# AoFrio

PRODUCT GUIDE

# Gateway
# Product Guide

Document # AO127_i11

Issue date: March 2025

AoFrio Ltd

**P:** +64 9 477 4500 **E:**

# Contents

# Warnings

| Warnings | Important do's and don'ts |
|---|---|
| **Installation**<br>The Gateway is mains electricity powered and therefore the installation should only be performed by people that have the appropriate qualifications in the country of installation.<br><br>The Gateway must only be installed and configured by trained and authorized staff. Please follow the instructions provided in this Guide otherwise the warranty may be void. | ⚠️ **Warning! Risk of electrocution**<br><br>• Only authorised and appropriately qualified staff should install the Gateway.<br>• Mount the Gateway in an environment that is not subject moisture or high humidity.<br>• Use the screw type identified in the mounting instructions. |
| **No serviceable parts**<br>There are no serviceable parts inside the Gateway. Do not attempt to open the housing. Opening of the electronics housing, altering, or modifying the Gateway will invalidate the warranty and damage the device. | • There are no serviceable parts inside the Gateway.<br><br>• Do not open the housing. |
| **Fit for purpose**<br>The Gateway must only be used for the purposes and functions described in this manual. While AoFrio may provide technical support on suitable applications and configurations of the Gateway (where such a relationship may exist), no liability, responsibility or risk is accepted in determining if the Gateway is fit for purpose for any particular application.<br><br>No liability, responsibility or risk is accepted by AoFrio for the operational function of any particular installation or configuration. | • The Gateway must only be used for the purposes described in this manual. |
| **Cellular connection, ownership, and activation**<br>The Gateway requires a cellular connection, either LTE-M or 2G to self configure and upload data to the Cloud.<br><br>A cellular connection might not be available in all locations. The presence of LTE does not guarantee LTE-M signal being available. LTE-M is intended for low bandwidth Internet of Things (IoT) products where LTE is for mobile high bandwidth applications.<br><br>Because this device is shipped in a non-active state, ownership is established as part of the setup process where AoFrio adds the device and owner to its database. Permission to manage pairing with other AoFrio hardware can be granted through User Roles within AoFrio's User Manager software.<br><br>To use AoFrio's Field app as part of the configuration process, the Gateway needs to be activated to the database that you are working in and registered in the Cloud. If not activated, then it's possible you won't be able to see the device in the Field app's list of available devices. | • The Gateway requires a clear cellular connection<br><br>• Each device needs to be registered with AoFrio as part of setup and activated to the correct database<br><br>• Pairing requires additional user role permissions through User Manager. |

| Warnings | Important do's and don'ts |
|---|---|
| **Correct disposal**<br><br>The Gateway is subject to EU Directive 2012/19/ EU (WEEE) for e- waste. It may also be subject to other national legislation for the safe disposal of e-waste.<br><br>The Gateway must not be disposed of in municipal collections, it must be disposed of through an approved WEEE collection point.<br>Alternatively, Gateway may be returned to an authorised AoFrio distributor at the end of its working life. Penalties may be applicable for incorrect disposal, as specified by national legislation.<br><br>The device contains a lithium battery. This may be hazardous if incinerated or physically damaged. The circuit board may contain hazardous substances which could affect health and the environment if disposed of incorrectly.<br><br>Once the device's battery is depleted, remove the device from equipment and dispose of it according to local requirements. Leaving Gateway installed in the equipment presents risks due the potential for battery housing corrosion leading to chemical leakage. | **Warning!** The Gateway devices contain a lithium battery. This may be hazardous if incinerated or physically damaged.<br><br>• Do not leave an old Gateway installed in field equipment after it has reached its end of life.<br><br>• The Gateway must not be disposed of in municipal collections; it must be disposed of through an approved e-waste collection point. |
| **Vibration and impact**<br><br>The unit must be installed in such a way as to be protected from vibration and impact during operation. Exposure to impact and mechanical shock, either in operation, installation, transportation, or storage, may damage electronic circuits and housing components, leading to premature failure, and may cause the Gateway to become unsafe. Damage caused by impact is not covered by warranty. | • Do not drop or install the Gateway in locations with vibration. |
| **Continuous development**<br>AoFrio undertakes to continuously develop and improve products and services. The design and specification of Gateway and contents of this manual are subject to change without notice.<br><br>While every endeavour is made to ensure that all specifications and documents are current and complete, AoFrio accepts no liability, responsibility, or risk due to omissions or changes caused by continuous improvement and design changes. Users of this manual should verify that they have the latest version of the information (published on the AoFrio website www.aofrio.com) before proceeding. | • The design and specification of the Gateway is subject to change and new firmware may be released without notice. |
| **Mains connection**<br>Installation should only be done by a qualified technician. | Only authorised and appropriately qualified staff should connect mains power |

