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# ATIM Cloud Wireless®

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## Bridge Mode RS232/485 DINRS-RS+

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### User Guide



Concerned models:

ACW/868-DINRS

ACW/868-DINRS+

ACW/SF8-DINRS [Software 2.3 Revision B.0 or previous]

ACW/LW8-DINRS [Software 1.7 Revision A.3 or previous]



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## Document version history

Version	Date	Description	Author
1.5	12/05/2020	Sigfox and LoRaWAN available versions update + update of the device pictures	MD
1.4	11/10/2017	Front face image update	AM
1.3	09/05/2017	Concerned products references additions	YM
1.2	13/02/2017	Images update	AM
1.1	25/11/2016	Corrections	FR
1.0	25/09/2016	1 <sup>st</sup> version	AM

## Disclaimer

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## Trademarks and copyright

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## Declaration of compliance

All ACW Atim Cloud Wireless® products comply with the regulatory requirements of the R&TTE Directive (1999/5/EC), article 3:



### **1 SAFETY** (Article 3.1a of the 1999/5/EC Directive)

NF EN60950-1 Ed. 2006/A1:2010/A11:2009/A12:2011 (health)

EN62479: 2010 (power <20mW) or EN62311:2008 (power > 20mW)

### **2 Electromagnetic compatibility** (Article 3.1b of the 1999/5/EC Directive)

EN 301489-3 v1.4.1, EN 301489-1 V1.9.2

### **3 Efficient use of the radio frequency spectrum** (Art.3.2 of the 1999/5/EC Directive)

ETSI EN300 220-2 v2.4.1 and EN300 220-1 v2.4.1

## Environmental recommendations

### Explosive atmosphere

Except for the ACW-ATEX line specifically intended for this purpose, do not use ACW radio modems in the presence of flammable gases or fumes. Using the equipment in such an environment constitutes a safety hazard.

### Environment

Respect the temperature ranges for storage and operation of all products. Failing to respect these guidelines could disrupt device operation or damage the equipment. ACW products in IP65 water- and dust-resistant housings may be placed outdoors, but must not, under any circumstances, be submerged.

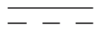
Follow the instructions and warnings provided below to ensure your own safety and that of the environment and to protect your device from any potential damage.



**General hazard** – Failure to follow the instructions presents a risk of equipment damage.



**Electrical hazard** – Failure to follow the instructions presents a risk of electrocution and physical injury.



Direct-current symbol



**WARNING:** do not install this equipment near any source of heat or any source of humidity.



**WARNING:** for your safety, it is essential that this equipment be switched off and disconnected from mains power before carrying out any technical operation on it.



**WARNING:** the safe operation of this product is ensured only when it is operated in accordance with its intended use. Maintenance may only be performed by qualified personnel.



Waste disposal by users in private households within the European Union. This symbol appears on a product or its packaging to indicate that the product may not be discarded with another household waste. Rather, it is your responsibility to dispose of this product by bringing it to a designated collection point for the recycling of electrical and electronic devices. Collection and recycling waste separately at the time you dispose of it helps to conserve natural resources and ensure a recycling process that respects human health and the environment. For more information on the recycling centre closest to your home, contact your closest local government office, your local waste management service or the business from which you purchased the product.

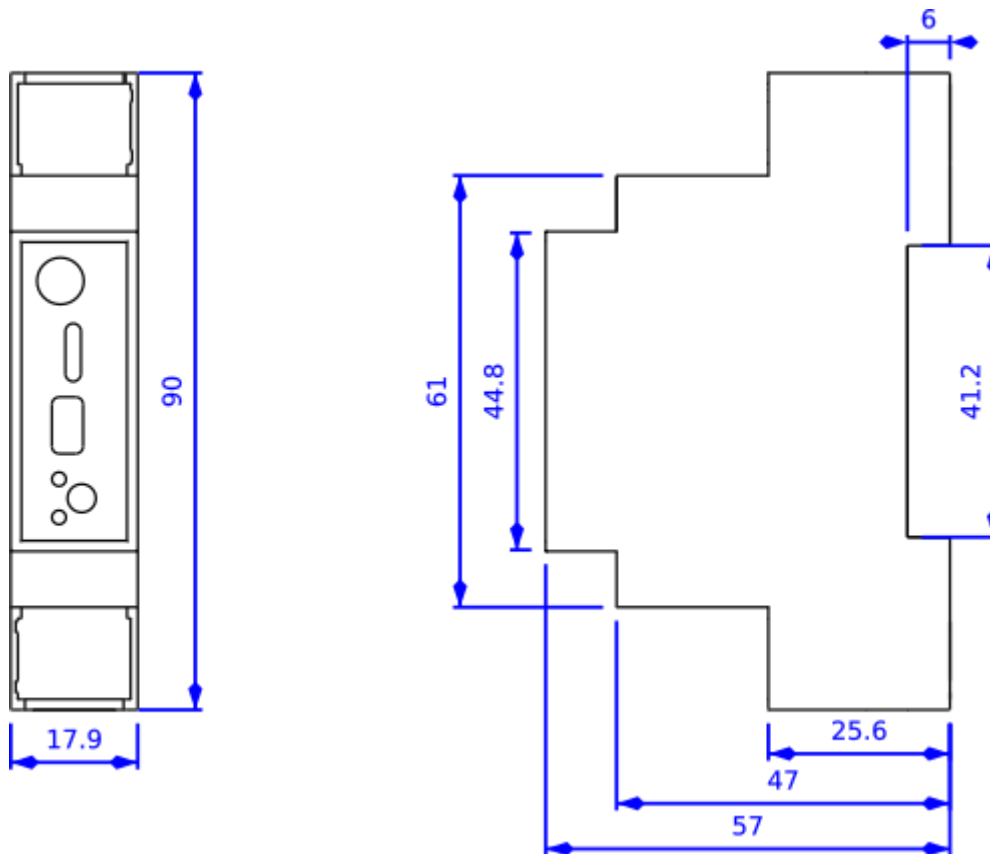
## Radio

Modems in the ACW line are radio-communication modems that use the ISM (industrial, scientific and medical) bands, which may be used freely (at no cost and with no authorisation required) for industrial, scientific and medical applications.

## Technical specifications

Dimensions	90 x 57 x 67 mm		
Antenna	External by SMA connector		
Temperature	-20°C to +55°C (operating)		
	-40°C to +70°C (storage)		
Mounts to	DIN-Rail		
Power Supply	10-30Vcc		
Frequency	865 – 870 MHz		
Power (RS model)	25 mW (14 dBm)		
Power (RS+ model)	500 mW (27 dBm)		
Rate	Local: 1.2 to 115 Kbit/s		
	Sigfox: 100 bps		
	LoRaWAN: 300 bit/s to 10 Kbit/s		
Consumption (10V)	Local (868):	Sigfox:	LoRa:
Tx mode	40 mA	40 mA	35 mA
Rx mode	30 mA	30 mA	20 mA
Eco energy mode	4.5 mA		

## Space requirements and mounting



Dimensions indicated in mm.

'Circuit-breaker'-style ACW DIN modems are mounted on a DIN rail.

## Installation

### a. Positioning

This version was designed for installation in an electrical box made of PVC or metal. If the cabinet is made of insulating material (PVC, ABS, fiberglass), it is possible to simply use a small whip-wave antenna: Ref ATIM ANT868-12FSC. This antenna must be firmly screwed on the SMA connector is positioned vertically, preferably upwards.

- ➔ In the case of a metal box, it is imperative to deport the antenna to the outside to have good results in radio (avoid the Faraday cage!)

For best results, it is advisable to move the antenna up and clear of any metal obstacle within a radius of 1 meter if possible.

## b. Connecting the modem



### Terminal blocks

Name	Description	In / Out
GND	Earth/Ground (Gnd)	In (power supply)
10/30V	Power supply between 10V and 30V	Earth
NC	Not connected	/
Tx/BZ	RS232 Tx	Output
	RS485 BZ	Bidirectional/differential
Rx/AY	RS232 Rx	Input
	RS485 AYm	Bidirectional/differential
NC	Not connected	/

### Antenna (SMA)

Before powering the product, a 50  $\Omega$  / 868MHz antenna must be connected, either directly to the SMA connector or via a 50  $\Omega$  cable in case of antenna offset.

### Power supply (bottom terminal block)

The ACW-RS module must be powered with a DC power supply between 10V and 30V that can supply a minimum current of 100mA.

### RS232/RS485 (top terminal block)

The maximum cable length will depend on the type of serial link and the baud rate used. A maximum length of 1 meter is suitable for all use cases.

For an RS232 connection it will also be necessary to switch the slide switch to the lower position (USB side).

For an RS485 connection, you have the option to activate the 120  $\Omega$  termination resistor:

- *up (SMA side): resistor activated*
- *down (USB side): resistor deactivated*

The USB connector is used to configure the ACW via a PC and a USB cable. See the 'Modem Configuration' section for more details.

➔ The configuration must be done with the device powered by 10 / 30Vdc

## c. LEDs meaning

When the power is turned on or after removing the USB cable, the red LED (bottom LED) stays on for 3 seconds, indicating the start cycle. Then, the green LED (top LED) illuminates for a moment indicating a good start of the ACW.



In USB configuration mode, the green LED flashes until the configuration is completed and the USB cable is removed.

Overall, in normal operation, the green LED illumination confirms an RS232 / 485 or radio communication. The red LED lights to indicate any errors that may occur.

#### d. Push button

The push button located on the front of the box makes it possible to emit a test frame in order to validate the installation on site. The sending of test frames is only available in the operating modes described in the following subsections.

