# *BLUE MESH PRODUCT LINE USER GUIDE*

WIREPAS

# TABLE OF CONTENTS

# 1 GENERAL INFORMATION ABOUT MESH NETWORKS

### Mesh networks

A mesh network is a network topology (wired or wireless) in which all hosts are connected “peer-to-peer” without a centralized hierarchy, thus creating a structure shaped like a net. With this architecture, every node can send, receive, and relay data. This eliminates the presence of “backbone” points that can isolate parts of the network in case of malfunction. If a host stops working, data simply takes another route to its destination. A mesh network can relay data via “flooding” (broadcasting data so that it is received by all nodes within direct wireless range). It can also use predefined routes, in which case the network must plan for uninterrupted connections or alternative routes.

### Wirepas Mesh

The Wirepas Mesh protocol is a wireless network protocol that uses a multi-jump, self-organizing, and decentralized design. Decentralized network topology enables extremely dense network deployment.

Information about Wirepas Mesh technology is available on [www.wirepas.com](http://www.wirepas.com)

# 2 BLUE MESH PRODUCTS, BEACONS, AND SENSORS BY ELA INNOVATION

### BLUE ID MESH BEACONS


Blue SLIM ID MESH / Blue SLIM ID+ MESH


Blue COIN ID MESH / Blue COIN ID+ MESH


Blue PUCK ID MESH / Blue PUCK ID+ MESH


Blue PUCK BUZZ MESH / Blue PUCK BUZZ+ MESH


Blue ANCHOR


Blue Lite ID MESH

## BLUE MESH SENSORS


Blue COIN T MESH


Blue COIN MAG MESH


Blue PUCK T MESH


Blue PUCK RHT MESH


Blue PUCK MAG MESH


Blue PUCK DI MESH


Blue PUCK DO MESH

# 3 BLUE MESH GATEWAY PRODUCTS BY ELA INNOVATION

***Raspberry Gateway and Wirepas Wireless Dongle (2.4 GHz)***

*Raspberry Pi3 B+*

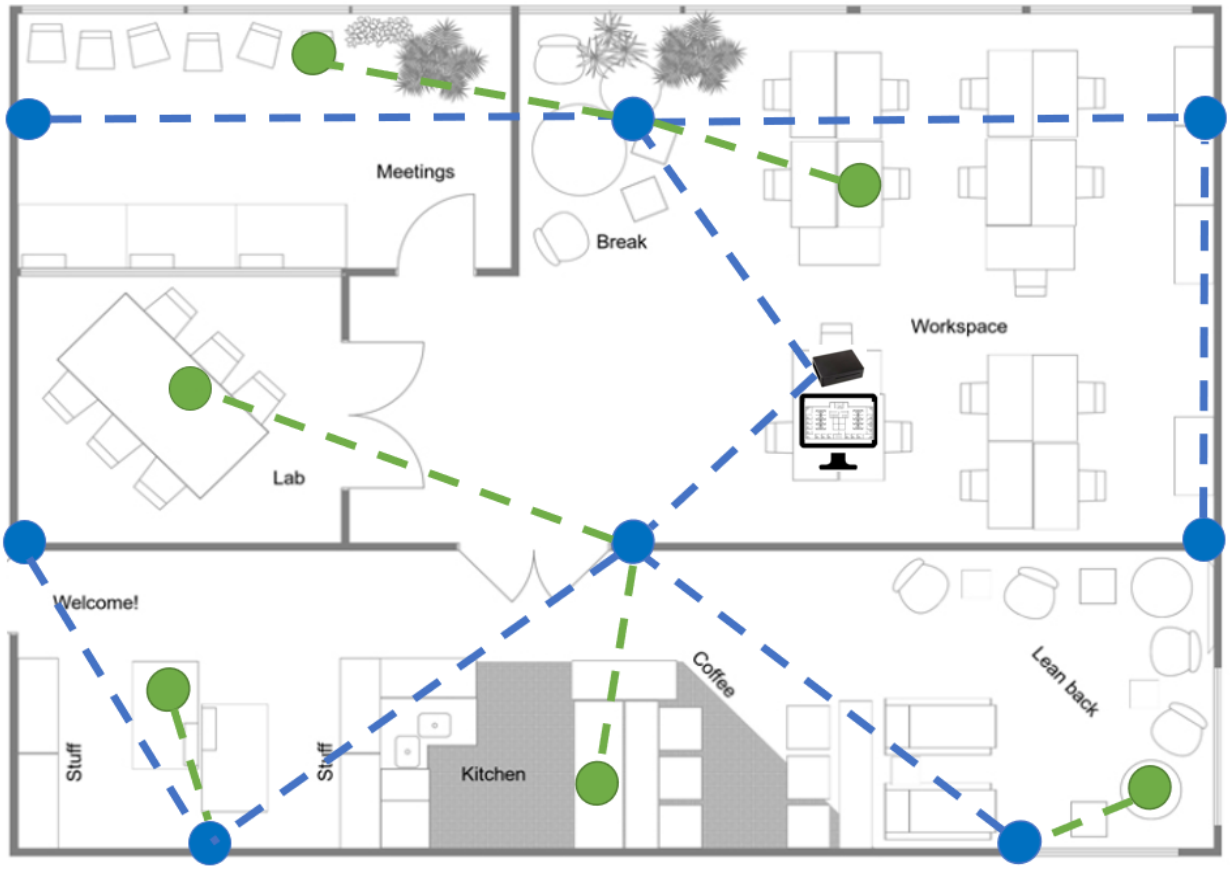
*Wirepas Wireless Dongle (2.4 GHz)*

***SolidRun Gateway***


*Solidsense N6*

# 4 BLUE ID MESH PRODUCT DESCRIPTION

**Wirepas Mesh network diagram**




| Network components | Products |
|---|---|
| **Router** | Blue PUCK ID MESH / Blue ANCHOR MESH |
| **Non-router** | Blue PUCK/COIN/SLIM ID MESH and ID+ MESH |
| **Gateway** | ELA Innovation Mesh Gateway |

**Router**

Fixed tag (“Anchor”) used to upload data via the network; serves as a reference point for positioning.

**Non-Router**

Mobile tag used for positioning over a configured period.

**Gateway**

Software gateway between the Wirepas Mesh tag network and server.

**“ID+” functionality**

The “+” functionality of BLUE PUCK ID+ MESH, BLUE COIN ID+ MESH, and BLUE SLIM ID+ MESH devices enables the user to define two periods for updating positioning based on the detection or absence of movement. The movement detection threshold is configured using the “Threshold” parameter.

This function is activated when Min Period is different from Max Period.

- ➔ Movement detection: updating positioning on the period defined in Min Period.
- ➔ Absence of movement detection: updating positioning on the period defined in Max Period.

This functionality is deactivated if Min Period is equal to Max Period. In that case, the threshold parameter is not taken into account and “+” functionality is not used.

**Usage example:**

Min Period = 300 seconds → 5 minutes

Max Period = 7200 seconds → 2 hours

Threshold: 0050 (adjustable by the user based on the application scenario).

The tag moves constantly over a period of 4 hours: positioning data is sent at Min Period.

The tag does not move during a period of 20 hours: positioning data is sent at Max Period.

This functionality gives the user optimal control over the duration of tag life by modifying these two emission periods in cases where movement can be detected.

**Caution:**

This functionality is to be used taking into consideration the initial period configuration.

Identifying the absence of motion phases and increasing the maximum period without modifying the default minimum period will allow you to extend the product lifespan.

Identifying the presence of motion phases and modifying the minimum period with a smaller value than the default value, together with applying phases without unreliable motion will degrade considerably the product lifespan.

Min Period and Max Period can be changed by the user via NFC.

If you change the period with the Data Configuration application described in the previous chapter, the Min Period and Max Period values present in NFC configuration remain unchanged.

## 5 OPERATION OF BLUE MESH SENSORS BY ELA INNOVATION

Sensors data from MESH products are sent wirelessly via the network to MQTT broker configured in your Gateway. The data are available on the different MQTT topics described below.

Please refer to the following Wirepas documents for details regarding data decoding.

- ***WP-RM-128 – API between a Gateway and Wirepas Backends***
- ***WP-RM-129 - WNT backend API***
- ***WP-RM-104 - Wirepas Mesh Diagnostics Reference Manual***

| Functionality | Topic | Data | | | Results | |
|---|---|---|---|---|---|---|
| | | Type | Length | Received data | Interpreted data | Value |
| **BV**<br>**Battery Voltage* | 11 | 01 | 02 | BD 0B | 0x0BBD | 3.005 v |
| **T** | 100 | 02 | 02 | 92 0B | 0x0B92 | 2962 -> 29.62° |
| **RHT** | 110 | 03 | 04 | 27 00 BA B0 | 0x0027<br>0x0BBA | 39 %<br>3002 -> 30.02° |
| **DI** | 120 | 04 | 06 | 01 00 2A 00 00 00<br>00 00 2A 00 00 00 | 00 01<br>00 00 00 2A<br>00 00<br>00 00 00 2A | Input activated<br>Counter: 42<br>Input deactivated<br>Counter: 42 |
| **DO** | 130 | 05 | 06 | 01 00 01 36 00 00<br>00 00 01 36 00 00 | 00 01<br>00 00 36 01<br>00 00<br>00 00 36 01 | Output activated<br>Counter: 13825<br>Output deactivated<br>Counter: 13825 |
| **AT** | 140 | 06 | 06 | 01 00 12 00 00 00<br>00 00 12 00 00 00 | 00 01<br>00 00 00 12<br>00 00<br>00 00 00 12 | Tag removed<br>Counter: 18<br>Tag not removed<br>Counter: 18 |
| **MAG** | 150 | 07 | 06 | 01 00 B5 00 00 00<br>00 00 B5 00 00 00 | 00 01<br>00 00 00 B5<br>00 00<br>00 00 00 B5 | Magnet detected<br>Counter: 181<br>Magnet not detected<br>Counter: 181 |

Attention: all MESH SENSOR frames sent on MQTT topics (other than Topic 11, BV) are comprised of sensor data in TLV format as described in the table below, and “Battery Voltage” data in the same TLV format.

AT format only concerns BLUE SLIM ID MESH and BLUE SLIM ID+ MESH devices.

## MQTT Topic Commands

| Functionality | Product | Endpoint source | Endpoint destination | Description | |
|---|---|---|---|---|---|
| | | | | Command | ACK |
| **LED ON** | BLUE PUCK ID MESH<br>BLUE PUCK ID+ MESH<br>BLUE PUCK BUZZ MESH<br>BLUE PUCK BUZZ+ MESH<br>BLUE COIN ID MESH<br>BLUE COIN ID+ MESH<br>BLUE LITE ID MESH | 20 | 20 | LED_ON | OK: 00<br>NOK: 01 |
| **LED OFF** | | 20 | 20 | LED_OFF | OK: 00<br>NOK: 01 |
| **LED ON Time**<br>*** "Time" in seconds** | | 20 | 20 | LED_ON 10 | OK: 00<br>NOK: 01 |
| **BUZZ ON** | BLUE PUCK BUZZ MESH<br>BLUE PUCK BUZZ+ MESH | 20 | 20 | BUZZ_ON | OK: 00<br>NOK: 01 |
| **BUZZ OFF** | | 20 | 20 | BUZZ_OFF | OK: 00<br>NOK: 01 |
| **BUZZ ON Time**<br>*** "Time" in seconds** | | 20 | 20 | BUZZ_ON 10 | OK: 00<br>NOK: 01 |
| **LEDBUZZ ON** | BLUE PUCK BUZZ MESH<br>BLUE PUCK BUZZ+ MESH | 20 | 20 | LEDBUZZ_ON | OK: 00<br>NOK: 01 |
| **LEDBUZZ OFF** | | 20 | 20 | LEDBUZZ_OFF | OK: 00<br>NOK: 01 |
| **LEDBUZZ ON Time**<br>*** "Time" in seconds** | | 20 | 20 | LEDBUZZ_ON 10 | OK: 00<br>NOK: 01 |
| **DIGITAL Output ON** | BLUE PUCK DO MESH | 130 | 130 | DIGI_ON | See table on previous page |
| **DIGITAL Output OFF** | | 130 | 130 | DIGI_OFF | See table on previous page |
| **DIGITAL Output ON Time**<br>*** "Time" in seconds** | | 130 | 130 | DIGI_ON 10 | See table on previous page |

These commands may be addressed via MQTT topics. The commands cannot be sent over the network using the Data Configuration application. These commands may not be used when the tag is configured as NRLS for positioning functionality.

