

# Product Specification

**Product Name: AoA positioning Locator**  
**Model Name: DSGW-200**

## Revision History

Specification		Sect.	Update Description	By
Rev	Date			
1.0	2022-04-21		New version release	

## Approvals

Organization	Name	Title	Date

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## 1. Introduction

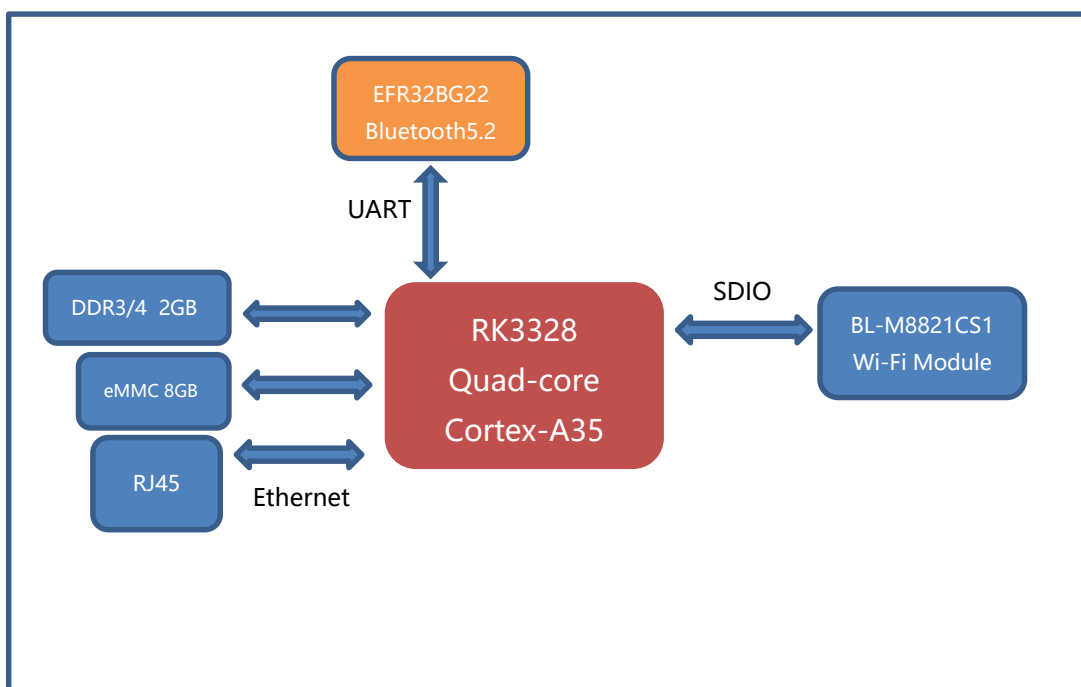
### 1.1 Purpose& Description

- DSGW-200 is indoor Locator for Bluetooth AoA Positioning. It can reach a positioning accuracy of 0.3-1 meters in the 2D plane. At the same time, it has the characteristics of low power consumption, low delay, low radiation and strong anti-interference. A signal locator can achieve 2D positioning.
- DSGW-200 is suitable for personnel tracking and real-time positioning of assets in smart healthcare, smart factories, smart offices, and smart education.
- DSGW-200 also have IoT gateway function, it support the WLAN, BLE wireless protocol.

### 1.2 Product Feature Summary

- Support 5V USB type-c power supply
- Support IEEE802.3-2012 Type 1, the IEEE802.3-2012 Type 1 requires a power supply device (PSE) to provide 44 to 57V, and the power of the powered device (PD) must not exceed 12.95 W and the current does not exceed 350 mA.
- Support IEEE802.11ac, IEEE802.11a,IEEE802.11n,IEEE802.11g,IEEE 802.11b Protocol
- Support Bluetooth 5.2
- One WAN/LAN variable network port
- Support USB2.0

### 1.3 Hardware block diagram



## 2. Mechanical Requirement

### 2.1 Drawings



### 2.2 Size



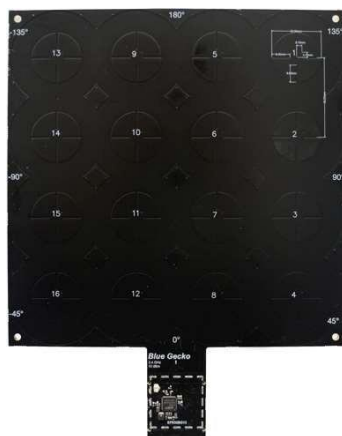
### 3. QA Requirements

#### 3.1 Quality and Testing Information

Information Description	Standard(Yes) custom(No)
ESD Testing	Yes
RF Antenna Analysis	Yes
Environmental Testing	Yes
Reliability Testing	Yes
Certification	FCC, CE, Bluetooth(BQB), PTCRB, RoHs

