atim cloud wireless™
PRODUCT LINE

# Atim Cloud Wireless

# LoRa-LoRaWAN repeater

# LW8-GW

## User Guide


Concerned models:

ACW/LW8-GW

LoRaWAN™

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# TABLE OF CONTENTS

## This user guide applies to the below references:

| Product reference | Product version |
|---|---|
| ACW/LW8-GW | A.0 |

## Document version history

| Version | Date | Description | Author |
|---|---|---|---|
| 0.1 | 22/01/2021 | User Guide creation | YLB |
| 1.0 | 29/01/2021 | Minor corrections | FR |
| 1.1 | 24/03/2021 | Correction of the frame's decoding section | YLB |

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## Trademarks and copyright

# Declaration of compliance

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

CE

**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

## a. 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.

## b. 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 be submerged under any circumstances.

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.

### c. 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 authorization required) for industrial, scientific, and medical applications.

# Prelude

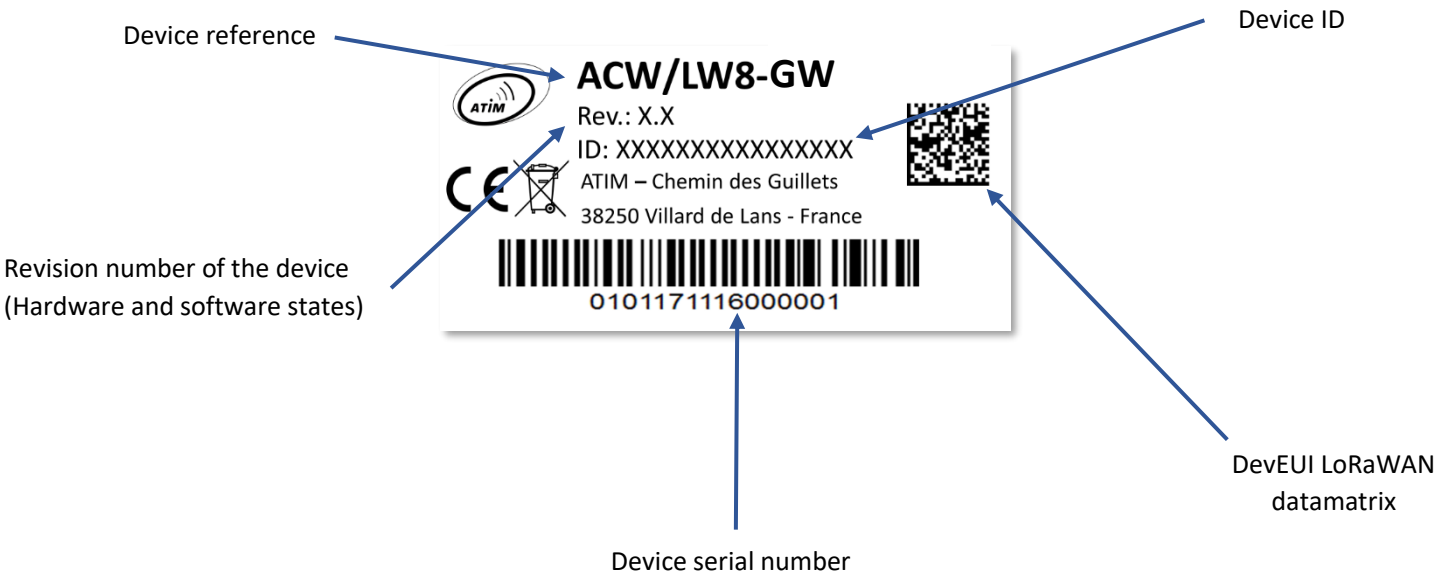
This guide describes the features of the ATIM ACW / LW8-GW product. It explains how to use this Lora LoRaWAN repeater and how to install it.

