

Beeks-RLC Low Profile Asset Tag

Beeks-RLC Duress Badge

BLE Antenna Details for FCC Certification

This document provides technical specifications, theoretical parameters, radiation pattern, and FCC compliance notes for the BLE antenna used in Beeks- RLC Low Profile Asset Tag and Beeks-RLC-Duress Badge.

Both products use the same PCBA and BLE antenna properties are the same.

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1. Antenna Type

- Type: Planar Inverted-F Antenna (PIFA)
- Orientation: Erected at 90° relative to PCB
- Height above PCB: 1.5 mm

2. Physical Dimensions & Placement

- Length from feed point: 0.7375 in (18.73 mm)
- Shape: Bent around coin-cell battery with mid-leg support
- Location: Edge-mounted on PCB, near battery

3. Electrical Characteristics

- Frequency Band: 2.4 GHz ISM (BLE)
- Return Loss (S11): Better than -12 dB across full BLE band
 - @ 2.412 GHz: -14.92 dB
 - @ 2.440 GHz: -14.66 dB
 - @ 2.480 GHz: -12.00 dB
- Theoretical Gain: ~2.0 dBi (nominal for PIFA in BLE applications)
- Efficiency: ~95–98% (based on typical PIFA design and simulation data)

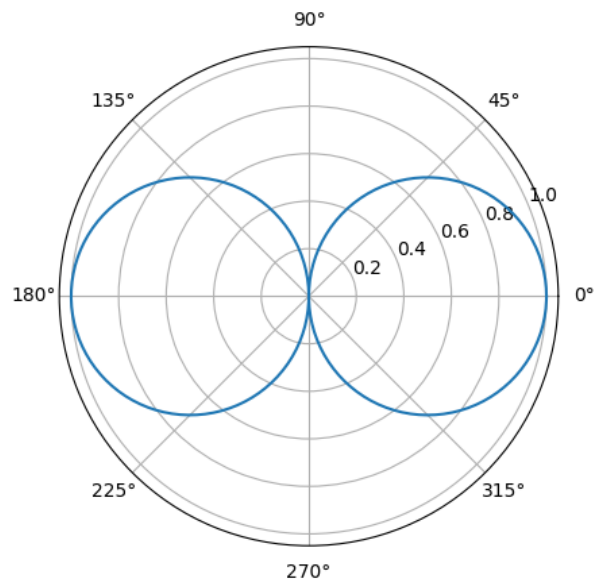
4. Matching & Performance

- Matching circuit optimized for BLE band
- Efficiency curve shows >95% across 2.4–2.48 GHz

5. Radiation Pattern

Theoretical radiation pattern for a PIFA antenna in BLE applications is typically omnidirectional in the horizontal plane with slight elevation lobes.

Theoretical Radiation Pattern of PIFA Antenna



6. FCC Compliance Notes

This antenna design complies with FCC Part 15 requirements for intentional radiators operating in the 2.4 GHz ISM band.

- Emissions are confined within the 2.4–2.4835 GHz range.
- The antenna exhibits sufficient return loss and efficiency to meet radiated power limits.
- No external amplifier is used; antenna gain is within acceptable limits.

7. Images & Measurement Evidence

