In Field Installation Guide

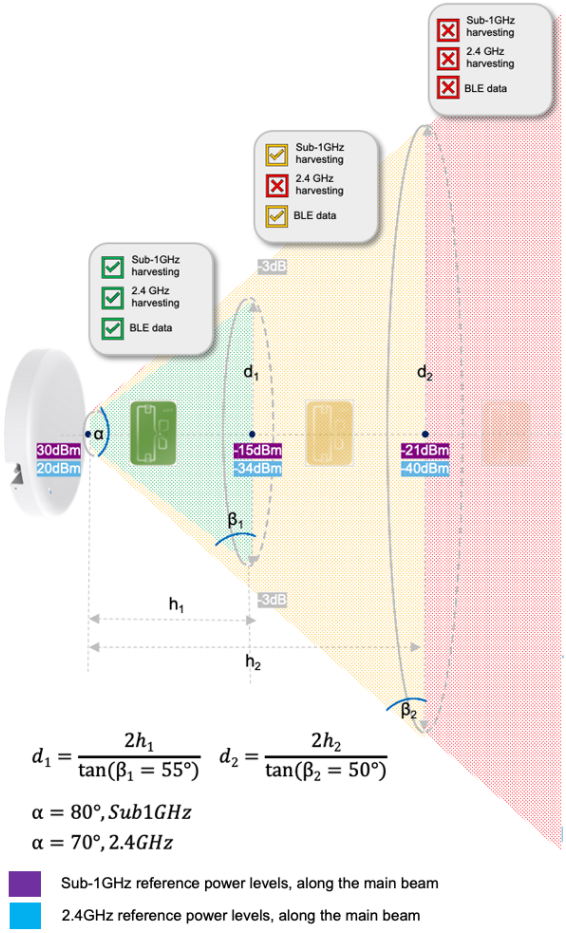
1 Definitions and General Recommendations

- Operating volume: the 3D space where the Wiliot® Pixel Tags can harvest energy from the PowerBridge and broadcast data back to it.

Operating Areas	h_1[m]	h_2[m]	d_1[m]	d_2[m]	TTFP[s] (1)	TBP[s](2)
Primary	5	-	7	-	≤45	≤25
Extended/Optional	5	10	7	16	>45	>25

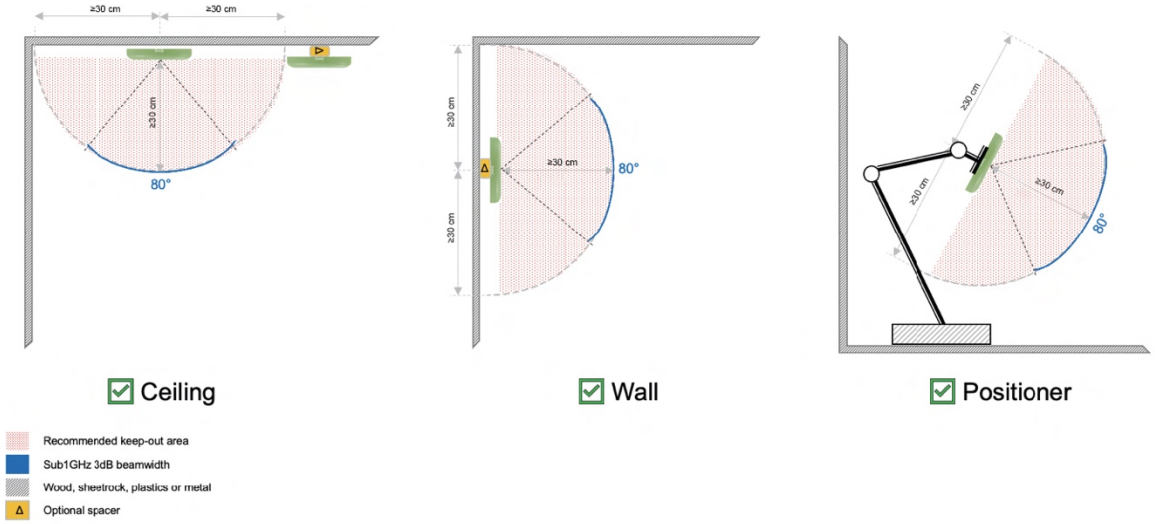
(1) TFFP: time to first packet; the time it takes for the Pixel to respond from the first exposure.
(2) TBP: time between packets; the time it takes the Pixel to respond while exposed.

