

# Beacon Placement

## Document Revision [↗](#)

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## 1. Introduction [↗](#)

This guide explains how to place Beacons to get the best possible results from the **TEKTELIC LOCUS** application. Whether you work in a large warehouse, a small lab, or somewhere in between, the right Beacon setup is essential for accurate asset tracking.

## 2. Acronyms & Glossary [↗](#)

Here are a few terms and abbreviations you'll see throughout the guide:

- **Beacon** – A small wireless device that helps track the position of an asset by sending location signals.
- **Regular Beacon** – A Beacon used in open areas with Regular Localization Mode to calculate precise asset positions.
- **Nearest Beacon** – A Beacon used in small rooms or narrow spaces to show the closest Beacon's location instead of calculating the exact position.
- **GW (Gateway)** – Short for LoRaWAN Gateway. It collects data from nearby Beacons and sends it to the central tracking system.
- **Multilateration** – A location calculation method that estimates position based on signal strength from multiple Beacons.
- **Signal Obstruction** – Any material (like walls, concrete, or metal) that weakens or blocks wireless signals, affecting tracking accuracy.

## 3. Beacon Placement Guidelines [↗](#)

### 3.1 How Location Tracking Works [↗](#)

The TEKTELIC LOCUS application offers **two modes** of location tracking. The ideal mode to use depends on your environment and the precision required for your tracking needs.

### 3.1.1 Regular Localization Mode [🔗](#)

Use this mode in **large, open areas** such as warehouses, production floors, or open-plan offices. In these environments, Beacons can communicate easily and provide accurate location tracking.

This mode uses a multilateration algorithm to calculate the asset's position based on signals received from **at least three Beacons**. It gives detailed information about **the asset's location within a space**.

To get the most accurate results, ensure that the **area where the Tracker will be localized is placed inside the convex hull** formed by the surrounding Beacons. This means the Beacons should surround the tracking zone rather than line up on one side of it.

These are referred to as **Regular Beacons**.

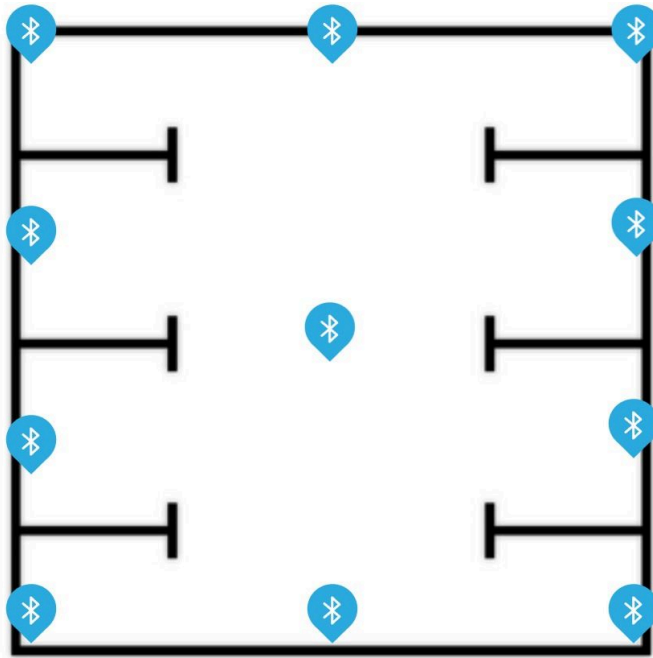


Figure 1: Warehouse or open office space using Regular mode

### 3.1.2 Nearest Beacon Mode [🔗](#)

This mode is ideal for **smaller, enclosed spaces** such as narrow hallways, private offices, or cleanrooms with many interior walls.

When walls or barriers interfere with signal strength, multilateration may not be accurate. Nearest Beacon Mode solves this by identifying the **closest Beacon** and using its location instead. This is helpful when you only need to know **which room** the asset is in.

To improve accuracy in this mode, place Beacons so that **no other Beacons are too close by**. This will help the system determine which Beacon has the strongest signal and avoid confusion in signal selection.

These are referred to as **Nearest Beacons**.

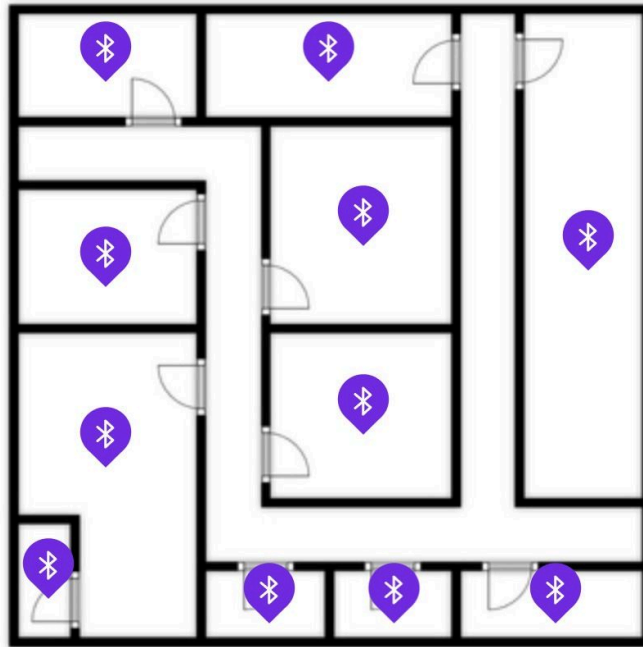


Figure 2: Segmented room layout using Nearest Mode

 Visual Placeholder: Narrow hallway or segmented room layout using Nearest Mode for clear room identification.

