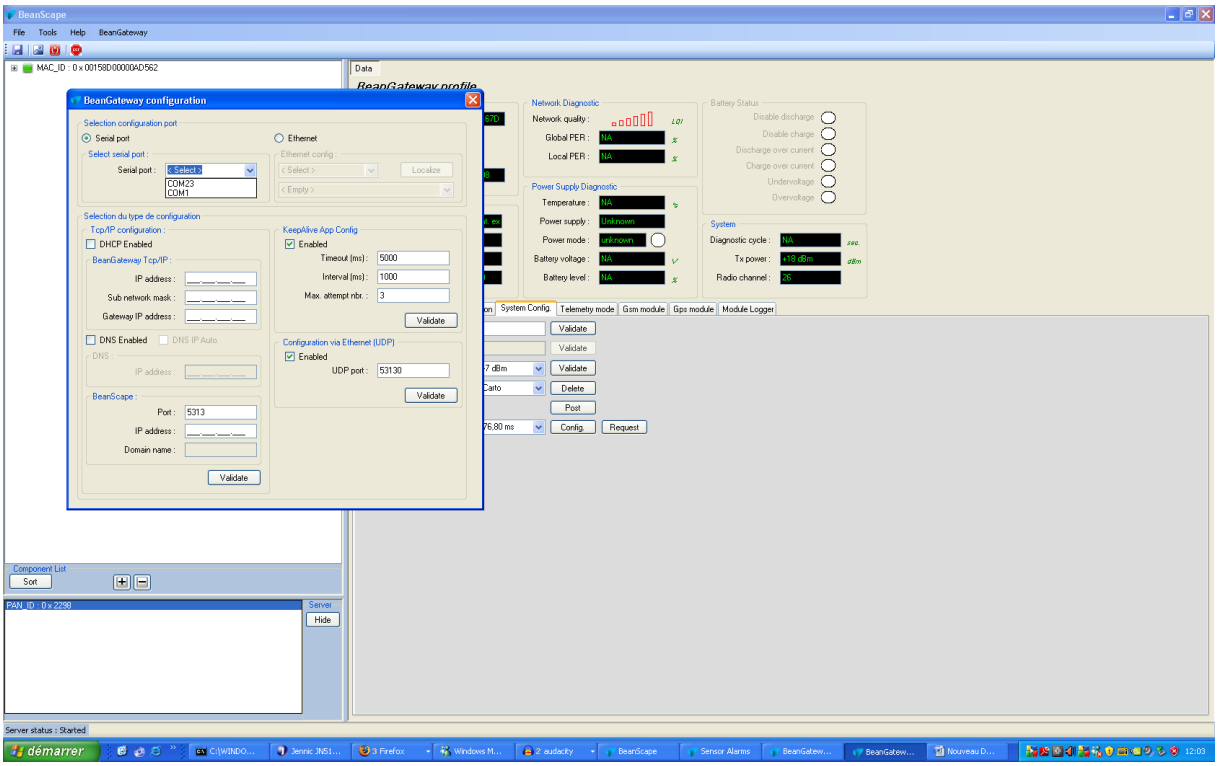
Please check your Network settings before you make any changes.

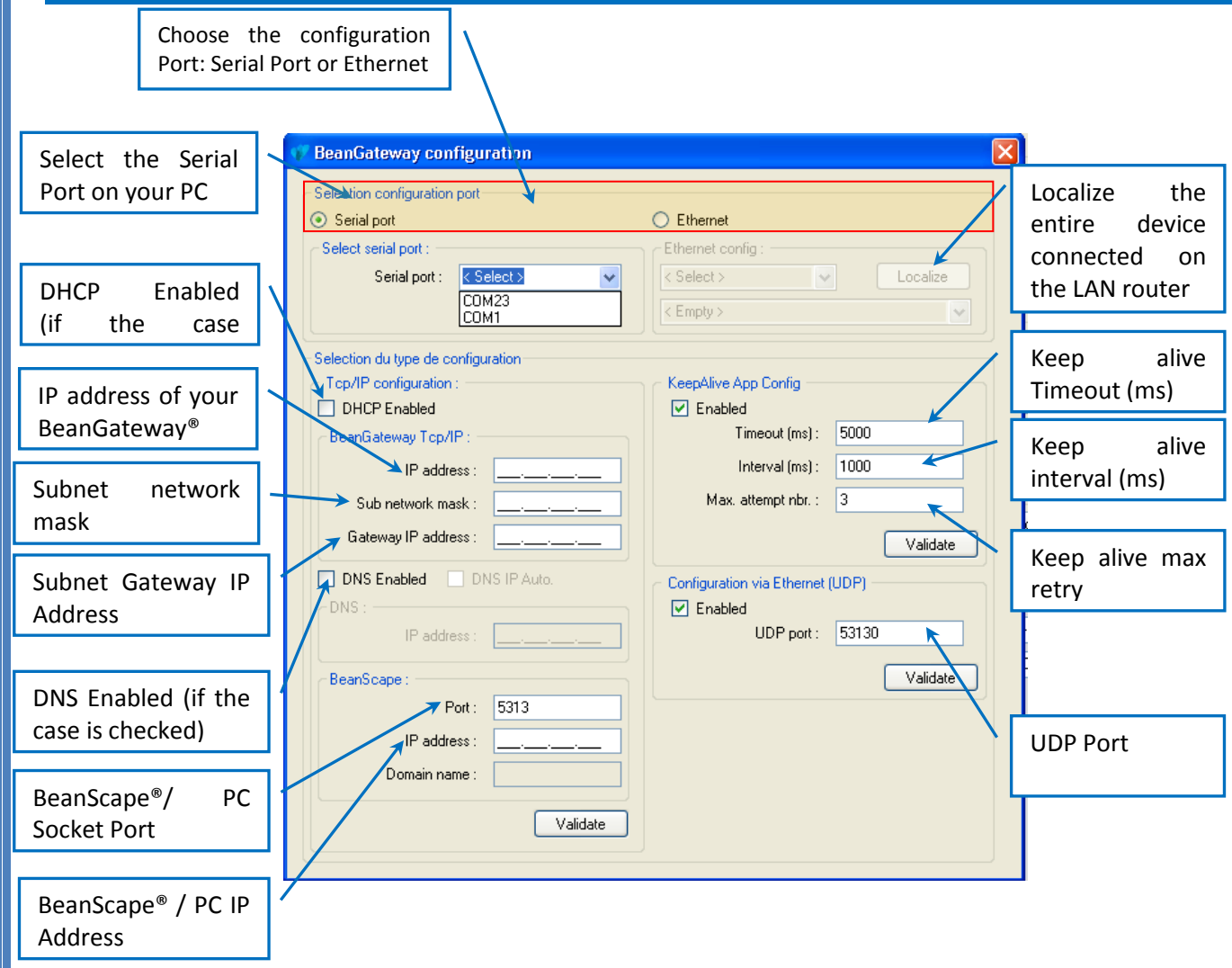
By default, the BeanGateway® is configured with a static IP address: **192.168.4.123**. This allows the user to connect fastly the Beangateway® to a PC.

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 config.

A new window will open called "Beangateway® configuration"





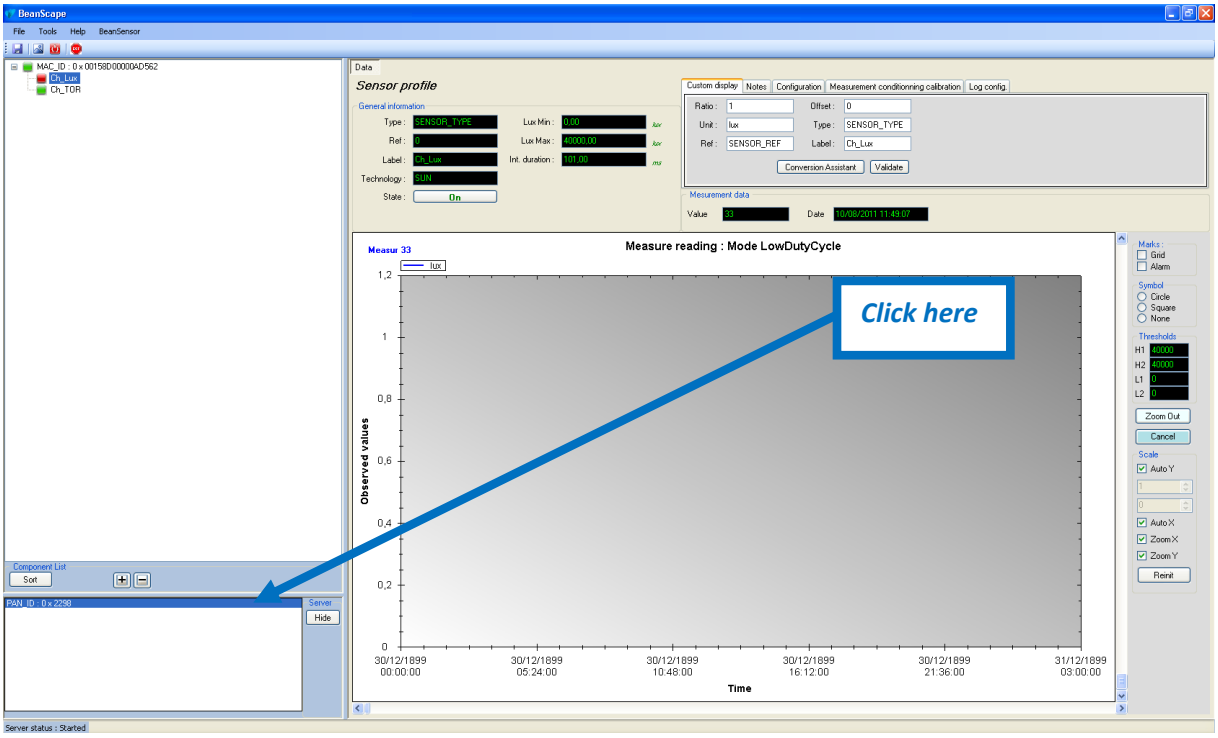
- ***DHCP Enabled***: Check this case if you want to enable the DHCP. For further information about DHCP read the ***Technical Note "BeanGateway® management on your Local Area Network infrastructure".***
- ***If DHCP is not activated, the user must configure the Beangateway® IP parameters:***
  - ***IP 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
  - ***Subnet Network mask:*** The subnet mask is set to "255.255.255.0" by default
  - ***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 »

