

## **ISMA W0202 Quick Engineering Guide**

### **Summary:**

This guide covers the installation process required to integrate the ISMA Wireless W0202 modules onto 3<sup>rd</sup> party Modbus RS485 networks

### **Tools Required:**

Latest ISMA Configurator download: <http://www.innon.co.uk/pages/isma-download>

Windows Laptop running Win7

USB Lead type A to Mini B

### **Index:**

- 1. Firmware Verification**
- 2. Manual Configuration Settings**
- 3. Automatic Configuration Settings**
- 4. Problem Solving Hints**

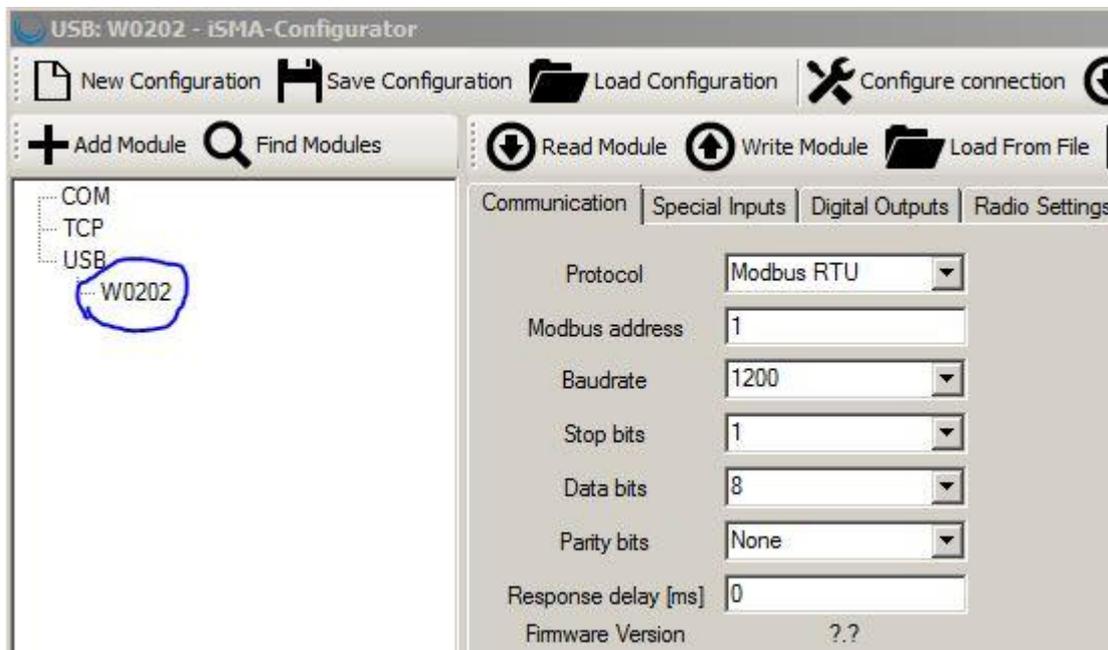
**Author:** M Langley

**Rev:** 2.3

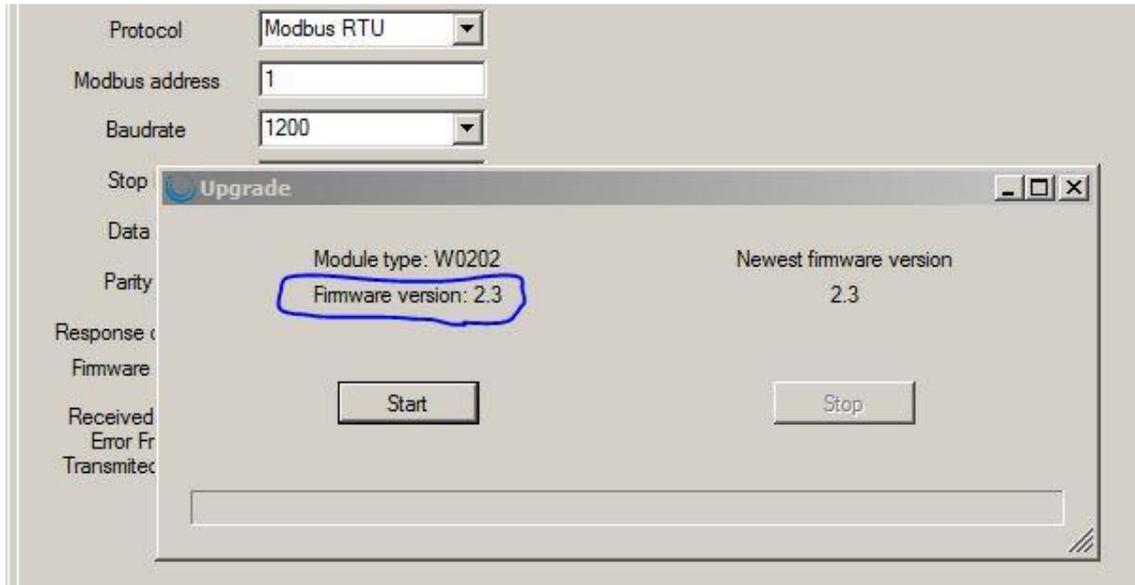
**Date:** 1<sup>st</sup> March 2016

## 1. Firmware verification

- The configurator is a plug and play application which is designed for configuration all of the ISMA range of controllers direct via serial 485, USB or IP connections
- The W0202 modules can be configured by either serial 485 or USB however it is recommended that they are configured using the USB protocol as this is plug and play
- It is also recommended that only one of the devices is installed and connected to the Modbus master and then powered, the other remote device is then connected and powered from the USB lead and commissioned locally before deploying into the field, this will eliminate any third party problems such as signalling issues and save on frustration in diagnosing connection failures
- Launch the Configurator application, we recommend you do this whilst connected to the internet to get the latest firmware updates; this can be done in the office environment before going to site. Any updates for the configurator will appear at the bottom of the application it is recommended that these are installed to support any hardware changes. Next click on the “download newest firmware” button and wait for the response before proceeding to the next step or shutting down the app.
- Connect the configurator to the first device connected to the Modbus master and the device should appear on the configurator page automatically under the USB tree as below:



- To verify the current version of firmware installed on this device, right click on the W0202 module and then select upgrade, the following applet will then appear:



- If the firmware is older than the newest then press the start button, once the firmware has loaded the device will automatically re-boot.
- The next step will re-align all of the post manufacturing settings so you will need to select the following by right clicking on the W0202 module once it appears in the USB network tree and then selecting the following functions in order:

**Default Settings**

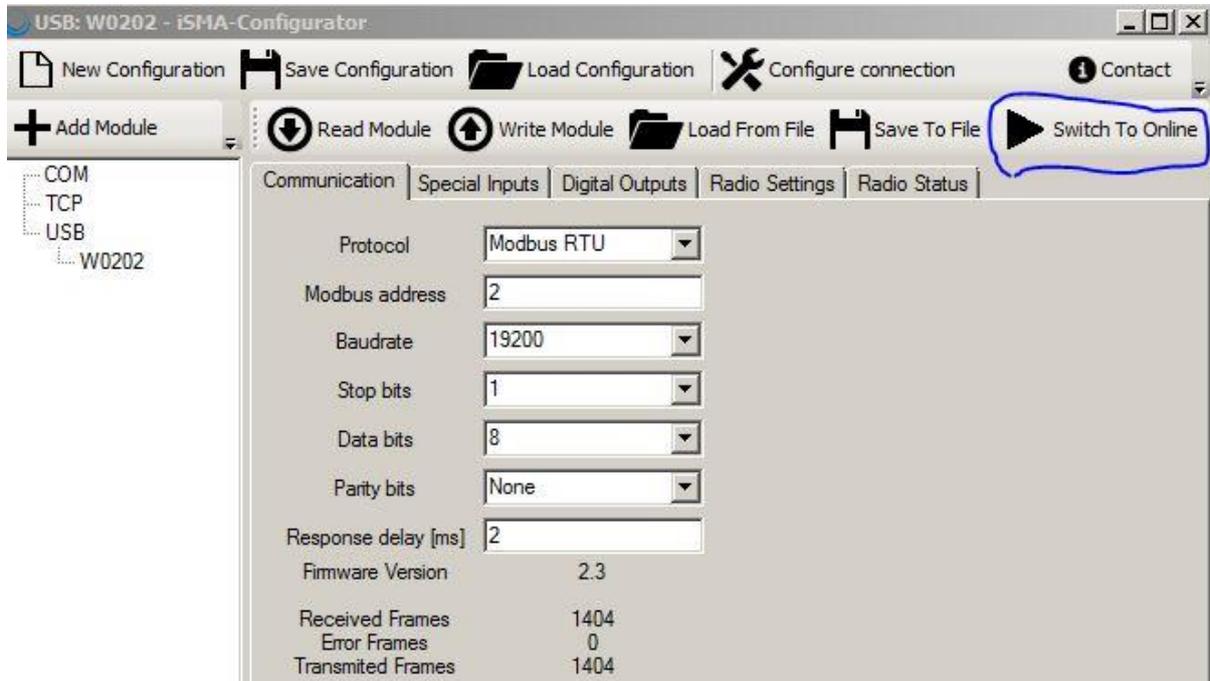
**Reload Settings**

**Reset Module**

- Once the device has re-booted you will then be able to start the desired Manual or Automatic configuration if you have a previously saved template. (please note that this has to be carried out on all modules that require installing within your system)

**2. Manual Configuration Settings**

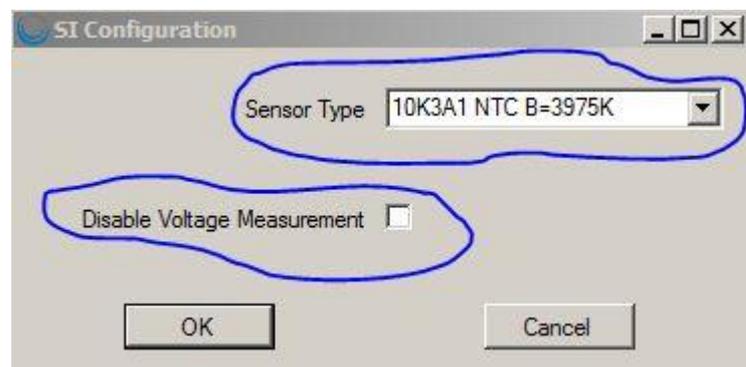
- The first step is to determine a unique Modbus address from your existing network that you are intending to connect too (please note that the Modbus master devices are normally fixed at address 0 so please select a free address between 1 and 127 as this is the address range of the W0202 devices)
- Once you have this information you will now need to double click on the W0202 module in the USB tree and then enable the live edit mode by pressing the button below:



- Now change the Modbus address and click the mouse pointer on to the grey area of the applet this will then initiate a save.
- Repeat this for the desired Baud rate not forgetting to click on the grey area of the applet after changing the setting
- Repeat this for the remaining comms settings, it is advised that you enter a value of 2 in the response delay box if you are intending to extend metering networks this will break up the comms into packets and prevent overflow.

### Special Inputs Tab:

- if you are intending to use the digital inputs then make sure that the input type is 10K3A1 and its in voltage mode as below otherwise the Digital inputs will not operate:



- These modules can also be used to control lighting scenarios and have three built in programs which can be selected from the following tab:
- 

Input Name	Input State	Block input	Counter	Counter Reset	Input Mode	Command	Mode Time [ms]
Input 1	<input type="radio"/>	OFF	0	OFF	Time relay	OFF	0
		Voltage 0 mV	Temperature 0 °C	Resistance 0 Ω	Actual Type 10K3A1 NTC B=3975K	Configuration Configure	Filter [s] 0
Input 2	<input type="radio"/>	OFF	0	OFF	Ordinary IO	OFF	0
		Voltage 0 mV	Temperature 0 °C	Resistance 0 Ω	Actual Type 10K3A1 NTC B=3975K	Configuration Configure	Filter [s] 0

- **Monostable relay:** once the input has been triggered the corresponding digital output will switch ON/OFF reflecting the state of the input
- **Bistable relay:** the corresponding relay will toggle on and off during every input pulse this is used where external BMS control of the lighting circuit is also required.
- **Time relay:** this mode is used for PIR control so once the PIR has been triggered the corresponding relay output will stay on for the set Mode time period

**(Please remember to click on a grey area of the applet after changing any of these settings to initiate the save feature)**

### Digital Inputs Tab:

- There are two settings on this tab the first is the output default state button which you can use to determine if the relay needs to be either on or off during comms failure, the other is the watch dog time this needs to be set higher than the ping/poll time of this module if the device fails to get either request from the master then it will go into default output mode.