# 6 OPERATING MODES

Depending on the tag model you are using, you may choose three operating modes using the setting described in the following section.

**Positioning Mode**

Tag role in network ANCHOR and MOBILE TAG

Anchors (Routers) serve as reference points for the positioning function and also route wireless traffic.

Mobile tags are localized at the specified period.

**Sensor Mode**

Tag role in network AUTOROLE

Tag role in network managed automatically, either as a Router or as a Non-router.

Tags send their data at the specified period.

**Positioning and Sensor Mode**

Tag role in network ANCHOR and MOBILE TAG

When you want to use both functions, the positioning function is the one that sets the configuration.

Anchors (Routers) serve as reference points for the positioning function and also route wireless traffic.

Mobile tags are localized at the specified period.

Mobile tags and/or Anchors send their data at the specified period

# 7 NFC CONFIGURATION VIA NFC

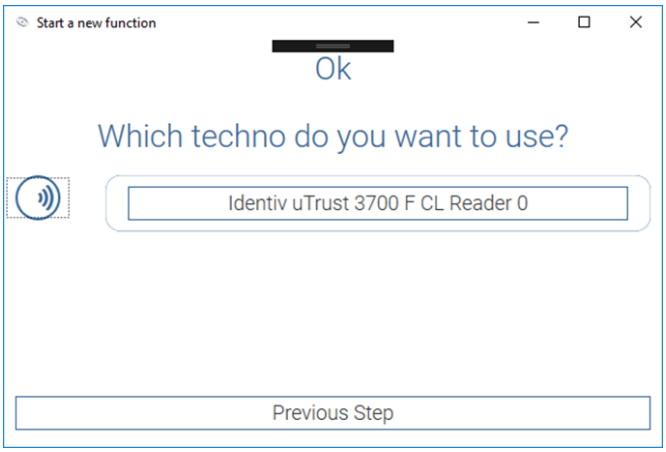
1. **Connect NFC reader** to PC (ELA reference: NFC R/W 01 - ref. ACIOM177)

2. Start the **Device Manager** application (installed prior to use).

   The application can be downloaded from the www.ela.fr website, in Support ->Downloads

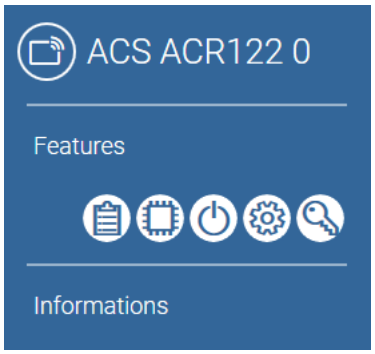

3. Launch the **NFC widget**


4. Click on the button  to select the proposed **NFC reader**.

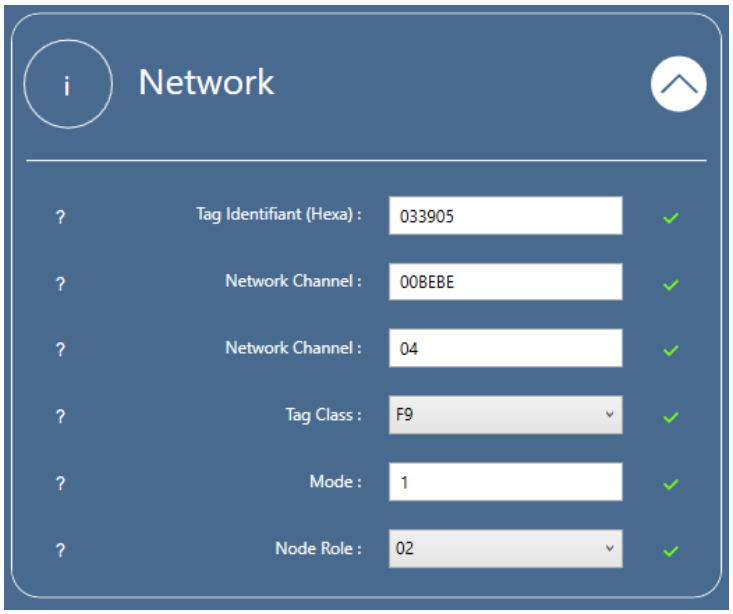


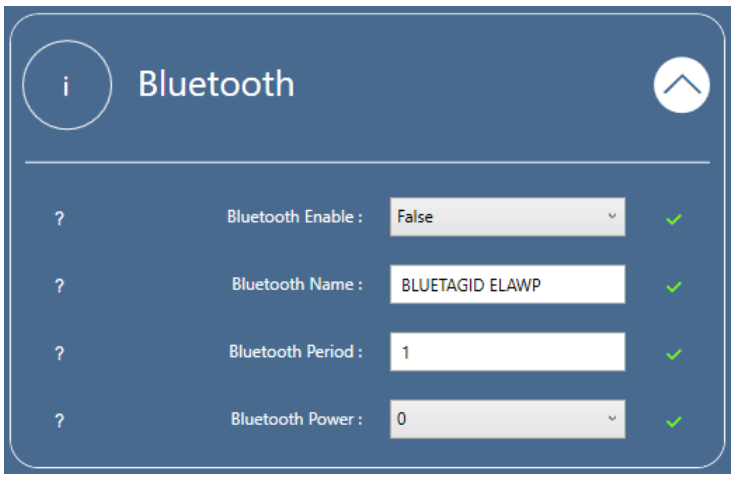
5. **Place** the tag on the NFC reader as shown below.

6. **Click** on the **Configuration** icon  to read tag parameters.




7. **Configuration:** example of read parameters with firmware version v1.0.2




## 8. Parameter list

Available versions

| ELA Firmware | WIREPAS Stack | Positionning Application | Compatibility Stack WIREPAS |
|---|---|---|---|
| v0.0.6 | v3.4.47 | v3.40 | Incompatible with 4.x.x version |
| v1.0.0 | v4.0.50 | v4.0.0 | Compatible with all 4.x.x version |
| v1.0.2 | v4.0.64 | v4.0.0 | Compatible with all 4.x.x version |

The latest version (at the time of this writing) is v1.0.2. Details for other versions are provided in the Annex of this document.

This section describes the details of the parameters used to configure products in the MESH tag range with version v1.0.2.

**Version v1.0.2 – Wirepas stack 4.0.64**

| Parameters | Restrictions | Default values | Description |
|---|---|---|---|
| Tag identifier | 6 characters (required): [0-9] [A-F]<br>* hexadecimal value | 24-bit identifier | Tag identifier in MESH network, user modifiable. |
| Tag activation | True/False | False | Tag activation / deactivation (storage mode) |
| Mode | NRLS tag: 1 ** Non-Router Long Sleep*<br>Autoscan tag: 2<br>Autoscan anchor: 3<br>Opportunistic anchor: 4<br><br>* decimal value | 2 | Tag mode in Wirepas network:<br><br>- Positioning function<br>Fixed tag ("Anchor"): ROUTER, value 4<br>Mobile tag: NON-ROUTER, value 1<br><br>- Sensor function<br>Autoscan tag: 2 Auto Role = 42<br>Autoscan anchor: 3 Auto Role = 41<br><br>- Sensor and positioning<br>Fixed tag ("Anchor"): ROUTER, value 4<br>Mobile tag: NON-ROUTER, value 1 |
| Class | Possible values from 0xF9 to 0xFF<br><br>* hexadecimal value | FA | Creation of tag groups<br>Example:<br>- PUCK: class 0xFA<br>- COIN: class 0xFB<br>- SLIM: class 0xFC |
| Node role | 0x01: Router<br>0x02: Non-router<br>0x41: Router with autorole mode<br>0x42: Non-router with autorole mode<br><br>* hexadecimal value | 42 | Tag function in Wirepas network<br><br>- Positioning function<br>Fixed tag ("Anchor"): ROUTER, value 01<br>Mobile tag: NON-ROUTER, value 02<br><br>- Sensor function<br>Autorole: 41 / Mode = 3 or Autorole: 42 / Mode = 2 |
| Network channel | 2 characters (required): [0-9] [A-F]<br>* hexadecimal value | 04 | MESH network channel (8 bits) |

| | | | |
|---|---|---|---|
| Network address | 6 characters (required): [0-9] [A-F]<br>* hexadecimal value | 123ADD | MESH network address (24 bits) |
| Minimum positioning period | Period of rapid positioning frame emission<br>From 15 seconds to 64800 seconds (18 hrs.) | 300 (seconds) | Period of rapid tag position updates, in seconds: automatic change of slow/rapid period possible only with **ID+ MESH** models. |
| Maximum positioning period | Period of slow positioning frame emission<br>From 15 seconds to 64800 seconds (18 hrs.) | 300 (seconds) | Period of slow tag position updates, in seconds: automatic change of slow/rapid period possible only with **ID+ MESH** models. |
| Threshold | Possible values from 0001 to 07FF | 0050 | Threshold used by accelerometer when Min Period is different from Max Period. Min Period must always be less than Max Period. |
| BLE beacon name | BLE beacon tag name: | BLUETAGID ELAWP | BLE tag name: 15 characters |
| BLE BEACON ACTIVATION | Activation of BLE Beacon mode<br><br>0: deactivation, BLE BEACON OFF<br>1: activation, BLE BEACON ON<br>2: activation, BLE BEACON ON WHEN OFFLINE | 0 | Activation / Deactivation of BLE Beacon function<br><br>0: deactivation, BLE BEACON OFF<br>1: activation, BLE BEACON ON<br>2: activation, BLE BEACON ON WHEN OFFLINE, the BLE Advertising Beacon is activated only when the tag is in OFFLINE mode, that is, when the tag is activated but not connected to its mesh network. |
| BLE transmission interval | BLE Beacon advertising period | 1 (second) | BLE advertising period in seconds, range 1 to 10 |
| BLE power | BLE Beacon tag power: | 0 | BLE transmission power: [-8, -4, 0, 4] |
| Format | Tag format | ID | Available formats:<br><br>ID – T – RHT – MAG – DI – DO - AT |
| Activate RTLS | True/False | False | Activation / deactivation of positioning function |

# 8 CONFIGURATION OVER THE NETWORK: DATA CONFIGURATION APPLICATION

Using the Data Configuration Application via the network, you may:

- Modify certain configuration data
  - Attention: not updated in NFC parameters
- Activate / Deactivate LED and/or BUZZER

**Command syntax:**

[Class] [Type] [Length] [Value]

**Command field details:**

**[Class]:** Parameter available for tag settings via NFC. This parameter enables you to differentiate tag groups if necessary. By default, the "Class" assigned to tags is 0xFA.

Sent commands are addressed to one or more Classes. It is important to know the tag Class when sending commands.

Example:

| | |
|---|---|
| PUCK ID | Class: 0xFA |
| COIN ID Building 1 zone | Class: 0xFB |
| COIN ID Building 2 zone | Class: 0xFC |
| SLIM ID Building 3 zone | Class: 0xFD |