## Technical characteristics

| **General** | |
|---|---|
| Dimensions | 177 x 55 x 55 mm |
| Antenna | Integrated (¼ wave) |
| Temperature | -20°C to +55°C (operating mode)<br>-40°C to +70°C (storage) |
| Mounts to | Wall, tube or pole, DIN rail |
| Housing | IP 65 |
| Weight | 210 g |
| **Power Supply** | |
| ACW/LW8-GW | 10-30Vcc (power supply 220Vac / 12Vdc included) |
| Consumption | @ 3.3V : |
| Tx mode | 50 mA |
| Rx mode | 20 mA |

## Product identification

The ID of the repeater is visible on the exterior label on the back of the device:



Each product in ATIM's ACW range has a QR Code label visible either on the side or on the front of the product.


This QR code can be easily read with any 2D barcode reader application on a smartphone.

Reading this code indicates the following information:

ATIM|ACW/LW8-GW|A.0|210122|1|1.0|0.1|70B3D59BA00003A4

Interpretation

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ATIM | ACW/LW8-GW | A.0 | 210122 | 1 | 1.0 | 0.1 | 70B3D59BA00003A4 |
| Manufacturer name | Product reference | Version of the revision | Manufacturing date | Manufacturing site | Hardware version | Application firmware version | LoRaWAN DevEUI |

# Operating mode

L'ACW/LW8-GW is a LoRa / LoRaWAN repeater that works exclusively with ATIM devices.

## Operating principle

When an ATIM device is not able to join the LoRaWAN network (private or operated), the ACW/LW8-GW repeater allows to overcome this issue.

