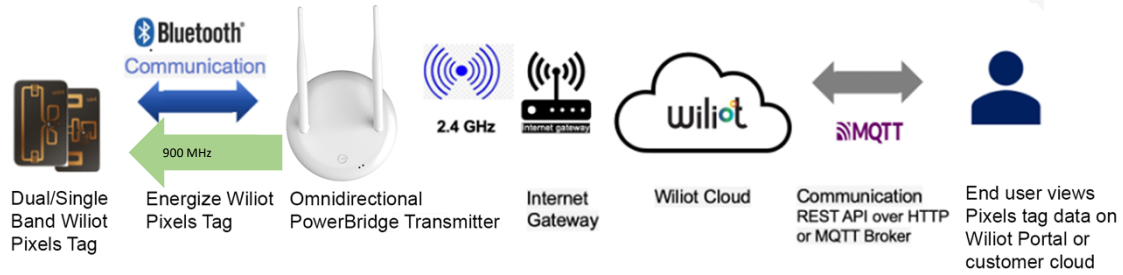# Technical Datasheet

1 Key Features

- Works with Wiliot
  - Up to +30 dBm (1 watt) 900 MHz band energizing signal
  - Up to +20 dBm 2.4 GHz band energizing signal
  - BLE beacon filter and repeater functionality
- 5V/1A Operation
- Linear 900 MHz and 2.4 GHz antennas
- External omnidirectional antennas (#VN55-E)

2 Characteristics

Specification	Description
Supported products	Wiliot Single-band IoT Pixels tags Wiliot Dual-band IoT Pixels tags
Energizing*	Up to +30 dBm in 900 MHz band Up to +20 dBm in 2.4 GHz band
Echo function*	Scan for Wiliot beacons, filter non-Wiliot BLE beacons, and re-broadcast
Antennas	Linear Sub-1 GHz and 2.4 GHz
Typical antenna gain	Sub-1 GHz Dipole antenna: 2 dBi 2.4 GHz Dipole antenna: 5 dBi
LED indicators	**Echo LED**: blue LED blinks = Wiliot Pixels tag packets are echo'd **Energizing LED**: white LED on = PowerBridge is energizing **Blink action**: blue and white LEDs blink rapidly = PowerBridge receives blink action **Keep alive**: Echo LED blinks 3 times every 30 seconds = transmission of management packets by PowerBridge if no Pixels tag packets are being sent **Advertisement mode (BLE services)**: constant Echo LED = PowerBridge is in Advertisement mode 30 seconds after wake-up and can be connected for BLE services
Software updates	Via OTA from Wiliot Management portal
Power supply	5V/1A via USB-C connector
Certifications	FCC Part 15, ISED (Canada), Japan
Operating temperature	-20°C ~ +70°C
Dimensions	15.4 cm diameter, 2.6 cm thick