- Use the primary area for time critical applications, where low TTFP and TBP is required.
- Use the extended/optional area in non-time critical applications, where high TTFP and TBP is acceptable.



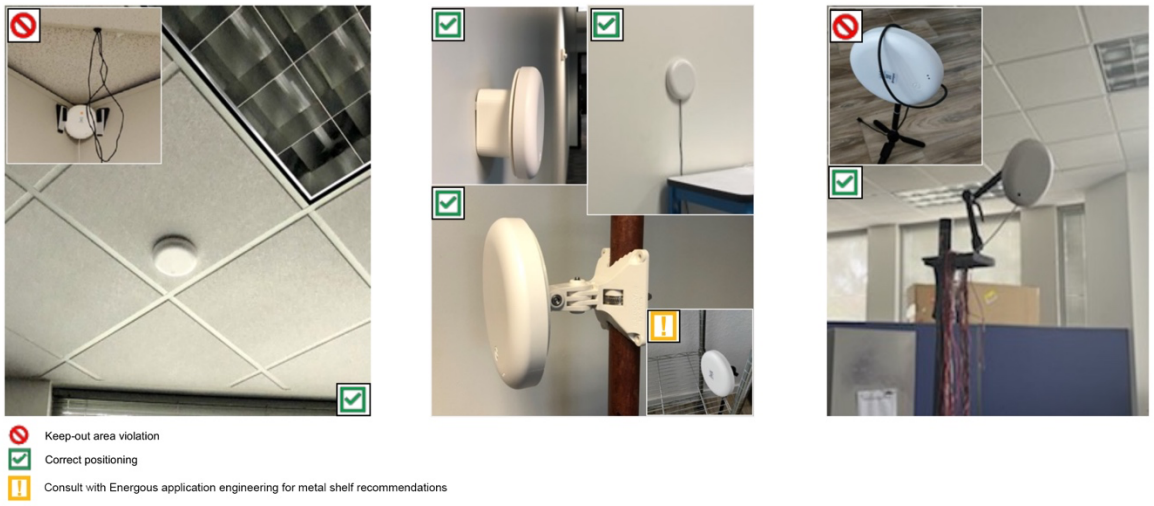
2 PowerBridge Positioning Options

Recommendations for best performance:



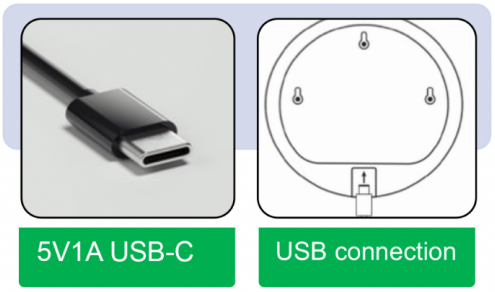
3 PowerBridge Positioning (Practical Examples)

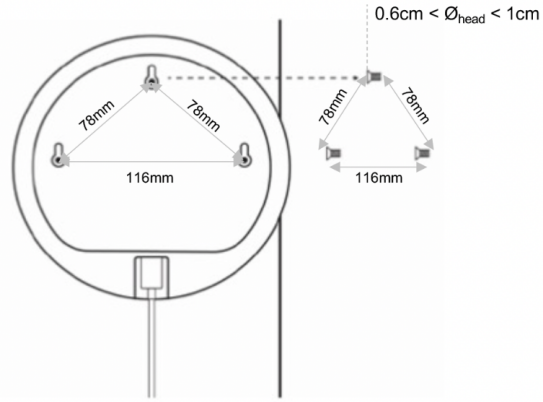
Recommendations for best performance:



4 PowerBridge Powering and Mounting

Connect the PowerBridge to the power source and mount in a fixed position. The transmitter must be installed to provide a separation distance of at least 20 cm (in US) or 22 cm (in Canada) from all persons.