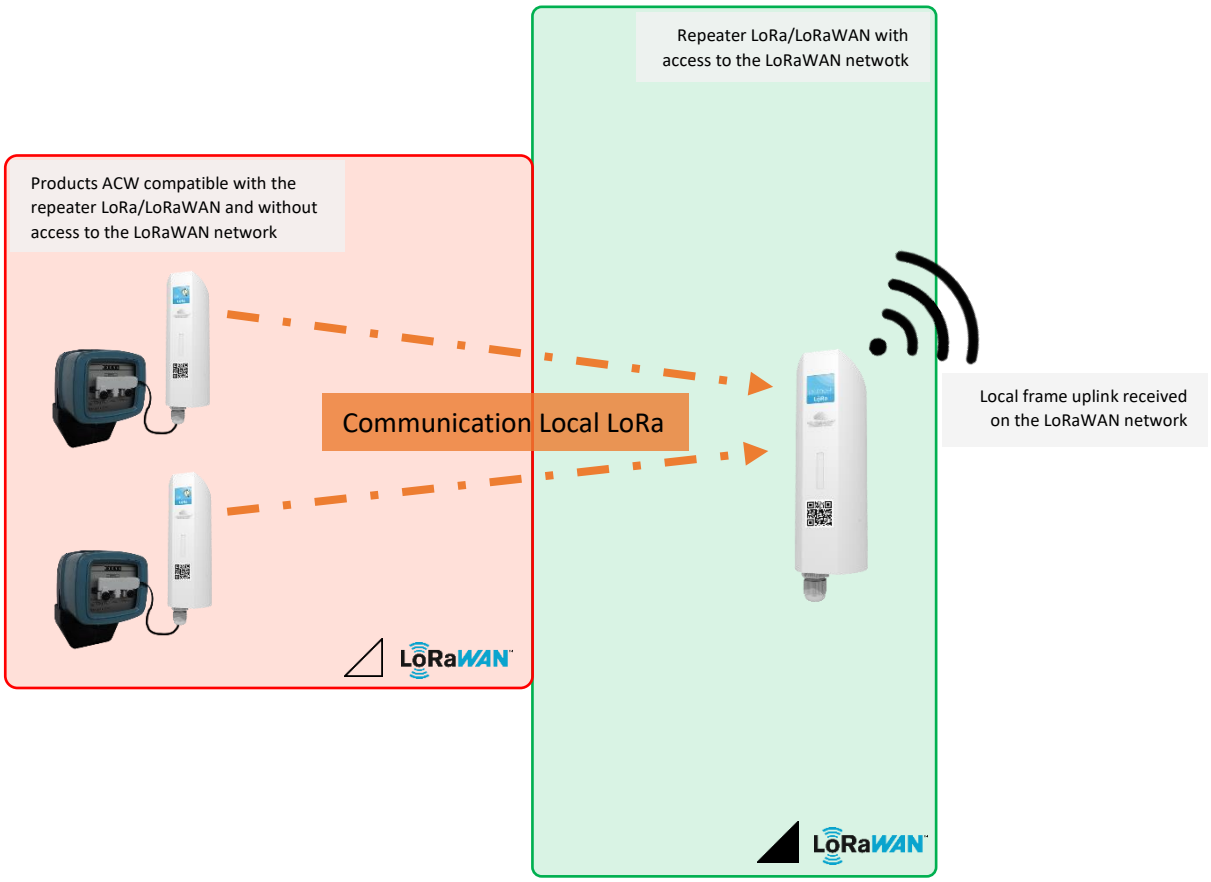



*Figure 1 : operating principle*

The ATIM product that must be repeated must be an ATIM product that is compatible with this repeater (see Limitation chapter to check the product compatibility).

Instead of going through the LoRaWAN network to send its business frames, the product that does not have access to the network will then modulate its LoRa messages to a repeater placed nearby. A local point-to-point communication is then established between the product to be repeated and the repeater.

As soon as the repeater receives a local frame, it transfers it to the LoRaWAN network that it previously joined: that way, the frame of the product is well modulated and received on the LoRaWAN network.

**Important observation**

The repeater is not limited to one repeating device. Several products can operate with the same repeater. The only limitation is the bandwidth (If two devices transmit their local frames at the same time, there will be a collision because all the equipment involved in the repetition configuration are operating with the same radio configuration).

## Installation and commissioning

- Repeater installation

For the product to be repeated, the ACW / LW8-GW Repeater must indeed be provisioned on the LoRaWAN network and that it has joined the network. Provisioning is conventionally done in OTA (Over the Air) using information from DevEUI, JoinEUI and AppKey.

- Configuration of the device(s) to be repeated

Once the repeater is installed, provisioned, and has joined the network, the product must be configured so that it sends its business frames locally if no connectivity to the LoRaWAN network is found.

Indeed, this operating mode is not the default mode. The product must be configured to activate this compatibility mode. This is done through the ACW configurator available here:

https://www.atim.com/en/downloading/

Once connected to the product, all you must do is change its radio parameters by applying the **"LoRa / LoRaWAN Repeater Mode Compat Mode"** configuration as indicated below:

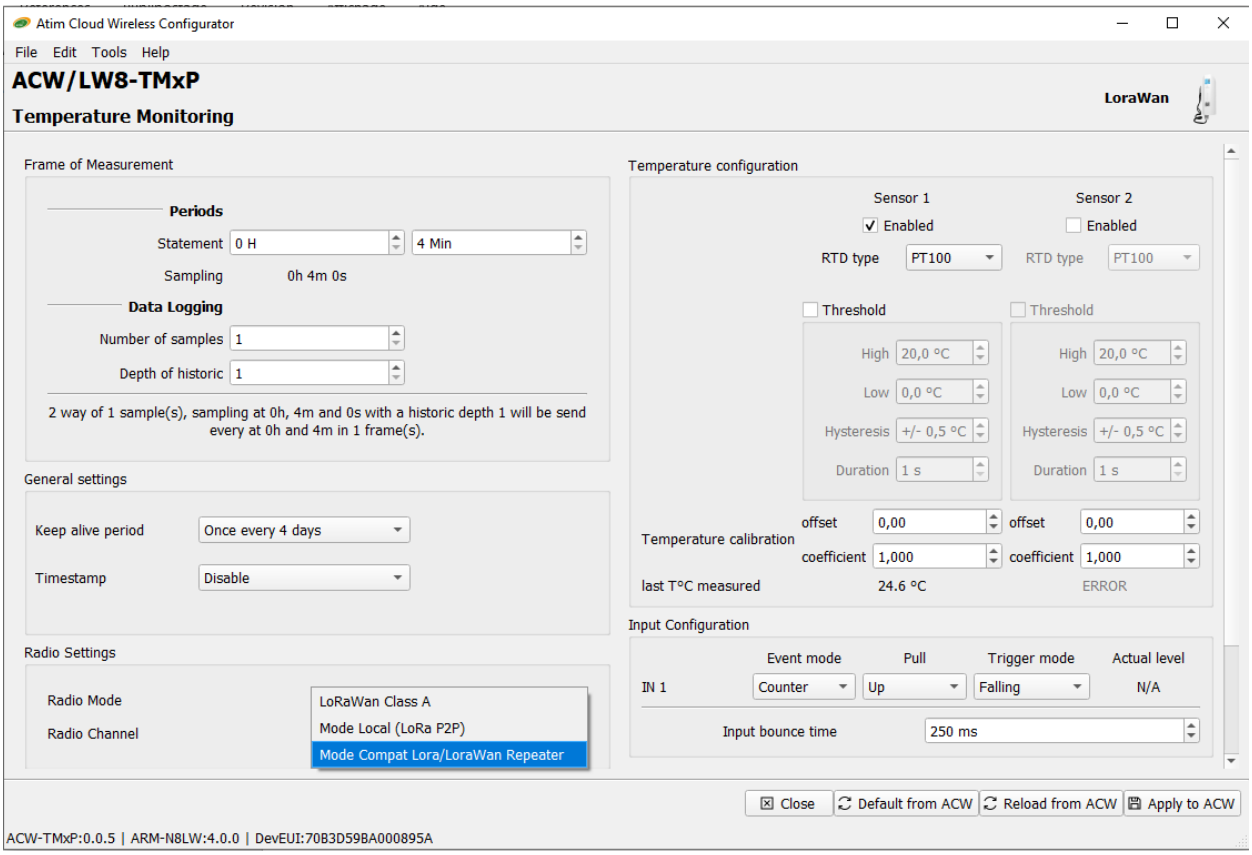



*Figure 2 : Configuration of the device to be repeated to activate the repeater compatibility with the LoRa/LoRaWAN repeater*

Apply the new configuration by clicking on « ***Apply to ACW*** ».

The device is now compatible with the installed repeater.

- Frame decoding

| Reserved (0x01) | Reserved (0x00) | Reserved 0x00) | Repeated Product last DevEUI byte | Repeated Product before last DevEUI byte | Reserved (0xFF) | Reserved (0xFF) | Repeated product payload |
|---|---|---|---|---|---|---|---|

*Figure 3 : Payload decoding sent by the repeater*

The repeater adds a header before sending the received local frame. This header allows you to know to which device the payload is attached.

*Example :*

A product compatible with the repeater (devEUI: **70B3D59BA000895A**) sends the "**A0080885180850**" frame locally.

The frame received on the LoRaWAN network will then be: "**0100005A89FFFFA0080885180850**".

# Limitation

- General limitations

  - Currently, the repeater does not allow the downlinks to be transferred to the equipment (s) to be repeated

  - If a device to be repeated is within “radio range” of several repeaters, each repeater will transfer the local frame (it will therefore be sent in duplicate).

- Products compatible with the repeater

  Only the following products can work with the LoRa / LoRaWAN repeater (by enabling LoRa / LoRaWAN compatibility mode in the product settings):

  - ACW/LW8-MR4 (4 inputs pulse metering or state of dry contacts)
  - ACW/LW8-TMxP (2 inputs PT100/1000 + 1 pulse metering or state of dry contacts)
  - ACW/LW8-LVL (Silo level, river, waste bin, etc…)
  - ACW/LW8-TCR (Temperature and humidity | Cold rooms)
  - ACW/LW8-THAQ (Temperature + humidity + CO2 + VOC)

# Technical support

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