Picoo One antenna information

Version: 1

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Version history

Version	Date	Author	Change
1	2-8-2024	Martijn Stommels	Initial version

Introduction

This document provides antenna information for the Picoo One controller. It contains two antennas:

- 2.4GHz antenna used for Bluetooth low energy and IEEE 802.15.4 communications.
- 13.56MHz loop antenna used for reading ISO/IEC 15693 RFID tags

The following chapters will provide more details about the antennas.

Antenna locations

The figures below show the locations of the antennas inside the product. The part of the PCB containing the 13.56MHz antenna is installed horizontally, in the bottom of the controller.

Note figure 3 is for illustration purposes only, and is not an exact representation of the real product.

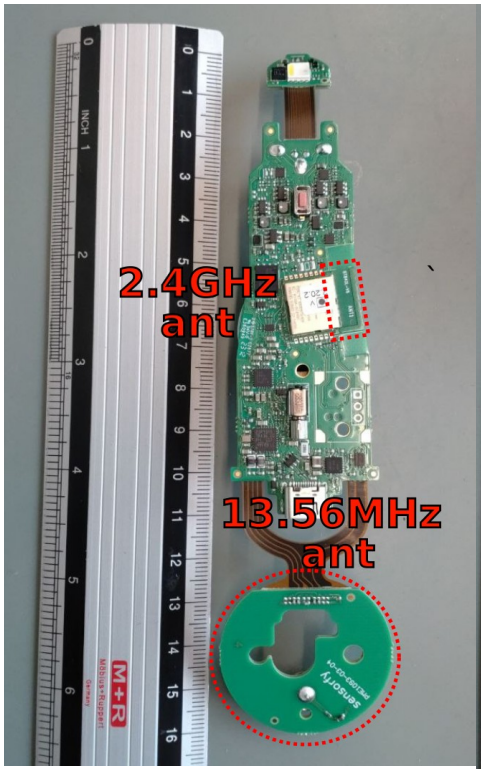

Figure 1: Antenna location (Front)

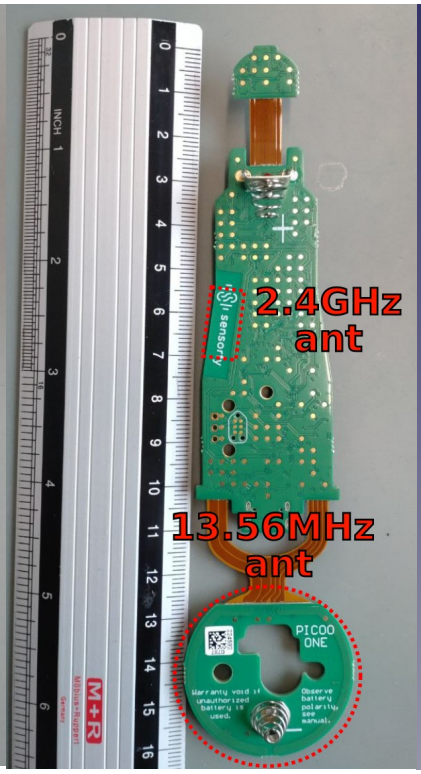

Figure 2: Antenna location (Back)

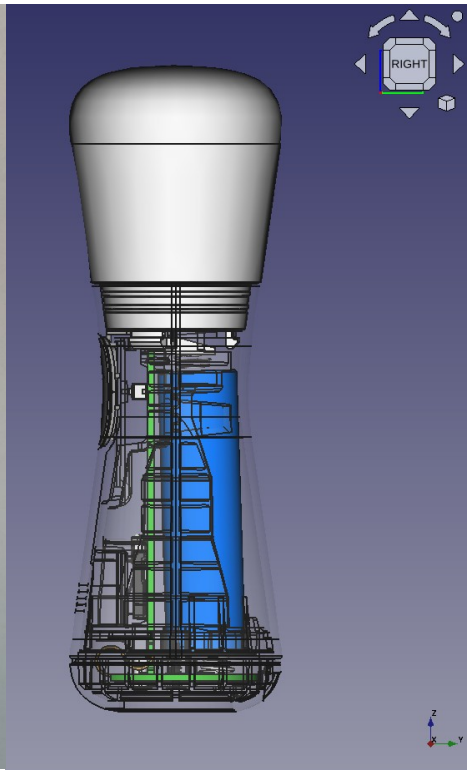

Figure 3: Illustration showing the PCB (green) inside the product

2.4GHz (BLE and IEEE 802.15.4)

The Bluetooth Low Energy and IEEE 802.15.4 functionality is implemented on a Fanstel BT840 module with integrated antenna. This module has modular FCC approval under FCC ID X8WBT840F.

Attached to this PDF is the test report (ISL-19LR205 ANT(BT840L) report.pdf) for the antenna on the Fanstel BT840 (as supplied by the manufacturer).