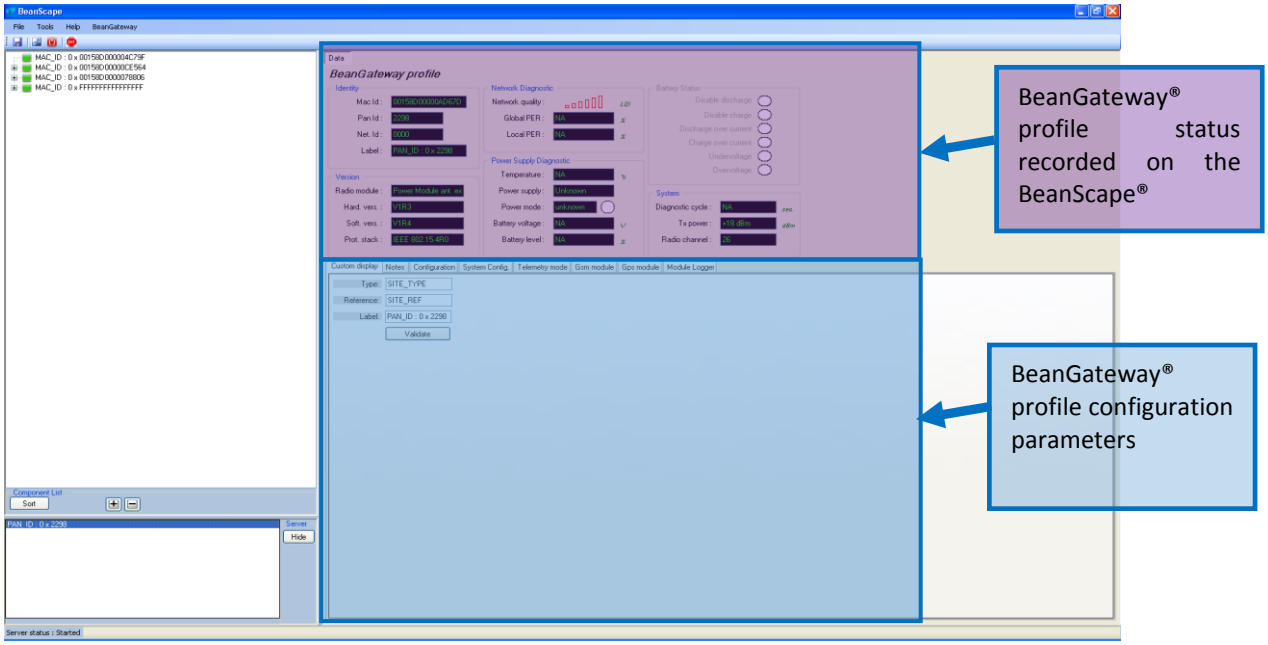
10.5 BEANGATEWAY® PROFILE

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

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



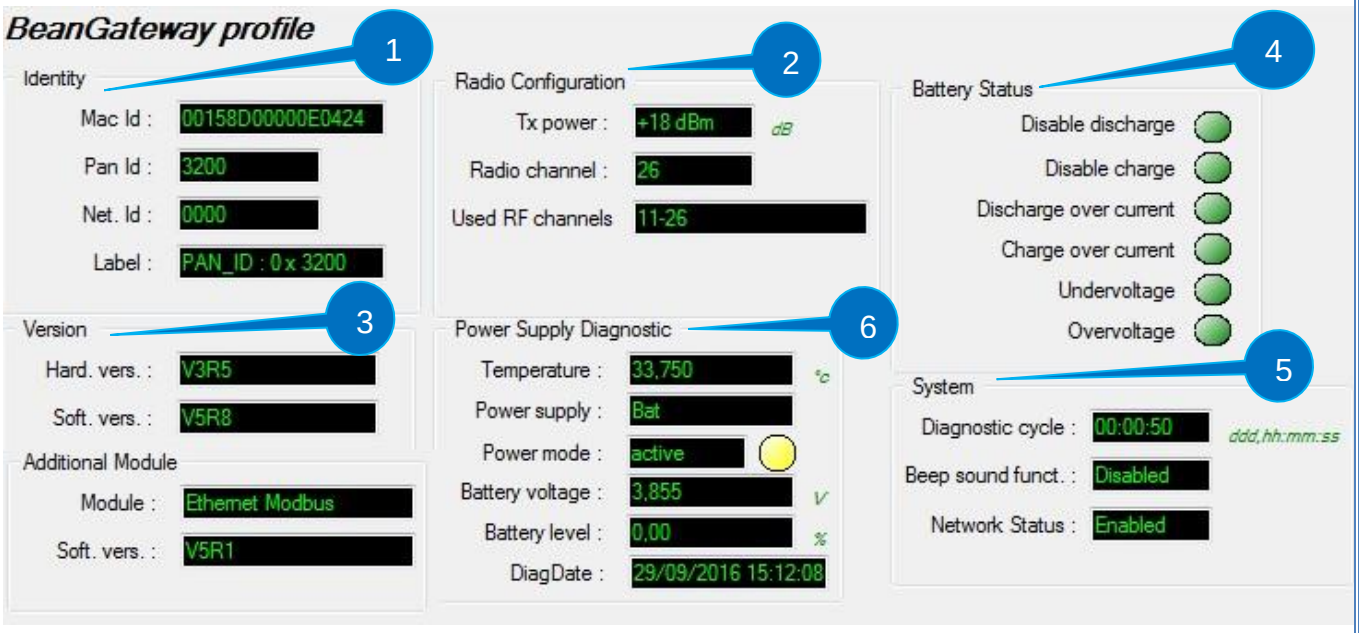
✓ You will see the following window:



The BeanGateway® profile is divided into two frames:

- ✓ Profile status
- ✓ Profile configuration parameters

10.5.1 BeanGateway® profile status description

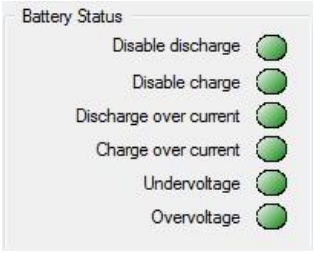


1	This frame displays all the ID allocated to the BeanGateway®: • **MAC Address (encoded on 64-bits): MAC Address (encoded on 64-bits):** The Media Access Control address is a unique identifier assigned to the BeanDevice® by the manufacturer for identification. • ***PAN Address (encoded on 16-bits):*** 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

10.5.1.1 Frame : Battery status

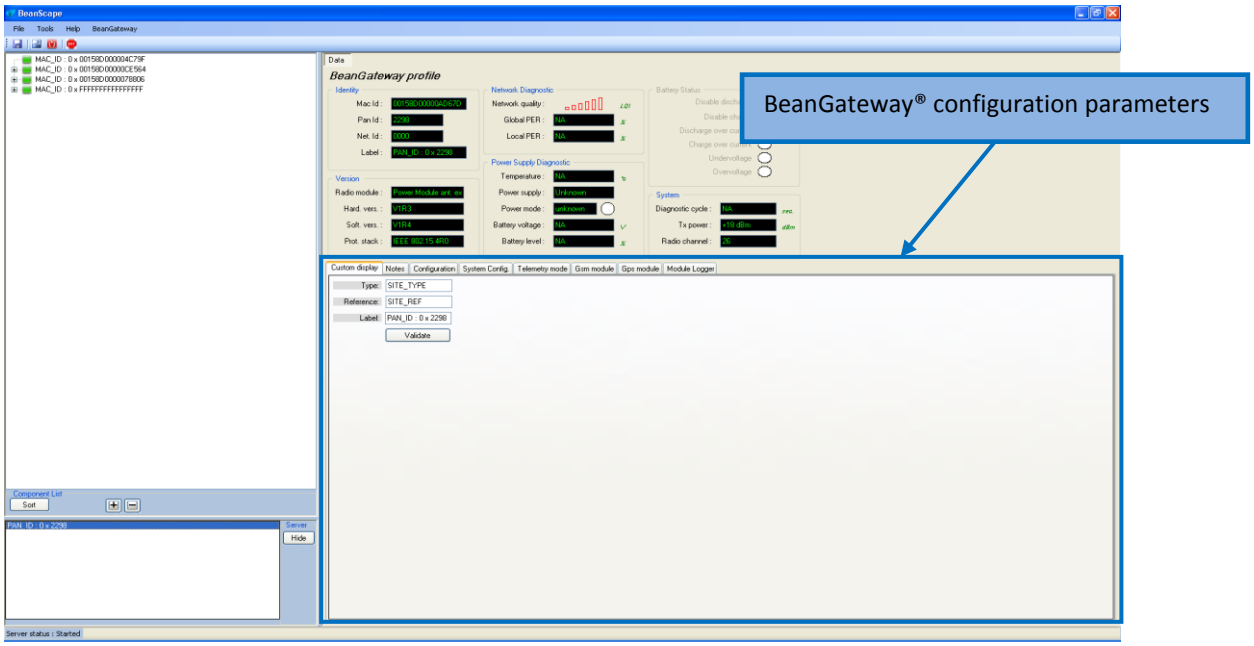
This frame displays information on battery/primary cell status.
The ***BeanGateway***® performs frequently a battery diagnostic on the ***BeanGateway*** ®. An alarm notification is transmitted automatically to the ***BeanGateway*** ® if a battery failure is detected on the ***BeanGateway*** ®.



