AoFrio®

SCS 800
Cellular Connected Controller

AoFrio's cellular connected controller delivers an always-on solution with on-site and remote control enabling you to get the most value from the AoFrio IoT ecosystem.

- Real time alerting via always-on cellular connectivity
- Rugged IP54 rated housing
- Advanced refrigeration parameters
- Safety isolated power supply
- Variable speed compressor control
- Variable speed motor control (In development)
- Energy measurement of entire cooler

- Wi-Fi / Cellular geolocation
- 1 month+ backup battery
- Zero voltage relay switching
- Optional external displays^
- Accelerometer for motion detection
- High gain internal cellular antenna
- Mounting bracket for easy installation

Product Models

Model	Reference SKU	Modem options	Outputs	Inputs
SCS 800	SCS-A1-101	LTE Cat M1	8	5
	SCS-A1-201	LTE Cat 1 bis	8	5

Refrigeration Specifications

Input voltage and current	90-240V AC 50/60 Hz	**Refrigerant compatibility**	HFC, CO2, Hydrocarbon (per IEC 60335-2-89)
Sensor inputs	5 x Sensor inputs: NTC, PTC, Digital e.g. Door Switch	**Ingress protection**	IP54
Control outputs	2 x Relay: • 1x UL: 7.2FLA & 34.8LRA, IEC: 8A • 1x UL: 3A, IEC: 3A 2 x 0.4A (solid state triac) 3 x PWM: LED Lighting 1 x VSC control (12V, 25mA)	**Operating temperature**	IEC -20°C to +55°C (-4°Fto +131°F) UL -20°C to +50°C (-4°F to +122°F)
		Storage temperature	−40 °C to +85 °C (−40 °F to 185 °F)
Voltage outputs	1 x 5V DC output for powering displays, gas sensors, PIR etc.	**Dimensions**	L:155.56mm x W:116.4mm x D:41.1mm
Connectors	Faston + Stocko	**Weight**	350g (0.77lb)
Rechargeable backup battery	1 month+ BLE and Cellular connectivity	**Approvals**	*Approvals pending

^External display sold separately

Radio Specifications

Bluetooth	BLE 5.4; 2402–2480 MHz
Wi-Fi	2.4GHz, 802.11 b/g/n; 2412–2462 MHz
Cellular: **LTE Cat 1 bis version**	LTE-FDD: B1, B2,B3, B4, B5, B7, B8, B12, B13, B18, B19, B20, B25, B26, B28, B66; LTE-TDD: B34, B38, B39, B40, B41; Max output power: 25dBm
Cellular: **LTE Cat M1 version**	North America (US & Canada): B2, B4, B5, B12, B13, B25, B26; European Union: B1, B3, B8, B20, B28; Max output power: 23dBm
Approvals	FCC ID: 2AHCE-SCS2 IC ID: 21145-SCS2 EU Declaration of Conformity: Please contact AoFrio Limited. info@aofrio.com

Sensor inputs

AD1 to AD5	Digital 0-5Vdc input, Analog NTC input, PTC Option	Door Switch, Return Air Temp, Evaporator Temp, Condenser Temp, Ambient Temp, PIR

High voltage outputs

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C	Switched 8A output	Compressor power
R	Switched 3A output	Defrost heater / Lights
POut	Non-switched output, 12A max continuous 50A max in-rush, non-repetitive	Current measured power output for cooler components such as heaters, LED lights etc.
S1 & S2	2x 0.4A Triac	Fan on/off control and energy efficient variable speed control

Low voltage outputs

V_Out	5V DC 200mA output	Power peripherals such as PIRs, tethered display, gas leak sensors
PWM1, PWM2, PWM3 (LED)	0-24Vdc, 1A sink (open drain)	Control dimmable LED lighting
VSC output	12V, 25mA	Frequency control output for VSC speed control.
Display	5V Half duplex serial	UART port for digital LED display

Refrigeration notes

- Outputs S1 and S2 can be used to switch fan motors and lights or as a signal line to control the speed of Wellington ECR evaporator and condenser fan motors in real time
- R Relay output can be used to switch fans, lights, defrost heater
- PWM outputs are independently controlled
- Pulse Width Modulation outputs providing controls for LED light dimming to provide color tuning or multi-zone intensity control for LED lighting, and PWM2 can be configured to provide frequency-based control for VSCs. LED power supply is not included.
- Total AC current, when combining current on the high voltage outputs, should not exceed 12A.
- Compliance and regulatory approvals pending
- Status LEDs for operational indicators - Power and BLE connectivity
- The POut terminal remains live whenever the SCS 800 is plugged in.