#### Modbus Master Mode

In Modbus master mode, pressing the push button triggers a Modbus frame as if the 'Statement period' was reached.

#### Bridge and Slave Mode (SF8)

In Sigfox bridge mode configuration, this triggers a test frame of the following format:

Octet :	1	2	3	4	5	6
Data :	0x05	Counter	0x00	0x00	0x00	0x00
Octet :	7	8	9	10	11	12
Data :	0x00	0x00	0x00	0x00	0x00	0x00

**Note:** The value 'Counter' is incremented with each press.

## Modem configuration

Download and install the configuration software " setupACW.exe " at:

<http://www.atim.com/produit/atim-cloud-wireless-acw/>

Connect the radio modem to your computer with a USB cable and then launch the software.

When you are logged in, the software window changes to allow you to access the main features. Automatically, the current configuration of the connected module is retrieved and displayed.

The different configuration modes are described below.

Once the configuration is done, you just have to click on the **Write** key. After a few seconds of waiting, a message appears next to it to inform you if the module update succeeded or failed.



Once the configuration is complete, do not leave the module connected to USB. This mode of operation is very energy intensive. When you remove the USB link without disconnecting the power supply, the module automatically returns to normal operation.

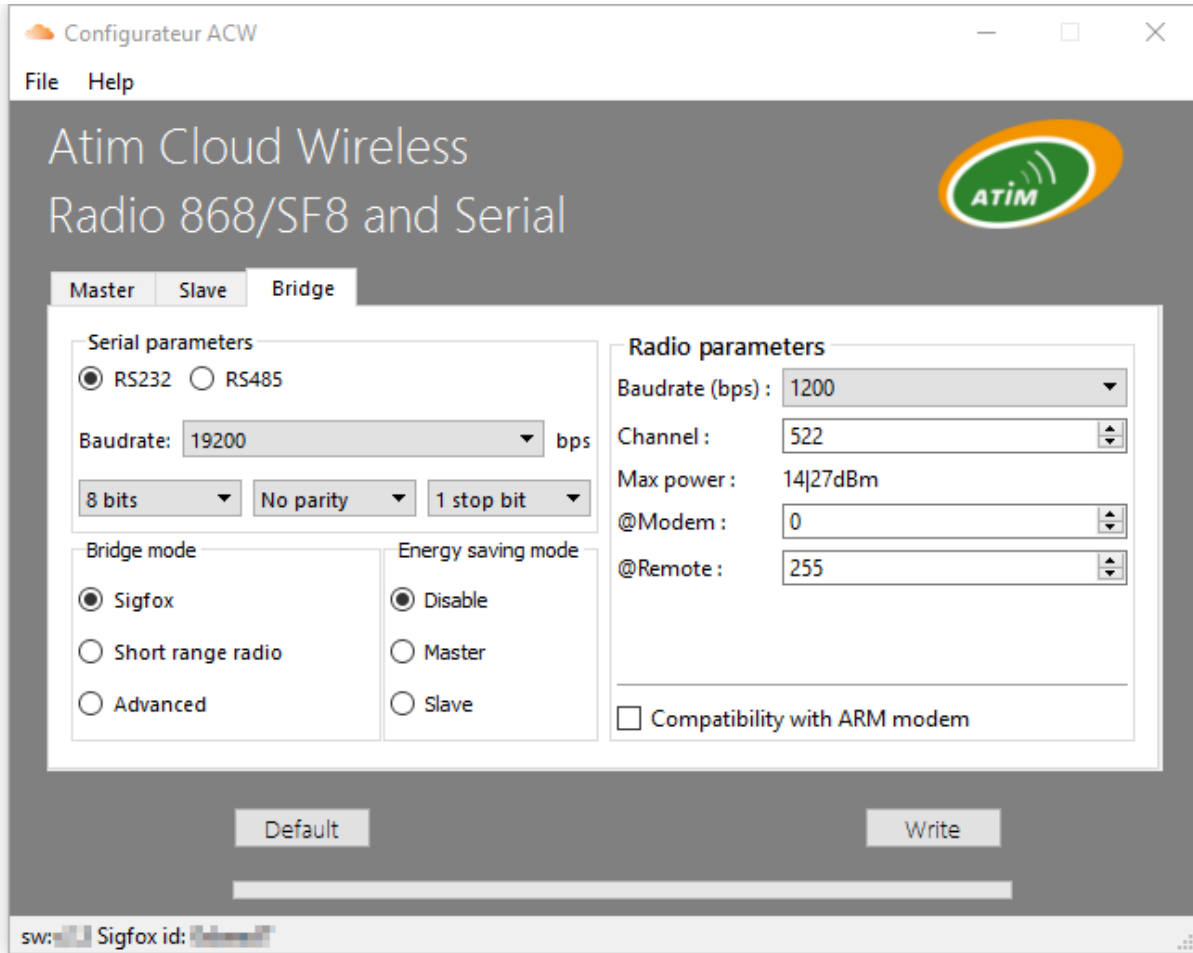
### a. Bridge mode configuration (SF8)

#### Attention

Setup available for SF8 (Sigfox) references Software 2.3 Revision B.0 or prior.

The following information applies to the ACW / SF8-DINRS.

In this mode of operation, the data of the serial link is directly transmitted as such on the Sigfox network.



**Note:** If the frames sent via the serial link are greater than 12 bytes these will be split into several frames of 12 bytes.

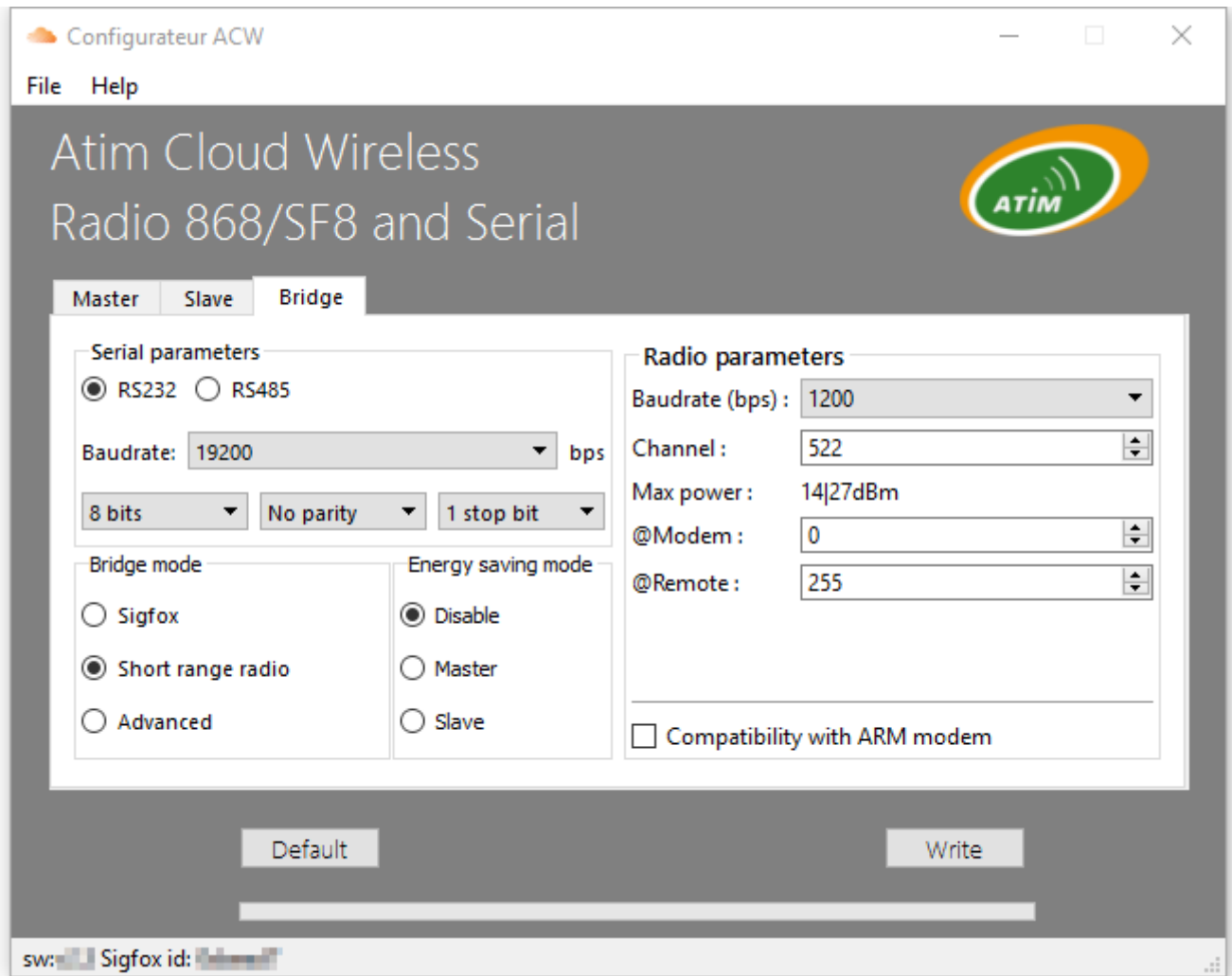
**Note:** The transmission time of a frame depends on its length (10 seconds max).

- ✓ 1: Serial parameters: The ACW-RS module has a serial link that you can set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600, and 115200 are available. The other default parameters (and not configurable for RS485 type links) are: 1 stop bit, no parity, no flow control and 8 data bits.
- ✓ 2: Bridge mode: The Sigfox option must be checked to activate the Sigfox bridge mode.
- ✓ 3: Other settings are not used in this mode and can be left by default.