# Introduction

AoFrio's Gateway is an easy-to-use and secure IoT communications hub for single asset monitoring and remote control. It provides automated data acquisition for one asset from a connected AoFrio SCS Controller or Monitor installed within your equipment by connection to AoFrio's secure iQ Cloud portal.
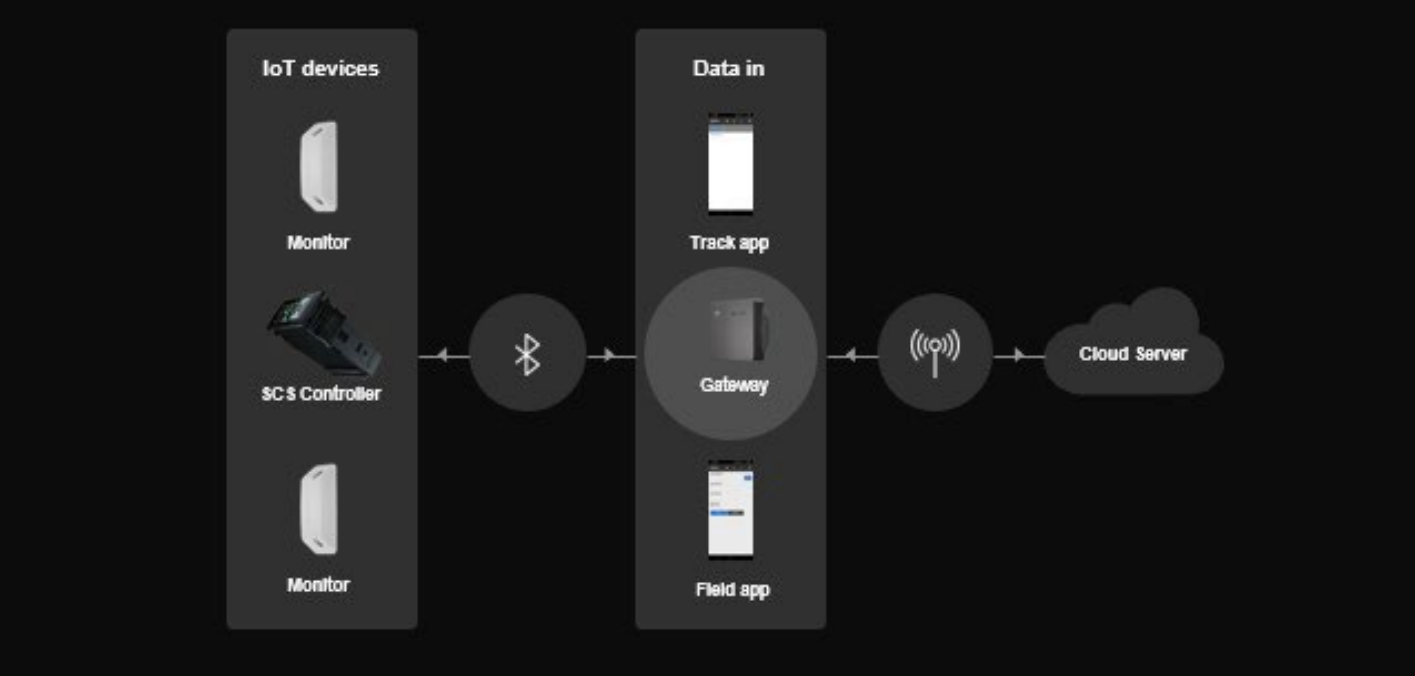


