SLU-A1000-B

Content

1.Product Specifications

Specification	
Dimension	Φ175mm
Net working	RJ45 / Wifi
Interface	POE, Type C, SMA, Reset
IP Grade	IP50
Working Environment	Working Temperature: -30~70℃ Humidity:10%~90%
UWB Specification	
Frequency Band	CH2: 3993.6MHz; CH5: 6489.6MHz
Speed	6.8Mbps
Output Power	≤-41.3dBm/MHz
Channel	Support channel 2&channel 5
Protocol Standard	IEEE 802.15.4-2011 UWB
WIFI Specification	
Frequency	2412MHz-2462MHz
Modulation	CCK, OFDM

Wireless Data Rate (Mbps) LED #3	802.11b: 1, 2,5.5,11 802.11g: 6,9,12,18,24,36,48,54 802.11n: MCS0~7,HT20 reach up to72.2Mbps, HT40 reach up to150Mbps HT40 reach up to300Mbps (2T2R)
Rx Sensitivity LED #2	-98dBm (Min)
TX Power	21.36dBm (Max)
IEEE Standards	IEEE 802.11b/g/n

2.Product Picture

Product Picture：
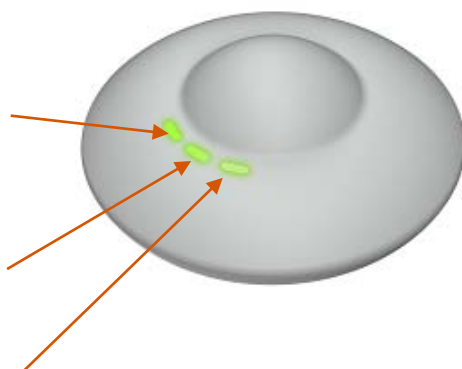
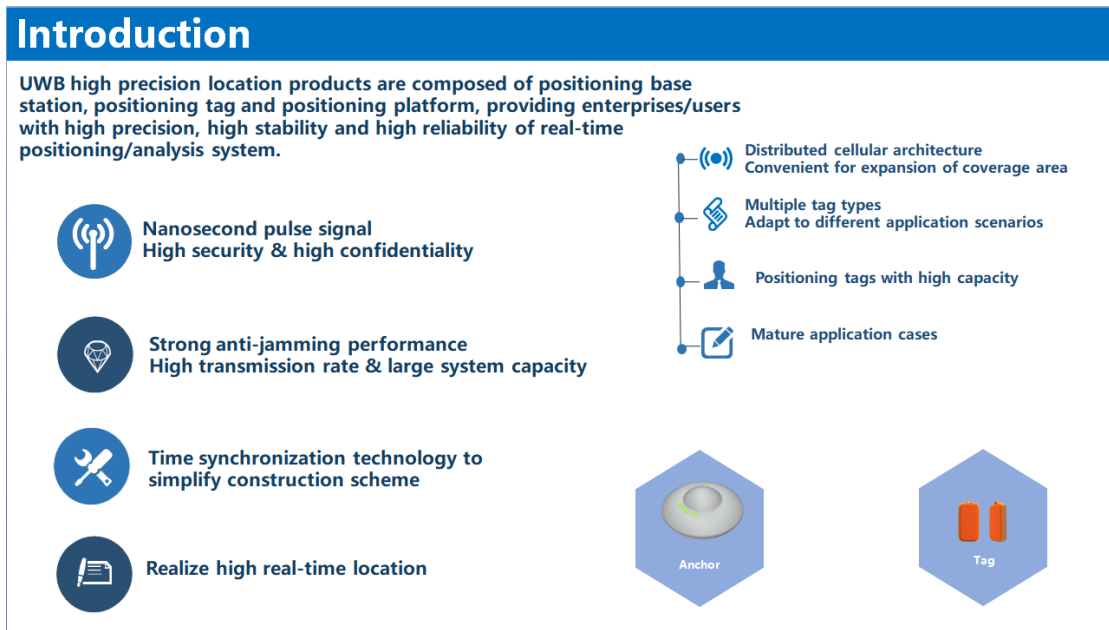

LED status：

LED #1: Power on: Green, Power off: light off
LED#2: WIFI on: Green,WIFI data transmission: Green Flash, WIFI off:
light off
LED#3: RJ45 POEon: Green, RJ45 data transmission: Green Flash, RJ45
POE off: light off

3. System Introduction

3.1 System composition

The indoor location system is composed of web application platform, location engine, anchors and tags.