*Programmable from Wiliot Management portal

1W Omnidirectional PowerBridge within the Wiliot Ecosystem

3 Antenna Radiation Patterns

2.4 GHz Omnidirectional Radiation Pattern


900 MHz Omnidirectional Radiation Pattern
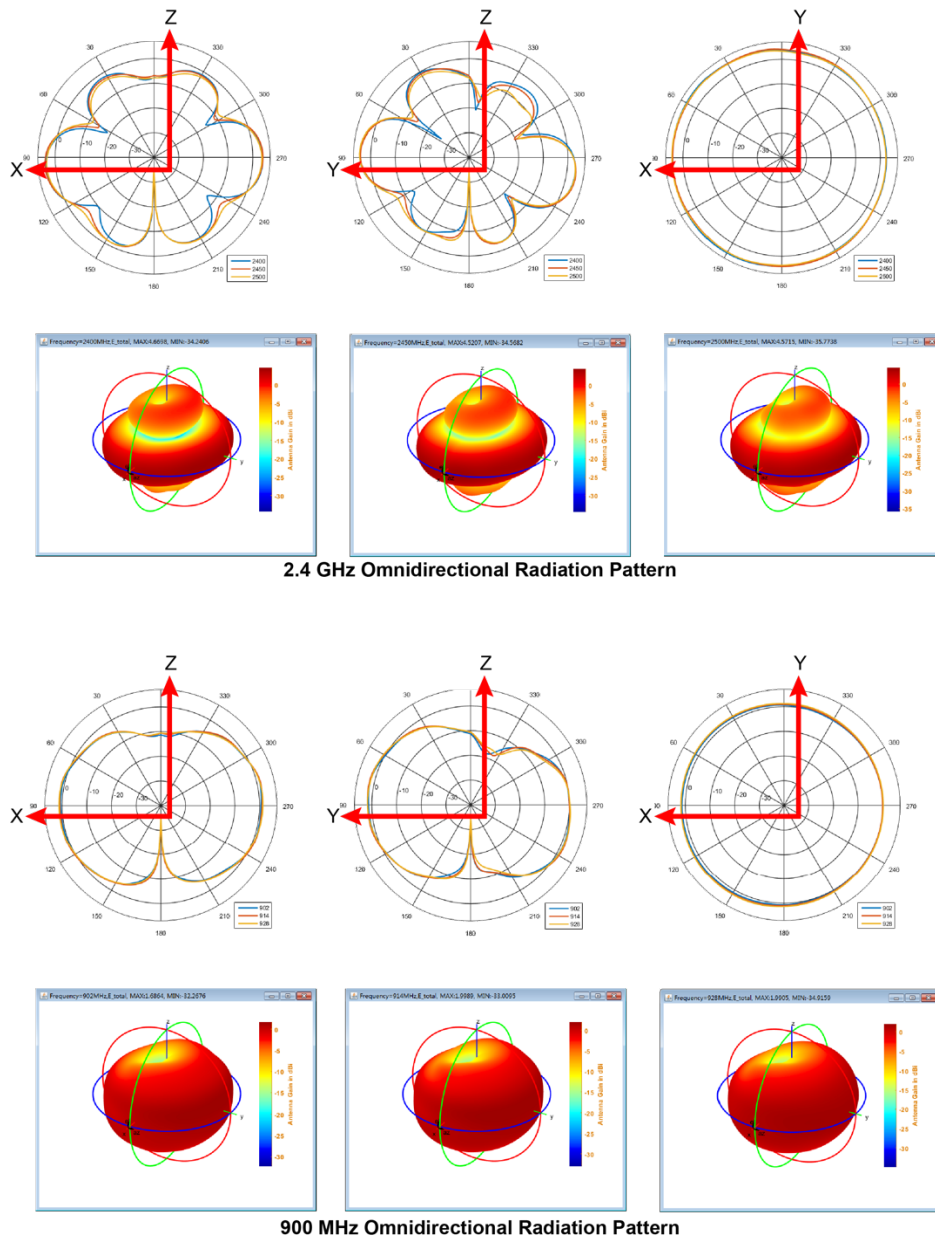
4 Operational Range

The PowerBridge energizes Pixels tags over a distance. Packets received from Pixels tags are rebroadcast by the PowerBridge at a higher power level; this is called Echoing. The distance over which Pixels tags can be energized is defined as Energizing Range and the distance over which the rebroadcast packet can be received is defined as Echo Range. This allows Pixels tag deployments to be meshed, with fewer gateways and "dead zones". Being an RF technology, the operating environment plays a critical role in determining the range; the following data is reported for nominal, over-the-air conditions.
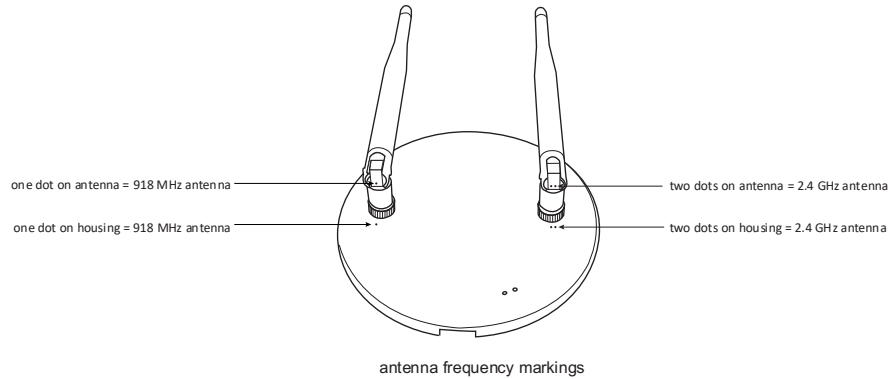
5 Pacing

The PowerBridge can reduce the amount of over-the-air traffic and throttle the amount of data pushed to the cloud. This feature is known as Pacing and refers to how often data packets received from Pixels tags are echoed by the PowerBridge which is programmable via the Wiliot Management portal.

6 1W Omnidirectional PowerBridge Diagram


antenna frequency markings
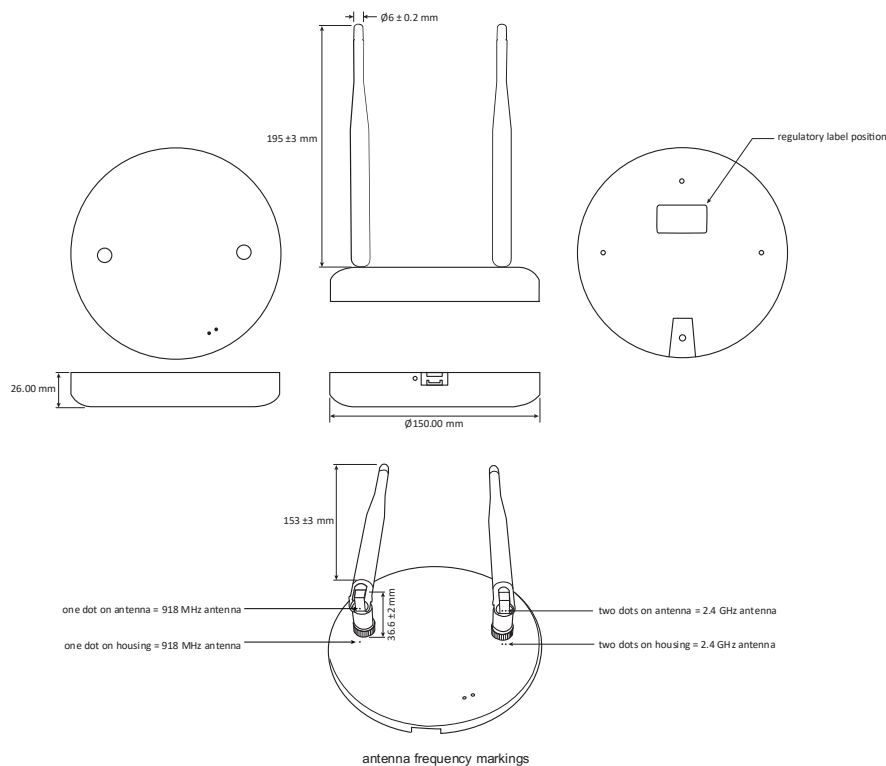
6.1   Installing External Antennas