Gateway expands the portfolio of data collection options available within AoFrio's IoT ecosystem by adding to and enhancing all the intelligence and data collection opportunities in its existing AoFrio Track app, and SDK portfolio, with a robust 1-1 Cloud connected communications hub. Connectivity to the Cloud over a cellular network also eliminates the need for asset managers to make site visits to acquire data from the asset fleet or update the firmware on the device.

- Simplified installation

- Increased battery backup and data capacity

- Location tracking via Wi-Fi positioning

- Cloud connectivity using LTE Cat M1 with 2G fallback

- BLE connectivity with a single asset

- Over the air updates for firmware and parameters

- Seamless 1-1 pairing with AoFrio's SCS Controller or Monitor devices

# How it works

Gateway is an advanced communications gateway that collects data from the AoFrio IoT device within your asset and uploads it to the AoFrio Cloud Platform. It connects to the entire suite of AoFrio IoT devices using Bluetooth. It then uploads all the data to the AoFrio Cloud using a cellular data connection.

# Key features

## One-to-one asset management

A dependable 1-1 IoT communications hub for new and retrofit assets that offers remote and onsite asset management with daily data uploads, alarms, and remote monitoring.

## Simplified installation

Gateway delivers a design that is both robust and simple to install. The power connection is set up for direct wiring into the equipment's existing AC power. Mounting is also simplified with fixed screw holes as part of the casing and a larger surface area for adhesive tape. The casing is also more durable to protect the sensitive electronic components inside

## Location tracking

Wi-Fi positioning is used to help determine the location of the Gateway, and therefore also the cooler it is paired with. WiFi is not used to transfer data, i.e., Gateway is not capable of establishing a WiFi connection.

## On site verification

By connecting to AoFrio's Field app an installation or service technician can test and verify the Gateway's status and data upload to ensure that the IoT system is fully functional at the location where the equipment is being used.

## Battery

The device has a rechargeable internal battery that provides backup if the external power supply is removed or interrupted. The battery backup enables cooler location updates for up to 1 month.

## Communications

This device is equipped with 2 different types of radio connectivity:

- Bluetooth, for connectivity to AoFrio IoT devices
- Cellular, for internet access to enable data uploads to the AoFrio iQ Cloud portal.

## Cellular connectivity

Gateway is equipped with a global cellular module that provides connectivity using LTE Cat M1 with a 2G fallback. Cellular SIMs are installed at the time of manufacture and the data plan is managed by AoFrio.

## Bluetooth

The device is fully compatible with the AoFrio IoT system and uses Bluetooth to acquire data from a single asset.

## Remote Setpoint control

For seasonal changes and on demand energy savings, you can change the Setpoint Temperature of a cooler equipped with a SCS Controller and a paired Gateway using the remote asset management feature in the AoFrio iQ Cloud portal.

## Increased data capacity for reporting

Gateway also offers enhanced data capacity for reporting and location mapping in AoFrio's iQ Cloud Portal. This will enhance the ability for equipment managers to track and monitor their fleet and individual assets remotely

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## Product label & QR code

The Gateway product identification label contains product information and a QR code.

These include the model and part number as well as all compliance requirements and marks. The QR code can be scanned by users to connect to the device using the AoFrio IoT apps and digital toolkit. An additional copy of the QR code is supplied as a sticker for mounting on the asset exterior.