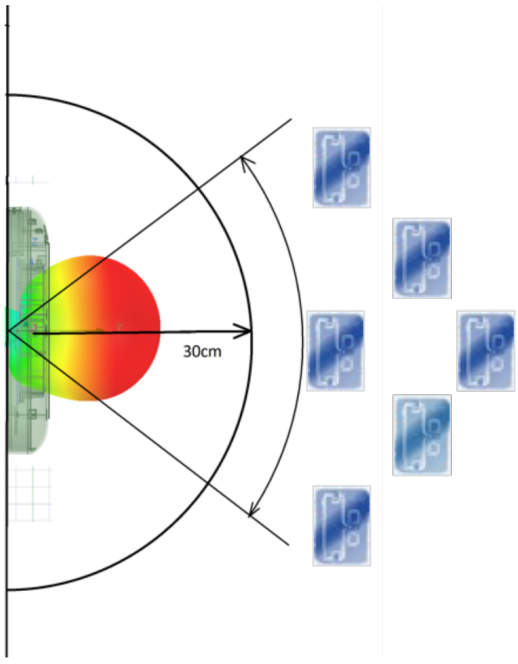


mounting dimensions

5 Pixel Tag Positioning

Recommendations for best performance:

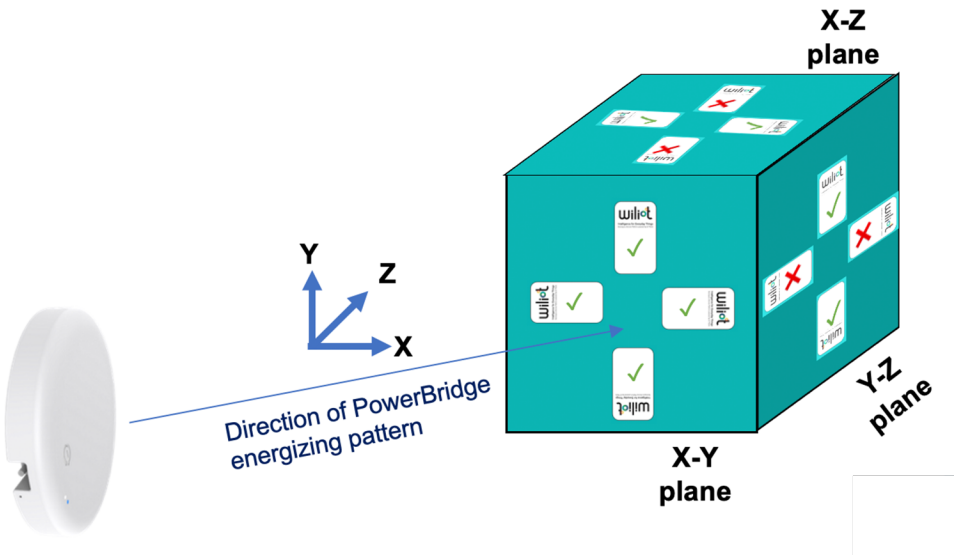
- Place in the line of sight of the PowerBridge.
- Keep distance between Pixel Tag and PowerBridge within 10 meters.
- Place within the 3 dB beamwidth area of the transmitter, outside of the 30 cm recommended keep-out area.
- In some cases, the operating area may be subject to multi-path channel effects and power may vary at a given Pixel Tag location. To mitigate such effects, multiple transmitters may be required for full coverage.