If any battery status information is displayed (ex: ***BeanGateway*** ® is not connected), status led is white.
When LEDS are green a normal state is indicated. During a malfunction, the LEDS turns red.
Here are the details:

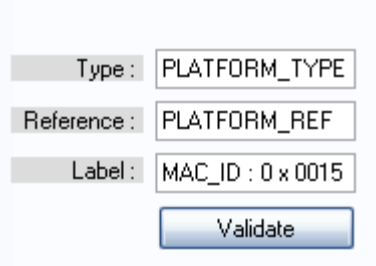
Led definition	Green Led signification	Red led signification
Disable Discharge	Battery discharge activated	Battery discharge deactivated
Disable Charge	Battery charge activated	Battery charge deactivated
Over current during battery discharge	No over current during battery discharge	Over current during battery discharge detected
Over current during battery charge	No over current during battery charge	Over current during battery charge detected
Overvoltage	Any presence of battery overvoltage	Battery over voltage detected on the battery
Under voltage	Any presence of battery under voltage	Battery under voltage detected on the battery

10.6 USER-CONFIGURABLE PARAMETERS



Frame	Description
Custom Display	Customize the BeanGateway® label
Notes	This area contains the notes related to the BeanGateway®.
Configuration	Radio parameters configuration (RF channels, Energy Scan, PAN ID….)
System configuration	System configuration (Diagnostic cycle, Nwk deletion, Post system clock…)
Module Status	Module status (Logger)
Logger Module	Datalogger on Micro-SD® configuration

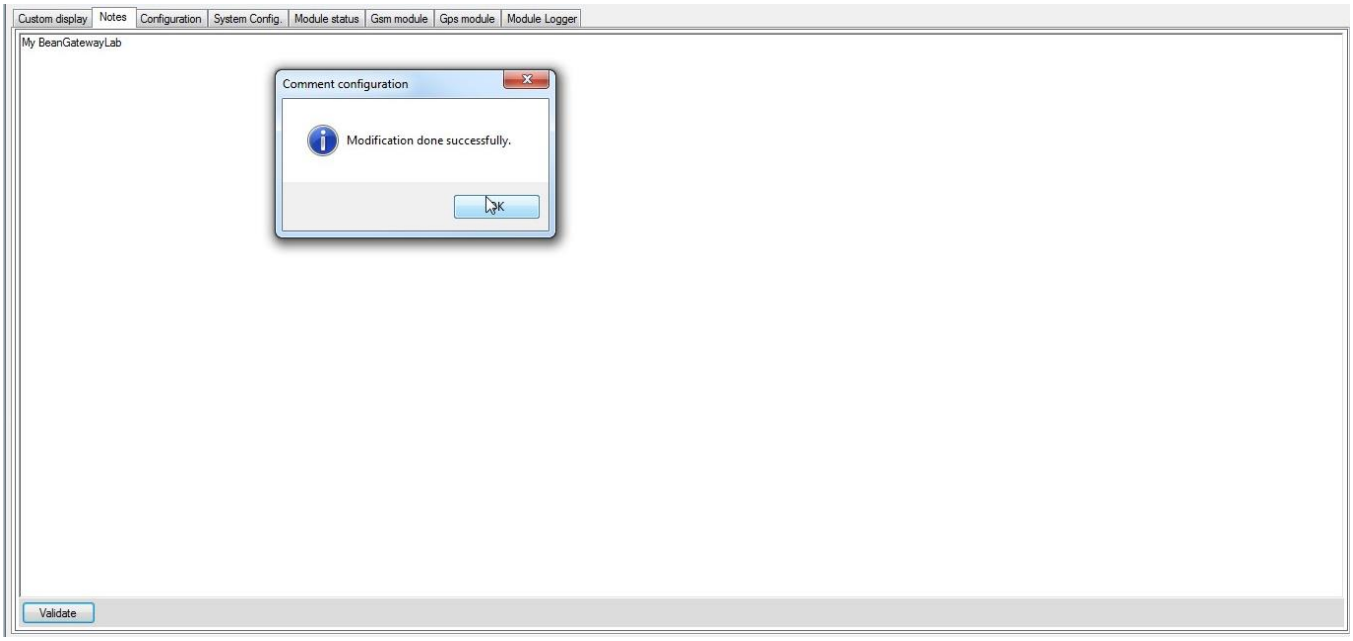
10.6.1 Custom Display



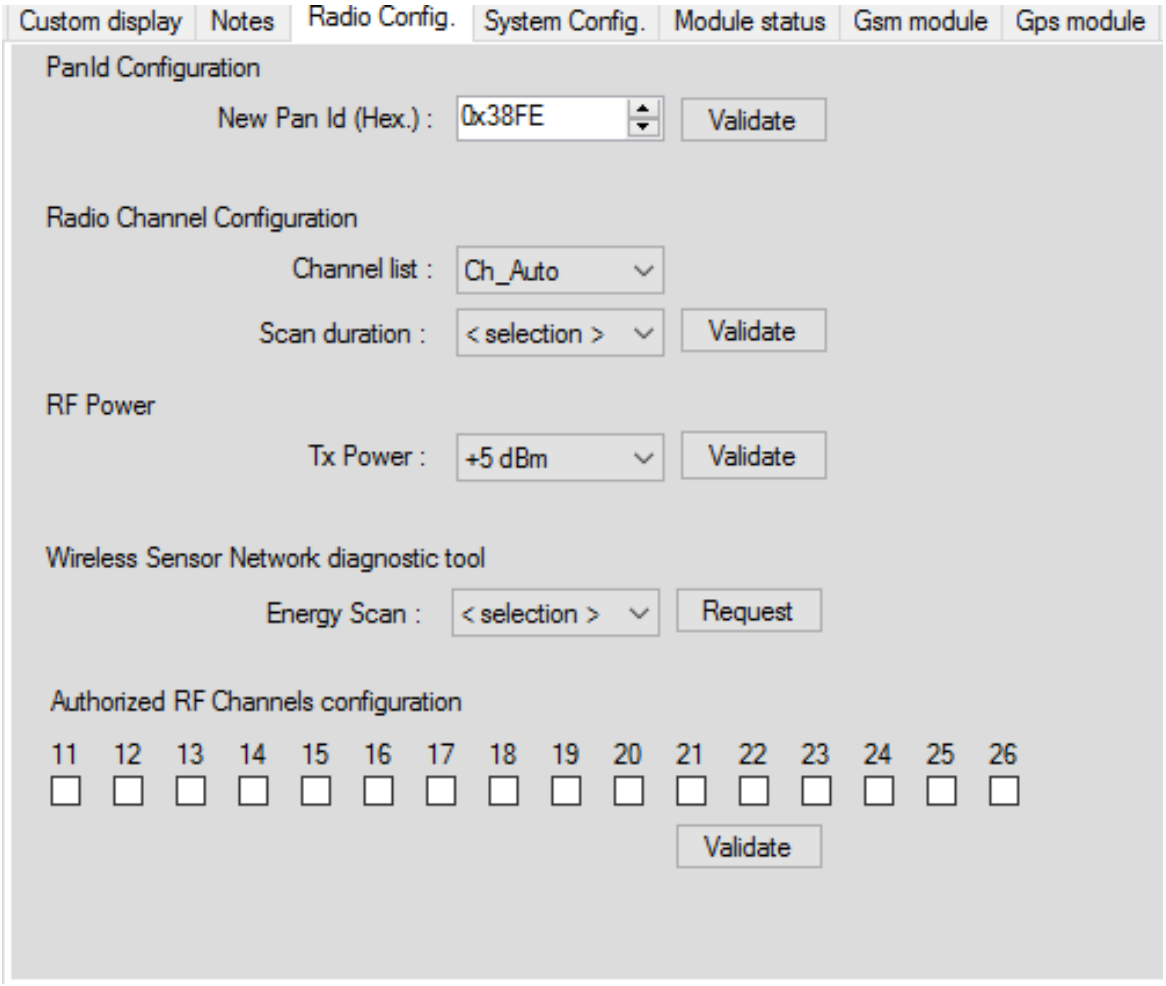
Parameter	*Description*
Type	You can enter here the type of BeanGateway® you want to use.
Reference	You can assign an internal reference to the BeanDevice® you have purchased.
Label	You can assign any sort of Label to your BeanGateway ®. Therefore, the user can easily associate the BeanGateway® with its equipment or environment (example: Nwk_Room_1, Nwk_Room_2).