## b. Bridge mode configuration (868)

The following information applies to ACW / 868-DINRS and ACW / 868-DINRS +.

In this operating mode, the data of the serial link is transmitted directly in local radio to another ATIM device (ACW / ARM) and vice versa. Typically, with another ACW / 868-DINRS or DINRS +.



**Note:** Frames must not exceed 512 bytes.

**Note:** It is advisable to change the default 'Channel' radio channel.

- ✓ 1: Serial parameters: The ACW / 868-DINRS module has a serial link that you can set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600 and 115200 are available. The other default parameters (and not configurable for RS485 type connections) are: 1 stop bit, no parity, no flow control and 8 data bits.
- ✓ 2: Bridge mode: The 'Short range radio' option must be checked to activate the bridge mode in local radio. The 'Advanced' option is reserved for advanced use of the radio module.

- ✓ 3: Energy saving mode: This mode reduces the power consumption of the ACW-RS if it is set to 'Slave'. In this mode of operation, another ACW-RS must be configured in 'Master' mode so that communication between the two modems is possible. 'Disable' Disables this mode.
- ✓ 4: Radio parameters: These are the radio parameters that will have to be selected carefully according to the environment in which the ACW is located.
  - All ACWs that must communicate together must have the same radio settings ('Baudrate' and 'Channel').
  - Compatibility with older generation radio modems (ARMs) is assured by checking the 'Compatibility with ARM modem' box. In this operating mode, only two radio rates are available; 9600 and 19200bps as well as 16 channels.
  - To increase the radio range, decrease the 'Baudrate' rate. The 'Channel' channel will have to be chosen according to the environment and the transmission power.
    - Transmit power and defined by 'Channel' and 'Baudrate' used
    - 'Max Power' informs you of the transmit power that will be used.
    - Not all radio channels are available for all baudrates.
    - Channels from 517 to 527 are available in 27dBm (500mW) only for the ACW / 868-DINRS + version, otherwise they will be clamped at 14dBm.
  - Frame filtering can be done by the '@Modem' and '@Remote' addresses.
    - '@Modem' is the address of the ACW / 868-RS, The other ACW / 868-RS who want to communicate with this device must have the same address '@Modem' in '@Remote'.
    - By default '@Remote' is 255, in this case the ACW / 868-RS communicates with all other ACW / 868-RS (Broadcast Mode).

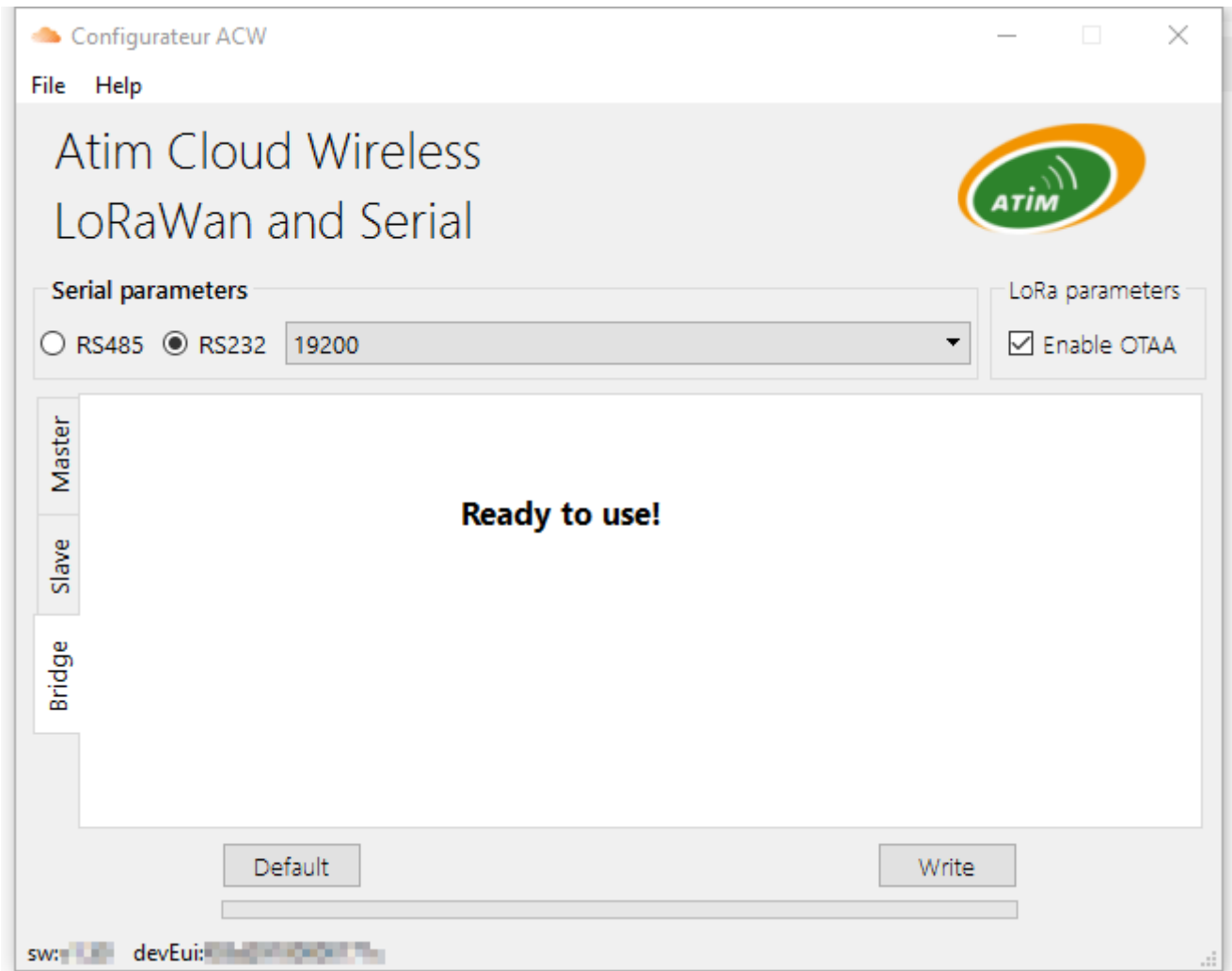
### c. Bridge mode configuration (LoRaWAN)

#### Attention

Setup available for LW8 (LoRaWAN) references Software 1.7 Revision A.3 or prior.

The following information applies to the ACW / LW8-DINRS.

In this operating mode, the data of the serial link is transmitted directly to the LoRaWAN network.



**Note:** Frames must not exceed 512 bytes.

- ✓ 1: Serial parameters: The ACW-DINRS module has a serial link that you can set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600, and 115200 are available. The other default and non-configurable parameters are: 1 stop bit, no parity, no flow control and 8 data bits.
- ✓ 2: LoRa parameters: Check 'Enable OTAA' to activate the 'Over The Air Activation' mode. Uncheck 'Enable OTAA' to activate 'Activation By Customization' mode.

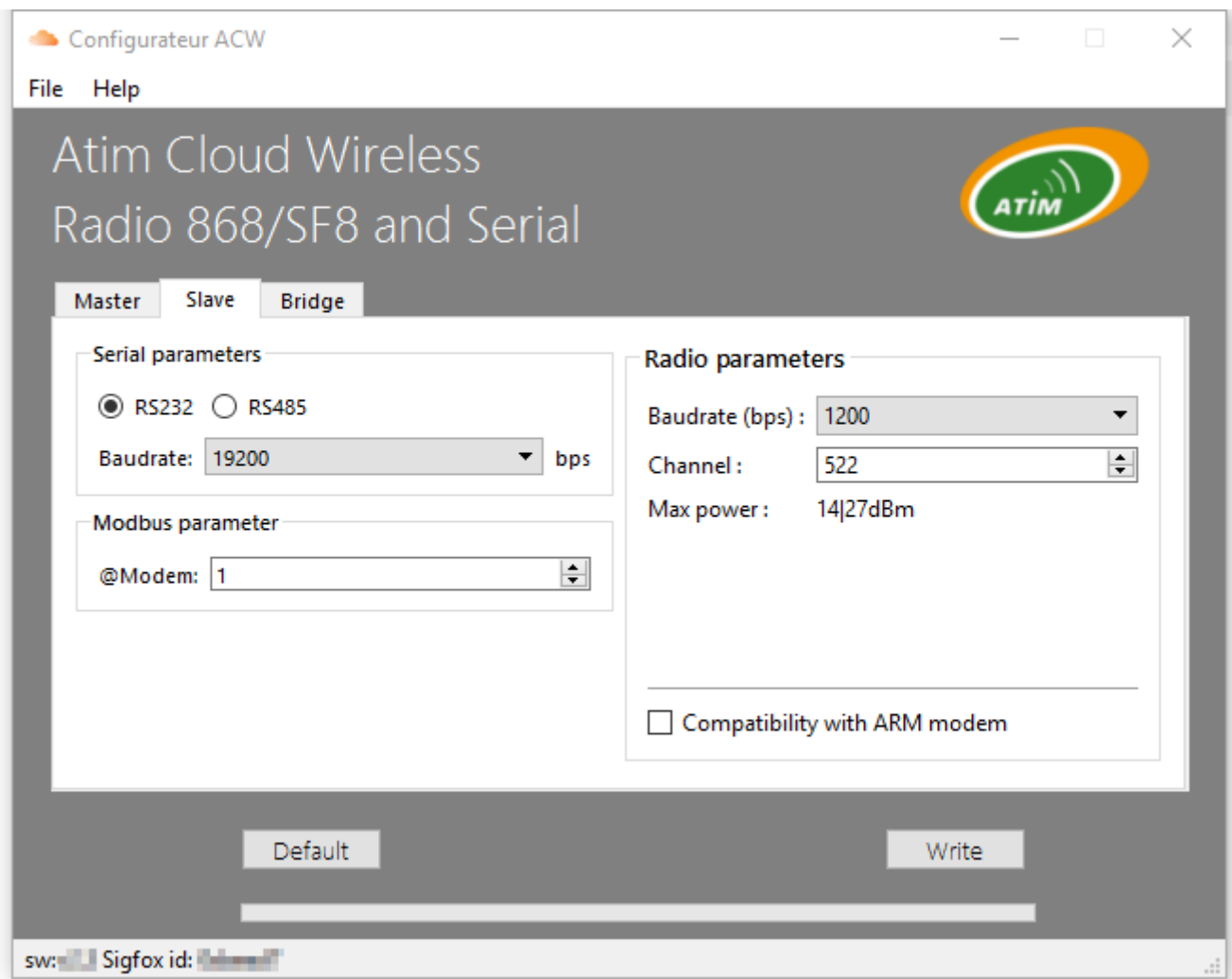
#### d. Slave Modbus configuration (SF8 & 868)

##### Attention

For SF8 (Sigfox) versions, setup available for references Software 2.3 Revision B.0 or prior.

