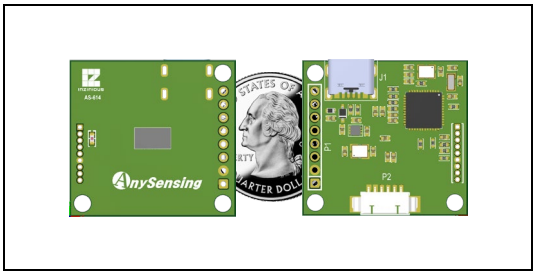
AS_614

Distance, Location, Human Vital-sign detection multi-channel FMCW Radar
with High performance, Small size, Low-power
GPIO, UART, Indicate LED

User Manual



1. Features

- 60GHz multi-channel FMCW radar
- One board solution
- Include antenna and DSP
- Wide input voltage available: 3.3~7.0V
- Small size and easy to use
- GPIO, UART interface
- Low power consumption : 500 mW
- Provides a variety of sensing modes
  - Wall mounting position measurement mode : distance max. 10m
  - Wall mounting occupancy detection mode : distance max. 10m
  - Ceiling mounting position measurement mode : diameter max. 5m
  - Celling mounting occupancy detection mode : diameter max. 5m
  - Side wall mounting vital-signal measurement mode: distance max. 2.5m
  - Side wall mounting vital-signal and position measurement combined mode: Vital-signal: 3m, position measurement: 8m
  - Restroom ceiling mounting mode
- 3 types of power source input possible: USB-C, 2.54mm pin-header, connector

2. Specification

Content		Definition
Model name		AS_614
Hardware size		32.0 x 30.0 x 3.35 mm (No connector) 32.0 x 30.0 x 5.1 mm (Applying connector)
Weight		3.07 g
Transmit frequency		60GHz
Antenna		1 TX (EIRP : 10dBm), 4 RX / Antenna gain : 3dBi
RF pattern (-3dB width)		Horizontal 100° / Vertical 100°
Supply voltage / current		3.3 ~ 7 VDC / max 500 mW
Operating / Storage temperature		-30 ~ 85 ℃ / -55 ~ 125 ℃
Interface		GPIO, UART(TTL level),
Function		Motion, Distance, Vital-sign(BR, HR), Indicate LED
Distance	Range	Distance : max. 10m Vital-sign : max. 3m
	Resolution	Distance : 12 cm Vital-sign : 80%

Max.target power EIRP: 8.94 dBm

3. Function

Function Mode	Function
Side wall mounting position measurement mode	Installed on the wall to detect the positions of people or moving objects in space. Outputs the location of the detected object as X, Y coordinates, or outputs data to the detection area
Ceiling mounting position measurement mode	Installed on the ceiling to detect people or moving objects on the floor. Outputs the location of the detected object as X, Y coordinates, or outputs data to the detection area
Side wall mounting occupancy detection mode	Installs on the wall and outputs the approximate number of people or moving objects.
Celling mounting occupancy detection mode	Installed on the ceiling to output the approximate number of people or moving objects
Side wall mounting vital-signal measurement mode	Detects biological signals of people within 3m and outputs the person's location, heart rate, breath rate, heart rate waveform, breathing waveform, and movement value
Side wall mounting vital-signal and position measurement combined mode	Complex mode that detects biological signals and location information, detects location, heart rate, and respiration up to 3m, detects location and respiration up to 5m, and only detects location up to 8m.
Restroom ceiling mounting mode	Installed on the bathroom ceiling, it outputs the occupancy status and breathing information of people in the bathroom. Provides the ability to distinguish whether a person is standing, sitting, or lying down

4. Order Information

AS_614_P/C/U		
AS_611	P	Installing 2.54mm pin header
	C	Installing connector
	U	Installing USB-C connector
AS_614_U		Model with USB-C connector only installed
AS_614_PU		Model with 2.54mm pin header and USB-C connector installed
AS_614_CU		Model with connector and USB-C connector installed

5. FCC Instructions

FCC Compliance Statement(Part 15.19 (3))
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.

FCC Interference Statement(Part 15.105)
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 correct the interference by one 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 which the receiver is connected. • Consult the dealer or an experienced radio/TV technician for help.

FCC Caution
Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

FCC Radiation Exposure Statement (Part 2.1091)
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

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<Regulatory notice to host manufacturer according to KDB 996369 D03 OEM Manual v01>

List of applicable FCC rules
This module has been granted modular approval as below listed FCC rule parts.
-FCC Rule parts 15C (15.255)

Summarize the specific operational use conditions
-The OEM integrator should use equivalent antennas which is the same type and equal or less gain then an antenna listed in 2.7 in this instruction manual.

RF exposure considerations
The module has been certified for integration into products only by OEM integrators under the following condition:
-The antenna(s) must be installed such that a minimum separation distance of at least 20 cm is maintained between the radiator (antenna) and all persons at all times.
-The transmitter module must not be co-located or operating in conjunction with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.
-Mobile use
As long as the three conditions above are met, further transmitter testing will not be required.
OEM integrators should provide the minimum separation distance to end users in their end-product manuals.

Antennas list
This module is certified with the following integrated antenna.
-Type: On Chip Antenna
- Max. peak Antenna gain: 3 dBi

Any new antenna type, higher gain than listed antenna should be met the requirements of FCC rule 15.203 and 2.1043 as permissive change procedure.

Label and compliance information End Product Labeling
The module is labeled with its own FCC ID and IC Certification Number. If the FCC ID and IC Certification Number are not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. In that case, the final end product must be labeled in a visible area with the following:
“Contains FCC ID: 2AEJ5-AS-614”

Information on test modes and additional testing requirements
-OEM integrator is still responsible for testing their end-product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, additional transmitter in the host, etc.).

Additional testing, Part 15 Subpart B disclaimer
-The final host product also requires Part 15 subpart B compliance testing with the modular transmitter installed to be properly authorized for operation as a Part 15 digital device.