**[Type]:** The Type identifies the chosen functionality or parameter to modify.

** see complete list on next page*

**[Length]:** Data size (length).

**[Value]:** Value to be updated or activation / deactivation data.

If "Length" is greater than 1, the value must be written with the least significant bit firs

| Description | Class | Type | Length | Value |
|---|---|---|---|---|
| **SCAN period** | 0xFA<br>[0xF9 – 0xFF] | 0x01 | 0x02 | **600 seconds:**<br>Hexadecimal value: 0x02 58<br>Value to send: 58 02 * *Little Endian* |
| **Mode** | 0xFA<br>[0xF9 – 0xFF] | 0x02 | 0x01 | **NRLS mode:**<br>0x01 |
| **CLASS** | 0xFA<br>[0xF9 – 0xFF] | 0x0A | 0x01 | 0xFB |
| **LED activation / deactivation Broadcast command** | 0xFA<br>[0xF9 – 0xFF] | 0xE0 | 0x04 | **Continuous command**<br>LED ON<br>0x01 00 00 00<br>LED OFF<br>0x00 00 00 00<br>* Reserved |
| | | | | **Timed command**<br>LED ON 60 seconds<br>0x01 3C 00 00<br>LED ON 300 seconds<br>0x01 2C 01 00 * *Little Endian*<br>* Reserved |
| **BUZZER activation / deactivation Broadcast command** | 0xFA<br>[0xF9 – 0xFF] | 0xE1 | 0x04 | **Continuous command**<br>BUZZER ON<br>0x01 00 00 00<br>BUZZER OFF<br>0x00 00 00 00<br>* Reserved |
| | | | | **Timed command**<br>BUZZER ON 60 seconds<br>0x01 3C 00 00<br>BUZZER ON 300 seconds<br>0x01 2C 01 00 * *Little Endian* |

| | | | | |
|---|---|---|---|---|
| | | | | * Reserved |
| **LED & BUZZER activation / deactivation**<br>**Broadcast command** | 0xFA<br>[0xF9 – 0xFF] | 0xE2 | 0x04 | **Continuous command**<br>LED & BUZZER ON<br>0x01 00 00 00<br>LED & BUZZER OFF<br>0x00 00 00 00<br>* Reserved |
| | | | | **Timed command**<br>LED & BUZZER ON 60 seconds<br>0x01 3C 00 00<br>LED & BUZZER ON 300 seconds<br>0x01 2C 01 00 * *Little Endian*<br>* Reserved |
| **LED activation / deactivation**<br>**Unicast command** | 0xFA<br>[0xF9 – 0xFF] | 0xE3 | 0x08 | **Continuous command ID 0x1215FA**<br>LED ON<br>0x01 FA 15 12 00 00 00 00<br>LED OFF<br>0x00 FA 15 12 00 00 00 00<br>* Reserved |
| | | | | **Timed Command ID 0x1215FA**<br>LED ON<br>0x01 FA 15 12 3C 00 00 00 60 seconds<br>LED ON<br>0x01 FA 15 12 2C 01 00 00 300 seconds<br>* Reserved |
| **BUZZER activation / deactivation**<br>**Unicast command** | 0xFA<br>[0xF9 – 0xFF] | 0xE4 | 0x08 | **Continuous ID command 0x1215FA**<br>BUZZER ON<br>0x01 FA 15 12 00 00 00 00<br>BUZZER OFF<br>0x00 FA 15 12 00 00 00 00<br>* Reserved |
| | | | | **Timed command ID 0x1215FA**<br>BUZZER ON<br>0x01 FA 15 12 3C 00 00 00 60 seconds<br>BUZZER ON |

| | | | | |
|---|---|---|---|---|
| | | | | 0x01 FA 15 12 2C 01 00 00 300 seconds<br>* Reserved |
| **LED & BUZZER activation / deactivation**<br>**Unicast command** | 0xFA<br>[0xF9 – 0xFF] | 0xE5 | 0x08 | **Continuous command ID 0x1215FA**<br>LED & BUZZER ON<br>0x01 FA 15 12 00 00 00 00<br>LED & BUZZER OFF<br>0x00 FA 15 12 00 00 00 00<br>* Reserved |
| | | | | **Timed command ID 0x1215FA**<br>LED & BUZZER ON<br>0x01 FA 15 12 3C 00 00 00 60 seconds<br>LED & BUZZER ON<br>0x01 FA 15 12 2C 01 00 00 300 seconds<br>* Reserved |

A Broadcast or Unicast “ON” activation command, either continuous or timed must be followed by an “OFF” deactivation command of the same type to cancel that same command.

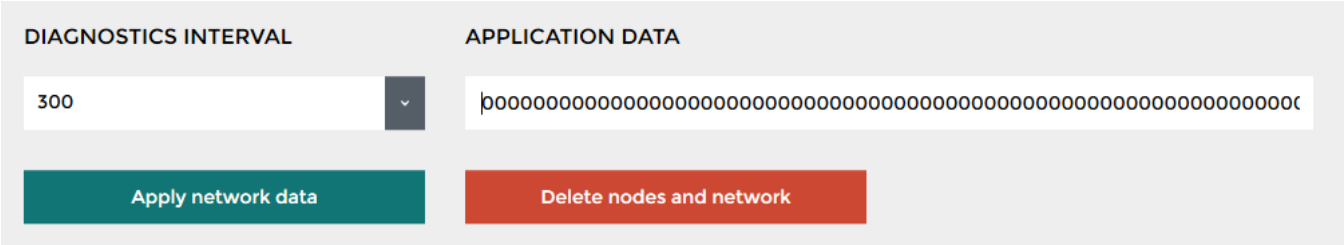
A sent command is persistent in the network. Each tag in the network receives this command, and each new tag entering the network also receives the command.

A tag configured for “NRLS” mode will receive the command and apply it upon wakeup. Its maximum standby time is equal to the configured period.

## Sending a command

Wirepas Network Tool (WNT):

- Open the **Settings** menu and select the **Network** tab.
- Enter the command in the “Application Data” field and then click on “Apply network data”.

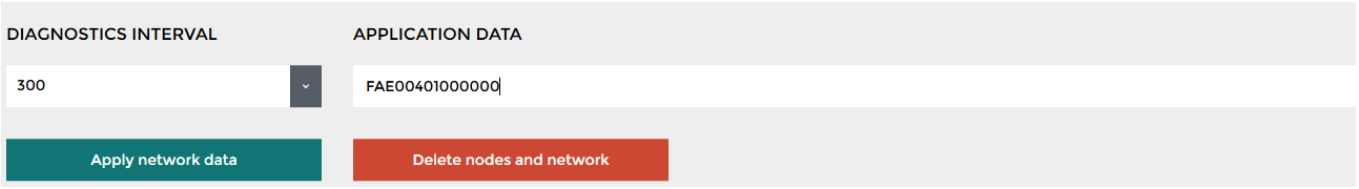



You may send commands using your own application. For more information, please refer to the following documents:

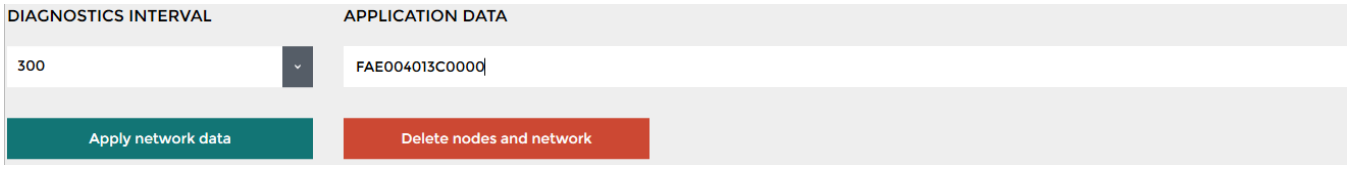
- *WP-RM-128 – API between a Gateway and Wirepas Backends*
- *WP-RM-129 - WNT backend API*
- *WP-RM-104 - Wirepas Mesh Diagnostics Reference Manual*

### Examples sending commands using Wirepas Network Tool (WNT)

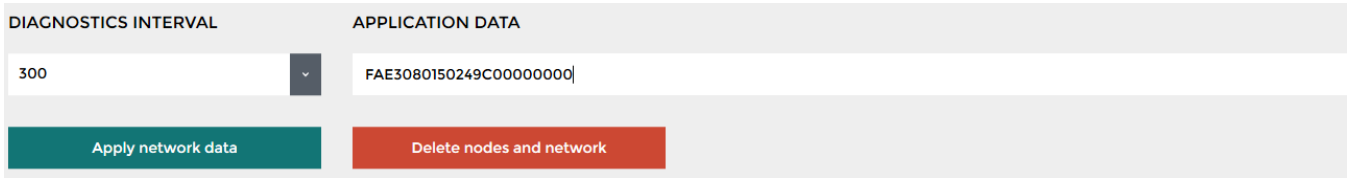
- Broadcast command:
  - Turn on the LED for all tags in the FA class network => FAE00401000000



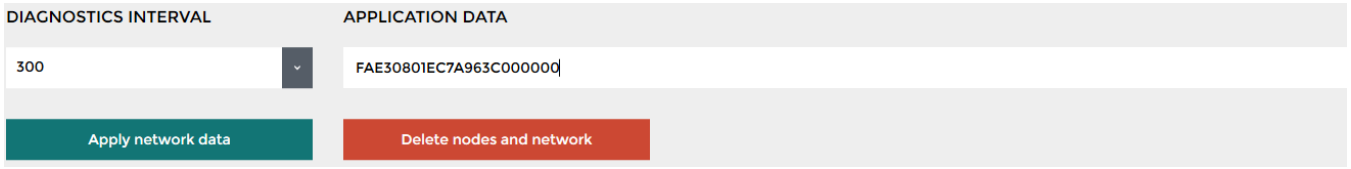
- Timed Broadcast command:
    - Turn on the LED for all tags in the FA class network for 60 seconds => FAE004013C0000




- Unicast command:
    - Turn on the LED for a tag in the FA class network.
        - ➔ Tag ID: 0x9C2450
        - ➔ Command: FAE3080150249C00000000




- Timed Unicast command:
    - Turn on the LED for a tag in the FA class network for 60 seconds.
        - ➔ Tag ID: 0x9C2450
        - ➔ 60 seconds
        - ➔ Command: FAE3080150249C3C000000



# 9 GATEWAY CONFIGURATION

## 9.1 RASPBERRY PI 3 GATEWAY

### a. Raspberry Pi configuration file

The Raspberry Pi configuration file is named **custom.env**. The file is located in the folder "boot/Wirepas" on the SD card. It contains all the fields that are used to configure the gateway.

```
# Wirepas Oy
#
# Custom settings
#
# The settings you enter below will take precedence over any default setting
#
# Keep in mind the following rule:
#   * directory paths should end in the name (do not add /)

# client settings - WNT or MQTT host targets
WM_SERVICES_HOST=yourcompanywpewnt.extwirepas.com
WM_SERVICES_MQTT_USER=mosquittouser
WM_SERVICES_MQTT_PASSWORD=pX9xAzpqI1rwhLDvz01n5WVE6Ykg44i

# Select which gateway to use: lxgw, sdgw
WM_GATEWAY=lxgw
WM_GATEWAY_STATE="start"


# Keyboard layout
WM_HOST_SET_KEYBOARD=true
WM_HOST_KEYBOARD_XKBMODEL=pc105
#WM_HOST_KEYBOARD_XKBLAYOUT=fi
WM_HOST_KEYBOARD_BACKSPACE="guess"


# DOCKER
WM_DOCKER_REGISTRY_LOGIN="false"
WM_DOCKER_REGISTRY=wirepas
WM_DOCKER_STATUS_DELAY=30


# Linux (dbus) Gateway
WM_LXGW_VERSION=1.1.0
WM_LXGW_IMAGE=wirepas/gateway-rpi

WM_HOST_SET_HOSTNAME=wm-yourcompany
WM_HOST_SSH_ENABLE_NETWORK_LOGIN="false"


WM_HOST_USER_NAME="pi"
WM_HOST_USER_PASSWORD="pleasesetme"
WM_HOST_USER_PPKI="ssh-rsa
AAAAB3NzaC1yc2EAAAADAQABAAACAQC6+CxhKEXyGxI7nYCk1zJg83YfVDowKZtu2eS82aH9H3SBuvOAN0rg5f1SXEWi0KHi5WwE6IgU
7E1bjSgPe9wJQKfiN/1m83036IRYBeK1a1mOR8oVudmdZvtQfUc4PMgEq5U3Pv0nUlgVVi49Jl1+ow2NyNU5/dg59o16yVxBKoeIinlc
JEwdmIsJHGce3GeiczpQ889cWpBKMzN4/bLTitswQ7liEuhA2jRYHfv5OXTurjNOH+Q+t9qFgw6AXt0ZLXiGWQjEuyd9ooEKBtxyH8wH
KHFDGv3Mxkuz4o1tuW6U3O24J3OFGuYiY+dSU7lyrdYvCuqIxjYEYSKpO3enSdmCZxgNAPrq/Aulxay2COhVQygX2RwD5Z/poBpKY8B4
PBRmbGGry2Qo4Lj6JGKZ4I6SLSs53qgSlsF3Cn3BDu43zfF8FrcUVSEmphx4pBD0iRYjuqx++cOIRfR3haOohq05bS/nukfhN+h4L/Bh
Xo5c/m2z9bt5vcA2IAyOQaBCxdJ7uyjYJZmOOPESC6dwTMOxjEoKPVoCOUatSDR/5brmyOraQf0YSyLJdIo0eM3hiVhppqiY6iE/PH+U
hSdi/ZUcBYOAoPIZADpWlX4C4oekxaJejbNgXqfAvR2P4GDbAkgy6hDngbKBKLFG3RKR3oYQ8yzEsTVYKfgZEpw6Ow==
wirepas@external"


# WiFi management - set the SSID and PASSWORD of the AP to which you want to connect your gateway
WM_WIFI_DISABLE="false"
WM_WIFI_AP_SSID="YOURSSID"
WM_WIFI_AP_PASSWORD="YOURWIFI PASSWORD"
```

**Server address assigned when you purchase your kit**

**MQTT Username**

**MQTT Password**

**Identifier for your gateway**

**WiFi connection**

### b. *Configuring Raspberry Pi Internet connection*

***Wired connection:***

Connect the Raspberry Pi to your Internet router using an Ethernet cable.