The following information applies to the ACW / SF8-DINRS, ACW / 868-DINRS and ACW / 868-DINRS +.

In this mode of operation, the ACW-DINRS is seen as a Modbus slave on the RS232 or RS485 serial link, as well as by the radio.



**Note :** Les trames Modbus ne doivent pas dépasser 512 octets.

- ✓ 1: Serial parameters: The ACW-DINRS module has a serial link that you can set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600, and 115200 are available. The other default and non-configurable parameters are: 1 stop bit, no parity, no flow control and 8 data bits

- ✓ 2: Modbus parameter: '@Modem' is the address of your ACW-DINRS. This is the Modbus ID by which the ACW-DINRS will respond.
- ✓ 3: Radio parameters: These are the radio settings that will need to be selected carefully according to the environment in which the ACW is installed.
  - In case you want to use only the Sigfox network, there is no need to modify the default values.
  - These parameters are used for Modbus communication via radio.
  - All ACWs to communicate together must have the same radio settings ('Baudrate' and 'Channel').
  - Compatibility with older generation radio modems (ARM) is ensured by checking the box 'Compatibility with ARM modem'. In this operating mode, only two radio rates are available; 9600 and 19200bps as well as 16 channels.
- To increase the radio range, decrease the 'Baudrate' rate. The 'Channel' channel will have to be chosen according to the environment and the transmission power.
  - The transmit power is defined by the 'Channel' and 'Baudrate' used.
  - 'Max Power' informs you of the transmit power that will be used.
  - Not all radio channels are available for all baudrates.
  - Channels from 517 to 527 are available in 27dBm (500mW) only for the ACW / 868-DINRS + version, otherwise they will be clamped at 14dBm.

## Modbus slave mode

### Modbus table

Modbus address	Default values	Descriptions
60000	0	Octets 1 and 2 SIGFOX.
60001	0	Octets 3 and 4 SIGFOX.
60002	0	Octets 5 and 6 SIGFOX.
60003	0	Octets 7 and 8 SIGFOX.
60004	0	Octets 9 and 10 SIGFOX.
60005	0	Octets 11 and 12 SIGFOX.
60006	0	Write a 1 to send the 12 bytes to SIGFOX.  Note: This register is always read at 0  Note: In the ACW / 868-DINRS or ACW / 868-DINRS + version nothing will happen, but the ACW will return a valid Modbus acknowledgment.
60007	0	(@Remote) Radio module address, from 0 to 255.



		This is an advanced setting: Do not edit.
60008	255	(@Modem) Address of the remote radio module, from 0 to 255 (broadcast).  This is an advanced setting: Do not edit.
60009	1200,  Or the value configured with the configurator.	Baudrate radio, the possible values are:  1200 2400 4800  9600 or 9601 to activate the compatible mode.  19200 or 19201 to activate the compatible mode.  38400 57600  Note: Not all values are possible depending on the radio channel and the selected transmission power.
60010	522,  Or the value configured with the configurator.	Canal radio, from 160 to 599.  Note: All values are not possible depending on the radio rate and the chosen transmission power.
60011	255	Transmitting power - the possible values are:  0 dBm 5 dBm 7 dBm 10 dBm 12 dBm 14 dBm  20 dBm (only with ACW/868-DINRS+) 23 dBm (only with ACW/868-DINRS+) 27 dBm (only with ACW/868-DINRS+)  255 for an auto configuration.  Note: Not all values are possible depending on the radio rate and the radio channel.
60012	/	Data register to send in local radio mode.  Note: This register is always read at 0.
...	...	...

60062 /

Data register to send in local radio mode.

Note: This register is always read at 0.

**Note:** The data written in the registers of 60012 to 60062 are directly sent in local radio mode to the writing. Only the number of written registers will be sent in local radio mode.

### Supported Modbus Functions

Function	Type
0x03 (3)	Read Holding Registers
0x04 (4)	Read Input Registers
0x10 (16)	Write Multiple registers

**Note:** You can read and write up to 50 registers in a single Modbus request.

**Note:** You must respect a timeout of 10s if you send data to SIGFOX and a timeout of 500ms if you modify all the configuration registers (60007 to 60011). Finally, if you send the 50 data registers in local radio, a time out of 1.2s must be respected. If you send data to SIGFOX and locally and with the modified configuration registers, a timeout of 11.7s must be respected.

**Note:** If you are sending data in SIGFOX and local radio, the SIGFOX data is sent first and then the local data is sent.

**Note:** During a SIGFOX transmission, the 12 bytes are transmitted.

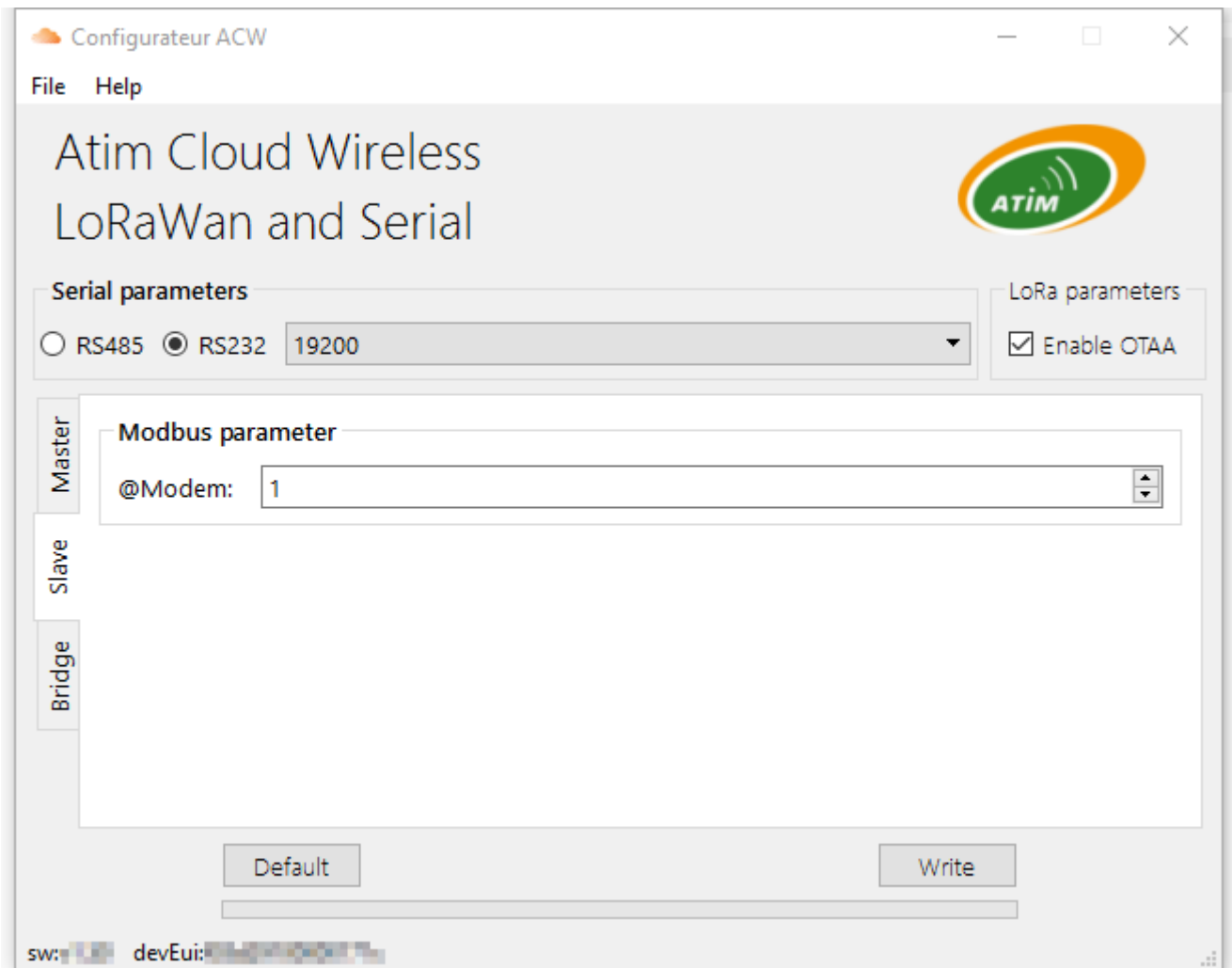
#### e. Modbus Slave mode configuration (LoRaWAN)

##### Attention

Setup available for LW8 (LoRaWAN) references Software 1.7 Revision A.3 or prior.