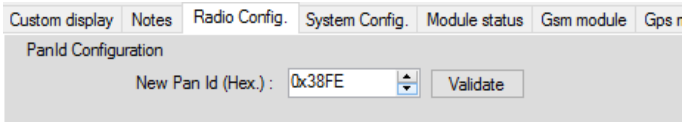
10.6.2 Notes

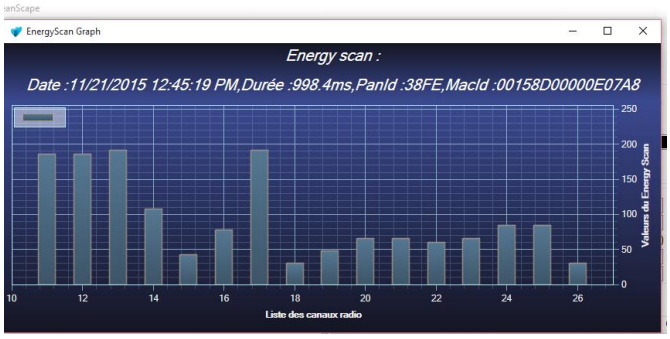
This area contains the notes related to the BeanGateway®. To edit this field, enter data to save and click on "Validate".



10.6.3 Radio Configuration

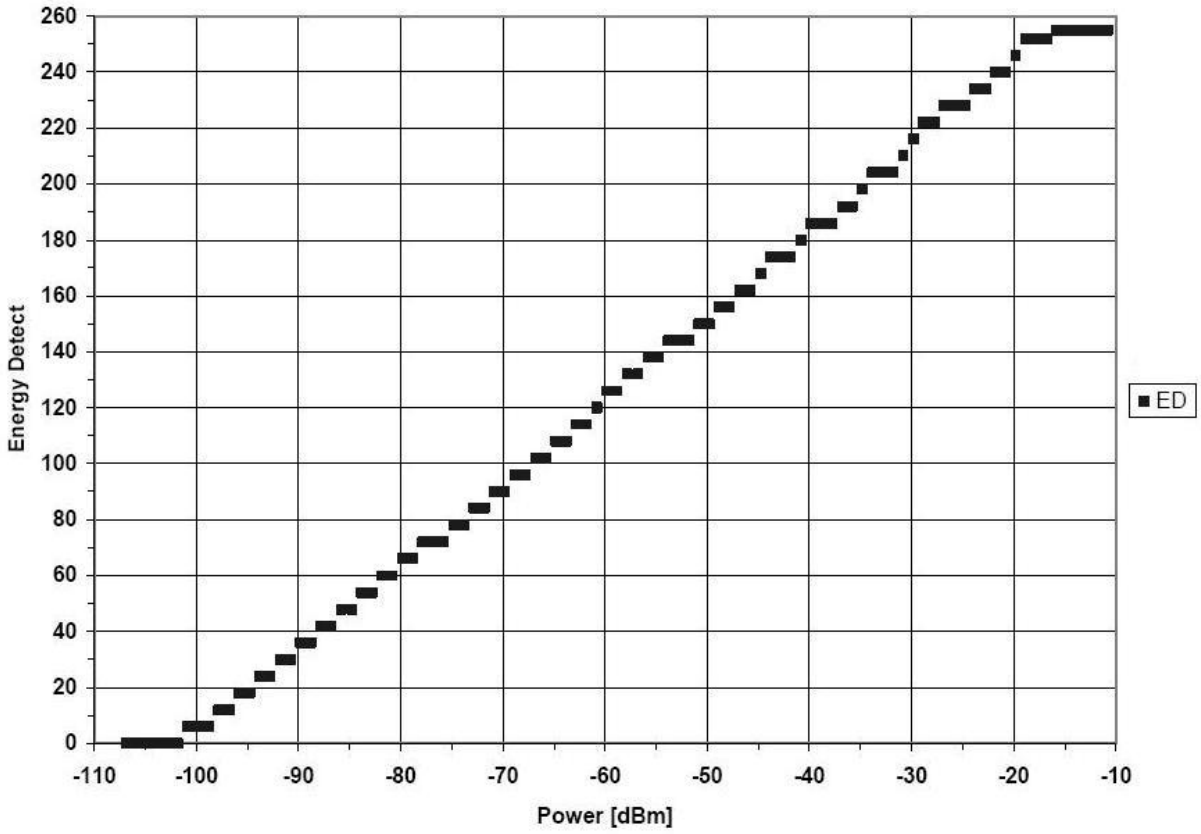


Setting	Description	Watch the short technical Video (Click on the Icon)
PAN ID Configuration	Select a PAN ID value between 0 to 3FFE. If you select a value > 3FFF , the value will not be assigned. Enter a value without "0x". Example: 03AB , 3DC2.  In the case if you have several networks	

	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. **It is strongly recommended to select Automatic channel selection if you have few information about radio activities on your site.**	Automatic RF channel selection Manual RF Channel selection
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. 	

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.	

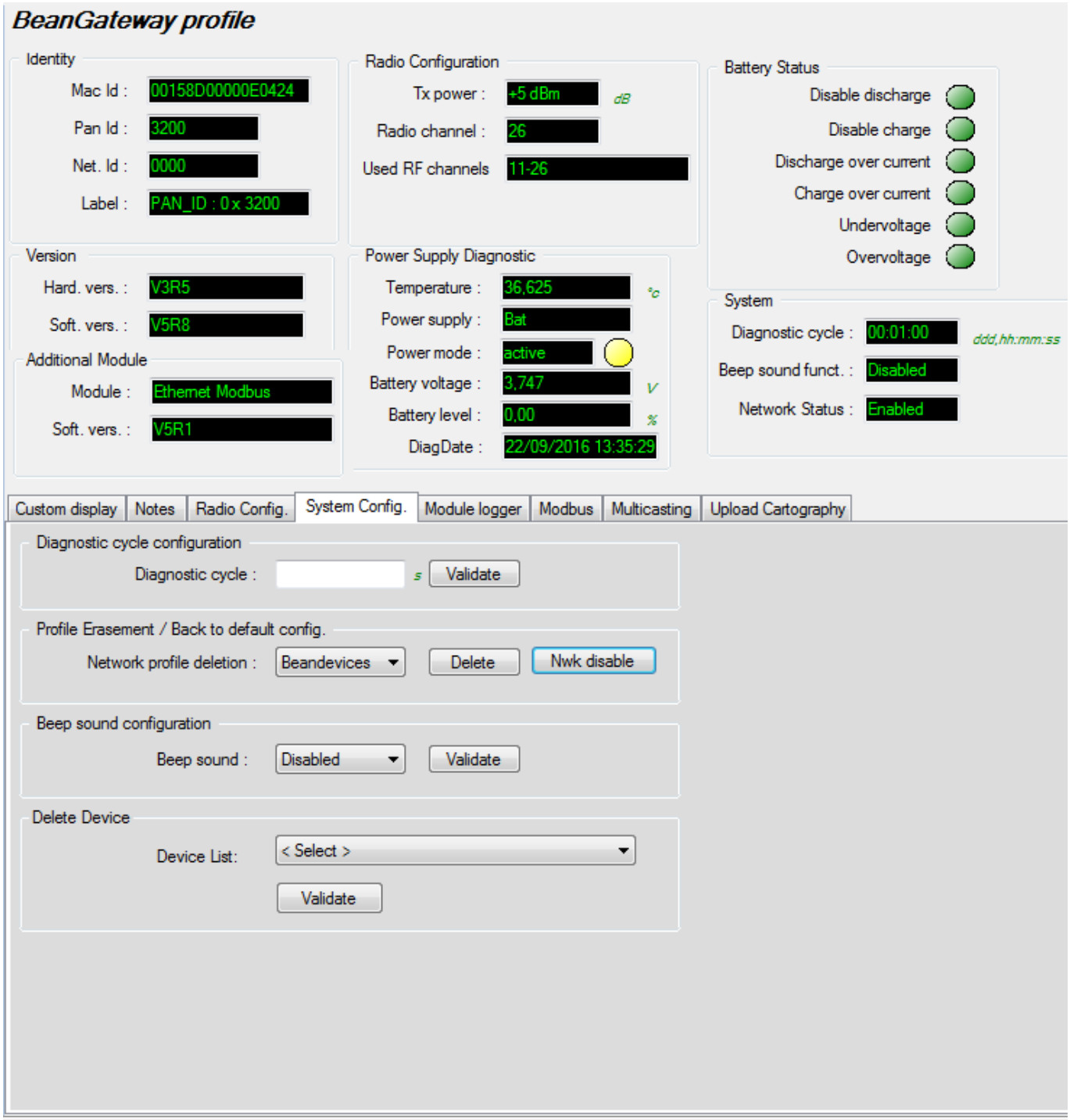
Select RF channels with the least detected activity.



