ASR-2KL Manual

Revision History

Revision	Date	Author	Change Description
0.5	01/24/2017	RSB/RB	Initial submission

Contents

1   Introduction

ASR-2KL is a Wi-Fi and Bluetooth$^®$ Smart module. It enables ultra-low power connectivity for data communication. The product integrates a Wi-Fi/Bluetooth radio, RF front-end, a microcontroller running the Afero custom firmware, security IC, and crystal into a small package. This is an ideal solution for Internet of Things (IoT) applications.

1.1   About Afero

Afero builds integrated hardware, software, and cloud services for IoT connectivity and data analytics. The Afero turnkey platform incorporates a secure wireless module, scalable cloud services, and a range of development tools that enable companies and developers to quickly prototype and build connected devices.

The Afero platform is vertically integrated, giving developers a solution that combines security and connectivity at the three key touch points for all connected devices:

- Product (embedded secure radio module)
- Mobile (app-level monitoring and control)
- Cloud (web APIs)

This vertical integration accelerates the creation of connected devices by minimizing the investment normally required for software development and testing -- while ensuring a secure and scalable solution.

The Afero Secure Radio module (ASR-2KL) comes programmed with authentication, encryption, and connection management software, ensuring a reliable connection to the Afero Cloud. The Afero mobile application, available for both Android and iOS phones, allows users to manage their smart devices and services from their phone. Afero Dynamic Hub Technology further extends users' control over their devices by providing a secure network that connects wirelessly to the Afero Cloud using LTE.

1.2 Features

- Model name: Afero Secure Radio Module
- Afero model number: ASR-2KL
- WLAN Type: 802.11 b/g/n 1x1
- WLAN radio frequencies: 2.4GHz
- Number of WLAN antennas: 1
- WLAN antenna configuration: Microstrip Monopole antenna
- WLAN Encryption: 64-bit WEP, 128-bit WEP, WPA-PSK, WPA2-PSK
- Bluetooth radio: Bluetooth® Smart wireless technology (4.0)
- Number of Bluetooth antennas: 1 (shared with WLAN)
- Bluetooth antenna configuration: Shared with WLAN
- Maximum transmit power: 16 dBm
- Receive sensitivity: -79.5 dBm
- Power consumption: 600 mW (average)
- BLE Transmit Power: 5dBm
- Security features: Cryptographic co-processor with secure, hardware-based key storage
- Host interface: UART, 5V TTL
- Interface pins: N/A
- Certifications: FCC/IC
- Compliance: Bluetooth Sig
- Dimensions: 48 mm x 32 mm x 4.5mm (L x W x H)
- Weight (Earth ABL): 10g
- Package: Connectorized module
- Power (VCC): 12VDC +/- 10%, 5VDC +10/-5%
- Operating temperature: 0 - +70C
- Storage temperature: -20 - +85C
- Operating humidity: 10-85% RH, non-condensing
- Storage humidity: 0-90% RH, non-condensing

Note: The specification for ASR-2KL shows a reduced output power from what was tested at the FCC. This difference is in place for two reasons:
• It allows for manufacturing margin, as some units will have a slightly higher output than nominal.
• Reducing the output power improves the EVM of the unit, improving bit rate error (BER), neither of which are regulated by the FCC.

1.3 Regulatory Compliance Information

Products that integrate the ASR-2KL in the USA should include the following language in their end-product user manuals:

1.3.1 FCC Statement

Products that integrate the ASR-2KL destined for sale in the USA should include the following language in their end-product user manuals:

> 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.
>
> **Note**: 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 the 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 the receiver.
> - Connect the equipment to an outlet on a circuit on a circuit different from that to which the receiver is connected.
> - Consult he dealer or an experienced radio/TV technician for help.

Important: Changes or modifications to this product not authorized by Afero could void the electromagnetic compatibility (EMC) and wireless compliance and negate your authority to operate the product. this product has demonstrated EMC compliance under conditions that included the use of compliant peripheral devices and shielded cables between system components to reduce the possibility of causing interference to radios, televisions, and other electronic devices.

Radiation Exposure Statement: This equipment complies with the FCC radiation exposure limit set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

Responsible party contact (contact for FCC matters only):

Afero
4970 W. El Camino Real
Suite 100
Los Altos, CA 94022

The product label should include

Contains FCC ID: 2AGLL-ASR-2KL

1.3.2   Innovation, Science, and Economic Development Canada Statement

Products that integrate the ASR-2KL destined for sale in Canada should include the following language in their end-product user manuals:

This product is compliant with CAN ICES-3(B)/NMB-3(B).

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the

following two conditions:

1. This device may not cause harmful interference;

2. This device must accept any interference received, including interference that may cause   undesired operation of the device.

IMPORTANT: Radiation Exposure Statement: This equipment complies with the IC RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20cm between the radiator and your body.

Cet appareil est conforme à Industrie Canada une licence standard RSS exonérés (s). Son

fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas provoquer d'interférences

2. Cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant   provoquer un fonctionnement indésirable de l'appareil.

The end-product label should include
Contains IC: 20929-ASR2KL

Afero reserves the right to make changes to the specifications and functionality of this product.