1. Tag

The tag is the terminal of UWB location system, which is mainly responsible for periodically sending location message to the anchor and receiving setting messages from the anchor.

2. Anchor

The UWB anchor is an important part of the whole location system. Its main function is to receive and parse the information reported by the tag, and then transmit it to the location engine. The anchor deployment has a direct impact on the location accuracy of the entire system, so special attention should be paid to the selection of anchor location. The following sections will specify the deployment principles of anchor location selection.

3. Location engine

The function of location engine is to receive the location message after the anchor is parsed, and calculate the anchor location through a certain

algorithm, or send some parameter configuration information to the anchor.

4. Web application platform

Web application platform is an upper application based on the development of location data. Users can directly use the functions provided by the Web application, or customize the development based on the secondary development interface provided by the Web platform.

3.2 Introduction of location mode

Location System Architecture
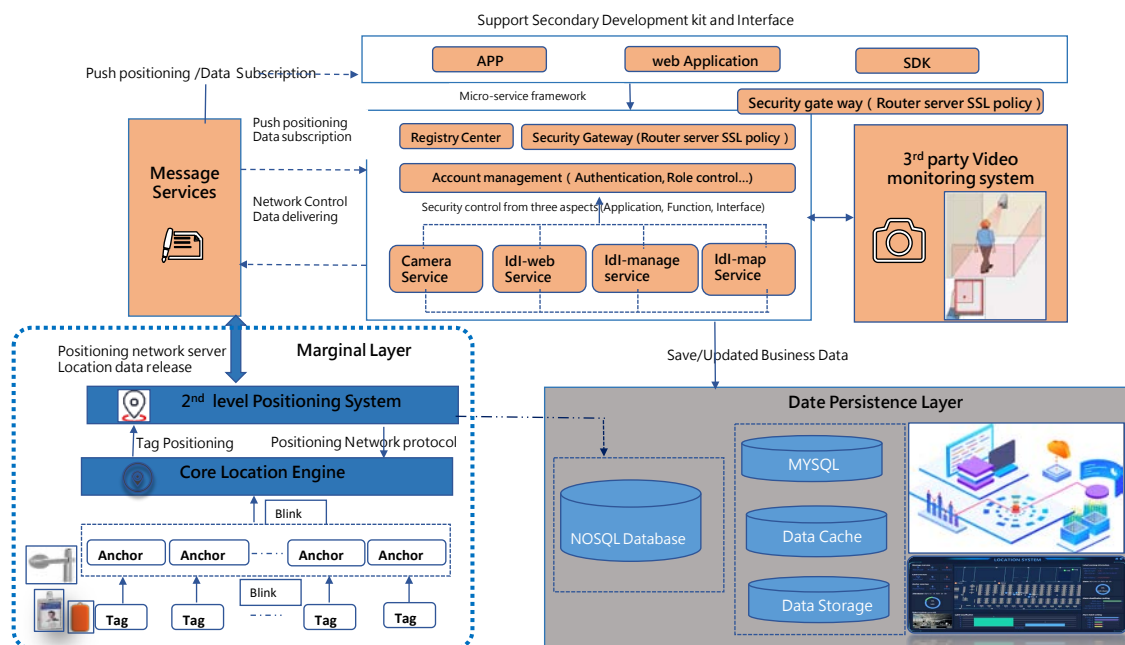
Indoor positioning system has three mode:

- ➢ Zero-dimensional positioning mode (existential positioning)
- ➢ One-dimensional positioning mode
- ➢ Two-dimensional positioning mode

1. Zero-dimensional positioning mode

Zero-dimensional positioning mode, also known as existential positioning, refers to that when a tag enters a specific positioning area, the positioning system only identifies the presence of the tag in the area, but does not judge the specific location of the tag. It is a kind of coarse precision positioning, which is generally suitable for small-enclosed area.

2. One-dimensional positioning mode

One-dimensional positioning mode is used to locate only one dimension in three-dimensional world, also known as "linear positioning". When the tag enters the one-dimensional positioning area, the system can accurately locate the tag on a straight line, which is generally applied in narrow and long areas such as tunnels and corridors.