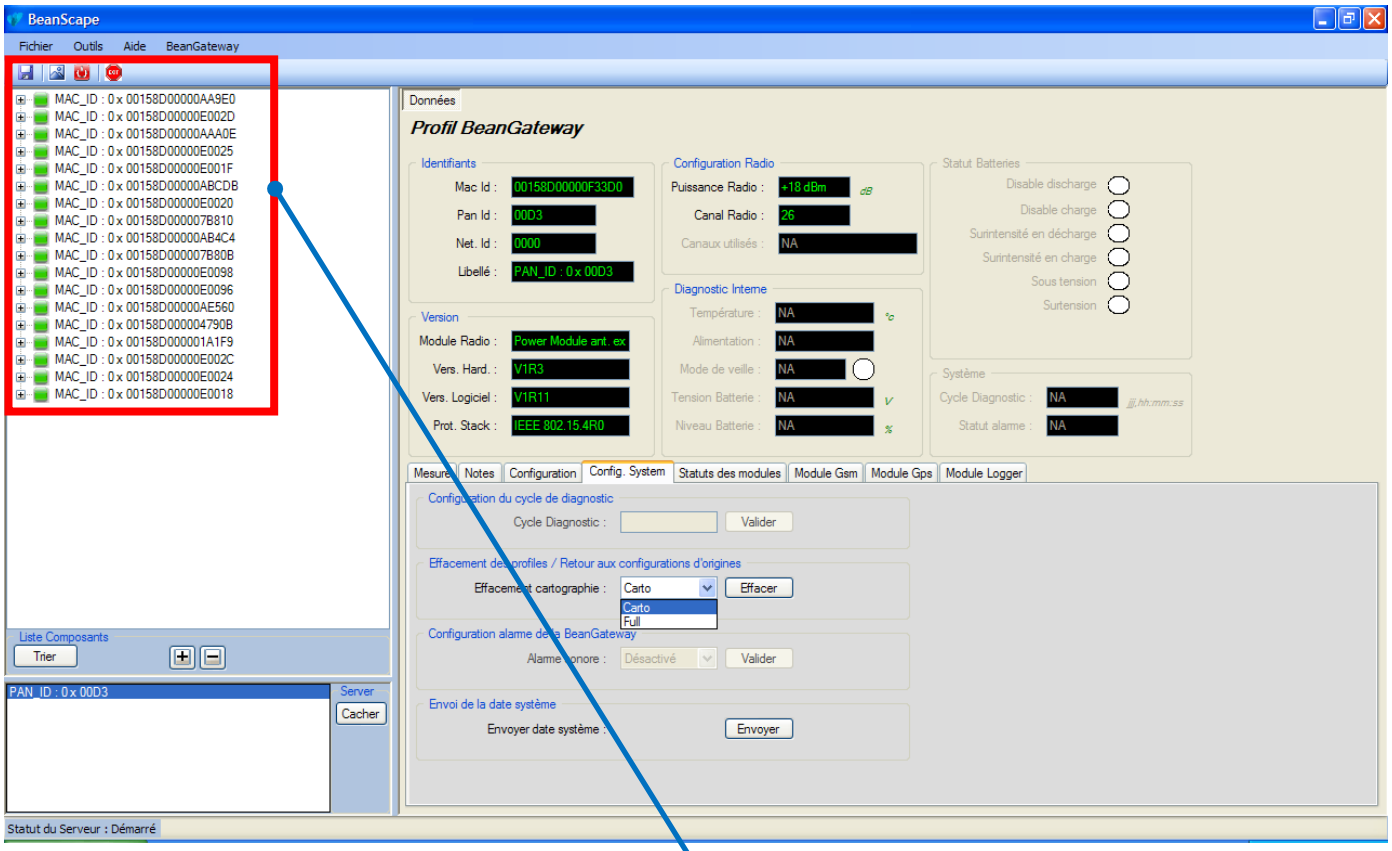
RF

Figure 3 : Conversion table - Energy Scan power in dBm

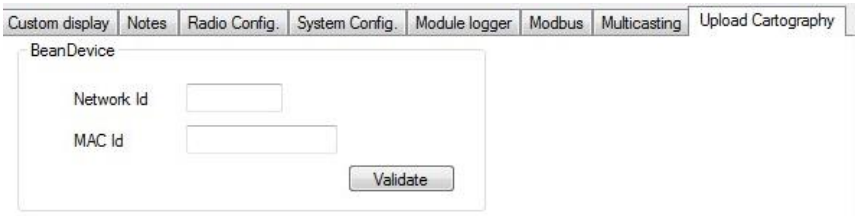
10.6.4 System Configuration



Setting	Description	Watch the short technical Video (Click on the Icon)
Diagnostic cycle	You can set the BeanGateway® diagnostic cycle (Battery status).	
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.	


BeanScape
Fichier Outils Aide BeanGateway
MAC_ID : 0 x 00158D00000AA9E0
MAC_ID : 0 x 00158D00000E002D
MAC_ID : 0 x 00158D00000AAA0E
MAC_ID : 0 x 00158D00000E0025
MAC_ID : 0 x 00158D00000E001F
MAC_ID : 0 x 00158D00000ABCDB
MAC_ID : 0 x 00158D00000E0020
MAC_ID : 0 x 00158D000007B810
MAC_ID : 0 x 00158D00000AB4C4
MAC_ID : 0 x 00158D000007B80B
MAC_ID : 0 x 00158D00000E0098
MAC_ID : 0 x 00158D00000E0096
MAC_ID : 0 x 00158D00000AE560
MAC_ID : 0 x 00158D000004790B
MAC_ID : 0 x 00158D000001A1F9
MAC_ID : 0 x 00158D00000E002C
MAC_ID : 0 x 00158D00000E0024
MAC_ID : 0 x 00158D00000E0018
Liste Composants
Trier
PAN_ID : 0 x 00D3
Server
Cacher
Données
Profil BeanGateway
Identifiants
Mac Id : 00158D00000F33D0
Pan Id : 00D3
Net. Id : 0000
Libellé : PAN_ID : 0 x 00D3
Configuration Radio
Puissance Radio : +18 dBm
Canal Radio : 26
Canaux utilisés : NA
Statut Batteries
Disable discharge
Disable charge
Surintensité en décharge
Surintensité en charge
Sous tension
Surtension
Version
Module Radio : Power Module ant. ex
Vers. Hard. : V1R3
Vers. Logiciel : V1R11
Prot. Stack : IEEE 802.15.4R0
Diagnostic Interne
Température : NA
Alimentation : NA
Mode de veille : NA
Tension Batterie : NA
Niveau Batterie : NA
Système
Cycle Diagnostic : NA
Statut alarme : NA
Mesure Notes Configuration Config. System Statuts des modules Module Gsm Module Gps Module Logger
Configuration du cycle de diagnostic
Cycle Diagnostic :
Valider
Effacement des profiles / Retour aux configurations d'origines
Effacement cartographie : Carto
Carto
Full
Effacer
Configuration alarme de la BeanGateway
Alarme sonore : Désactivé
Valider
Envoi de la date système
Envoyer date système :
Envoyer
Statut du Serveur : Démarré
BeanDevice® profile

10.6.5 Upload Cartography

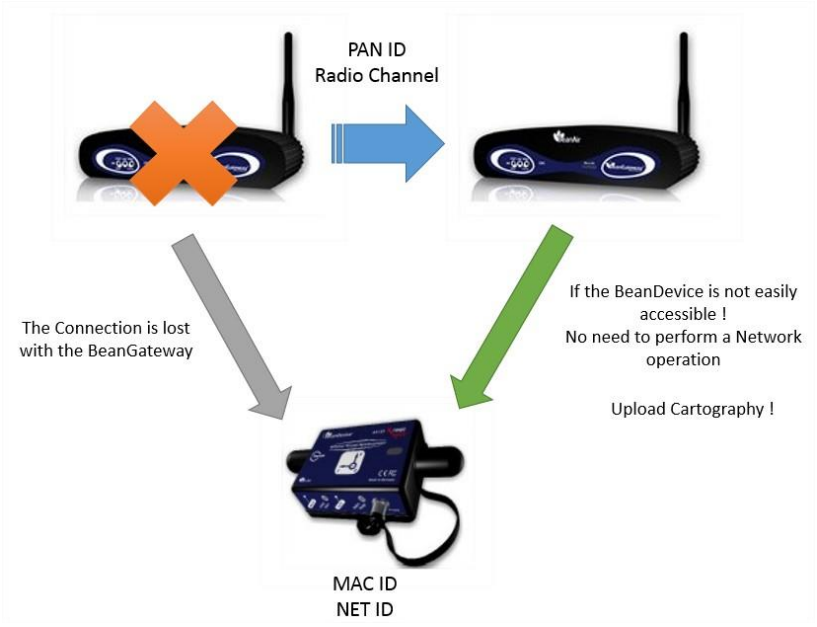


The module above is used for connecting another BeanDevice operating on a different BeanGateway to this BeanGateway.