The following information applies to the ACW / LW8-DINRS.

In this operating mode, the ACW / LW8-DINRS is seen as a Modbus slave on the RS232 or RS485 serial link.



**Note:** You can write up to 16 registers in a single Modbus request.

- ✓ 1: Serial parameters: The ACW / LW8-DINRS module has a serial link that can be set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600, and 115200 are available. The other default and non-configurable parameters are: 1 stop bit, no parity, no flow control and 8 data bits.
- ✓ 2: LoRa parameters: Check 'Enable OTAA' to activate the 'Over The Air Activation' mode. Uncheck 'Enable OTAA' to activate 'Activation By Customization' mode.

- ✓ 3: Modbus parameter: '@Modem' corresponds to the address of your ACW / LW8-DINRS. This is the Modbus identifier with which the ACW / LW8-DINRS will respond.

Slave Modbus mode

*Modbus table*

Data written in any register is sent directly to the LoRaWAN network. Only the number of written records will be sent.

*Supported Modbus Functions*

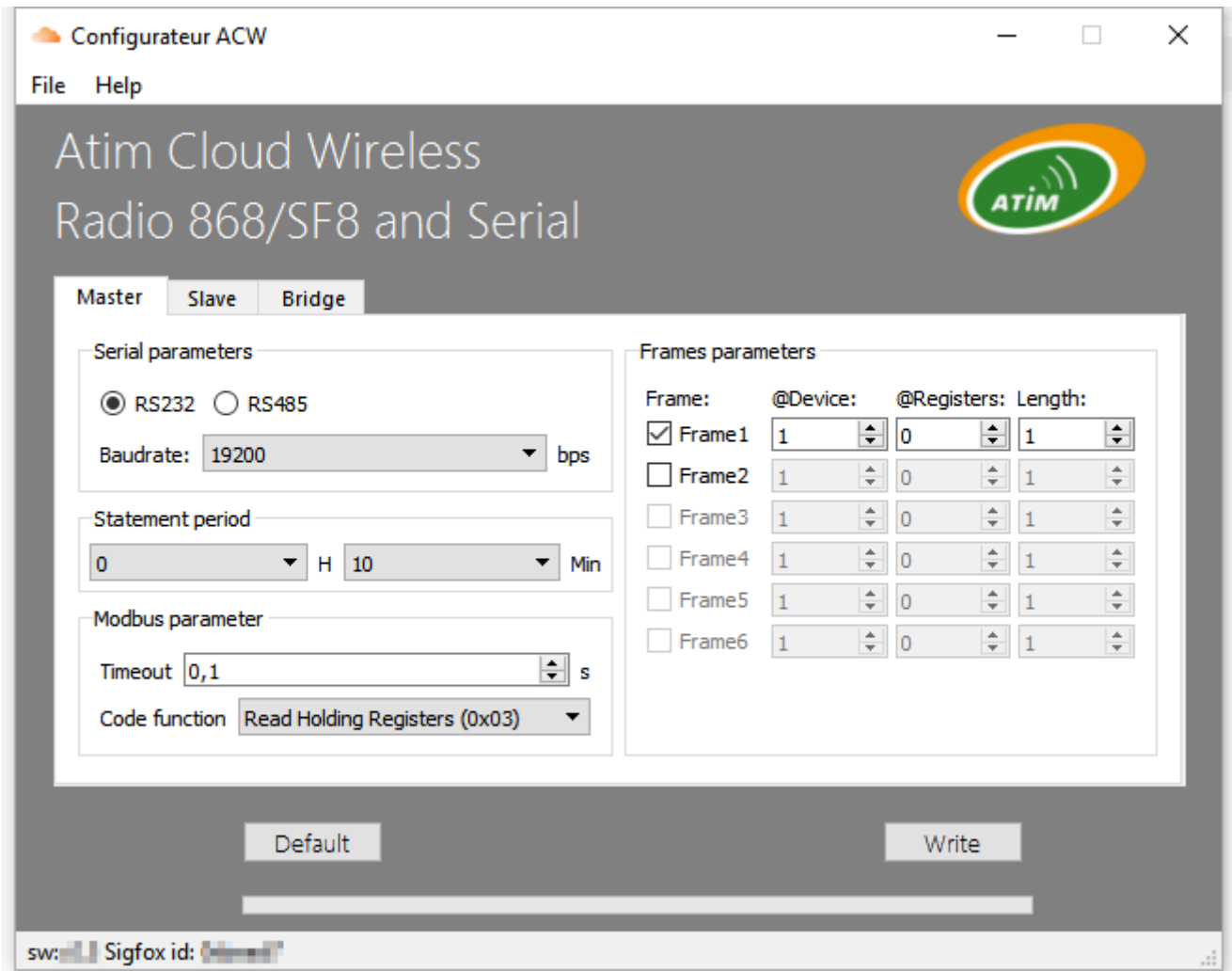
Function	Type
0x03 (3)	Read Holding Registers
0x04 (4)	Read Input Registers
0x10 (16)	Write Multiple registers

#### f. Modbus Master Mode configuration (SF8)

##### Attention

Setup available for SF8 (Sigfox) references Software 2.3 Revision B.0 or prior.  
The following information applies to the ACW / SF8-DINRS.

In this operating mode, the ACW / SF8-DINRS is viewed as a Modbus master on the RS232 or RS485 serial link.



- ✓ 1: Serial parameters: The ACW / SF8-DINRS module has a serial link that you can set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600, and 115200 are available. The other default and non-configurable parameters are: 1 stop bit, no parity, no flow control and 8 data bits.
- ✓ 2: Modbus parameter: 'Timeout' corresponds to the maximum response time of the slave. If the slave does not respond before this time, the message will be considered erroneous and will not be sent over the Sigfox network. Also specify the function code 'Function code' that you want to use.

- ✓ 3: Frames parameters: You can configure a maximum of 6 modbus frames. For each of the frames, you must specify the Modbus address of the slave '@Device' you wish to interrogate, the register (word 16bits) from which you want to read '@Registers' as well as the number of words 'Length' (max 4 words).
- ✓ 3: Statement period: This is the time between sending each Modbus frame, and therefore also Sigfox frames if there is no Modbus error.

Modbus Master Mode

Supported Modbus Functions

Function	Type
0x03 (3)	Read Holding Registers
0x04 (4)	Read Input Registers

Operating mode

Every 'Statement period', a Modbus frame is sent on the RS232 / 485 serial link. Then, if there are no errors, the read registers are sent to Sigfox as described in the next section. The following 'Statement period', the next Modbus frame will be sent (if the last frame corresponds to the 6th the 1st will be sent), even if an error occurred on the last frame.

Sigfox frame format

Data of the frame sent to Sigfox are defined in the table below:

Octet :	1	2	3	4	5	6
Donnée :	0x02	@Device	@Registers MSB	@Registers LSB	Register1 MSB	Register1 LSB
Octet :	7	8	9	10	11	12
Donnée :	Register2 MSB	Register2 LSB	Register3 MSB	Register3 LSB	Register4 MSB	Register4 LSB

**Note:** Only registers read in Modbus will be transmitted to the Sigfox network.

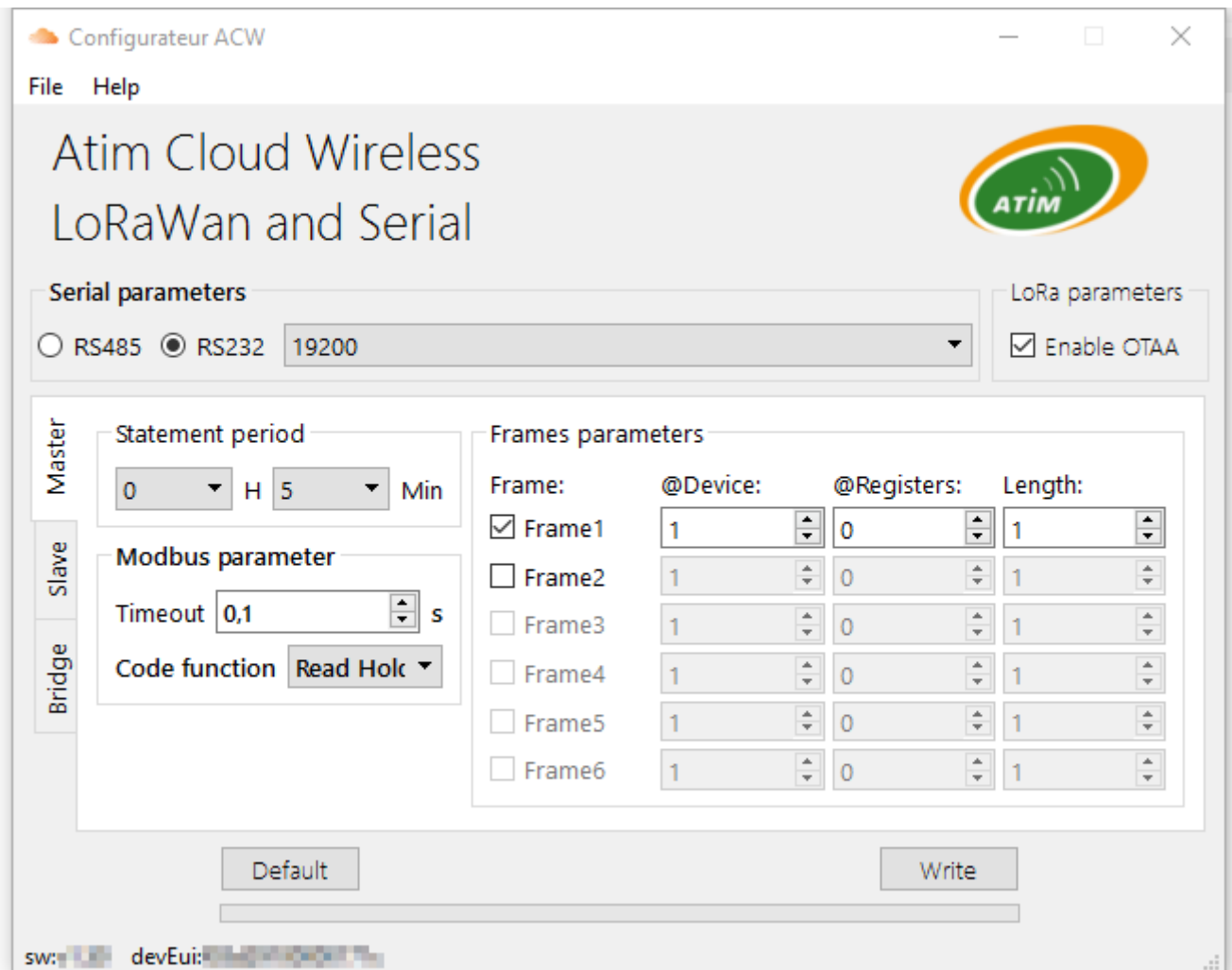
### g. Modbus Master Mode configuration (LoRaWAN)