6 Pixel Tag Positioning (Practical Examples)

Recommendations for best performance:

- IoT Pixels are optimized for attachment to plastic and cardboard surfaces.
- A spacer may be required for best performance when mounted to metal, ceramic, glass, or wood surfaces.
- On the image shown below, tags are placed on a cardboard box in various orientations:
  - Tags placed on the surface facing the TX (x-y plane) can achieve good performance at any angle/orientation.
  - Tags placed on other surfaces marked with a green check will also achieve good performance.
  - Tag locations marked with a red X are sub-optimal due to antenna cross-polarization; tag performance in these locations/orientations may vary.



7 Logical System Setup

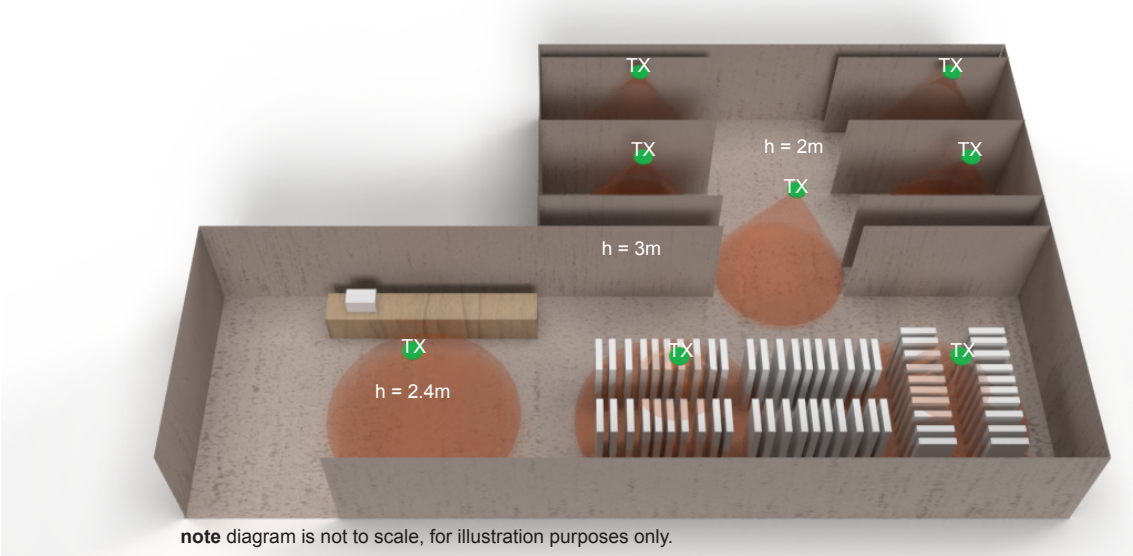
Follow the instructions described in the *Wiliot Ecosystem Setup Guide* for the logical system setup.

Step No	Action	Result
1	Purchase Wiliot could account	
2	Purchase PowerBridge	
3	Purchase Wiliot Pixel tag	
4	Download/Install Wiliot App	All components available
5	Create a user account	
6	Log into the user account	
7	Start the Gateway	
8	Observe the GW (auto) assignment	Gateway ready
9	Claim the PowerBridge	
10	Prepare PowerBridge for FW update	
11	Run FW update	
12	Configure the operation parameters	PowerBridge ready
13	Create a location	
14	Partition the location into zones	
15	Link PowerBridge to location/zone	Location ready
16	Prepare pixel transfer	
17	Request pixel transfer	
18	Run pixel transfer	Pixel Ready
19	Create asset category	
20	Associate pixel to asset	Asset ready
21	Create MQTT connection	
22	Receive tag events on web platform	
23	Interact with the system over mobile	System operational

8 Real World Examples

8.1 Retail Store

Achieving the best RF coverage in different environments. The following example is using a ceiling mount based system.