Model : **Gateway**
PN : **GW-A1-101**
Input : 90-240V AC, 50-60Hz, 4W

FCC ID : 2AHCE-GW1          IP54
Contains FCC IDs:XMR202005BG95M5,
XMR20211108FC41D
IC : 21145-GW1
Contains ICs: 10224A-2020BG95M5,
10224A-202111FC41D

Made in Vietnam

**NOM**



P125E00001

# Installation, commissioning, and verification

| Stage | Details |
|---|---|
| **Shipping** | Gateway ships from the factory in a deactivated state which ensures that its backup battery is not in use and there are no radio emissions during transport. The device only activates when external power is applied to it.<br><br>The SIM card installed in each device is appropriate for the country where it will be used. |
| **SIM card activation** | Typically, the SIM card will be activated during the Gateway and/or asset supply chain process.<br><br>If the SIM remains inactive prior to the asset's field installation, it will be activated if the Gateway is paired with a device using the AoFrio Field app. This may take several days depending on the scenario and timing. Refer to the **Gateway Installation Guide.** |
| **Installation & mounting** | Refer to the **Gateway Installation Manuals.** |
| **Commissioning & configuration** | On first power-up Gateway will attempt to connect to the cellular network and the AoFrio Cloud and download configuration and commissioning information. This will happen automatically and will allow the Gateway to know which AoFrio IoT device to track.<br><br>Only AoFrio IoT devices associated with the same customer database will be allowed to connect to the Gateway.<br><br>Gateway will also check for any new firmware updates at start up, and then every 24 hours. |
| **Verification** | The AoFrio Field app can be used to verify the correct operation of Gateway. Refer to the **Gateway Installation Manuals**. |

## Operating modes

### Normal operation

During normal operation, Gateway will perform the following tasks:

- Check-in to the AoFrio iQ Cloud every 24 hours to determine if new firmware or configuration is available for download.
- Acquire data from the AoFrio IoT device that it has been paired with. Data will be uploaded to the AoFrio iQ Cloud periodically, typically at least every 24 hours.
- Listen for alarms from the paired AoFrio IoT device and upload data to the AoFrio iQ Cloud immediately if high priority alarms have been configured.

### Battery powered operation

The device has a rechargeable internal battery that is used for backup when external power is removed.

- If fully charged the backup battery will continue to enable cooler location updates for up to 1 month.
- When operating from the backup battery the Gateway will continue to acquire data from IoT devices and send data to the AoFrio iQ Cloud until the battery is depleted.
- Once the battery is depleted the Gateway will turn off.
- Gateway will reactivate once reconnected to external power and then acquire and upload data from the paired IoT device as normal.
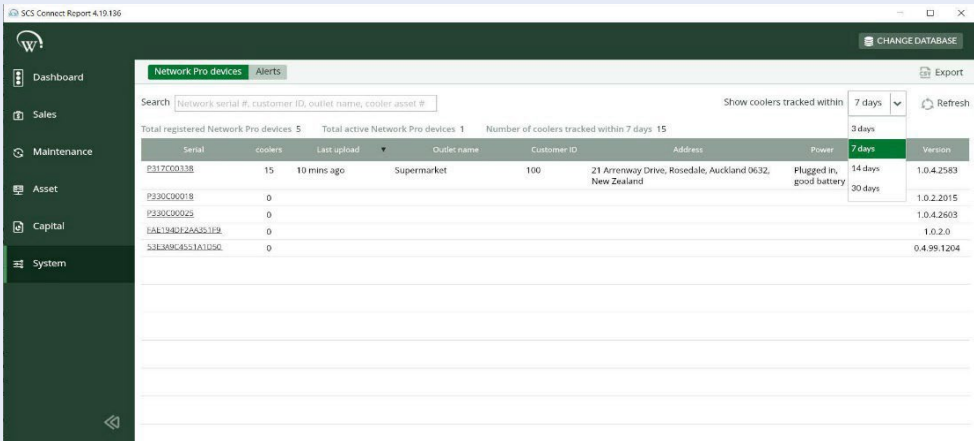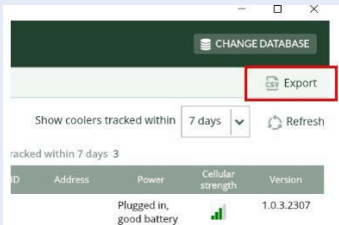- The backup battery will take 5-6 hours to fully charge.