#### Attention

Setup available for LW8 (LoRaWAN) references Software 1.7 Revision A.3 or prior.

The following information applies to the ACW / LW8-DINRS

In this operating mode, the ACW / LW8-DINRS is seen as a Modbus master on the RS232 or RS485 serial link.



- ✓ 1: Serial parameters: The ACW / LW8-DINRS module has a serial link that can be set in RS232 or RS485 mode. You must also specify the speed (Baudrate) you want to use: 4800, 9600, 19200, 38400, 57600, and 115200 are available. The other default and non-configurable parameters are: 1 stop bit, no parity, no flow control and 8 data bits.
- ✓ 2: LoRa parameters: Check 'Enable OTAA' to activate the 'Over The Air Activation' mode. Uncheck 'Enable OTAA' to activate 'Activation By Customization' mode.
- ✓ 3: Modbus parameter: 'Timeout' is the maximum response time of the slave. If the slave does not respond before this time, the message will be considered as erroneous and will not be sent on the LoraWan network. Also specify the 'Function Code' function code that you want to use.
- ✓ 4: Frames parameters: You can configure a maximum of 6 modbus frames. For each frame, you must specify the Modbus address of the slave '@Device' that you want to query. The register (16-bit word)

from which you want to read '@Registers' as well as the number of words 'Length' to read is also to be specified. The maximum number of words that can be read per frame is 16.

- ✓ 5: Statement period: This is the time between sending each Modbus frame. Frames with error feedback will not be sent to the LoRaWan network.

## Modbus master Mode

### Supported Modbus Functions

Function	Type
0x03 (3)	Read Holding Registers
0x04 (4)	Read Input Registers

### Operating mode

All 'Statement Periods', all configured Modbus frames are sent one by one on the RS232 / 485 serial link. For each frame sent and if there are no errors, the read registers are sent to the LoRaWAN network as described in the next section.

### LoRaWAN frame format

Data is sent over the LoRaWAN network in the following format:

Octet :	1	2	3	4	5	6
Donnée :	@Device	@Registers MSB	@Registers LSB	Register1 MSB	Register1 LSB	Register2 MSB
Octet :	7	8	9	10	11	12
Donnée :	Register2 LSB	Register3 MSB	Register3 LSB	Register4 MSB	Register4 LSB	Register5 MSB
Octet :	13	14	15	16	17	18
Donnée :	Register5 LSB	Register6 MSB	Register6 LSB	Register7 MSB	Register7 LSB	Register8 MSB
Octet :	19	20	21	22	23	24
Donnée :	Register8 LSB	Register9 MSB	Register9 LSB	Register10 MSB	Register10 LSB	Register11 MSB
Octet :	25	26	27	28	29	30
Donnée :	Register11 LSB	Register12 MSB	Register12 LSB	Register13 MSB	Register13 LSB	Register14 MSB
Octet :	31	32	33	34	35	
Donnée :	Register14 LSB	Register15 MSB	Register15 LSB	Register16 MSB	Register16 LSB	

**Note:** Only registers read in Modbus will be transmitted to the LoRaWan network

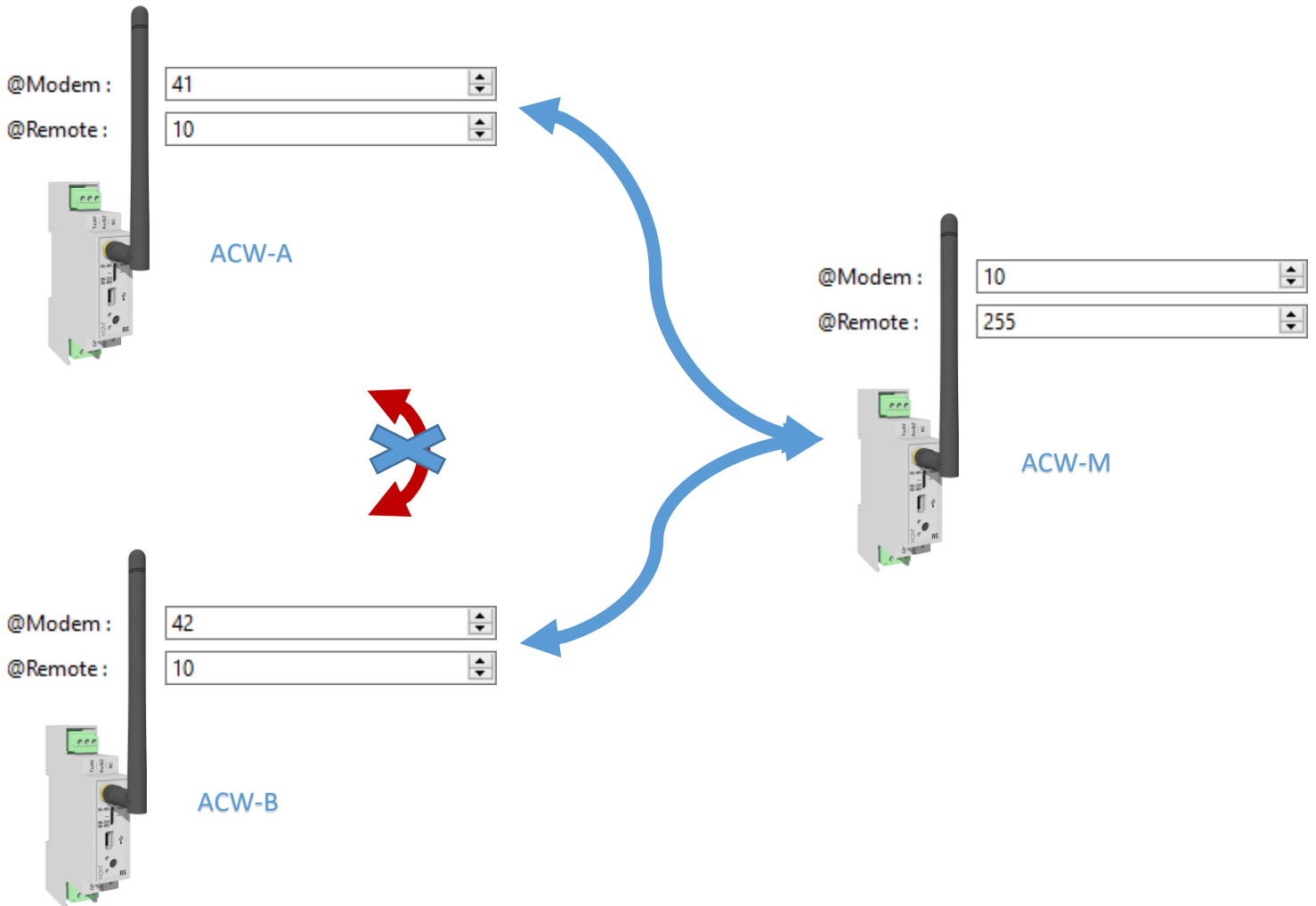


## Configuration example

### a. Bridge Mode (868)

The following information applies to ACW / 868-DINRS and ACW / 868-DINRS +.

There are three ACW-DINRS, which will be noted here by ACW-A, ACW-B and ACW-M (Master). It is desired that ACW-M communicate with ACW-A and ACW-B, but that ACW-A and ACW-B communicate only with ACW-M (ACW-A and ACW-B do not see the frames of one or the other. 'other). The figure below shows a possible configuration.



## b. Slave Modbus Mode (SF8 & 868)

### Attention

For SF8 (Sigfox) versions, setup available for references Software 2.3 Revision B.0 or prior.  
The following information applies to the ACW / SF8-DINRS, ACW / 868-DINRS and ACW / 868-DINRS +.

Conventionally, a PLC (or other Modbus master device) will be directly connected to an ACW-DINRS via an RS232 or RS485 serial link. The controller will write values to address registers 60000 to 60006 to send data to Sigfox.