13.56 MHz (RFID)

The RFID antenna is integrated into the (4 layer) PCB. It is a loop antenna consisting of 4 turns of track on the inner layers of the PCB. The top layer (facing the user's hand) contains a shield to GND. This shield provides a stable capacitive coupling to the antenna.

Note: All measurements on the 13.56MHz (RFID) feature were performed radiated and therefore additional antenna gain documentation is not required.

The PCB layers of the 13.56MHz antenna are shown below.

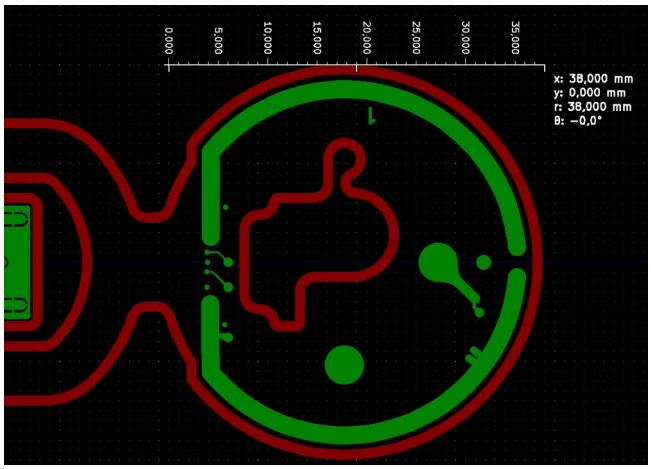

Figure 4: 13.56 MHz Antenna top layer

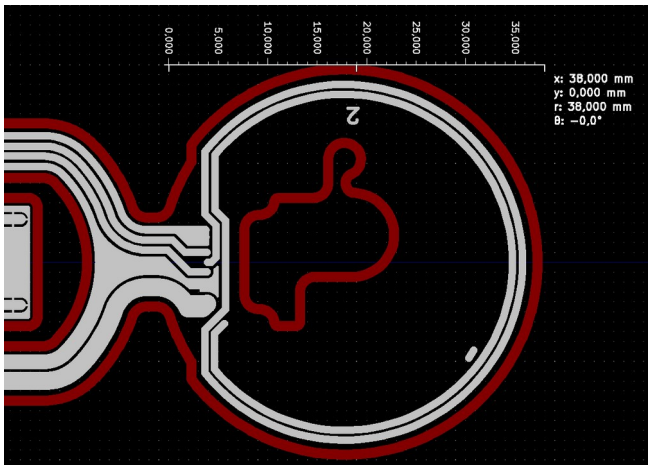

Figure 5: 13.56 MHz Antenna inner layer 1

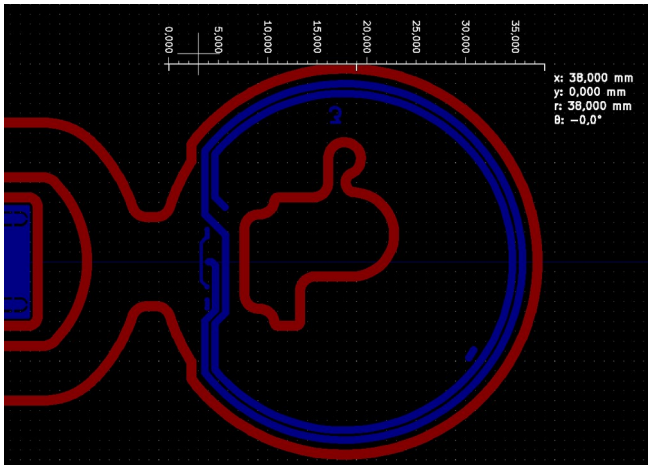

Figure 6: 13.56 MHz Antenna inner layer 2

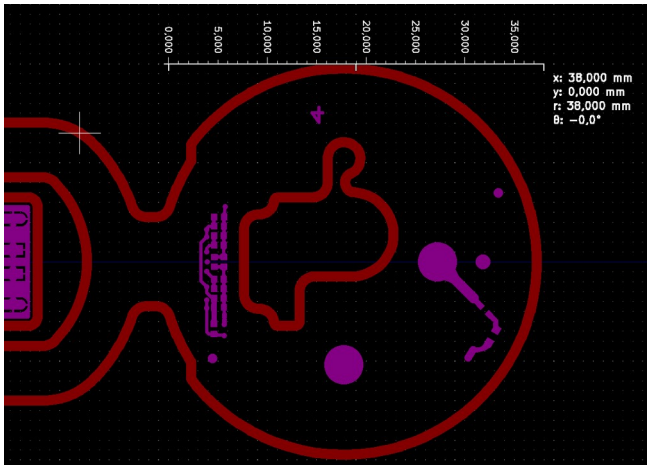

Figure 7: 13.56 MHz Antenna bottom layer