3. Two-dimensional positioning mode

Two-dimensional positioning mode refers to the positioning of two dimensions in three-dimensional world, also known as "planar positioning". When the tag enters the two-dimensional positioning area, the system can accurately locate the planar position of the tag. It is often used in office, warehouse, factories and other large areas, and is the most commonly used positioning mode of indoor positioning system.

4. Anchor selection and installation

4.1 Anchor selection

To a large extend, the selection of the tag installation location determines the difficulty of debugging and the final positioning effect, so the following principles should be referred to during the selection.
1. Zero-dimensional positioning
Zero-dimensional positioning is often used for smaller enclosed areas with physical boundaries and entrances. For example, a room is often used as a zero-dimensional area. After leaving the zero-dimensional area, you can enter the higher dimensional area. For example, after leaving the room, you can enter the corridor (one-dimensional positioning) or the office (two-dimensional area).

When the anchor is selected in the zero-dimensional region, the center of the zero-dimensional region is selected as the location of the anchor

Existential Positioning
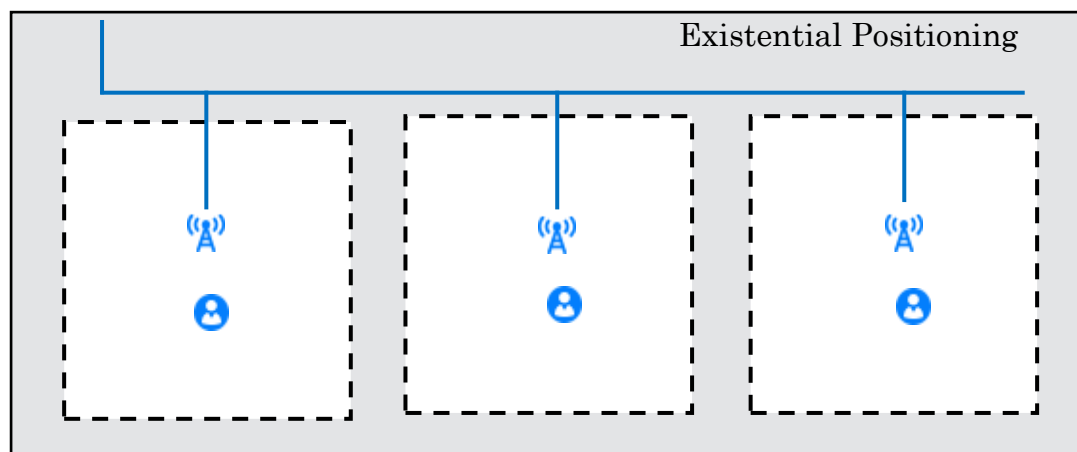
2. One-dimensional positioning
The following conditions should be satisfied when planning the one-dimensional positioning region.
➢   The space between each two anchors in the positioning area

is less than 40m (up to 80m in the especially open area)
➢ No shielding between anchors
➢ Anchors need to be installed in the front and at the end of one-dimensional area