### 3.1.3 Can You Use Both Modes? [🔗](#)

Yes. Many facilities have a mix of large open areas and smaller rooms. You can assign either mode **per Beacon** during setup in the LOCUS application, giving you flexibility to match the environment.

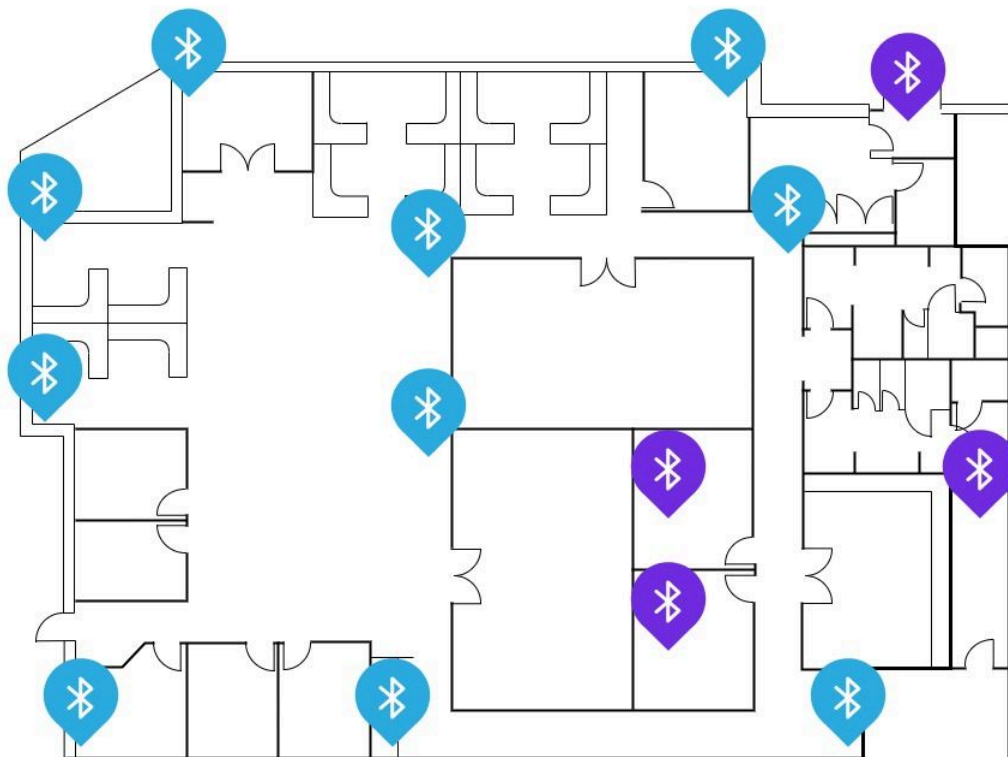


Figure 3: Hybrid floorplan example showing both Regular and Nearest Beacons in action

### 3.2 Considerations for Your Physical Environment [🔗](#)

Before placing Beacons, consider the physical layout and materials in the space. These directly affect signal strength and accuracy.

For example:

- **Drywall and glass** typically allow signals to pass through with little interference.
- **Concrete, metal, or thick walls** can significantly weaken or block signals.

### 3.3 How Many Beacons Do You Need? [🔗](#)

The number of Beacons required depends on your tracking mode and the size/layout of your space.

- For **Regular Mode**, use a minimum density of **0.02 Beacons per square meter**  
→ Approximately **one Beacon every 7 meters** in open, unobstructed areas.
- For **Nearest Mode**, you'll need **1.5 to 3 times more Beacons**, depending on how many walls and rooms are involved. This ensures strong signal detection and room-level accuracy.

### 3.4 Choosing the Right Mode for Your Environment [🔗](#)

Use the table below to decide which mode best suits each part of your environment:

Factor	Regular Localization Mode	Nearest Beacon Mode
Room Size	Large rooms > 5m x 5m	Small rooms or hallways < 5m x 5m
Wall Type	Few walls, drywall < 0.5m, glass partitions	Thick walls, concrete, metal barriers, many walls
Accuracy Needed	Know where the asset is <b>within</b> a space	Know <b>which room</b> the asset is in

### 3.5 Tips for a Smooth Setup [🔗](#)

- **Stay consistent** with Beacon mode selection across similar rooms or zones.
- **Test in the real environment** before finalizing placement. Obstacles like furniture or machinery can affect signals.
- **Avoid overcomplicating** your setup. In many cases, Nearest Mode provides enough detail and reduces hardware needs.