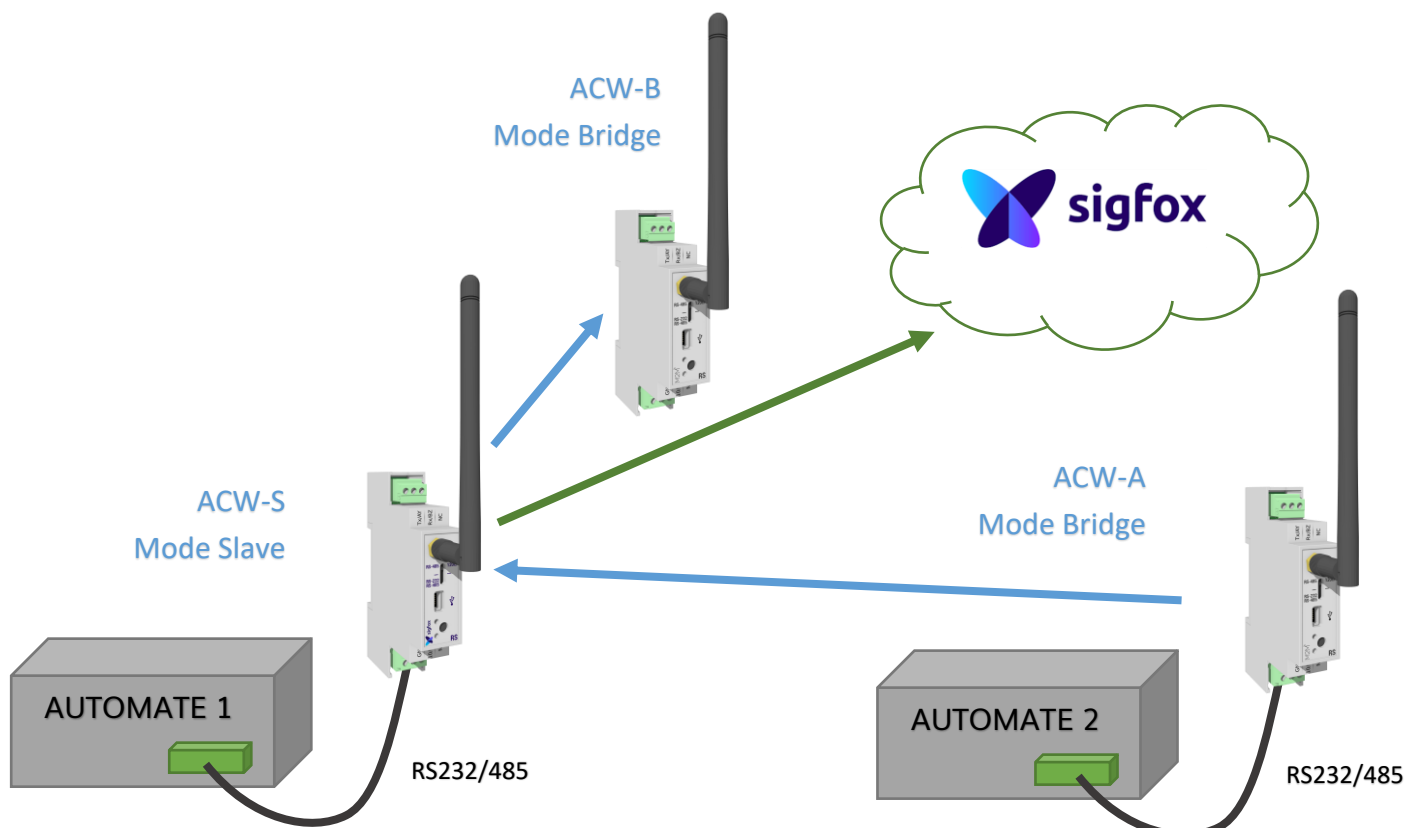
But the possibilities are a little wider, what we try to demonstrate in the following example.

### Material description

There are three ACW-RS, which will be noted here by ACW-A, ACW-B and ACW-S.

The ACW-S (Slave) is an ACW-RS-SF8, which means it will be the only one able to communicate with Sigfox.  
We also have 2 PLCs that we want to connect to Sigfox via the ACW-S.

Both controllers are configured as Modbus master. The PLC 1 is directly connected to the ACW-S and the PLC 2 is remote and is connected to the ACW-A configured in bridge mode. The purpose of the PLC 2 and do the same thing as the PLC 1 but in radio. Below a figure illustrating the different devices. (The role of ACW-B is introduced and described below).



## Functional description

Imagine that you want to send three registers of PLC 1 and 3 registers of PLC 2 every 30 min:

The idea would be to store / write 3 registers of the PLC 2 via radio to the ACW-S in these registers 60000 to 60002, for example every 15 min. Then the PLC 1 would write these registers to the ACW-S via RS232 / 485 in registers 60003 to 60005 by writing a 1 in register 60006 to trigger the sending of data on the Sigfox network.

The ACW-B will be used here to provide local information from PLC 1 and 2. The ACW-B could be connected to another PLC or to a simple control terminal. It would be enough for PLCs 1 and 2 to write to the ACW-S registers 60009/60012 to 60062 to send ACW-B serial link information.

## Configuration description

The ACW-S will be configured in Modbus 'Slave' with the Modbus ID of your choice. Its radio parameters must be the same as those of the ACW-A which is configured in bridge mode. Apart from your serial configuration and radio settings (Baudrate, Channel identical to ACW-S), the default configuration is required for the ACW-A.

The ACW-B meanwhile is configured in bridge mode but requires a radio configuration different from the ACW-S (and thus also the ACW-B). Again, the default configuration is necessary except the radio (Baudrate, Channel). To communicate with the ACW-B, the ACW-S radio settings (registers 60009 and 60010) must be identical to the ACW-B. This configuration can be sent once to the system startup or to each Modbus communication.

**Note:** When writing to registers 60012 to 60062, the ACW-S will automatically change these radio parameters (60009 and 60010) to transmit the local frame and will switch back to the radio parameters configured with the ACW configurator to continue Modbus communication.

**Note:** By default, the radio settings of the ACW-S registers are identical to the parameters configured with the ACW configurator. So, if the ACW-A does not exist in the system, you can configure the ACW-B radio parameters to the same values as the ACW-S and omit the radio configuration phase via Modbus. But in our case, the Radio Modbus communication of the ACW-A can not work properly. The radio data (the payload in the Modbus frame) is analyzed as a Modbus acknowledgment frame by the PLC 2.

## Configuration example

The ACW-S and the ACW-A have the same radio configuration. The ACW-B must have a different radio configuration than the ACW-S and the ACW-A. PLC 1 (or PLC 2 or the two PLCs) will write the radio configuration of the ACW-S allowing communication with the ACW-B.

### 1. ACW-S (Slave)

- @Modem : 7
- Baudrate : 19200
- Channel : 64
- Baudrate radio (reg 60009 via automate 1) : 19200
- Channel radio (reg 60010 via automate 1) : 190

### 2. ACW-A (Bridge)

- Baudrate : 19200
- Channel : 64

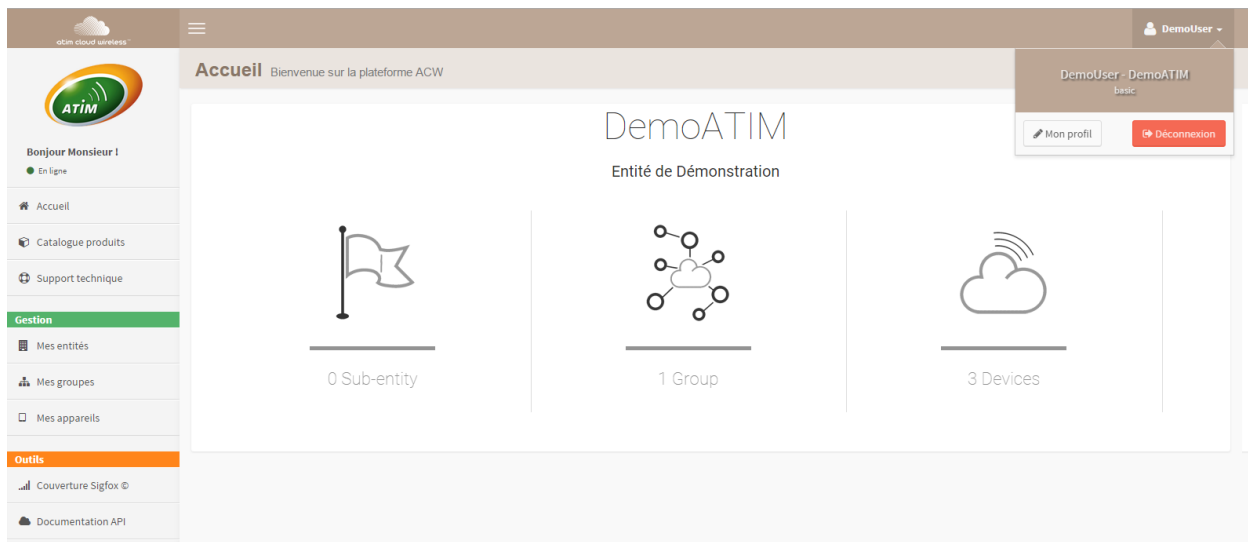
### 3. ACW-B (Bridge)