If more than two anchors are installed in the one-dimensional positioning area (for example, the length of the area is more than 40m), the anchor in the middle is located on the boundary between the two regions and can be reused by the two regions. As shown in the figure below, the anchor located in the middle can be shared by Region1 and Region2.
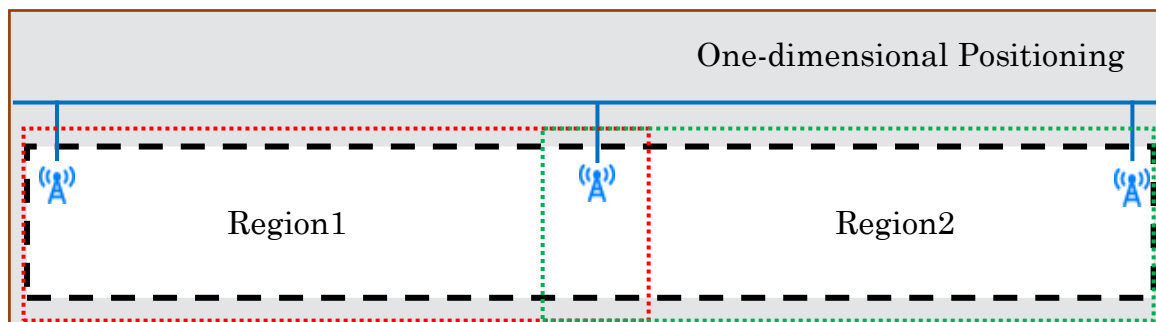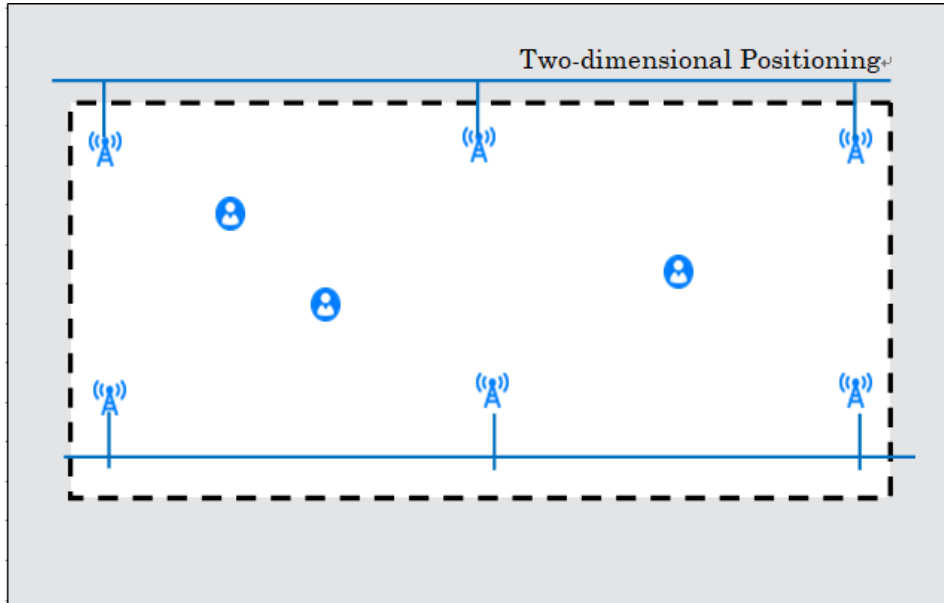

3. Two-dimensional positioning
Two-dimensional positioning is usually used in spaces with an area of more than 100 square meters, such as large factory areas, large conference rooms, halls, etc. The positioning area is divided into several two-dimensional positioning parts. These areas shall meet the following requirements

➢ Rectangle, length to width ratio is 1:1, the maximum is not more than 3:1
➢ The long side of the rectangle should not be greater than 35m (in open space, the length of the side can be extended to 50m)
➢ There are no walls, columns, storage shelves, cabinets, sky-type machinery, etc. The height of the equipment in the area shall not be greater than 1.5m; if there are above objects in the rectangular area, the accuracy of two-dimensional positioning will be reduced and the distance between anchors will be reduced accordingly.

For each two-dimensional positional area, at least four anchors need to be installed, respectively installed in the four corners of the area. If two positioning area are interlinked, then the anchor located on the dividing line of two cells can be reused by the two areas.

Generally a complex area will also contain a one-dimensional/two-dimensional/zero-dimensional positioning, for zero dimension in the meeting room, one dimension in the corridor, two dimension in the office or the hall. An overlap area should be set at the junction of one dimensional and two dimensional areas to ensure the fluency of switching between the two areas.
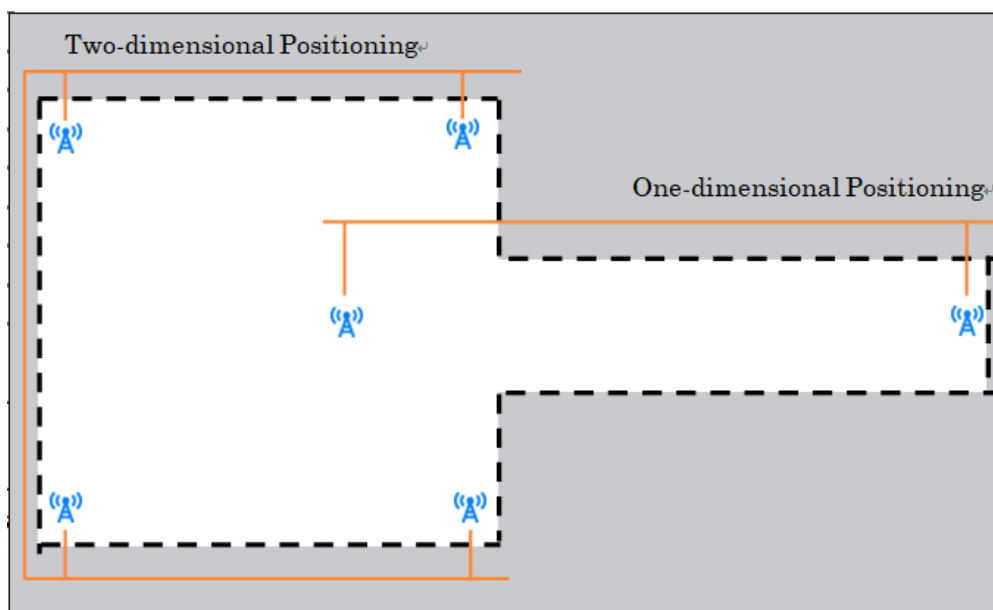
4.2 Anchor Installation