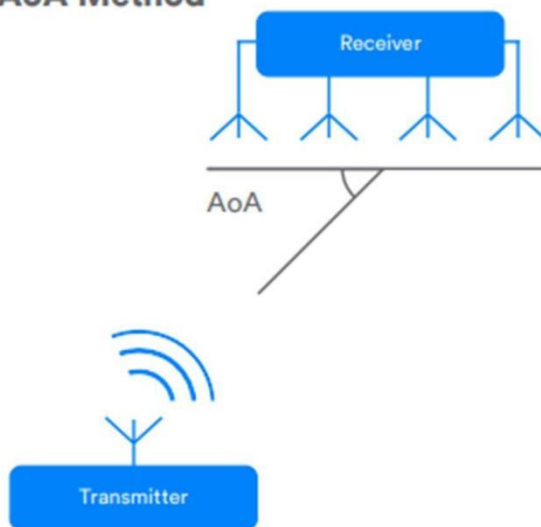
### 4. Application

The gateway has an array antenna, the beacon sends Bluetooth data, and the gateway can receive or send Bluetooth signals when switching between different antennas.



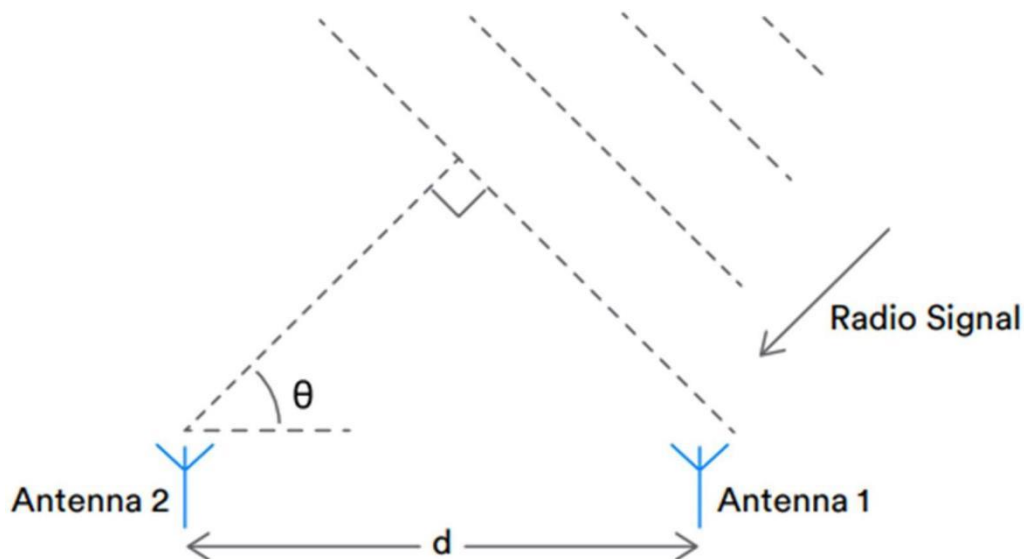
Antenna array design

#### AoA Method



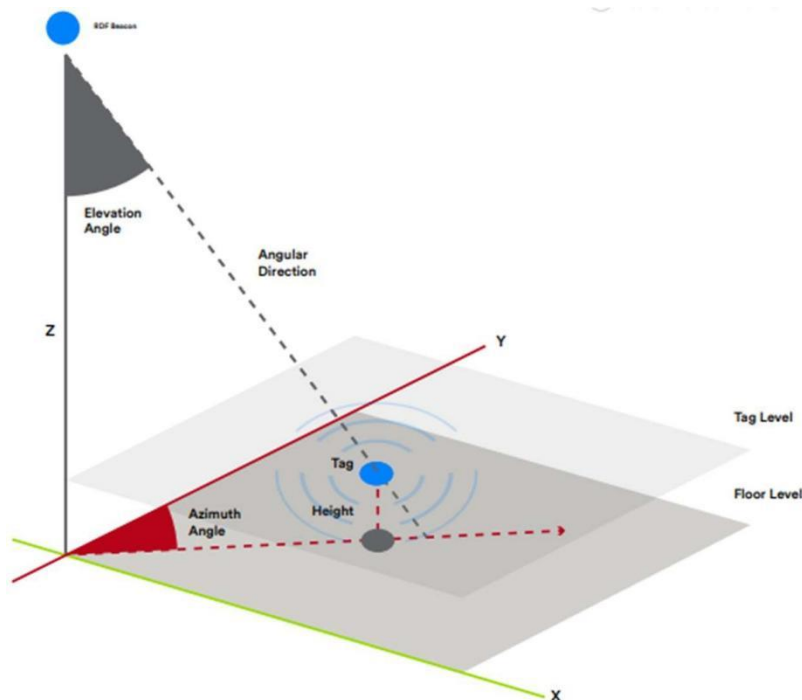
Angle of arrival operation

Measure and detect the phase difference of the Bluetooth signal between different receiving antennas, and then calculate the angle of arrival of the signal based on this information and the known distance between the different antennas.