*The connection is established automatically if there are no restrictions on your network. Otherwise, please contact your company's IT department to set up a direct Internet connection.*

***Wireless connection***

Insert the micro SD card (from the back of the Raspberry Pi device) into an available slot on your PC or use an external card reader.

- Navigate to the "boot (K:)" drive.
- Go to the "wirepas" folder.
- Use a text editor to open the file "custom.env".
- Update the fields below:
    - Fill in the fields SSID and PASSWORD

```
# WiFi management - set the AP SSID and PASSWORD you want your gw to connect to
WM_WIFI_DISABLE="false"
WM_WIFI_AP_SSID="YOUR SSID WIFI"
WM_WIFI_AP_PASSWORD="YOUR PASSWORD"
```

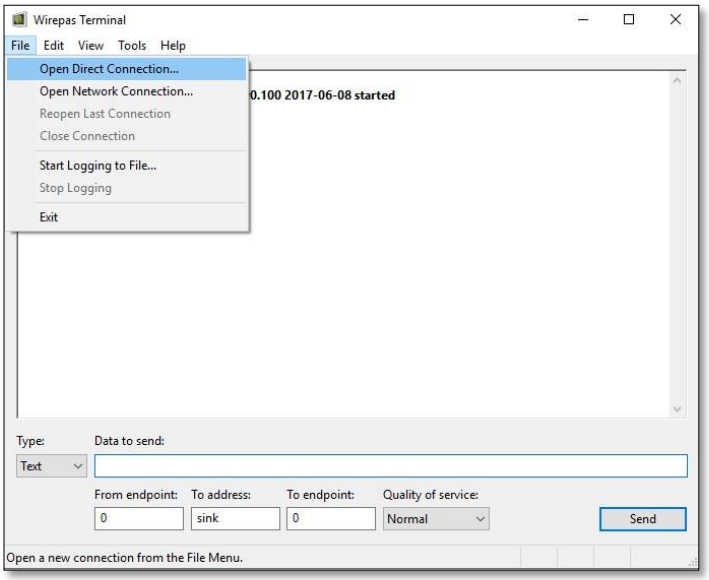
- Save your changes if necessary, close the file, and remove the SD card.
- Insert the SD in its original location on the back side of the Raspberry Pi device.
-

### c. *Configuring the Wirepas USB dongle*

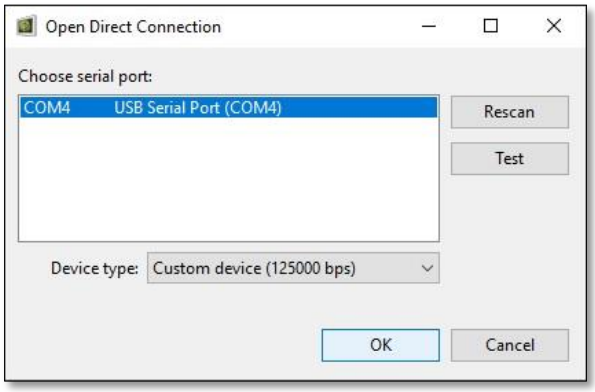
By default, your network details are preconfigured on the dongle before it is shipped to you.

The following explanations can help you reconfigure your SINK in case you need to change your network parameters.

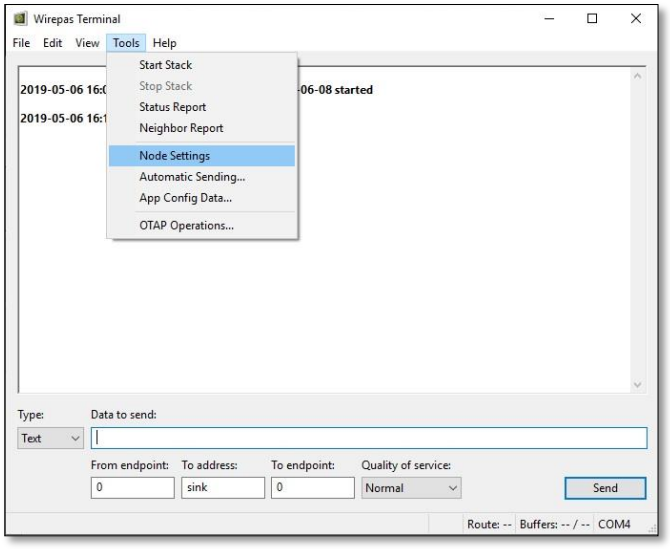
- Connect the **MOD0081** Wirepas USB dongle to your PC.
- Launch the Wirepas Terminal application (which you may download from your Wirepas "Sharefile" space.
- Click on **File** and then on **Open Direct Connection**.




- Choose the COM port on which the dongle is inserted, then select **Custom device (125000bps)**
- Click on **OK**.

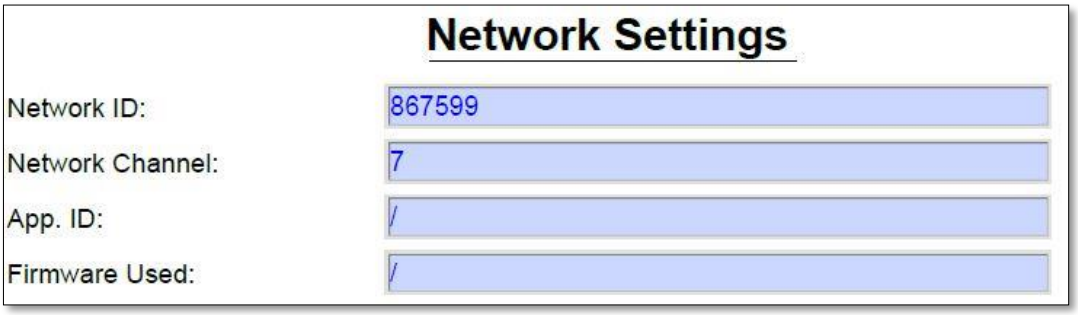


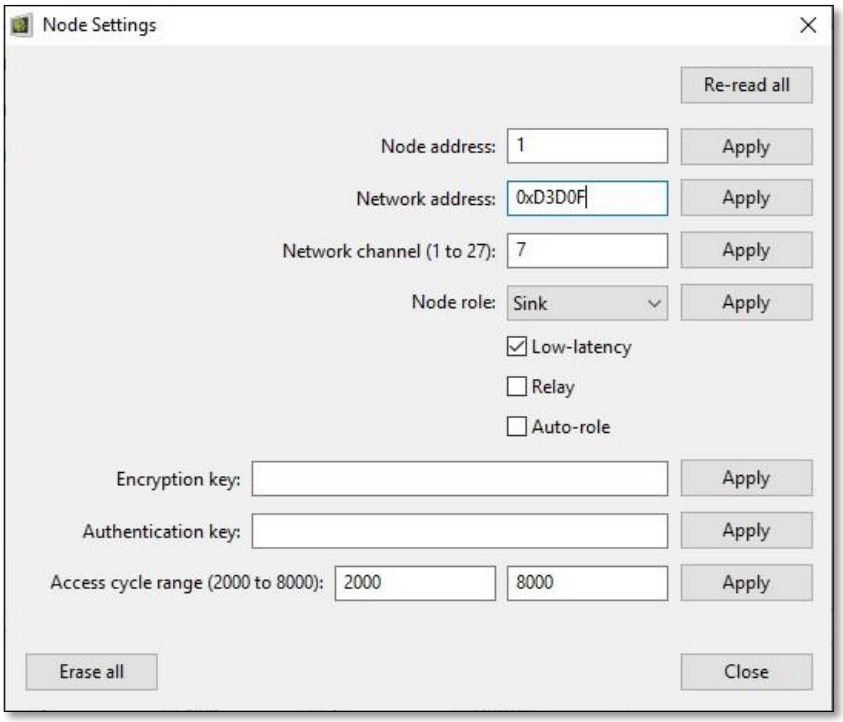

- Click on **Tools**, and then on **Node Settings**.



- Fill in the fields **Node address**, **Network address**, and **Network channel** using the values provided in the document "*WP-OF-xxx - Wirepas Evaluation Kit Order Form*".

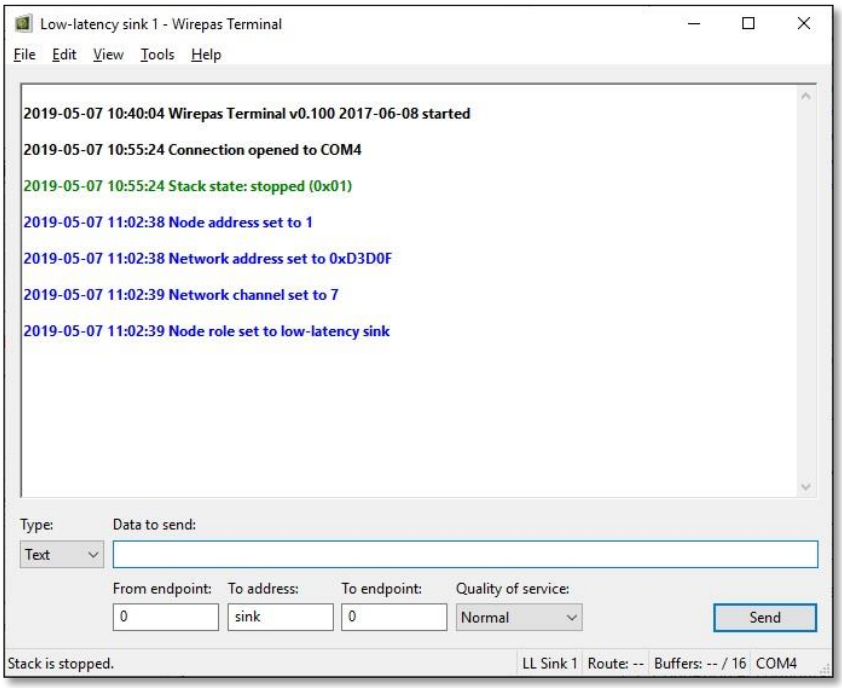
The values in the document "*WP-OF-xxx - Wirepas Evaluation Kit Order Form*" are indicated as decimal values.



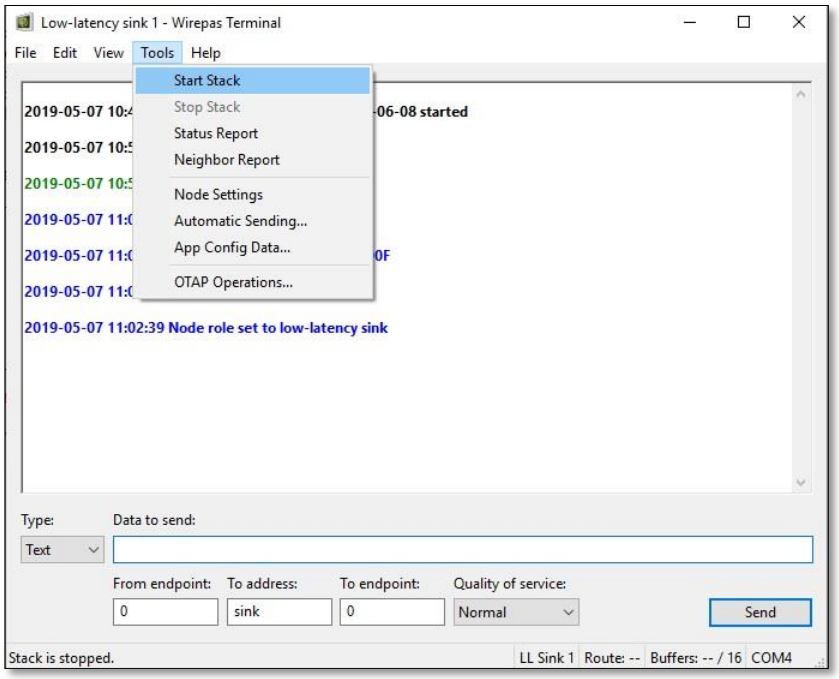




Values are to be used as decimal values, except for the "**Network address**" field, which must be entered as a hexadecimal value.

- Click on **Apply** four times, and then on **Close** to close the window. Verify that the blue lines appear on the terminal.




- Click on **Tools**, then on **Start Stack**, and verify that the blue line (below) appears on the terminal.





- The Wirepas USB dongle is now ready for use.
- Close the Wirepas Terminal application.

### *d. Plugging in hardware*

- Insert the Wirepas dongle into an available USB port.