**(Please note if you are using the digital outputs this must be set up correctly and please remember to click on a grey area of the applet after changing any of these settings to initiate the save feature)**

### Radio Settings Tab:

- **Tx Power:** this can be set between -18db and 20db if the modules are fairly close then set this to a lower level and if the units are far apart then set up to the maximum gain 20db

- **Channel:** the W0202 modules operate over 8 channels this will be increased to 16 on the next hardware revision, the default channel number is 4 but you can select any from 1 to 8 as long as all of the other units are on the same channel, (The channel select can potentially be used to create 8 networks each containing 247 Modbus devices 127 of which could be W0202 devices)
- **Bitrate:** this is similar to Baud rate and is recommended that this is set the same as the 485 baud rate (please note that a higher bitrate will reduce the distance between devices so a lower bitrate can be selected if distances of 500M are required between devices)
- **AES Key:** the W0202 module use the standard AES security protocol which is widely used on Wi-Fi systems across the world, this encrypts every message sent over the wireless system so even if a third party has another W0202 module they will not be able to connect to the network unless they have the same pass-key. The current default pass-key is **“11112222333344445555666677778888”** it is not recommended that you change this until you have established a connection with all devices, this will help eliminate one of many points of failure which can occur during the configuration of the system.

**(Please remember to click on a grey area of the applet after changing any of these settings to initiate the save feature)**

#### **Radio Status Tab:**

- This is just a diagnostics page for the wireless system so once the system is set-up the remote W0202 devices will appear and their current Rx power will be shown in –dB

### **3. Automatic Configuration Settings**

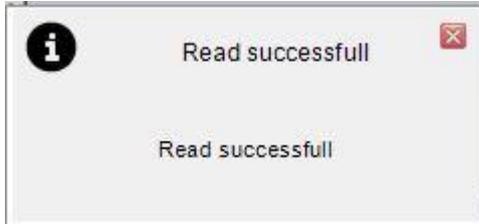
- The configuration tool is equipped with a tempting function which copies all of your current module settings for easy setup of future module
- Backing up a configuration: before you start please make sure that the live edit button is OFF if press to switch to offline as below:



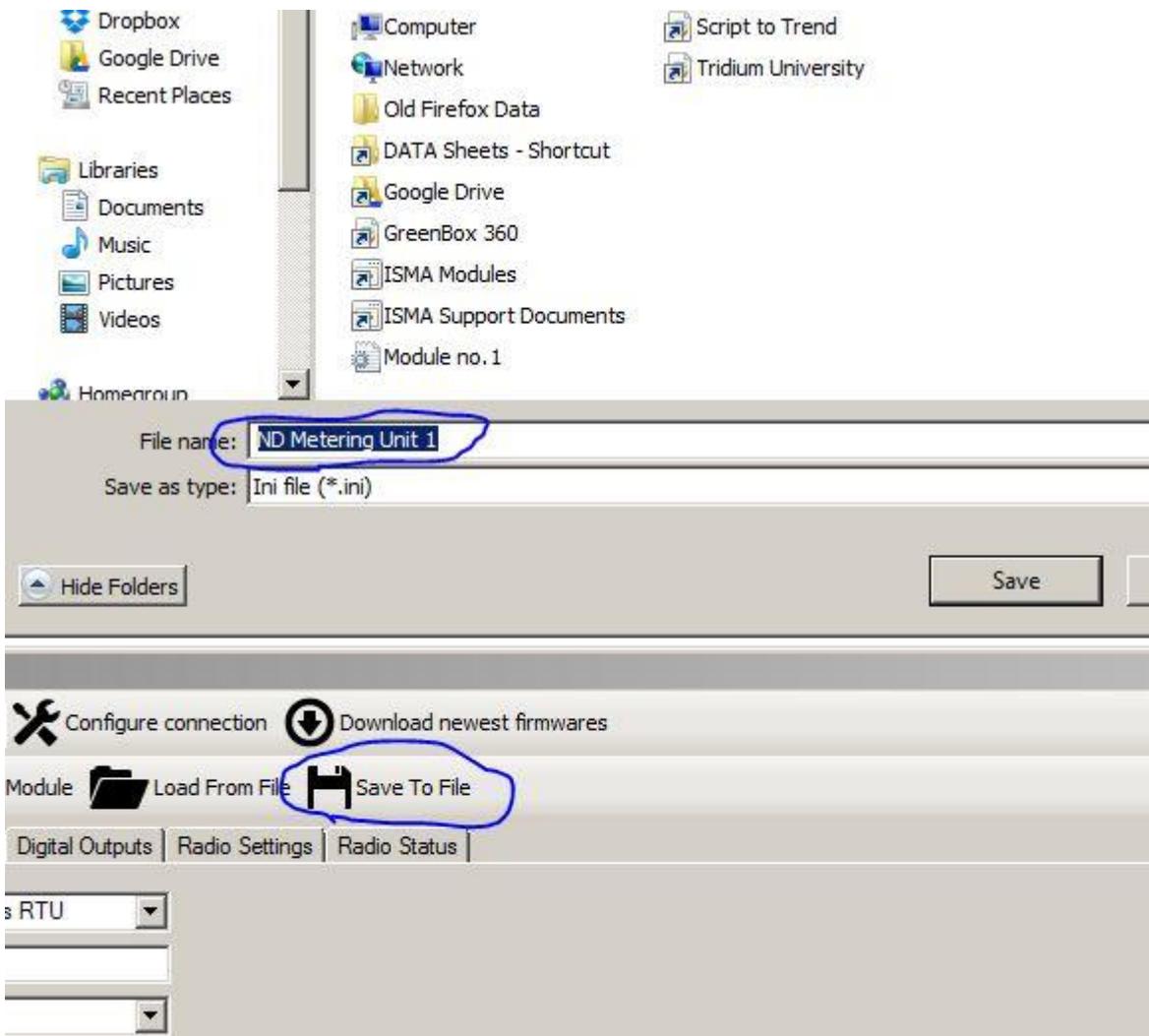
- Now press the Read Module Tab as below:



- You should now see an acknowledgement at the bottom of the applet:



- You can now save the configuration with a unique filename such as “ND Metering Unit 1” by pressing the Save to File button below:

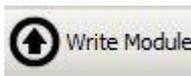


(Please note that the backup file is saved as an ini file but this can be edited and settings changed by opening in Microsoft WordPad)

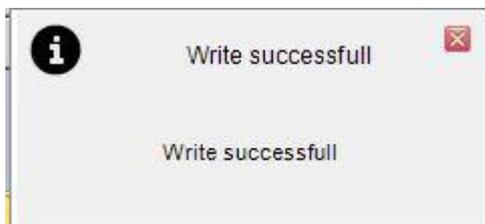
- The process for installing a pre-saved configuration is similar but further steps are required to make sure that the settings are saved to the device.
- The first step is to make sure that you are connected to the device and you have double clicked on the W0202 device in the USB tree
- Please do not press the live edit button at this stage as this will prevent the current process from working
- Now select your desired backup file by selecting Load From File:



- Once the desired file has been highlighted press open and then press the Write Module Button:



- The file will now be sent and stored on the module and an acknowledgement will appear at the bottom of the applet:



- To enable the changes required to take place then you will need to do the following: Right click on the W0202 module in the USB network tree and then selecting the following functions in order:

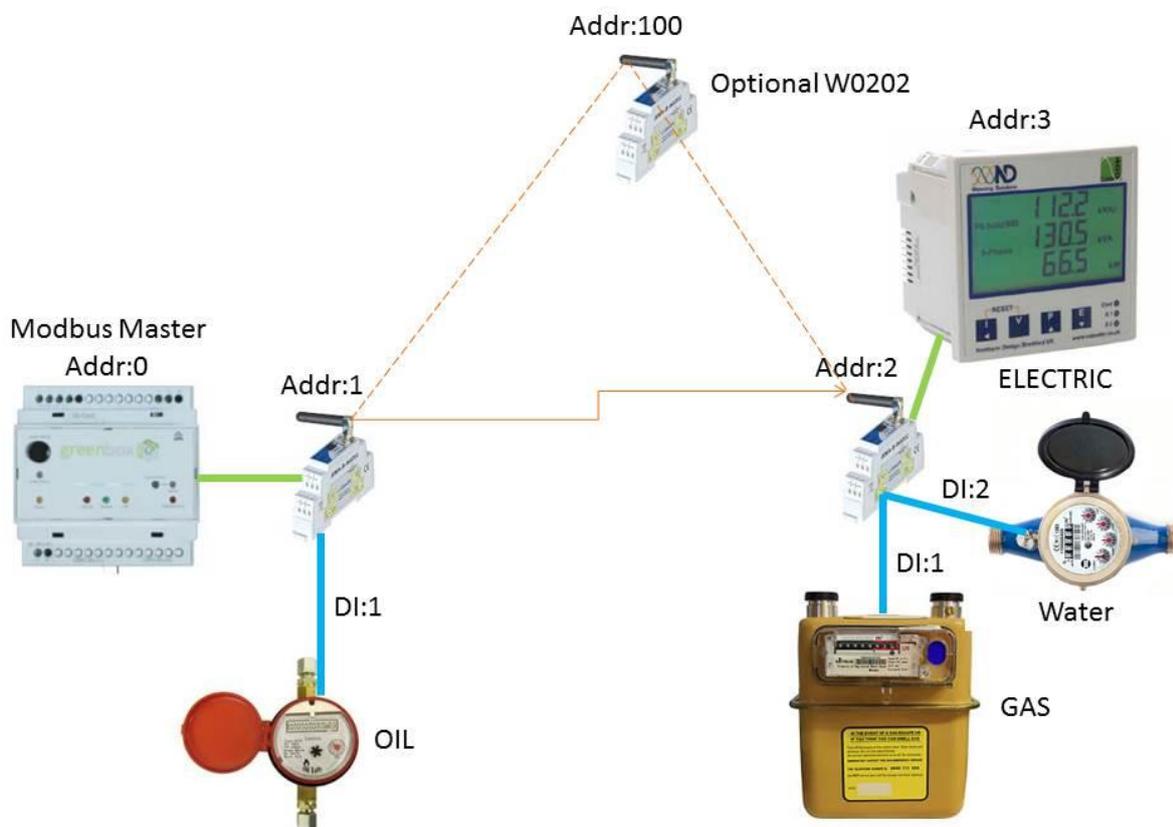
**Reload Settings**  
**Reset Module**

- The device will then re-boot you can now press the live edit button and verify quickly on each Tab if the correct settings have now been accepted by the module
- Once the other modules have also been configured the devices will come back online at the next initiated Ping or data request

#### 4. Problem Solving Hints

- The risk of a comms failure using gateways is always high due to the number of networks, third party devices and variety of protocol settings involved. Wireless networks also exacerbate the problem as these are not a physical connection and what was working one day may not work the next, this may be due to external influences such as Noise/Interference and physical obstructions such as Lorry deliveries. Below is a guide on how to eliminate most of the known causes when integrating the W0202 Modbus Gateways.

#### Typical Topology



#### **Known RS485 Network Problems:**

- The first is addressing conflicts, make sure that all of the Modbus Addresses are unique as in the illustration above
- Biasing: this is a big problem when mixing several makes of Modbus devices on the same networks as they have different chipset manufactures and therefor different impedances. The easiest way to see if this is the cause of the network failure is to measure the voltage between the common and Tx and compare with the common and Rx, if the voltage is greater than 0.5volts then you may need to install a 120ohm bias resistor between the Tx and Rx terminals of the W0202

- If the W0202 module is feed from an A/C power supply then an additional 10Kohm resistor may be installed between +24vac terminal and the Tx terminal of the W0202 device to correct any AC voltage offsets.

### Known Wireless Network Problems:

- The biggest known problems with the radio network are signal degradations, these are usually cause by metallic or solid objects such as walls and partition which will dramatically reduce the transmission capabilities.

### Here are a few things to avoid when installing the W0202 modules:

- Make sure that you avoid transmitting through loading bays as these can be obstructed with tall vehicles
- If you have to transmit through several concrete floors/ceilings then you may wish to consider installing an additional W0202 as a signal booster, also using our optional high gain aerial with a grounding plating kit will dramatically increases the signal gain
- Avoid metal enclosures you can use ABS enclosures if designing a new installation otherwise the aerial will require extending out of the panel and preferably mounted on a wall at high level
- Polarisation: the aerials for the W0202 radio band should be mounted vertically; if large distances are required between buildings then it is advised to use external directional aerials especially if there are trees in the path of the radio signal.

### 868MHz Aerial examples:



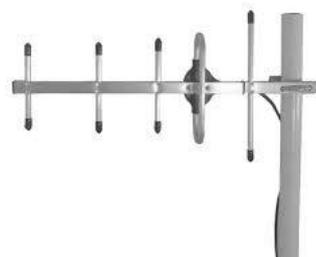
Standard Aerial

300Mts Line-of-site



High Gain Ground-plate Aerial

500Mts Line-of-site



Directional Yagi/Dipole Aerial

1Km Line-of-Site

For further details on our integration products or If you encounter any problems with this configuration then please contact Innon support at the following address where we will arrange for a call back to further assist: [support@innon.co.uk](mailto:support@innon.co.uk)