Derive AoA from the phase difference of different antenna signals

AoA technology only provides relative azimuth and/or elevation angle data between the sending and receiving devices, and other information is needed to calculate the absolute X, Y, and Z coordinates of the Bluetooth asset tag. Figure shows the mechanism to achieve this calculation. In this example, the receiver coordinates and direction are known, and AoA is used to derive azimuth and elevation data from the Bluetooth asset tag.



Determine the X, Y, and Z coordinates of the Bluetooth asset tag from the known location of the Bluetooth receiver and the azimuth and elevation information generated by AoA

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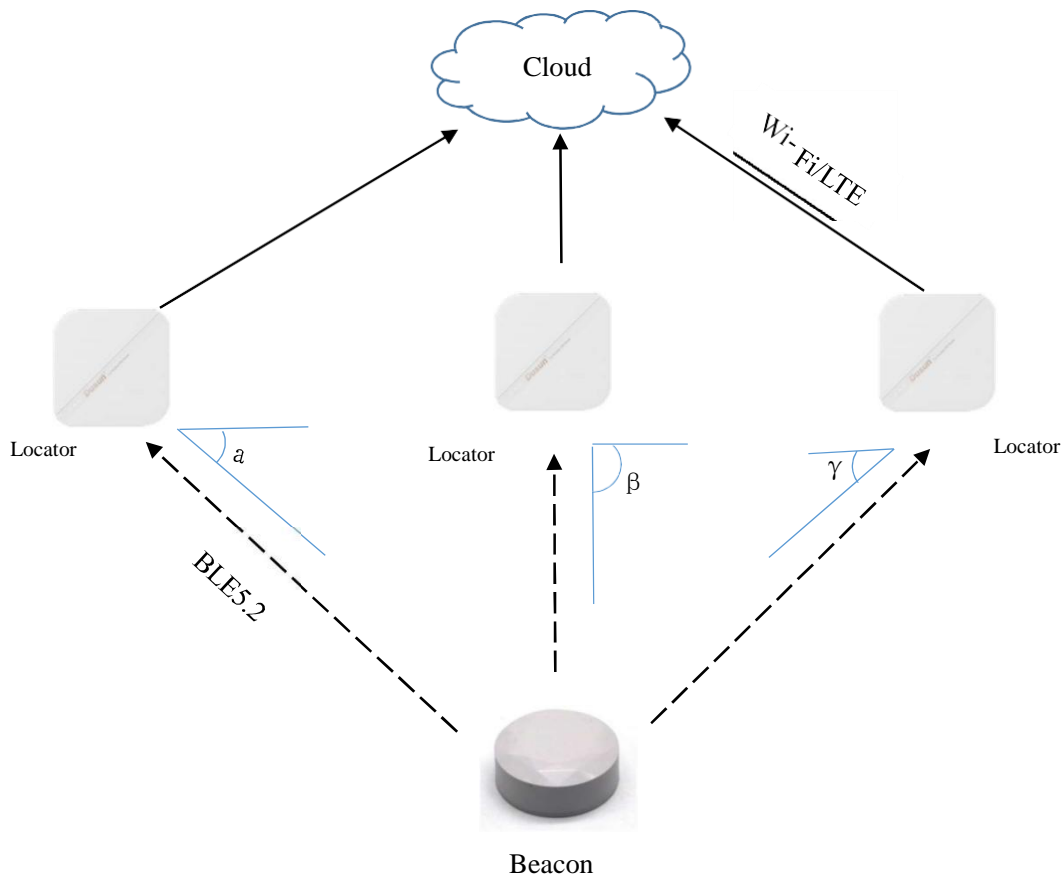
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There are other ways to calculate the X, Y, and Z coordinates of the tracked device, such as using multiple receivers to detect the signal sent by the asset tag, and then using triangulation or trilateral measurement to calculate the asset location.

### System structure



## 5. Application scenarios

- Real-time tracking of the elderly and children
- Product tracking
- Tool management
- Indoor navigation
- Asset positioning

## 6. FCC

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.

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

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 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.

This device and its antenna(s) must not be co-located or operation in conjunction with any other antenna or transmitter.

### Radiation Exposure Statement

To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance of 20cm from your body.