- If you are using a wired Internet connection, plug the Ethernet cable into the Raspberry Pi device.
- If you are using a wireless Internet connection, the required configuration is described in the previous chapter "***Configuring Raspberry Pi Internet connection***"
- Plug in the power supply as shown below:

- Wait a few seconds for the gateway to start and for the connection to be established.

## 9.2 SOLIDSENSE N6 GATEWAY

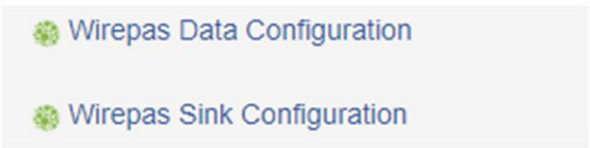
### a. Gateway configuration via WiFi using Kura Web UI

- Locate the serial number printed on the sticker on the back of the gateway or on its packaging.
  - Example: *BS184300127*
- Plug the gateway into mains power.
- Use your computer to do a WiFi network search and select the network that corresponds to the gateway's serial number (gateway SSID):
  - SSID = BS184300127


- Click on "Login" and enter the password **testKEYS**
- Launch your web browser and open the following address: http:// **172.16.1.1** / kura
- Enter the login name and password: **admin/admin**

The various sections for configuring the gateway are located in the Kura web application menu on the left-hand side.

The two Wirepas configuration services are located at the bottom of the Web page.



- **Wirepas Data Configuration**

Configurable fields are related to the configuration for the connection to the server and MQTT broker:

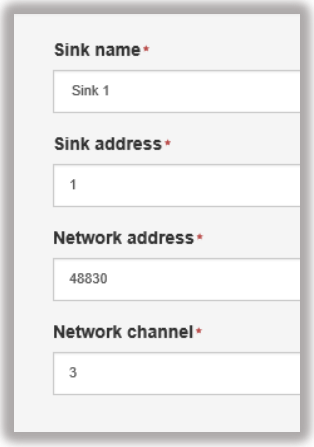
- Main MQTT transport enabled: true
- Main MQTT secure enabled: true
- Gateway Name, *example: gw_yourcompany*
- Server address, *example: yourcompanywpewnt.extwirepas.com*
- MQTT broker port, *example: 8883*
- MQTT username, *example: mosquittouser*
- MQTT password, *example: Bcb6QjRtS8HX0kzouxuCD8Je7rz*

- **Wirepas Sink Configuration**

Configurable fields are related to the gateway's mesh network configuration. Two sinks are configurable and may be used simultaneously on the gateway:

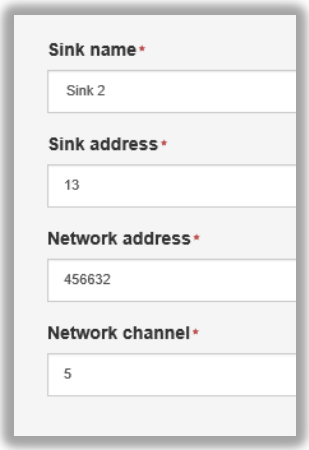
Configure the first Sink, then click 

on




Configure the second Sink, then click 

on



### *b. Configuring the Solidsense Internet connection*

The Solidsense gateway may be used with an Ethernet, WiFi, or LTE connection. Use the **Network** section in the **System** menu for configuration.

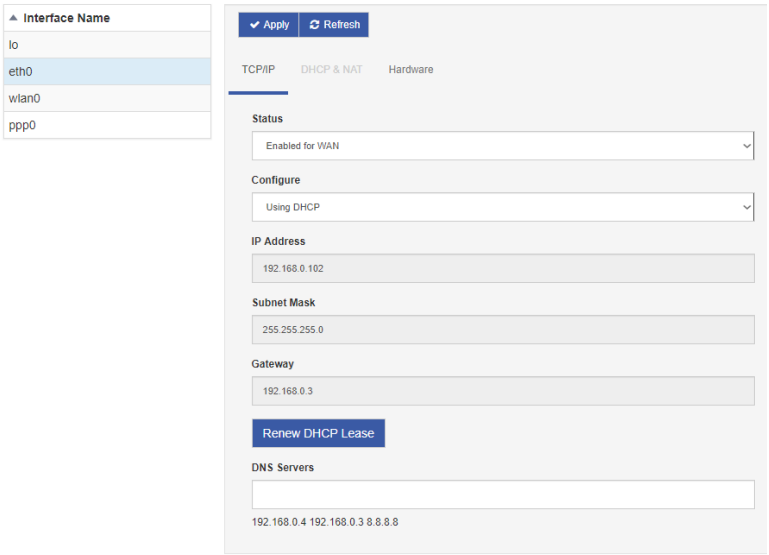

#### Ethernet configuration

Select the “Interface Name” **eth0**

Change the “Status” parameter to **Enabled for WAN**

**DHCP** configuration if you want automatic configuration of IP parameters.

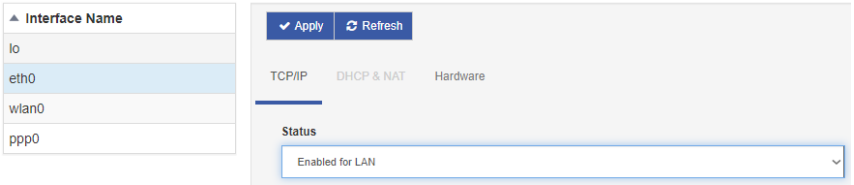
Click on **Apply**




#### LTE configuration: using a 3G SIM card

**Attention**: by default, your gateway is configured to use the connection “eth0”.

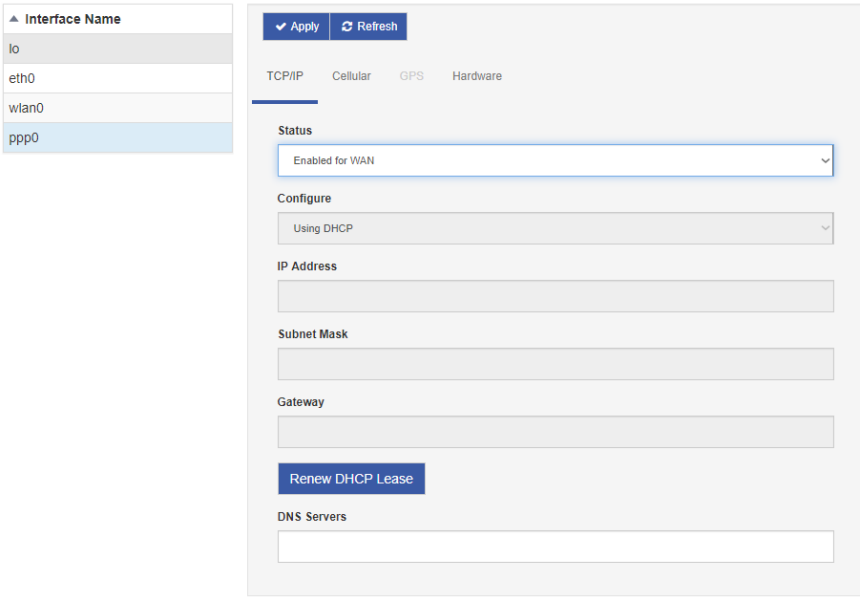
You must first set eth0 status to **Enabled for LAN**:




Then go into the ppp0 section to set up your gateway’s 3G connection.

Attention: if this section has never been configured before, the section name is a series of numbers, not “ppp0”. That does not change anything with respect to 3G configuration.

In the TCP/IP tab, set “Status” to **Enabled for WAN**, then click on **Apply**.




Select the Cellular tab, then configure the fields as follows:

Network Technology: LTE

Modem Identifier: Android

Interface #*: 0

Dial String*: atd*99***#

APN: Check with your wireless carrier for this information. For example, a Bouygues SIM card would be objcobytel.com.

Click on **Apply**

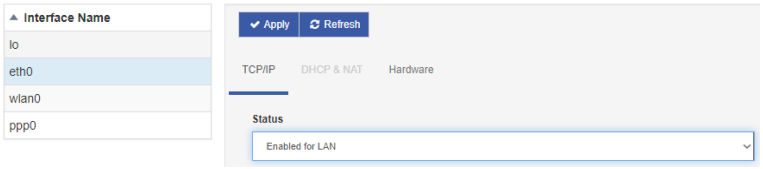
### WiFi configuration

Click on Interface Name **wlan0**.

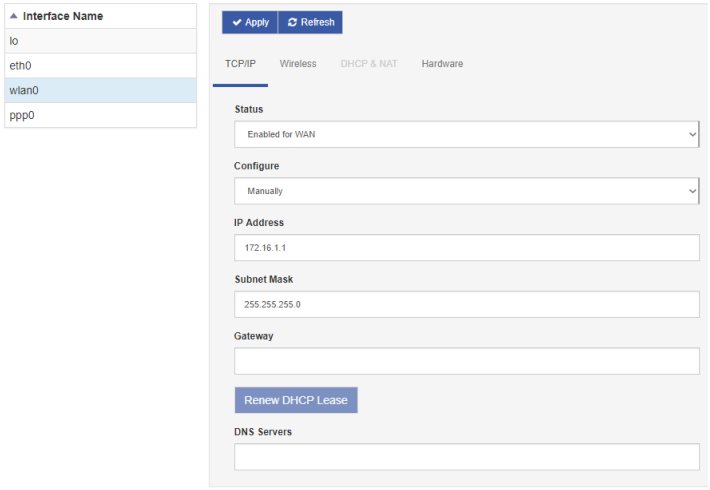
**Attention**: by default, WiFi is configured as an Access Point to enable Gateway configuration using a wireless connection. If you want to connect your gateway to the Internet via WiFi, you will no longer have the possibility to configure the gateway via WiFi and you must assign a fixed IP address in the section **eth0** to access gateway configuration over the TCP/IP network using the Kura Web UI, entering that IP address in a Web browser.

**Attention**: by default, your gateway is configured to use the connection “eth0”.

You must first set eth0 Status to **Enabled for LAN**:



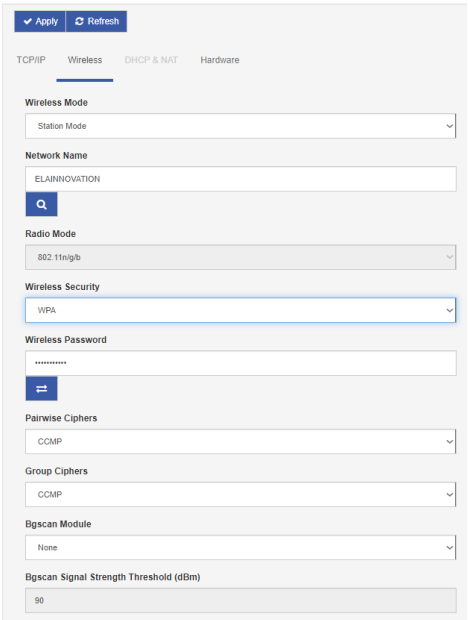

Go to the section **wlan0** and modify Status to **Enabled for WAN** and then click on **Apply**.




Go to the Wireless tab and change Wireless Mode to **Station Mode**.

Enter the SSID in the Network Name field, and the password in the Wireless Password field (after first choosing the security protocol to use in Wireless Security).