# Report app

The Report app includes features that enable the management of Gateway devices and the IoT devices that it is connected to:

- See the Gateway details including the outlet where it is installed, the installation address, when it last uploaded data to the AoFrio iQ Cloud and other details.

- List the asset the Gateway is paired with and click through to the asset's details.

- Search Gateway devices by **Network Pro serial #**, **Customer ID**, **Outlet name** or **Cooler asset #**.

For full details of functionality, go to the section **System**, then click **Tutorial Videos** within the Report app.

- **Access** - Access to Gateway features inside Report app are controlled by your Role settings within the AoFrio User Manager app. If your Role type does not include the Gateway permissions, then you will not have access to the feature.

- **Version** - Gateway features are available in version 4.19.122 or later of the Report app. Check the version from the banner within the Report app itself.
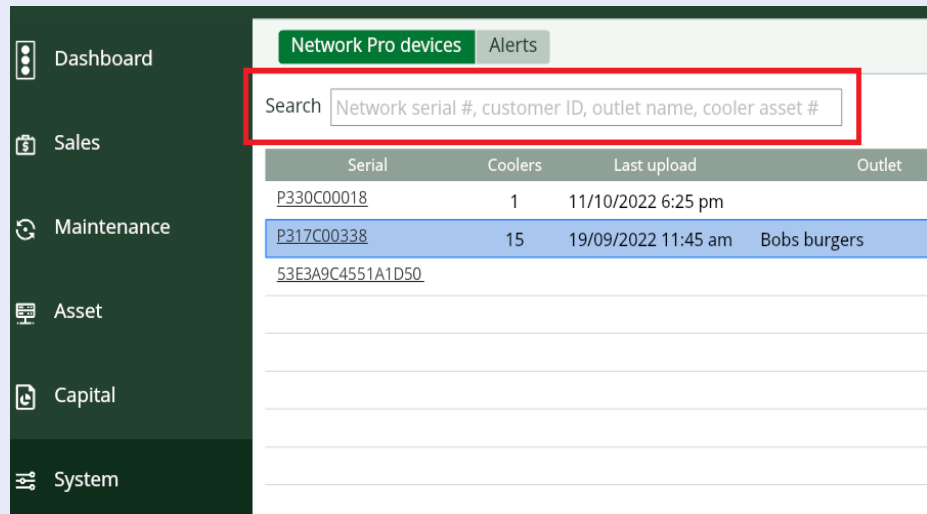
| Report app feature | Details / Screenshots |
|---|---|
| Access all the Gateway devices in the customer account. | 1. In the left-hand menu, click **System**, then click AoFrio Gateway**.** |
| List of all Gateway connections in the customer account | 1. In the left-hand menu, click **System**, then click **AoFrio Network Pro**.<br>2. Select a **Network Pro serial number** to see details for the Gateway and all IoT devices it has connected to.<br>Details include:<br><ul><li>**Total registered Network Pro (Gateway) devices**</li><li>**Total active Network Pro (Gateway) devices**</li><li>**Number of coolers tracked within the time period selected**</li><li>**Power**</li><li>**Cellular Signal Strength**</li><li>**Firmware Version number**</li></ul>3. (Optional) Filter connected devices. By default, the list will show the devices it has connected to in the past 30 days, but you can adjust this to show just the last 3, 7, or 14 days. A checkbox is also available to show ALL coolers that the Gateway has connected to in its life. You can also filter by:<br><ul><li>**Last upload** – the last time that Gateway uploaded data for the cooler to the AoFrio iQ Cloud.</li><li>**Last data** – the timestamp of the last datapoint that was received from the cooler.</li></ul> |
| Export option that lists all Gateway devices and the coolers they have tracked as a downloadable CSV file. | 1. In the left-hand menu, click **System**, then click **AoFrio Network Pro**.<br>2. Click **Export** to generate a CSV file.<br> |

| Report app feature | Details / Screenshots |
|---|---|
| Search by Network serial number, customer ID, outlet name, or cooler asset number | 1. In the left-hand menu, click **System**, then click **AoFrio Network Pro**.<br>2. Select a **Network Pro serial number** to see details for the Gateway and all IoT devices it has connected to.<br>3. Enter your search into the **Search** box. The list of Gateway's will dynamically update as you add additional search criteria.<br><br> |

# Over-the-Air (OTA) Firmware updates

AoFrio will update the Gateway firmware when necessary. Firmware updates are performed Over-the-Air (OTA) via the cellular network, enabling new functionality, improving product performance and/or resolving any product issues.