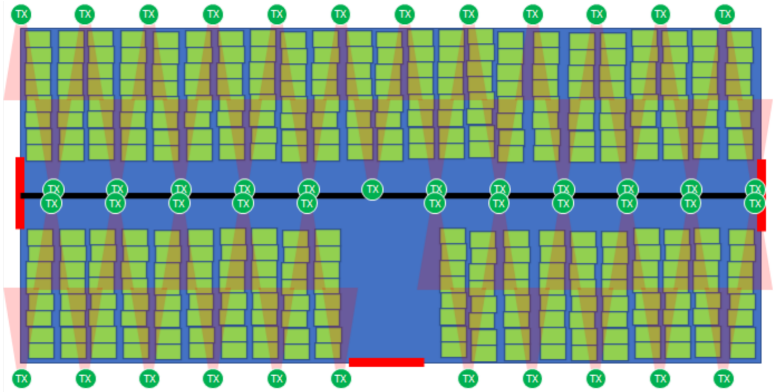


note diagram is not to scale, for illustration purposes only.

Area: ~100m²
Use-case: asset tracking
Environment: fashion retail store
Positioning: ceiling, facing down
Estimate of devices needed: 8 PowerBridges

8.2 Industrial Warehouse

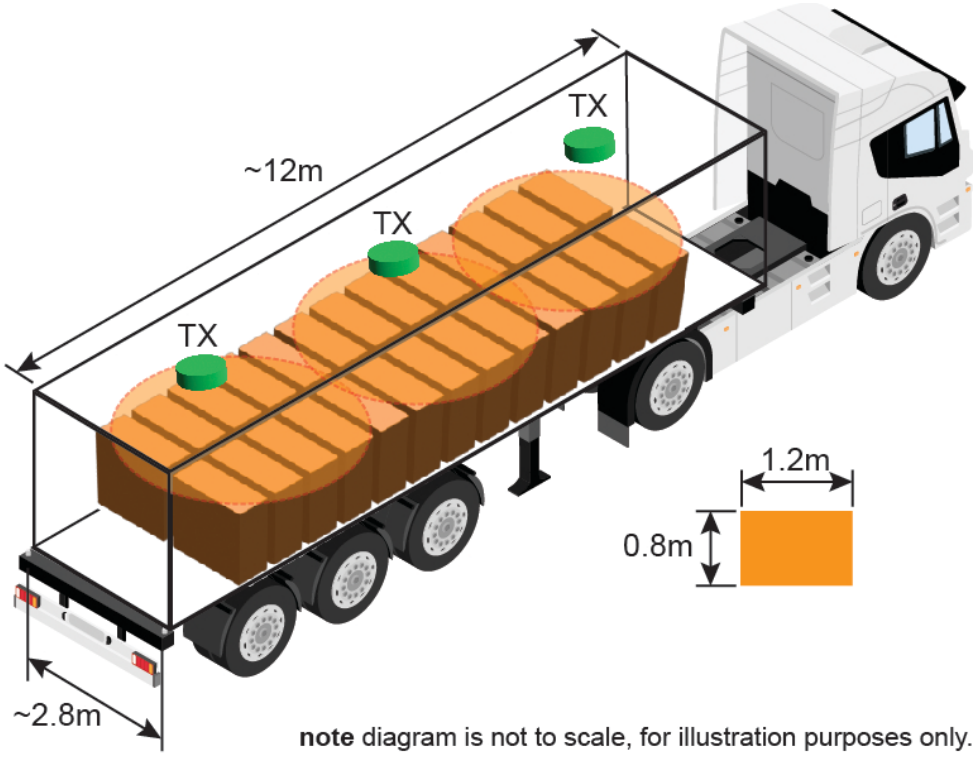
Achieving the best RF coverage in different environments. The following example is using a wall mount system. This is an example only. The number of devices depends on various factors.



Area: ~800m²
Use-case: real time inventory
Environment: warehouse
Positioning: wall and transversal beam, facing forward
Estimate of devices needed: 46 PowerBridges

8.3 Trailer

Achieving the best RF coverage in different environments. The following example is using a ceiling mount system.



note diagram is not to scale, for illustration purposes only.

Area: ~34m²
Use-case: food-chain monitoring
Environment: trailer
Positioning: ceiling, facing down
Estimate of devices needed: 3 PowerBridges

9 Revision History

Version #	Date	Description of Changes
Version 1.0	05/16/23	- Initial release