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

10.7 LOG FILE ORGANIZATION

10.7.1 Log file system overview

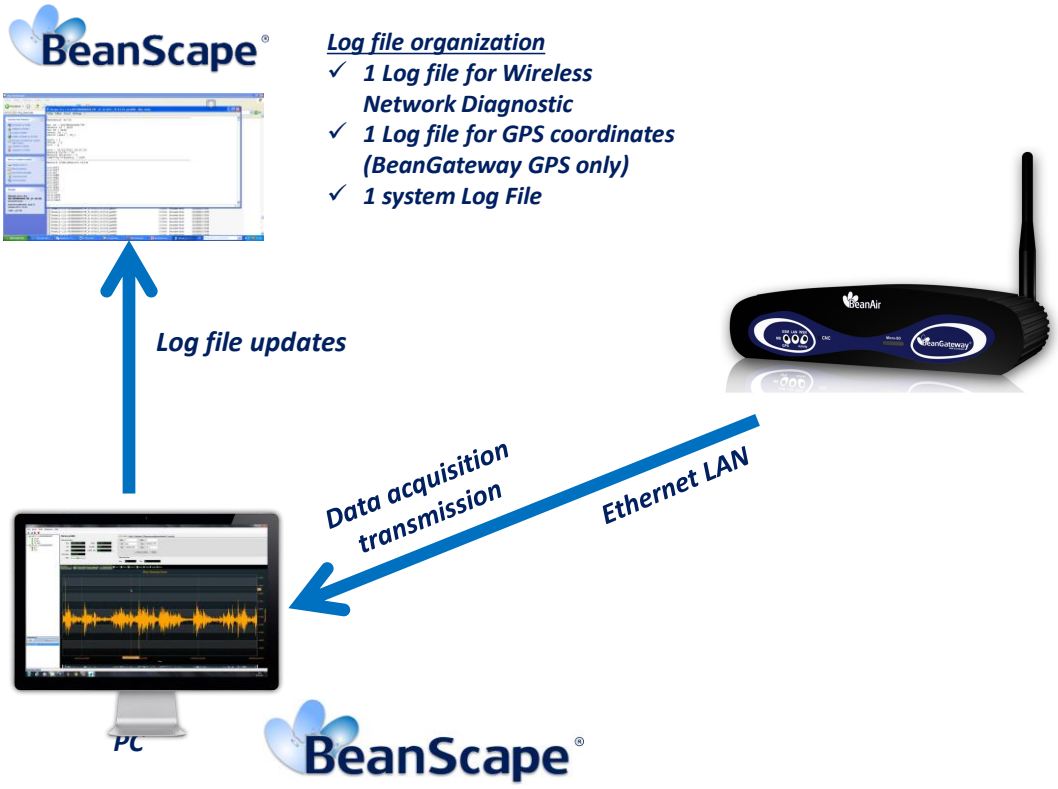
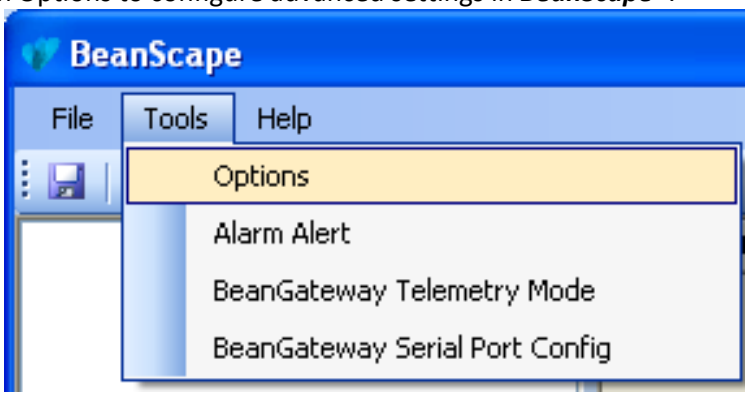


Figure 4 : Log file system overview

10.7.2 Log file directory

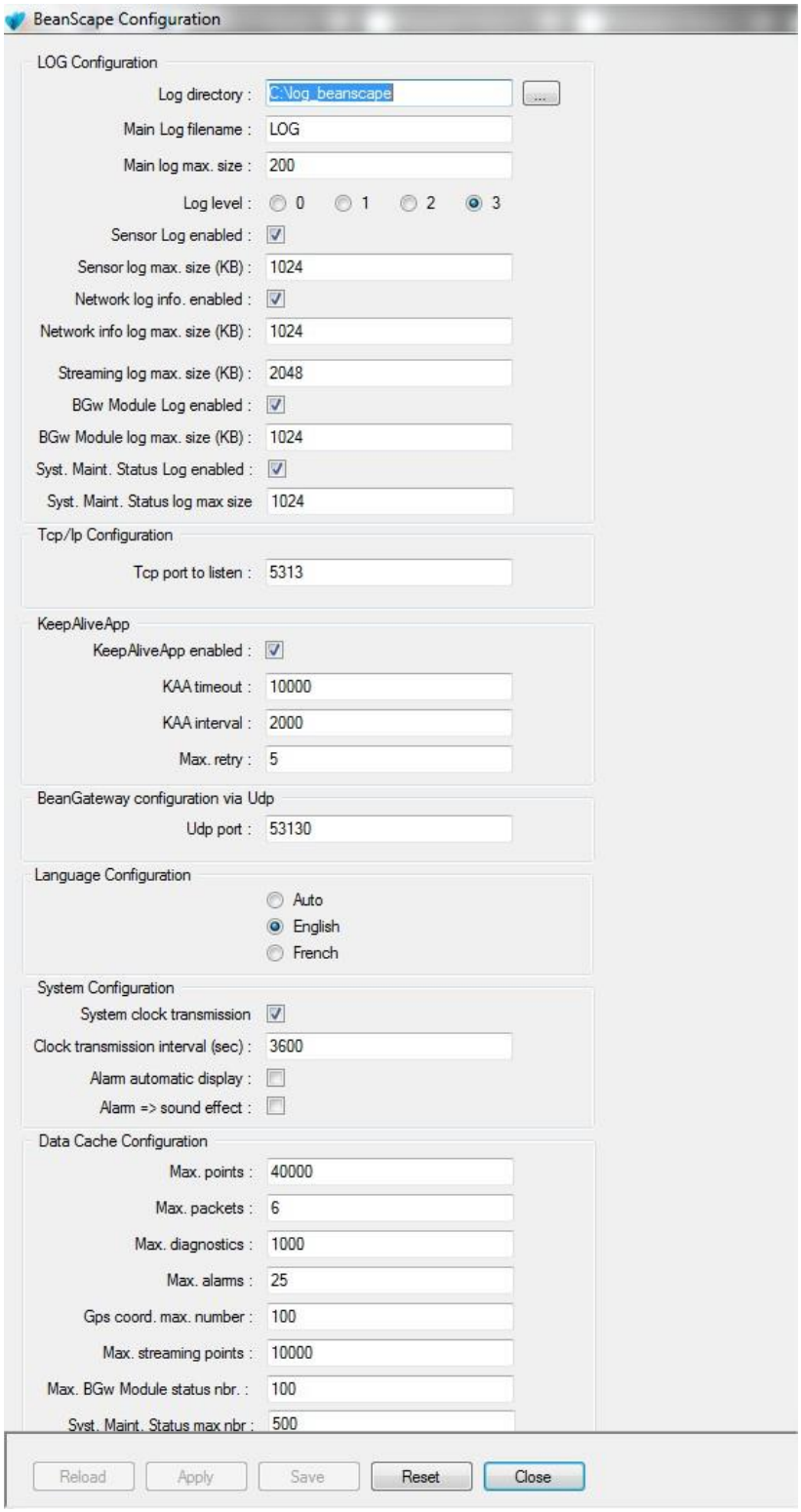
By default the Log file directory is: ***C:\log_beanscape***

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.