AoFrio Support staff will only deploy new firmware after comprehensive testing has been completed. Customers may not be notified of new firmware deployments ahead of time.
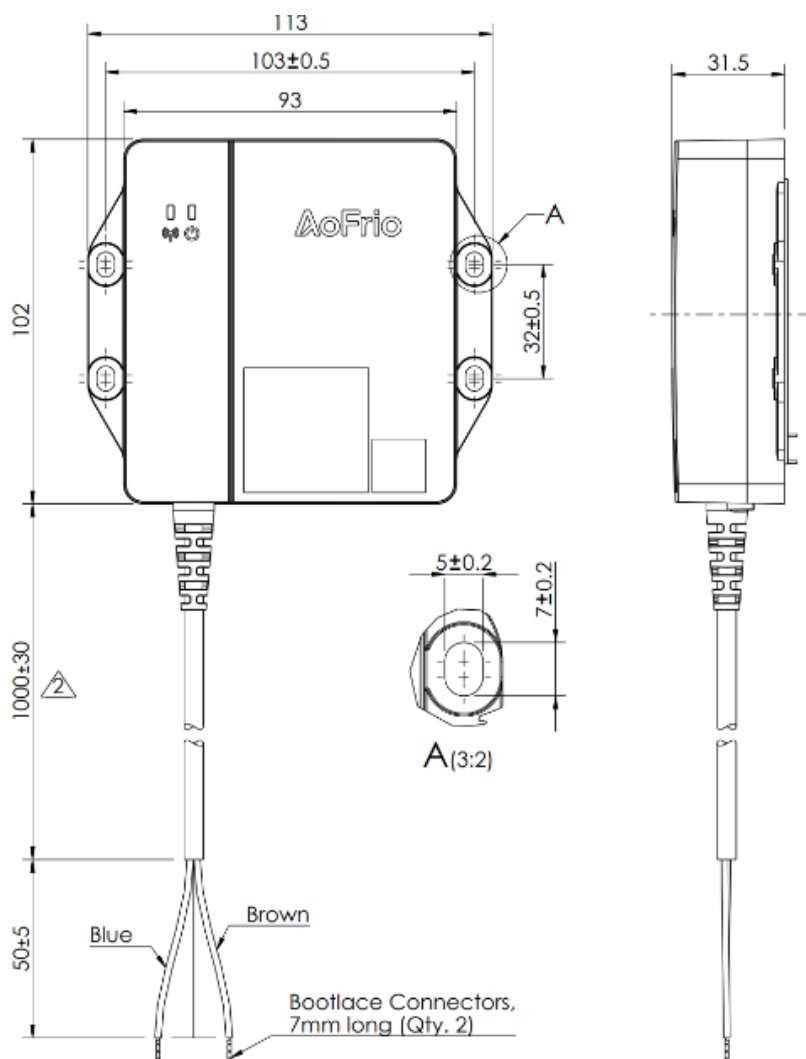
Gateway will check the AoFrio Cloud every 24 hours for firmware updates and will download any new version of firmware that is available.

During an OTA update:

- Gateway will not be servicing other tasks i.e., reporting of alarms and sending data from AoFrio IoT devices to the AoFrio iQ Cloud will be deferred until the firmware update has completed.

- If external power is lost during the OTA update process the cellular connection could be dropped and when external power is reconnected the OTA process will restart again.

Once Gateway has downloaded the new firmware it will restart and be offline for a few seconds before checking into the AoFrio iQ Cloud again.