Click on **Apply**

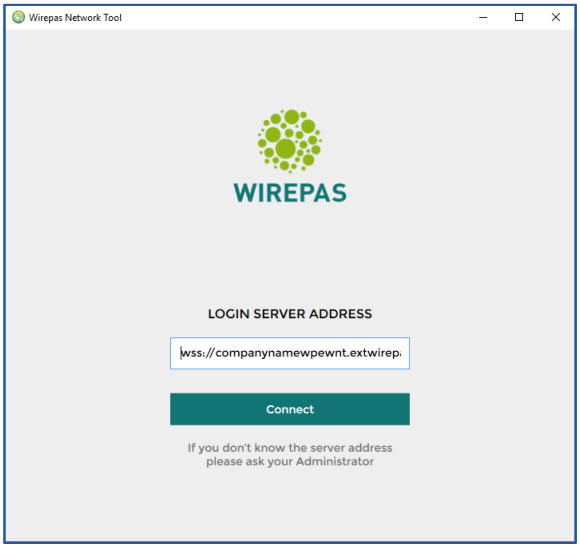


## *10 VIEWING TOOLS*

### Wirepas Network Tool (WNT)

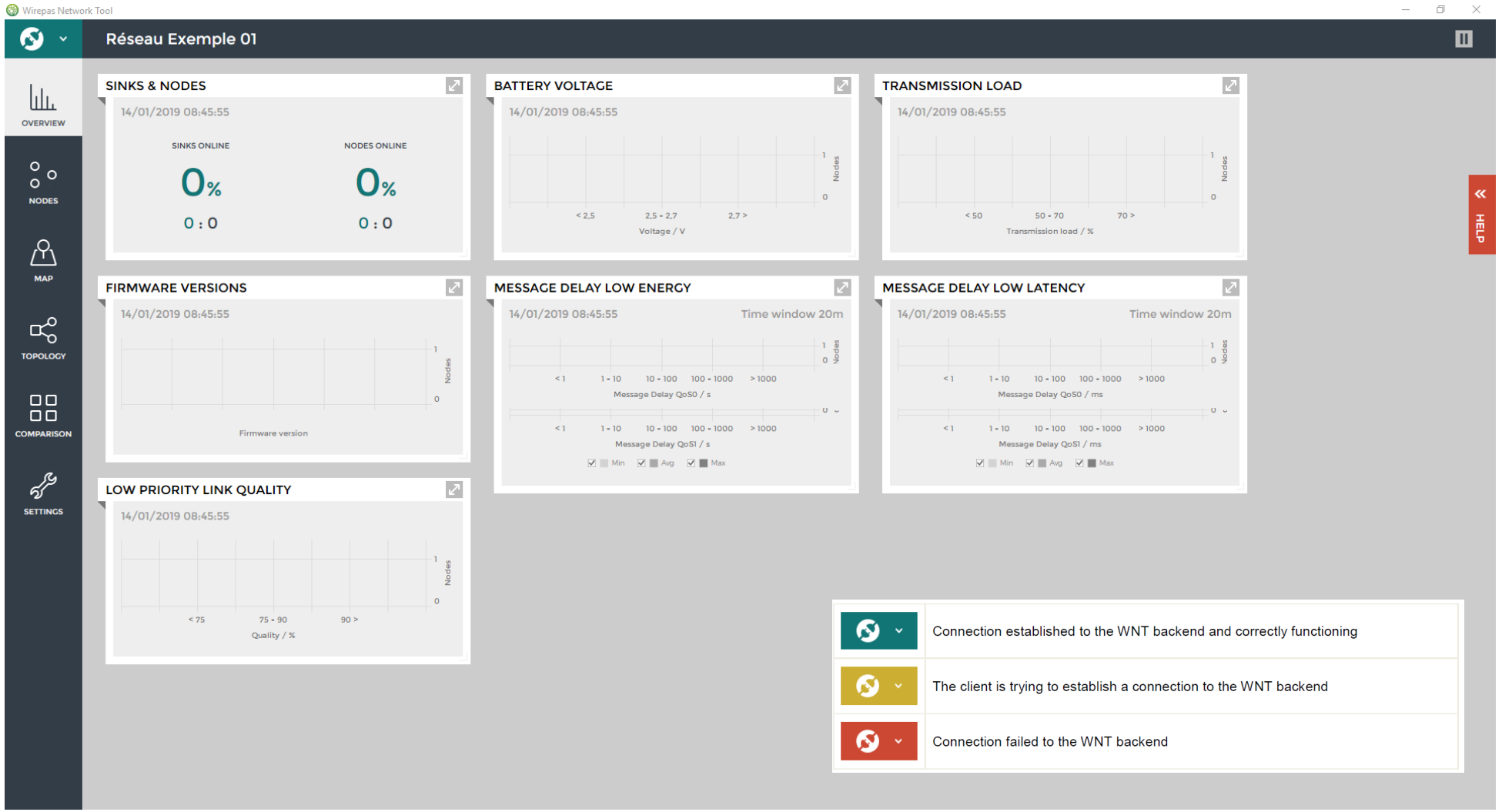
- Install the **WNT** application provided with your kit.
- Launch the **WNT** application.
- Fill in the field "**LOGIN SERVER ADDRESS**" with your "login server" provided with your kit. This information corresponds to your "instance".

  Example: **wss://yourcompanywpewnt.extwirepas.com:8813**

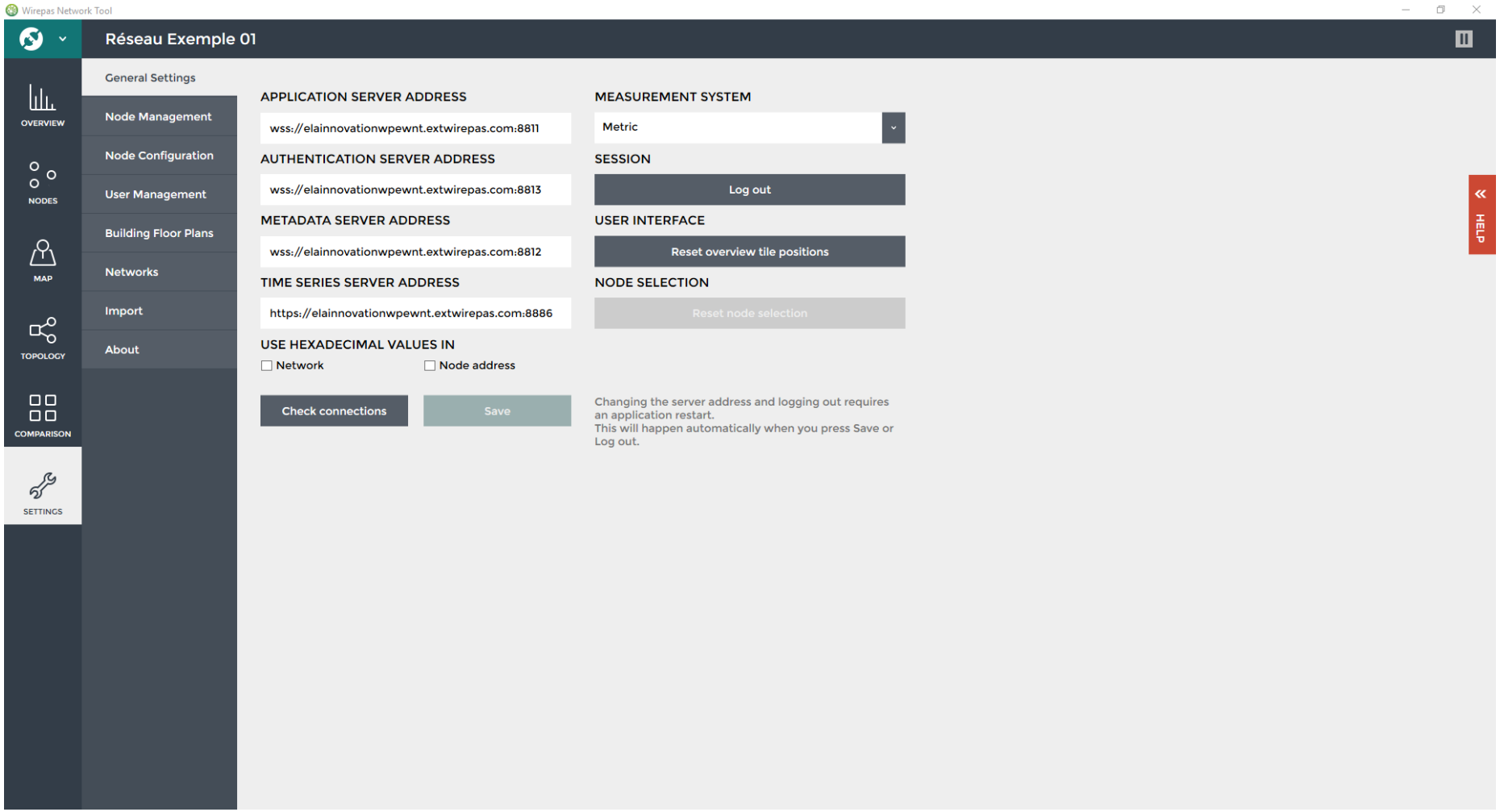



- Enter your login name and password (provided with your kit) and then click on **Log in**.

- **OVERVIEW** tab: a summary view of the network(s) in your instance



- **SETTINGS** tab: WNT software configuration and management of your network components

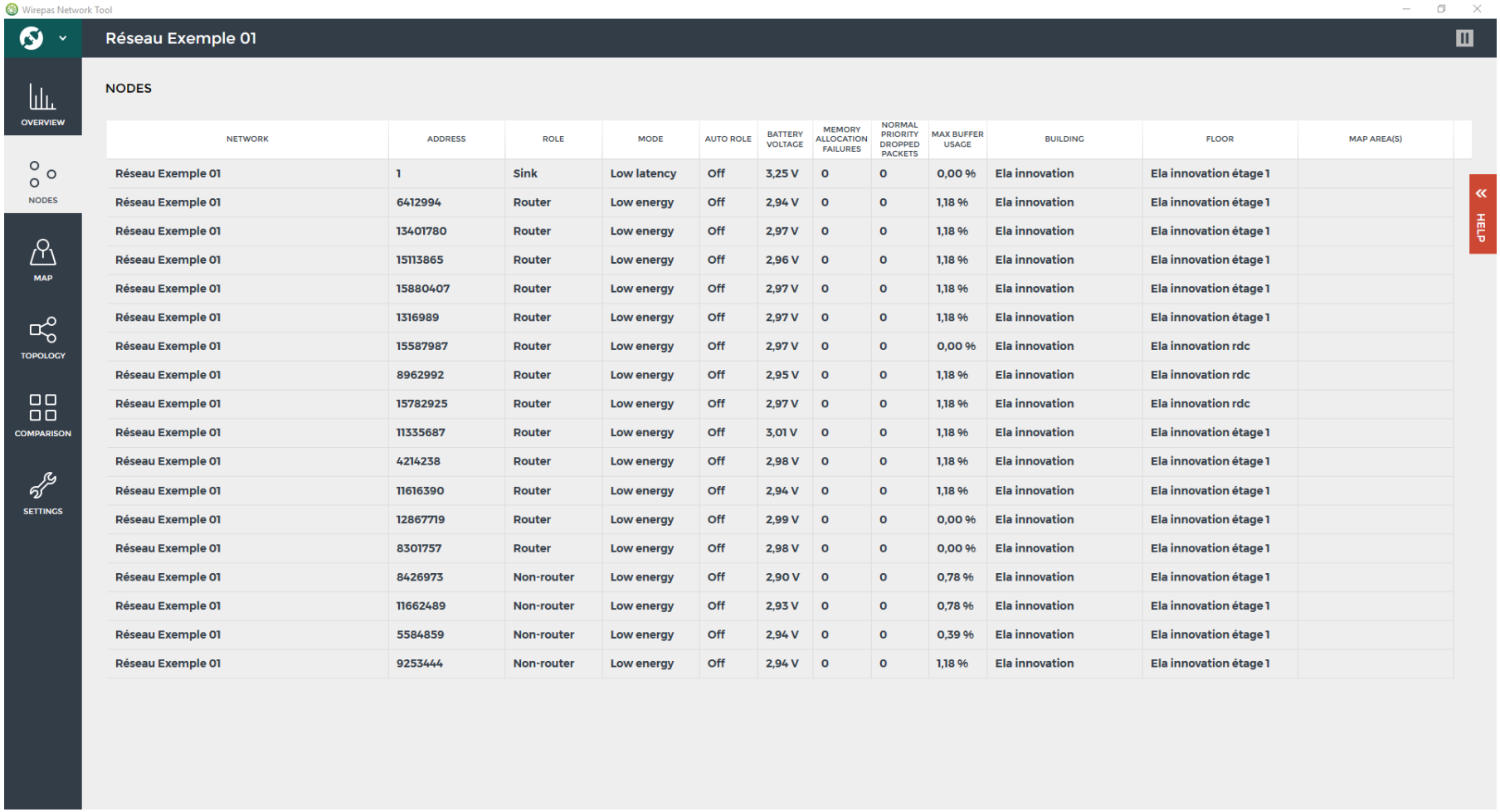


**Configuring and managing network components:**

| | |
|---|---|
| General Settings | Server address management<br>Session management: login and password<br>Wirepas Network Tool application configuration options |
| Node Management | Placement and management of network nodes on map using drag n'drop. |
| Node Configuration | Summary view of network elements<br>Configuration of network nodes |
| User Management | User management: operators and/or administrator |
| Building Floor Plans | Adding one or more maps |
| Networks | Viewing created network(s)<br>Managing network(s) |
| Import | Importing nodes into the software using a .CSV format file |
| About | Information about the Wirepas Network Tool |