Dimensions (mm)
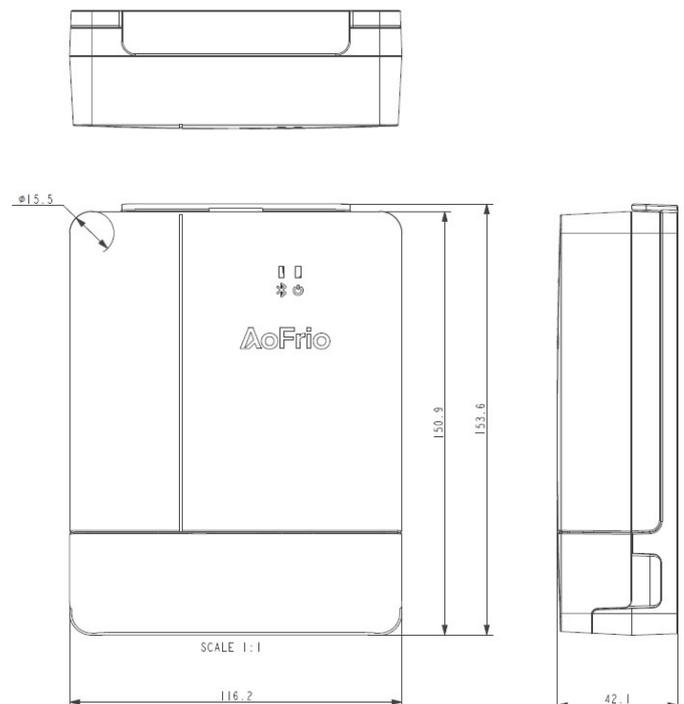
Compliance

United States (FCC)

FCC ID: 2AHCE-SCS2
This product contains pre-certified radio modules and complies with Part 15 of the FCC Rules.

FCC Compliance Statement
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.

RF Exposure Statement
1. This equipment complies with FCC radiation exposure limits for an uncontrolled environment.
2. It must be installed and operated with a minimum separation distance of 20 cm between the radiator and any person.

Module Identifiers
- Contains FCC ID: **XMR20211108FC41D** (Wi-Fi)
- Contains FCC ID:
    - **XMR202007BG95M6,** SCS-A1-101 LTE Cat M1
    - **XMR2023EG916QGL,** SCS-A1-201 LTE Cat 1 bis

Unauthorized Modifications
Changes or modifications not expressly approved by AoFrio could void the user's authority to operate this equipment.

Canada (ISED)

IC ID: 21145-SCS
This device contains licence-exempt transmitters that comply with ISED RSS standards.

ISED Compliance Statement
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(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.

RF Exposure Statement (ISED)
This equipment complies with ISED RF exposure limits for an uncontrolled environment.
Maintain **at least 20 cm separation** between the antenna and any person.

Module Identifiers
- Contains IC: **10224A-202111FC41D**
- Contains IC:
    - **10224A-2020BG95M6** (SCS-A1-101)
    - **10224A-023EG916QGL,** (SCS-A1-201)

EU-RED

Intended Use
This radio equipment is intended for **commercial refrigeration equipment** and **indoor use** within EU/EEA countries.

CE Marking
This product complies with:
- RED 2014/53/EU
- RoHS Directive 2011/65/EU
- WEEE Directive 2012/19/EU

AoFrio Ltd. hereby declares that this equipment is 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

Radio notes

Technologies	Frequency range (MHz)	Max. Transmit power (dBm)
2.4G WLAN	2412-2472MHz	18.50dBm
BLE – Bluetooth (Low Energy)	2402-2480MHz	5.26dBm

Cellular, LTE M1 variant

Technologies	Frequency range (MHz)	Max. Transmit power (dBm)
LTE FDD Band 1	TX: 1920-1980 RX: 2110-2170	23dBm
LTE FDD Band 3	TX: 1710-1785 RX: 1805-1880	23dBm
LTE FDD Band 8	TX: 880-915 RX:925-960	23dBm
LTE FDD Band 20	TX: 832-862 RX:791-821	23dBm
LTE FDD Band 28	TX: 703-748 RX: 758-803	23dBm

Cellular, LTE Cat 1 bis variant

Technologies	Frequency range (MHz)	Max. Transmit power (dBm)
LTE FDD Band 1	TX: 1920-1980 RX: 2110-2170	25dBm
LTE FDD Band 3	TX: 1710-1785 RX: 1805-1880	25dBm
LTE FDD Band 5	TX: 824-849 RX: 869-894	25dBm
LTE FDD Band 7	TX: 2500-2570 RX:2620-2690	25dBm
LTE FDD Band 8	TX: 880-915 RX:925-960	25dBm
LTE FDD Band 20	TX: 832-862 RX:791-821	25dBm
LTE FDD Band 28	TX: 703-748 RX: 758-803	25dBm
LTE TDD Band 34	TX: 2010-2025 RX:2010-2025	25dBm
LTE TDD Band 38	TX: 2570-2620 RX: 2570-2620	25dBm
LTE TDD Band 40	TX: 2300-2400 RX: 2300-2400	25dBm
LTE TDD Band 41	TX: 2496-2690 RX: 2496-2690	25dBm

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

Address: Not applicable

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