Fasten the external antennas to the PowerBridge. The antenna frequency markings are shown below. One dot represents 900 MHz band. Two dots represent 2.4 GHz frequency band.

one dot on antenna = 918 MHz antenna

one dot on housing = 918 MHz antenna

two dots on antenna = 2.4 GHz antenna

two dots on housing = 2.4 GHz antenna

antenna frequency markings

6.2   External Omnidirectional Antennas Mounting Example

The following image shows the PowerBridge using the external omnidirectional antennas mounted on the ceiling in a perpendicular position.
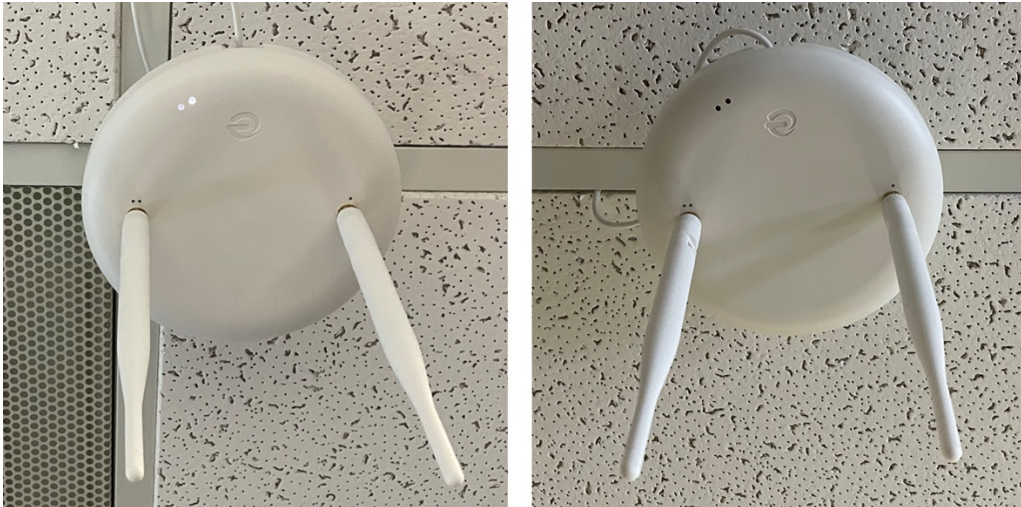
7 Regulatory Certification

The following countries are covered by 900 MHz band versions regulatory certification:
- US
- Canada
- Japan

8 Part Number Information

Part Number	Description
EN-TXS-1100-US-00	Energous 1W Omnidirectional PowerBridge Transmitter - US - 918 MHz - with Omnidirectional Antennas and Power Supply

9 Revision History

Version #	Date	Description of Changes
Version 1.0	07/25/23	- Initial release
Version 1.01	03/26/24	- Removed references to 1W directional PowerBridge throughout entire document - Changed product name to "Eagle (1W) Omni-directional PowerBridge…" throughout entire document - In section 1, added "(1 watt)" to first sub-bullet, switched position of second bullet with third bullet, and changed polarization type to "Linear" in third bullet - In section 2, changed Antennas polarization type to "Linear", changed 2.4 GHz Dipole antenna to "5 dBi", removed row for Internal antenna 3 dB beam width, and removed EU, UK from list and added Japan in Certifications - In section 4, removed table - In section 6, changed section title to "Eagle (1W) Omni-directional PowerBridge Diagram", updated diagram, and added new sections 6.1 and 6.2 - In section 7, removed EU, UK from list and added Japan - In section 8, replaced TBD with part number
Version 1.1	07/16/24	- Removed references to "Eagle", changed "Pixel" to "Pixels tag", and changed "bridge" to "PowerBridge" throughout entire document - In section 2, changed description of diagram to "…PowerBridge within the Wiliot Ecosystem" - In section 7, removed contact information
Version 1.11	08/06/24	- Updated Energous logo throughout entire document