11. MULTI-WSN CONFIGURATION

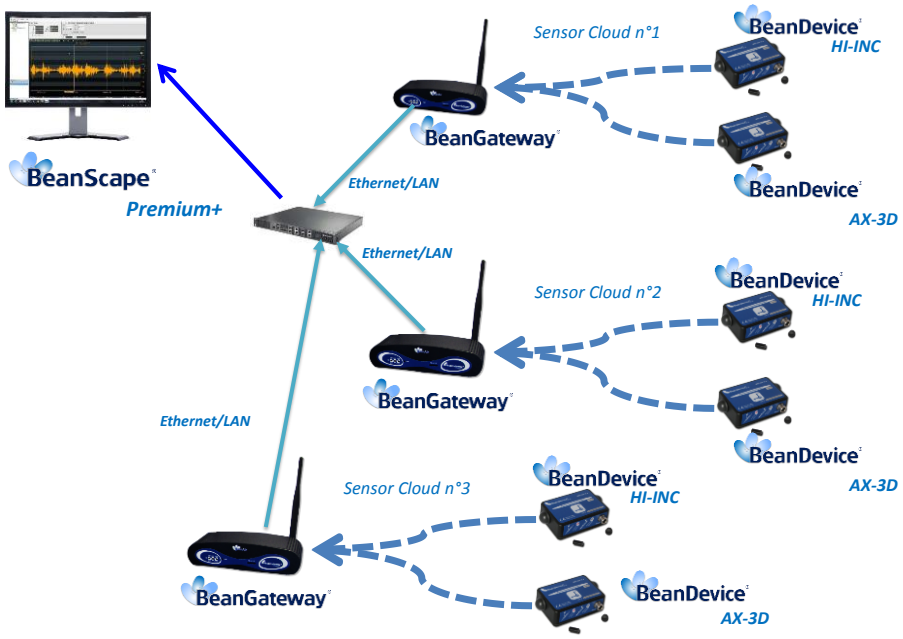


Figure 5 : A multi-WSN architecture

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

12. MAINTAINING AND SUPERVISING BEANGATEWAY®

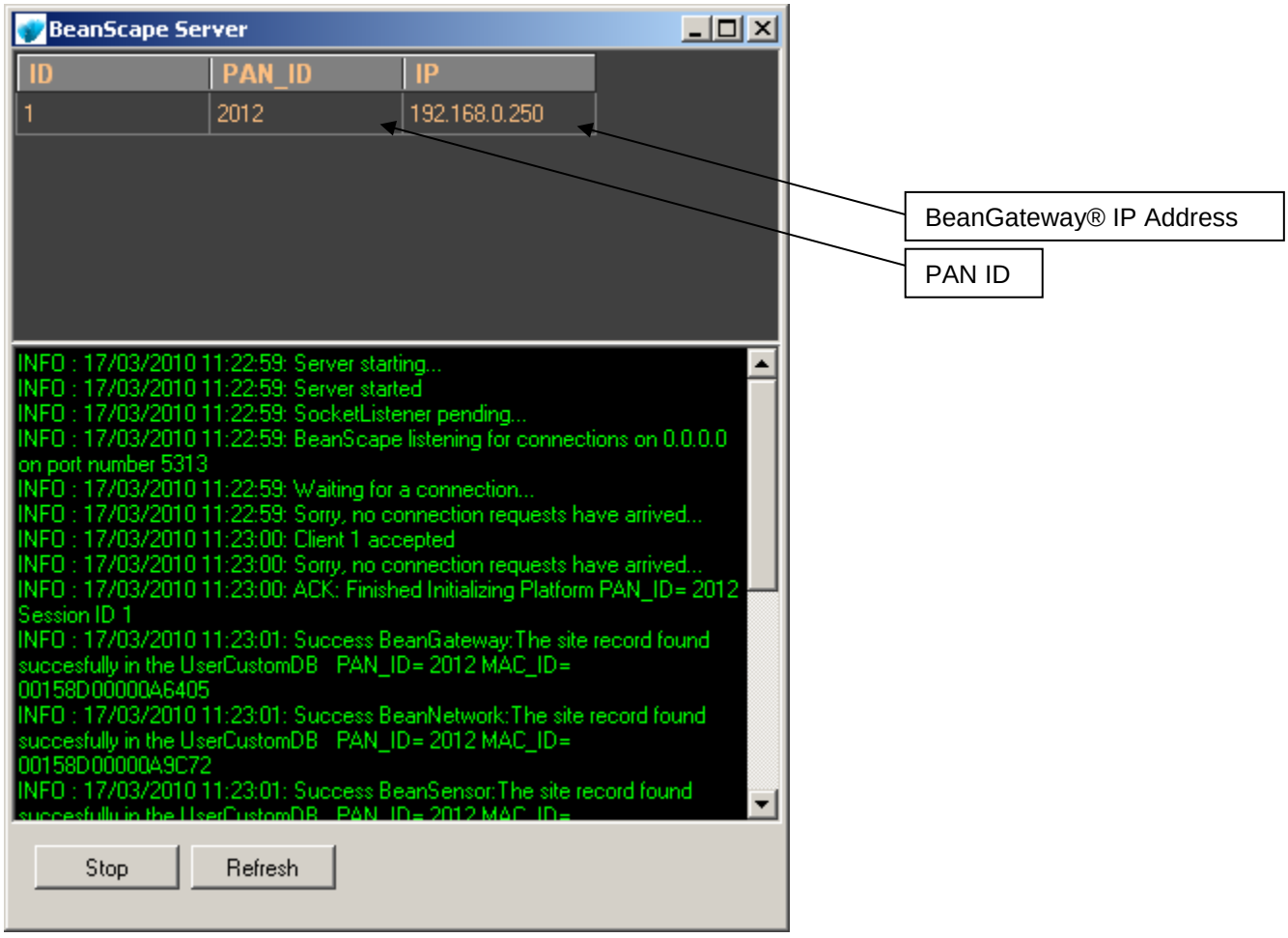
12.1 DIAGNOSIS USING BEANSCAPE®

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

12.1.1 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 ®.

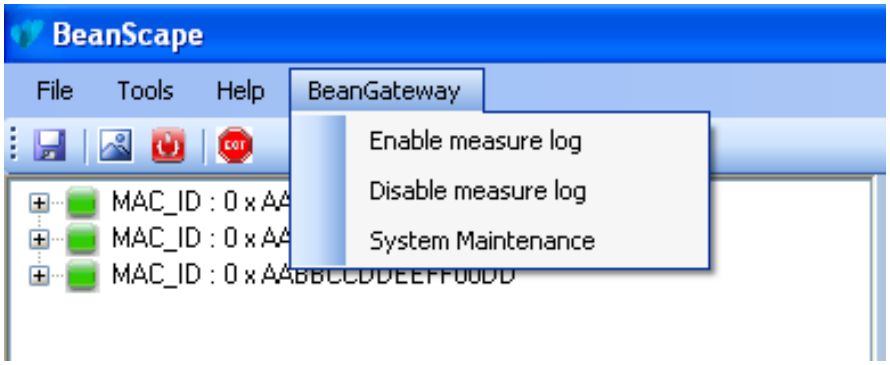
You see the following window:



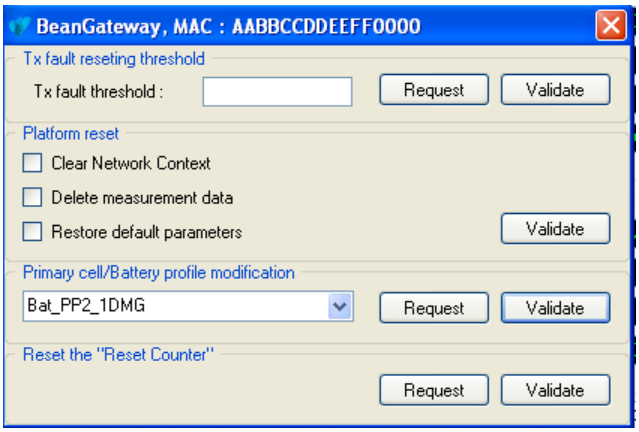
This window is the BeanScape® control server.

12.1.2 System Maintenance

On the main screen, select the scrolling menu "BeanGateway®" then left-click on "System Maintenance"



You will see the following window:



- ***TX Fault Threshold***: This value does not change.
- ***Clear Network context (software)*** : This option may be substituted for the push button "Network". However, when the BeanGateway® is not available (not powered or in sleeping mode) this option is not usable.
- ***Delete measurement data***: Delete stored measurements.
- ***Restore default parameters***: This option allows you to revert to factory settings.
- ***Primary Cell/Battery profile modifications*** : Not available on the BeanGateway®. This feature is only available on the BeanDevice®
- ***Reset the « Reset counter »***: Not available on the BeanGateway®

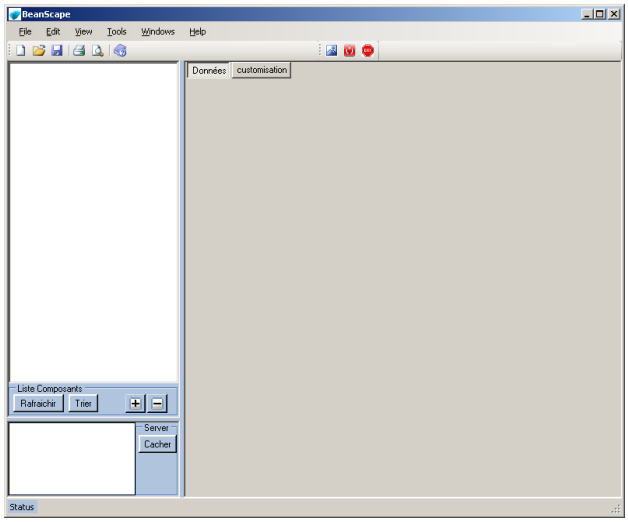
13. TROUBLESHOOTING BEANGATEWAY®: FAQ

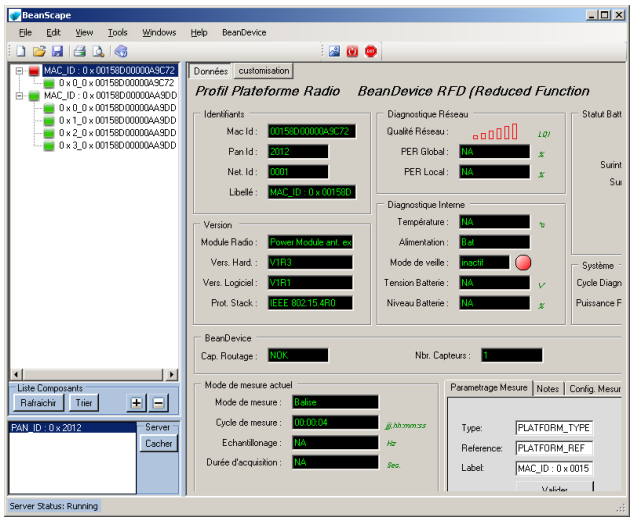
- I am not able to see the BeanGateway® status on the left side pane, why?

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





14. ENVIRONNEMENTAL CONSTRAINTS

14.1 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.

14.2 SENSITIVITY TO RADIO FREQUENCY

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

14.3 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®.

14.4 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).

14.5 REFLECTIONS, OBSTRUCTIONS AND MULTIPATH

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

14.6 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.

14.7 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"

14.8 OTHERS FEATURES

While having the highest BeanGateway possible transmission and receive over a wide area.

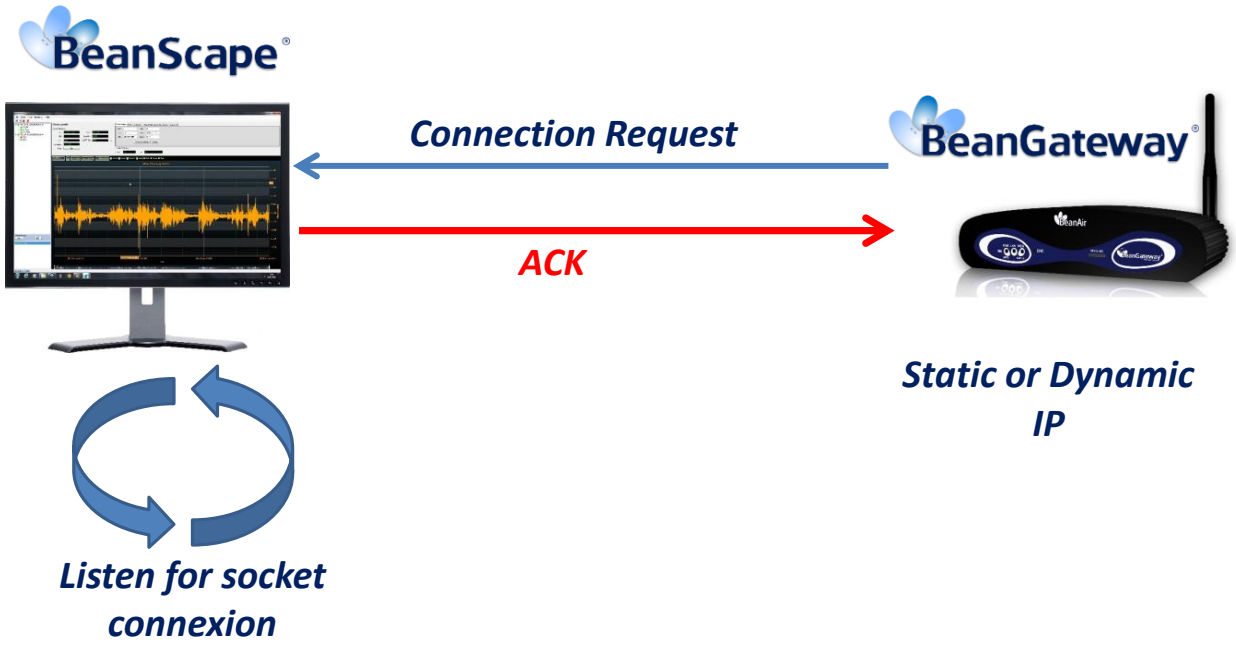
Do not take off the blue labels pasted on BeanGateway ® products