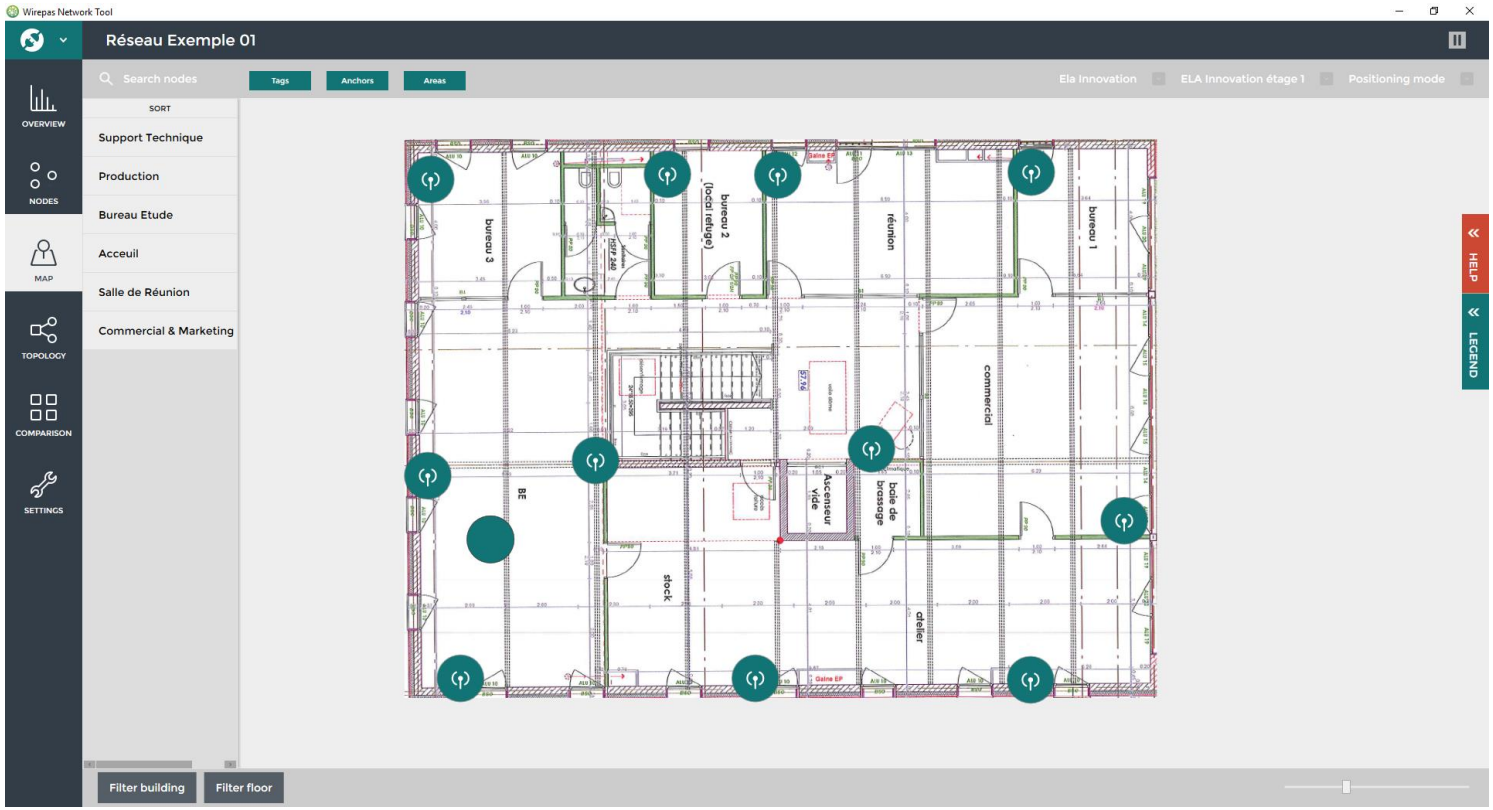
- **“NODES”** - **“MAP”** - **“TOPOLOGY”** - **COMPARISON”** tabs: Displays network elements

**NODES:** Lists network nodes and related information



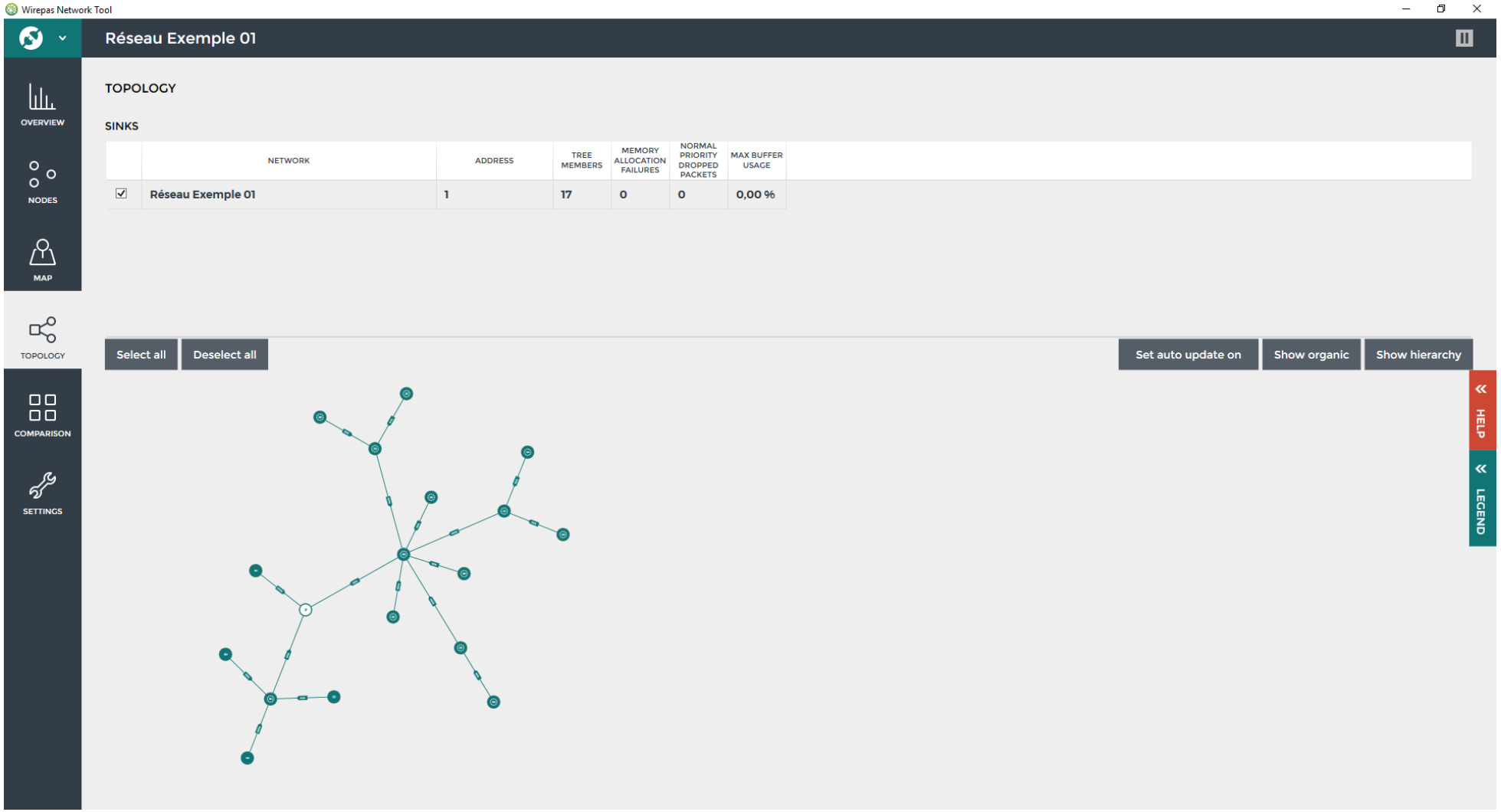

| NETWORK | ADDRESS | ROLE | MODE | AUTO ROLE | BATTERY VOLTAGE | MEMORY ALLOCATION FAILURES | NORMAL PRIORITY DROPPED PACKETS | MAX BUFFER USAGE | BUILDING | FLOOR | MAP AREA(S) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Réseau Exemple 01 | 1 | Sink | Low latency | Off | 3,25 V | 0 | 0 | 0,00 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 6412994 | Router | Low energy | Off | 2,94 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 13401780 | Router | Low energy | Off | 2,97 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 15113865 | Router | Low energy | Off | 2,96 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 15880407 | Router | Low energy | Off | 2,97 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 1316989 | Router | Low energy | Off | 2,97 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 15587987 | Router | Low energy | Off | 2,97 V | 0 | 0 | 0,00 % | Ela innovation | Ela innovation rdc | |
| Réseau Exemple 01 | 8962992 | Router | Low energy | Off | 2,95 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation rdc | |
| Réseau Exemple 01 | 15782925 | Router | Low energy | Off | 2,97 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation rdc | |
| Réseau Exemple 01 | 11335687 | Router | Low energy | Off | 3,01 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 4214238 | Router | Low energy | Off | 2,98 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 11616390 | Router | Low energy | Off | 2,94 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 12867719 | Router | Low energy | Off | 2,99 V | 0 | 0 | 0,00 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 8301757 | Router | Low energy | Off | 2,98 V | 0 | 0 | 0,00 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 8426973 | Non-router | Low energy | Off | 2,90 V | 0 | 0 | 0,78 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 11662489 | Non-router | Low energy | Off | 2,93 V | 0 | 0 | 0,78 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 5584859 | Non-router | Low energy | Off | 2,94 V | 0 | 0 | 0,39 % | Ela innovation | Ela innovation étage 1 | |
| Réseau Exemple 01 | 9253444 | Non-router | Low energy | Off | 2,94 V | 0 | 0 | 1,18 % | Ela innovation | Ela innovation étage 1 | |