After the location of the anchor is selected, the next step is to install the anchor. During the installation, the principles below should be followed.
➢ The anchor should be more than 30cm away from the wall, or 50cm away from the metal wall.
➢ The height of the anchor to the ground is generally between 3m and 5m
➢ The anchor must leak out, not be embedded in the ceiling and away from metal objects.
➢ Indoor anchor must be installed with body face down

Indoor anchor installation and debugger
Install the indoor anchor with the raised side of the anchor facing down, as shown in the figure below.

Record the location and ID number of the base station during installation, so that the anchor coordinates can be set when the system is debugged.

Positioning Map Software

Various map import modes and multi-dimensional display support customization and user to import map freely.

Display Mode	2D			2.5D			3D	
Effect Picture								
Scenarios	Park · factory · floor · indoor							
Data Resource	Geojson/SHP/Image/2DTiles/CAD/Spatialite/PostgreSQL							
Customized Map	Users provide CAD map and the map can be made in a short time	Accuracy	Accurate to 10cm	Multi-screen	PC/Cellphone	Customize model map	Customizable high simulation 3D model to make the scene more real	
User map import	Users can import various pictures to make a map	Picture format	JPG/PNG/BMP					

Indoor Positioning Base Station Application Scenarios

◆ Hi-tech, concise & integrated design
◆ Exclusive patent appearance match interior decoration

◆ Exquisite & light
◆ Easy to install, simple & Safe

◆ Support Wi-Fi
◆ Reduce network construction
◆ Switches saving
◆ Stable & reliable

Application Scenarios: Hi-tech Building, Hotel, Office, Swimming Center, Kindergarten, Home, etc.

Real-time positioning of children; Electronic fence; Electronic attendance; Emergency management; danger warnings; SOS; Visitors flow calculation; Drowning alarm; Provide the elderly with real-time positioning and nurse can rescue in time in case of emergency, etc.

5. Network Setting Up

In general environment, all anchors in this layer can be networked by POE switch of the access layer, and then connected to the core layer switch by means of optical fiber or network server.

Depending on the selected network architecture, each anchor needs a separate network cable connected to the switch, and the other end is fixed in a pre-reserved anchor location.

Note:
1. Recommended to use more than five types of network cable
2. Pull the network cable head to the anchor design point, and make a wire loop with a preset length margin of 1-2m, and place it at the point.
3. The two ends of the network must be marked with tags in order to find the two ends of the same network cable
4. The distance from the switch to the anchor should not be more than 90m, if more than 90m, please add a POE switch in the middle to avoid abnormal power supply of the base station.
5. At this point, the basic engineering installation of the UWB positioning system is completed, and the next step is the installation and debugging of the UWB positioning software system.

6.Warning

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.

Caution: Any changes or modify cations to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

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 Information
The device has been evaluated to meet general RF exposure requirement. The device can be used minimum distance from body to use the device is 20cm.

"This equipment may only be operated indoors. Operation outdoors is in violation of 47 U.S.C. 301 and could subject the operator to serious legal penalties."

Notices:

This product meets the technical requirements of indoor UWB system.

1. This UWB System needs to be professional installation, and we provide free technical support to install this product indoors. During debugging by software, the using zones will be strictly controlled indoors.
2. UWB positioning system includes UWB Tag, UWB Anchor and server. The positioning system is only used indoors, and the emissions from equipment operated would not be intentionally directed outside of the building in which the equipment is located.
3. It is forbidden to use the antenna installed outdoors.