Installation manual

Location infrastructure based on the BCNEW0203

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1. Copyright & trademarks

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2. FCC Compliance

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 not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with the FCC radiation exposure limits for an uncontrolled environment.

This equipment shall be installed and operated with a minimum distance of 20cm between the user and this device."

This transmitter must not be co-located or operated with any other antenna or transmitter.

3. Declaration of Conformity

MYSPHERA hereby declares that this BCNEW0203 is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC. A copy of the Declaration of Conformity can be found at mysphera.com/declaration-of-conformity

4. Introduction

The aim of this document is to describe how the deployment of the location infrastructure necessary to the startup of the location system in a particular client's premises must be done.

The number and position of the beacons has been determined in a phase previous to the wiring installation.

The installation team is given with:

- Plan with the positions of the net sockets to install. Each of the sockets has an identifier associated to make its reference easier.
- Support/holder to fix the beacons to the wall or ceiling.
- Location beacons.

How the communication network must be configured in order for the beacons to be able to communicate with the location server is also described in this document.

5. Wiring Installation

5.1. Plans with the position of the net sockets

The installation team is provided with the building plans in which the positions of the net sockets are marked. Figure 1 shows a piece of a plan. The red round symbols mark the position in which each beacon must be placed. The blue square symbols depict additional net sockets that are not intended for beacons, but for PCs or TVs

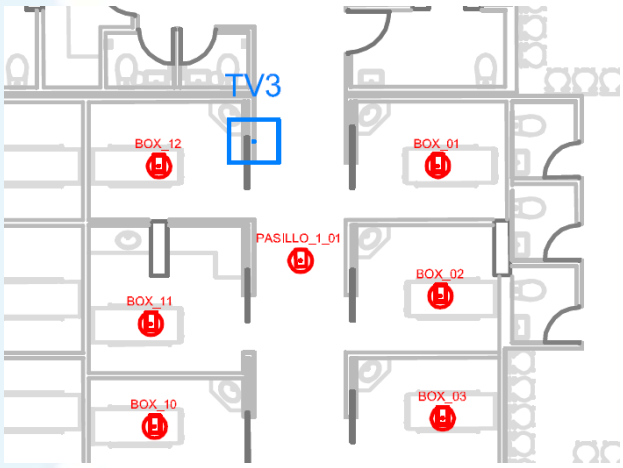

Figure 1 – Example of a plan; in red the beacons, in blue socket for TV or PC

The plan can be divided in several files, each of them with a section of the area to install. Each of the fragments of the plan must be printed, as they are intended to be used to **note down by hand** the following data:

- **Name of the net socket** (it normally corresponds with the patch panel port).
- **Serial number of the beacon** placed in that position (figure 1).

5.2. Wiring category

In case it is necessary to install new wiring, the cables to use must be at least UTP Cat 6 free of halogens. The lengths and placement of the cables must follow the regulation of the structured cabling standards.

In case there is a previous cabling installation, the beacon is able to operate with cables of Cat 3 or higher.

5.3. Wiring installation

A net socket will be installed in each of the positions shown in the plan. Once installed, the net socket identifier must be noted down on the printed plan. The identifier of the net socket will follow the format used in the client's network.

Wiring installation requires the following material:

- Cable installation from the beacon mounting point to the closest communications rack, protecting it with corrugated tube in areas without cable trays.
- 24-port patch panel, for cable connection in the communications rack.
- RJ45 connector (Keystone), for cable connection at the beacon mounting point.
- Pigtail cable, for beacon connection to the RJ45 connector.

Installation material examples:

Installation material	
Rigid UPT Cable Cat. 6 LSZH (min Cat 3.) Cable to install from the beacon mounting point to the communications rack.	
Corrugated tube 20 mm. Cable protection if cable trays are not available.	
Patch Panel 29'' 24-port For connection of the cable to the communications rack.	
Keystone RJ45 connector female Cat 6 (min Cat 3) For connection of the cable at the beacon mounting point.	
Pigtail RJ45 Cat. 6 UTP LSZH 1 meter For beacon connection to the RJ45 connector. Also needed for connections between patch panel and switch in the rack.	
Screw kits For beacon fixing bracket installation. The type must be the appropriate for the ceiling or wall materials.	

5.4. Socket labeling

To facilitate the identification of the sockets during the operation of the location system, they have to be labeled with their identifier.

5.5. Net socket certification

To ensure the proper installation of the wiring, the new net sockets must be certified. The record of the certification of each of the sockets will be saved.

6. Beacons placement

Once the wiring is complete and the numbers of the sockets are noted down in the plan, the beacons are to be installed in the corresponding beacon socket (red round symbol). The process of placement is described below.

6.1. Wall/ceiling support installation

It is necessary to fix the support/holder of the beacon beforehand to the wall or ceiling in order to get it placed in its corresponding position. The instructions are detailed in Annex I: Beacon attachment.

6.2. Placement of the beacon in its support

Once the support is fixed, the beacon can be placed in it. The following steps must be followed:

1- Note down in the paper plan the serial number of the beacon
2- Connect the beacon to the Ethernet socket
3- Place the beacon in its support.

The serial number is specified in the label attached to the bottom of the beacon. Figure 2 shows the serial number circled in red.