## Dimensions

# Technical specifications

| Specifications | |
| --- | --- |
| **Power Supply** | Input 90-240V AC, 50/60Hz, 4W |
| **AC Connections** | 2-core double-insulated 1m cable with ferrule ends |
| **Cellular communications** | LTE Cat M1 with 2G (GPRS) fallback |
| **Cellular bands** | North America (US & Canada): B2, B4, B5, B12, B13, B25, B26<br><br>European Union: B1, B3, B8, B20, B28 |
| **Bluetooth** | Bluetooth (BLE 5.4) |
| **Wi-Fi** | 2.4GHz, 802.11 b/g/n |
| **Battery*** | 1150mAh, 3.7V, Lithium-Polymer |
| **Status LEDs** | 1 x Power; 1 x Communication |
| **Mounting method** | Screws or double-sided adhesive. Use 2 to 4, 8G (4.2mm) screws if screw mount is required. Screw type depends on material. |
| **Ingress protection** | IP54 |
| **Operating temperature*** | -20°C to +55°C (-4°F to 131°F) |
| **Storage temperature** | -20°C to +60°C (-4°F to 140°F) |
| **Weight** | ~256g (~9oz) |
| **Factory**<br><br>NOTE: Manufacturer is AoFrio | East West Industries Vietnam LLC<br>Address: No.21 VSIP II, Dan Chu Street, VSIP II, Hoa Phu Ward, Thu Dau Mot City, Binh Duong Province, Vietnam |
| **Approvals**[†] | CE  FC  ⊘  NOM  c**RU**us |

* Backup battery charging only occurs between 0°C and 40°C

† NOM, CE, FCC, RCM, UL Recognised, other approvals pending

## IC
- IC:21145-GW1
- Contains ICs:10224A-2020BG95M5 and 10224A-202111FC41D

## EU-RED

AoFrio Ltd. hereby declares that this equipment are in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. Please contact AoFrio Limited for the complete EU Declaration of Conformity. info@aofrio.com

- 2.4G WLAN: 2412-2472MHz, Max output power: 18.50dBm

- BLE: 2402-2480MHz, Max output power: < 8dBm

- GSM 900: 880-915, 925-960MHz, Max output power:33dBm

- GSM 1800: 1710-1785, 1805-1880MHz, Max output power:30dBm

- LTE FDD Band 1:1920-1980, 2110-2170 MHz, Max output power:23dBm

- LTE FDD Band 3:1710-1785, 1805-1880 MHz - Max output power:23dBm

- LTE FDD Band 8:880-915,925-960 MHz - Max output power:23dBm

- LTE FDD Band 20:832-862,791-821 MHz - Max output power:23dBm

- LTE FDD Band 28:703-748,758-803 MHz - Max output power:23dBm

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.

EU Importer:     Not applicable
Address:          Not applicable
Notes:              EU importer and address are not valid at the moment and will be updated in newer versions.

## FCC warning
- FCC ID: 2AHCE-GW1
- Contains FCC IDs: XMR202005BG95M5 and XMR20211108FC41D

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.

- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio/TV technician for help.

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter, End-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance.

## ISED warning

• IC:21145-GW1

• Contains ICs:10224A-2020BG95M5 and 10224A-202111FC41D

This device complies with Innovation, Science and Economic Development Canada's licence-exempt RSS standard(s):

Operation is subject to the following Two conditions : (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil contient des émetteurs/récepteurs exemptés de licence qui sont conformes aux flux RSS exemptés de licence de Innovation, Science et développement économique Canada.

L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

## RF exposure

RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 23 cm from all persons.

Déclaration d'exposition Attention: Cet émetteur doit être installé pour fournir une distance de séparation d'au moins 23 cm de toute personne.

## IFETEL

- IFT WEAOGA25-00535

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) es posible que este equipo o dispositivo no cause interferencia perjudicial y (2) este equipo o dispositivo debe aceptar cualquier interferencia, incluyendo la que pueda causar su operación no deseada.

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AO127, issue 11, March 2025