15. APPENDICES

15.1 APPENDIX 1: HOW THE CONNECTION IS ESTABLISHED BETWEEN THE BEANGATEWAY® AND THE BEANSCAPE® ?

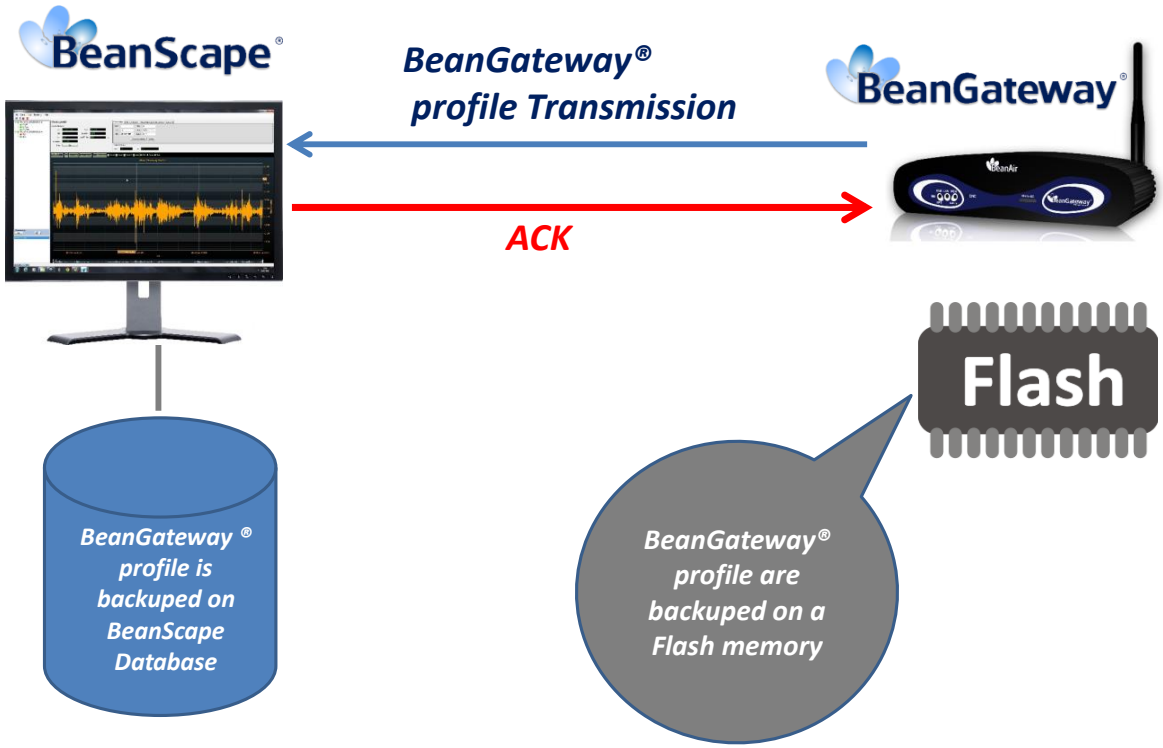
Step 1: Socket connexion

- 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®



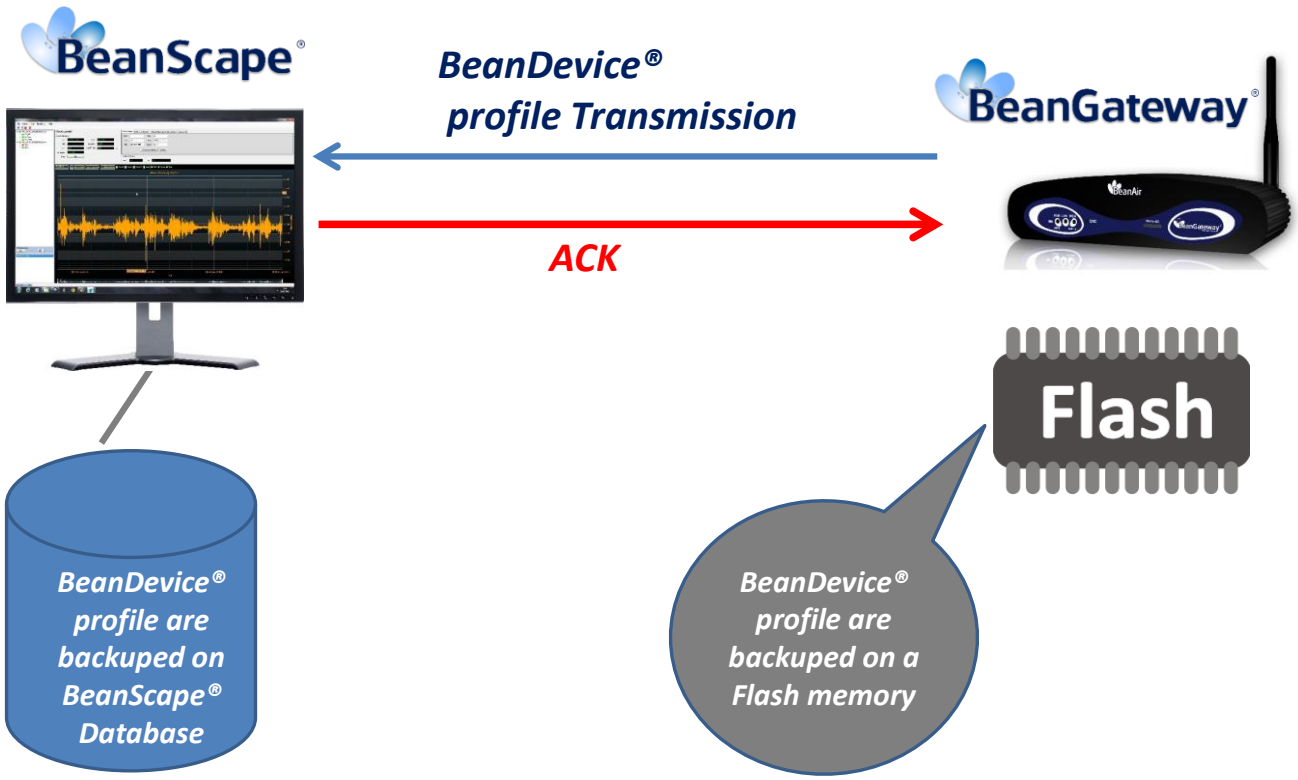
Step 2: BeanGateway® Profile Transmission

- 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®;



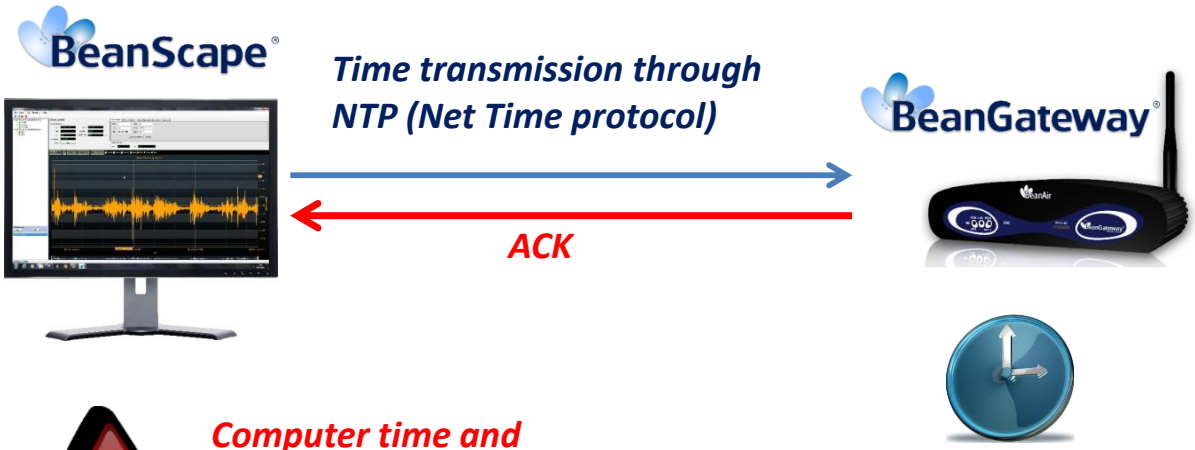
Step 3: WSN Mapping transmission

- 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.



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



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