- Baudrate : 19200
- Channel : 190

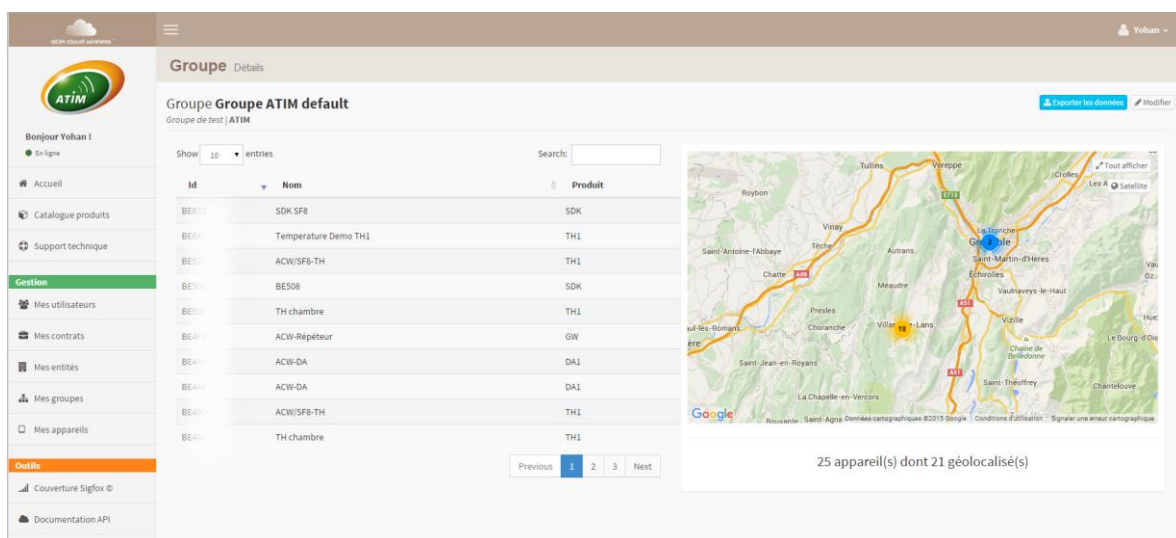
## Data access on the web (Sigfox and LoRa solutions)

### a. Viewing modems on the ACW platform

Log in to the web platform <http://acw.atim.com> to access your devices and view your data. Your login details will be provided by email to the shipping of your order.



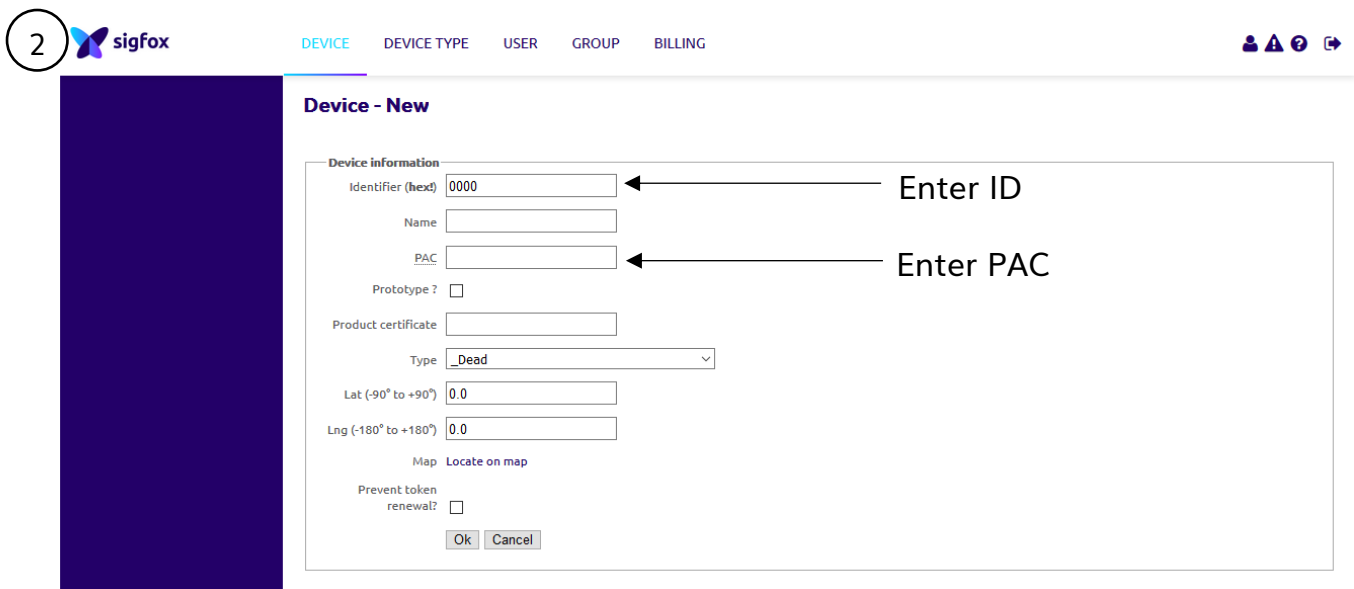
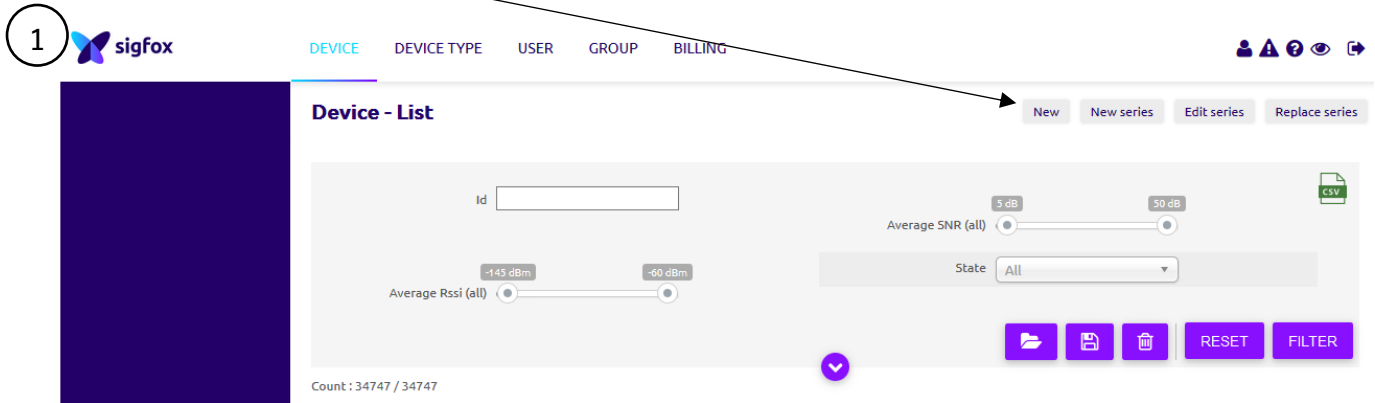
In the page "My groups" you will find all your geo devices located according to your installation.



## b. Register the modem on the SIGFOX network

To register the modem with the SIGFOX network, open an Internet browser and go to <https://backend.sigfox.com>.

Press "New" to add your device

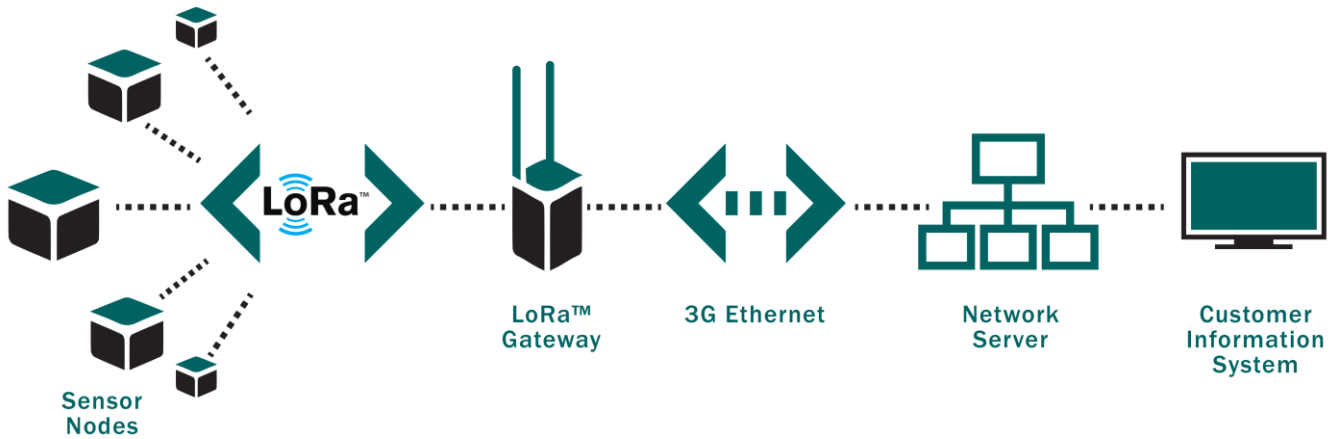


Your product is now being imported into your SIGFOX account. The import may take several hours.

c. Register the modem on the LoRaWAN network

A Join request to a LoRa network is issued when the product is powered on. The device must first be provisioned on the required network, at one of the operators (Orange or Objenious for example) or existing private gateways.

A new pairing request can be made by re-energizing the device (turn off the power for 10 seconds and put it back).



## Troubleshooting

### a. The modem cannot be configured via USB or the configuration tool page does not refresh

- Check whether the power supply is correctly connected to the modem
- Check whether the light is flashing
- Make sure that Windows Update is activated, the PC is connected to the Internet and driver installation has completed. Also make sure that you have an up-to-date version of the configuration tool (File menu -> Update).
- Replace the USB cable
- If you receive an 'Error writing configuration', unplug the USB cable and plug it back in

### b. Radio data not received

- Check whether the power supply is correctly connected to the modem
- Check whether the modem has been registered on the network
- Check whether radio network coverage is available

### c. Modem LED is not flashing

- Check whether the power supply is correctly connected to the modem
- Configure the modem using the USB configuration tool



## Technical support

For any information or technical problem, you can contact our technical support on this page:  
<https://www.atim.com/en/technical-support/>