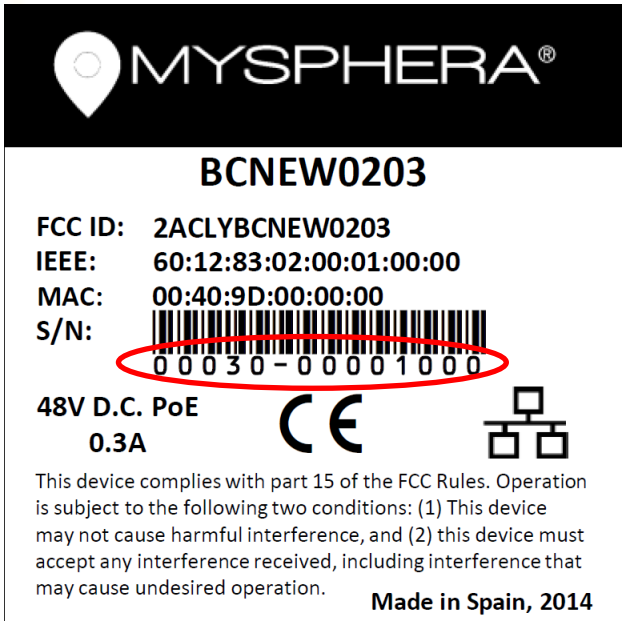

Figure 2 – Beacon serial number

6.3. Other beacon placements

The beacon can also be installed in other places different from ceilings or walls, such as over a desk or other furniture. If this is the case, the installation becomes a more complex procedure in order to ensure proper coverage of the area and avoid reduced precision in the location system. The procedure to place and fix the device must be detailed in the installation plan. Contact your MYSPHERA project manager if the installation plan is not clear enough.

7. Configuration of the Network

In order for the beacons to be able to send information to the server, it is necessary the TCP/IP connectivity between the beacons and the server. The beacons and the server can be in the same sub-network or in different ones, but the TCP connectivity must be present between each other (so the routers and firewalls in-between must be properly configured).

7.1. Patch cord connection

After the physical installation of the net sockets, the next step is to connect the patch panel to the corresponding network electronics. The beacons must be connected to a socket with POE powering able to provide at least 1.5W.

7.2. VLAN Configuration/ Device registering

If necessary, the sockets will be configured in order to provide with TCP/IP connectivity with the server. This process may vary depending on the client's network policy and can contain processes such as:

- Registering the beacons Ethernet MACs in the hospital network (a list with the MACs of all the beacons installed is given)
- Configuring the VLAN used by the beacons.

7.3. DHCP Configuration

The beacons are pre-configured to obtain the IP address dynamically, so there must be a DHCP server to provide service to the beacons.

It is recommended to have a list of the IP addresses that will be used by the beacons (it is enough to have the range). The list will be of use in case of maintenance operations (configuration changes or firmware update).

7.4. Necessary ports in the server

The beacons connect with the server using the TCP 30000 port.

7.5. Ports used in the beacons

The beacons do not need to have any open port during their normal functioning. During the installation period it is necessary to be able to connect with the TCP 22 port (SSH) of the beacons in order to configure them.

Annex I: Beacon attachment

In order to fix the beacon to the wall or ceiling, a support or holder is provided. Figure 3 shows an image of the support. Two screws suitable for the material of the surface where the beacon is going to be installed are needed to attach the support. The holes intended for the attachment are shown in the following figure.

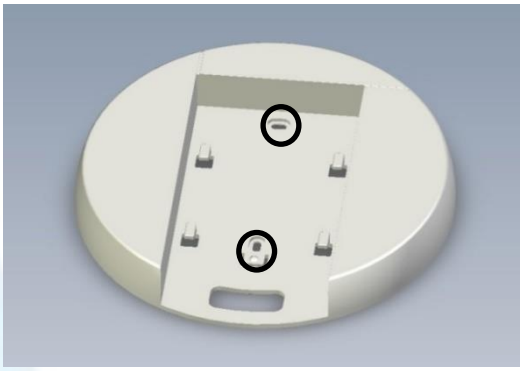

Figure 3 Holes used to fix the support to the wall or ceiling

The Ethernet cables will go through the hole intended for that purpose shown in Figura 4.

Figura 4 – Orificio para el paso de cables.

Once the support is placed, the net cable is connected to the beacon and the beacon is placed in the holder. The beacon fits into the support thanks to the four flanges that are shown in Figura 5.

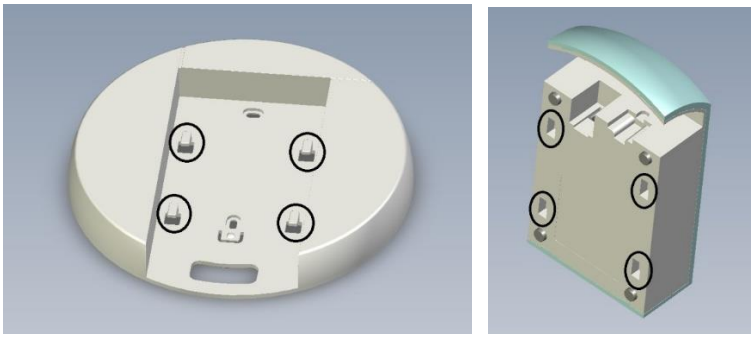

Figura 5 – Fastening of the beacon.

To fasten the beacon, it has to slide into the support until de flanges fit and the device fills all the space, as shown in Figure 6.

Figure 6 – Placement of the beacon in the support.