**MAP:** Shows nodes on imported map(s)

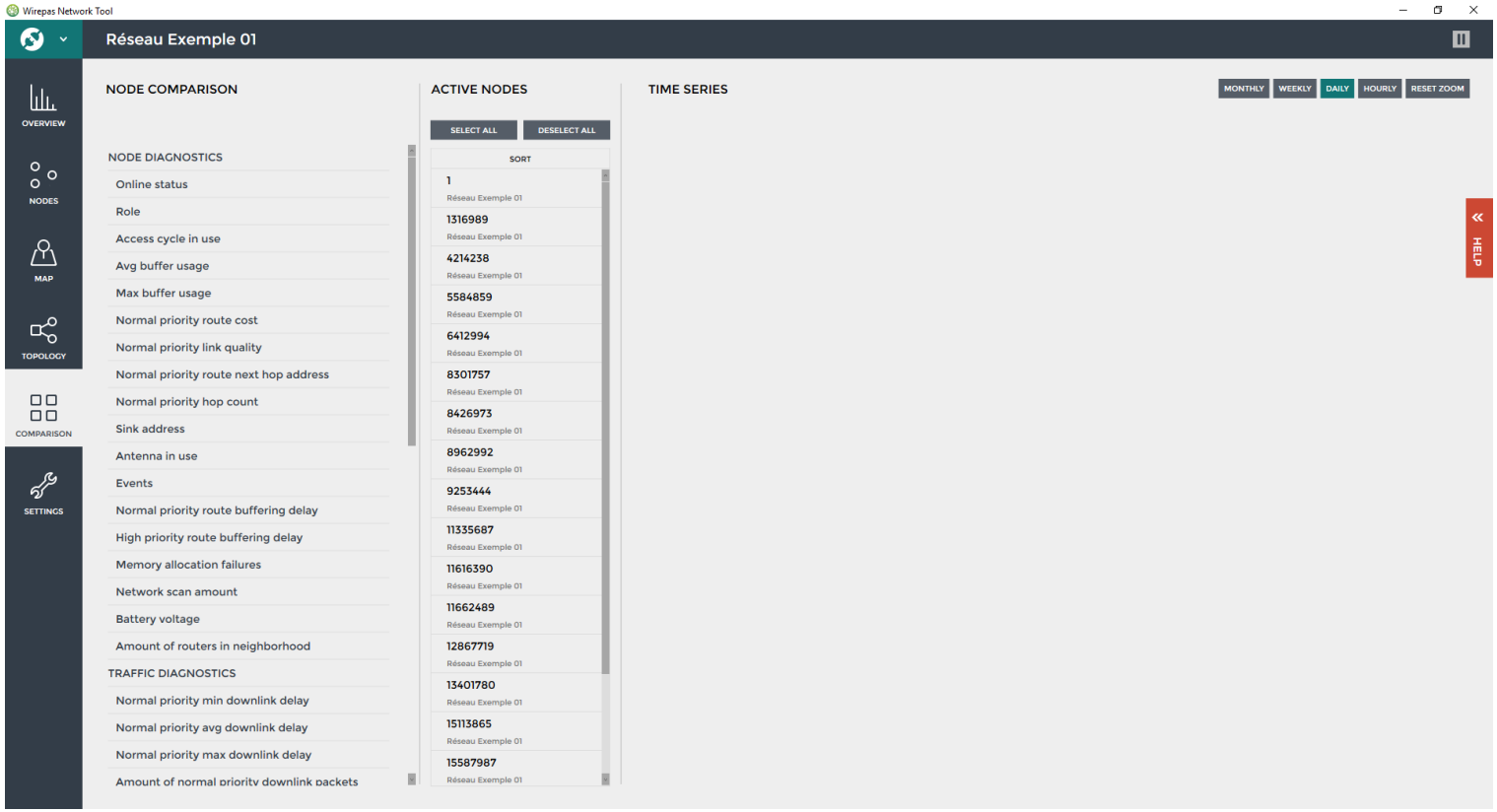



ANCHOR APPROVED

**TOPOLOGY:** Displays and manages mesh network(s)



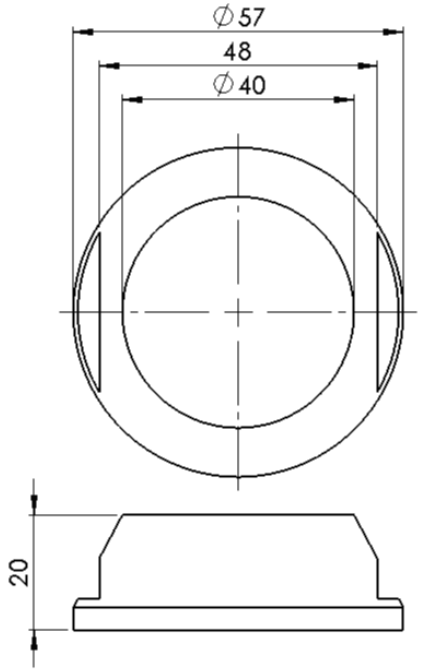
**COMPARISON:** Provides detailed information about network nodes



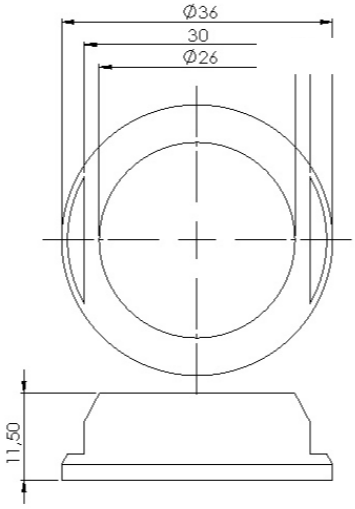

For more information about using the Wirepas Network Tool application, please see the user guide (available upon request when you purchase your positioning kit): WP-UG-421 - Wirepas Network Tool - Client User Guide

## 11 HARDWARE SPECIFICATIONS

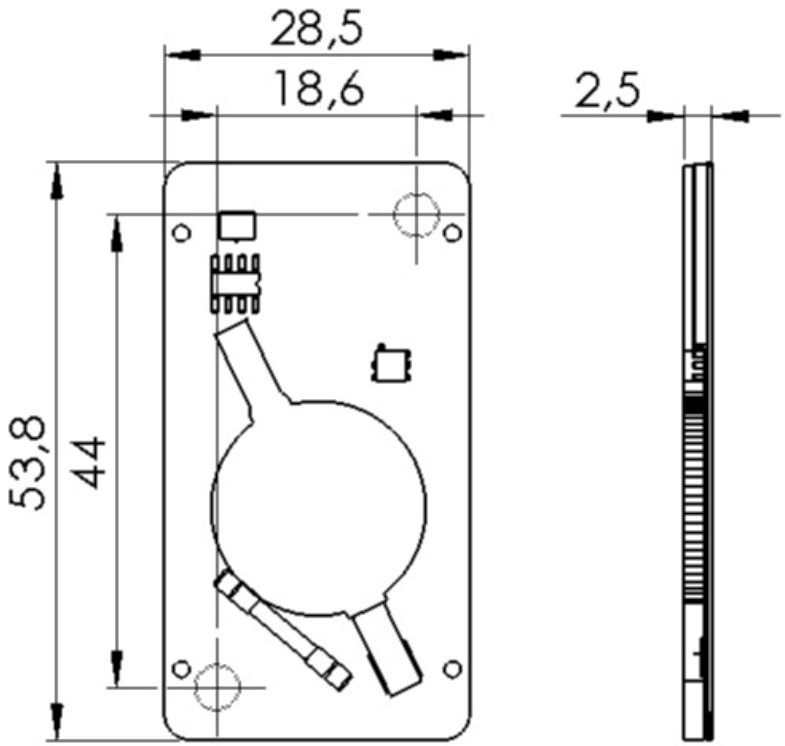
### PUCK module




### COIN module



## SLIM module



## 12 PRODUCT REFERENCES

| DESCRIPTION | REFERENCE | DESCRIPTION |
|---|---|---|
| Blue PUCK ID MESH | IDF25440 | ID MESH positioning tag |
| Blue PUCK ID+ MESH | IDF25451 | ID+ MESH positioning tag |
| Blue PUCK BUZZ MESH | IDF31445 | BUZZ MESH positioning tag |
| Blue PUCK BUZZ+ MESH | IDF25449 | BUZZ+ MESH positioning tag |
| Blue PUCK T MESH | IDF25441 | T MESH temperature sensor |
| Blue PUCK RHT MESH | IDF31442 | RHT MESH temperature and humidity sensor |
| Blue PUCK DI MESH | IDF25446 | DI MESH digital input sensor tag |
| Blue PUCK DO MESH | IDF25447 | DO MESH digital output sensor tag |
| Blue PUCK MAG MESH | IDF25443 | MAG MESH magnet detector sensor tag |
| Blue COIN ID MESH | IDF10440 | ID MESH positioning tag |
| Blue COIN ID+ MESH | IDF10451 | ID+ MESH positioning tag |
| Blue COIN T MESH | IDF10441 | T MESH temperature sensor |
| Blue COIN MAG MESH | IDF10443 | MAG MESH magnet detector sensor tag |
| Blue SLIM ID MESH | IDF03440 | ID MESH positioning tag |
| Blue SLIM ID+ MESH | IDF03451 | ID+ MESH positioning tag |
| Blue ANCHOR | IDF32450 | ID MESH positioning tag |
| Blue Lite ID MESH | IDF28440 | ID MESH positioning tag |
| Raspberry Pi 3 Gateway<br>Wirepas USB Dongle | SCIBT105 | Wirepas Raspberry Pi 3 Gateway<br>Wirepas 2.4Ghz wireless dongle |
| SOLIDSENSE N6 Gateway | SCIBT106 | SolidRun gateway – model SOLIDSENSE N6 |

## 13 STANDARDS AND CERTIFICATIONS

- CE logo

- FCC mark

- IC Mark

- RoHS certified


- Wirepas Mesh

# Annex

**Version v0.0.6 – Wirepas stack 3.4.47**

| Parameters | Restrictions | Default values | Description |
|---|---|---|---|
| Tag identifier | 6 characters (required): [0-9] [A-F]<br>* hexadecimal value | BLUE MESH Unique ID | Tag identifier in MESH network, user modifiable. |
| Tag activation | True/False | False | Tag activation / deactivation (storage mode) |
| Node role | 0x01: Router<br>0x02: Non-router<br>Not used for positioning function:<br>*0x41: Router with autorole mode*<br>*0x42: Non-router with autorole mode*<br>*0x11: Router with low latency mode*<br>*0x12: Non-router with low latency mode*<br>* hexadecimal value | 01 | Tag function in Wirepas network<br><br>- Positioning function<br>Fixed tag: ROUTER, value 01<br>Mobile tag: NON-ROUTER, value 02 |
| Flag | 0x00: Low energy<br>0x40: Autorole<br>0x10: Latency mode<br>* hexadecimal value | 40 | Tag function in Wirepas network |
| Network channel | 2 characters (required): [0-9] [A-F]<br>* hexadecimal value | 04 | Mesh network channel |
| Network address | 6 characters (required): [0-9] [A-F]<br>* hexadecimal value | 001234 | Mesh network address |
| Positioning function | True/False | True | Activation / deactivation of positioning function |
| Mode | NRLS tag: 1 ** Non-Router Long Sleep*<br>Autoscan tag: 2<br>Autoscan anchor: 3<br>Opportunistic anchor: 4<br>* decimal value | 4 | Positioning tag mode in Wirepas network<br><br>- Positioning function<br>Fixed tag: ROUTER, value 4<br>Mobile tag: NON-ROUTER, value 1 |
| Positioning period | Emission period of positioning frame<br>From 15 seconds to 1800 seconds | 300 (seconds) | Tag position update period in seconds |
| BLE BEACON activation | Activation of BLE Beacon mode<br>True/False | False | Activation / Deactivation of BLE Beacon function<br>Not operational for this version<br>Recommendation: do not activate this functionality |
| BLE name | BLE beacon tag name: | BLUE TAG ID WPE | BLE tag name: 15 characters |
| BLE power | BLE Beacon tag power: | 0 | BLE transmission power: [-8, -4, 0, 4] |
| Transmission interval | BLE Beacon advertising period | 1000 (milliseconds) | BLE advertising period in milliseconds, range 100 to 10000 |

**Version v1.0.0 – Wirepas stack 4.0.50**

| Parameters | Restrictions | Default values | Description |
|---|---|---|---|
| Tag identifier | 6 characters (required): [0-9] [A-F]<br>* hexadecimal value | BLUE MESH Unique ID | Tag identifier in MESH network, user modifiable. |
| Tag activation | True/False | False | Tag activation / deactivation (storage mode) |
| Class | Possible values from 0xF9 to 0xFF<br>* hexadecimal value | FA | Creation of tag groups<br>Example:<br>- PUCK: class 0xFA<br>- COIN: class 0xFB<br>- SLIM : class 0xFC |
| Node role | 0x01: Router<br>0x02: Non-router<br>Not used for positioning function:<br>*0x41: Router with autorole mode*<br>*0x42: Non-router with autorole mode*<br>*0x11: Router with low latency mode*<br>*0x12: Non-router with low latency mode*<br>* hexadecimal value | 01 | Tag function in Wirepas network<br>- Positioning function<br>Fixed tag: ROUTER, value 01<br>Mobile tag: NON-ROUTER, value 02 |
| Mode | NRLS tag: 1 ** Non-Router Long Sleep*<br>Autoscan tag: 2<br>Autoscan anchor: 3<br>Opportunistic anchor: 4<br>* decimal value | 4 | Tag mode in Wirepas network:<br>- Positioning function<br>Fixed tag: ROUTER, value 4<br>Mobile tag: NON-ROUTER, value 1 |
| Network channel | 2 characters (required): [0-9] [A-F]<br>* hexadecimal value | 04 | Mesh network channel |
| Network address | 6 characters (required): [0-9] [A-F]<br>* hexadecimal value | 001234 | Mesh network address |
| Minimum positioning period | Emission period of positioning frame<br>From 15 seconds to 64500 seconds | 300 (seconds) | **Required:** The minimum period must be the same as the maximum period |
| Maximum positioning period | Emission period of positioning frame<br>From 15 seconds to 64500 seconds | 300 (seconds) | **Required:** The minimum period must be the same as the maximum period |
| Threshold | Possible values from 0001 to 07FF | 0050 | Not used |

| | | | |
|---|---|---|---|
| BLE beacon name | BLE beacon tag name: | BLUETAGID ELAWP | BLE tag name: 15 characters |
| BLE BEACON activation | Activation of BLE Beacon mode<br><br>0: deactivation, BLE BEACON OFF<br>1: activation, BLE BEACON ON<br>2: activation, BLE BEACON ON WHEN OFFLINE | 0 | Activation / Deactivation of BLE Beacon function<br><br>0: deactivation, BLE BEACON OFF<br>1: activation, BLE BEACON ON<br>2: activation, BLE BEACON ON WHEN OFFLINE, the BLE advertising beacon is activated only when the tag is in OFFLINE mode, that is, when the tag is activated but not connected to its mesh network.<br><br>Not operational for this version<br>Recommendation: do not activate this functionality |
| BLE transmission interval | BLE Beacon advertising period | 1 (second) | BLE advertising period in seconds, range 1 to 10 |
| BLE power | BLE Beacon tag power: | 0 | BLE transmission power: [-8, -4, 0, 4] |