

| Version/Date | Author | Date | Checked | Date | Approved | Date |
|--------------------------|------------------------------------|------|-------------------------------|------|----------------------------|------|
| V1 29 Sep 2022 | B Wilson, Contract Device Engineer | | T Kirker, Snr Device Engineer | | M Gormack, Head of Devices | |

RF Antenna

The Hailie™ Sensor uses a 2.4GHz radio frequency antenna to communicate using the Bluetooth Low Energy protocol. The antenna is driven by the Nordic nRF52832 microcontroller, which is configured to operate at 1.0 mW (0dBm) output power at 2.40 - 2.48 GHz on 40 channels of 2MHz bandwidth using GFSK modulation.

An omnidirectional antenna is implemented in copper as part of the flexible printed circuit board and is used for both transmit and receive.

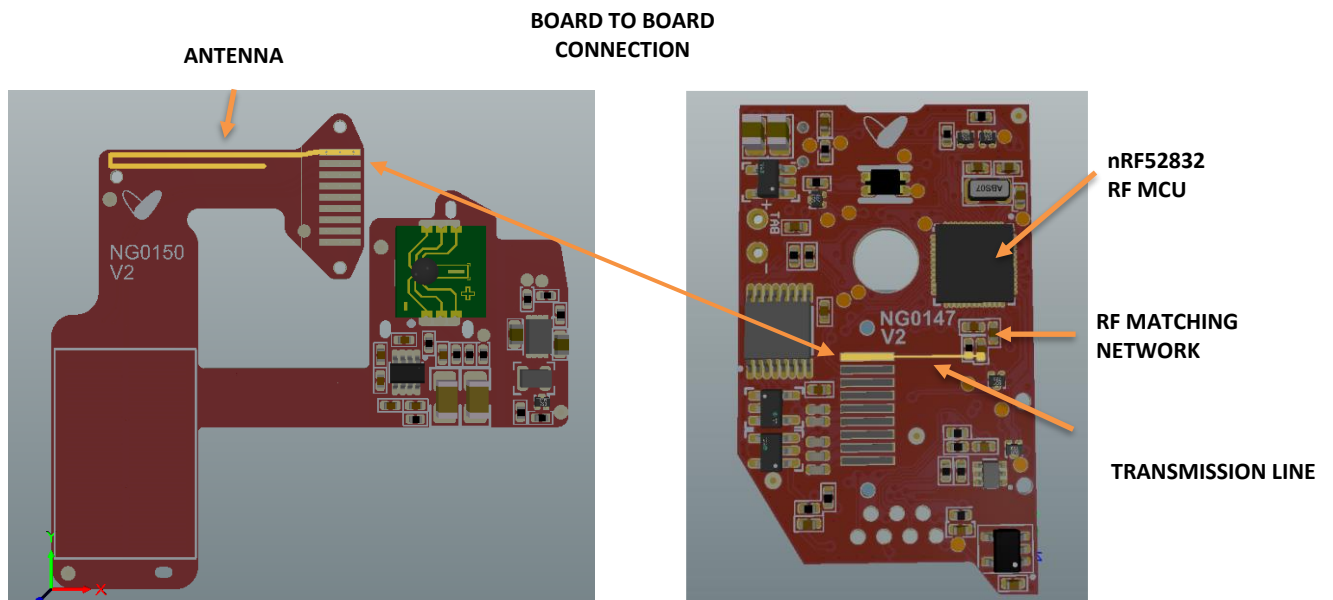


Figure 1 Flex PCB with antenna

Figure 2 Main PCB with nRF52832 RF MCU

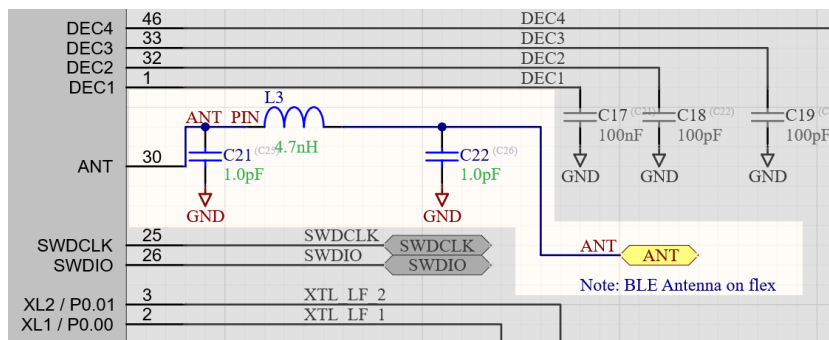


Figure 3 - Schematic, RF Matching Network

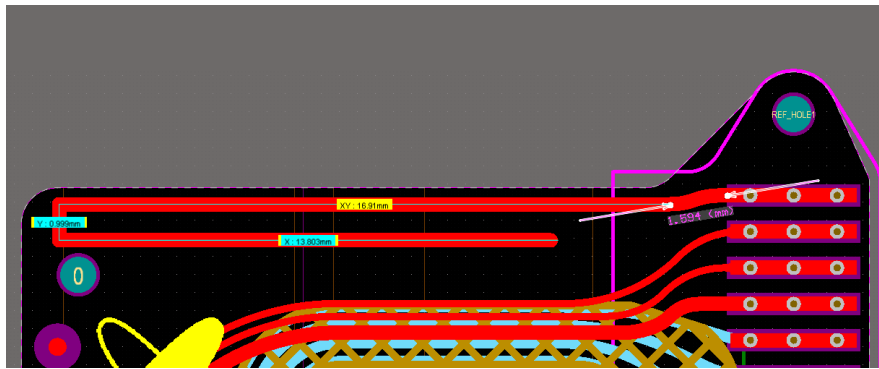


Figure 4 - Antenna Length Dimensions

Total PCB Antenna Length = 1.594 + 16.910 + 0.999 + 13.803 = 33.3mm

Antenna Style = Folded Monopole

Antenna Type = Omni-directional

EMC – Antenna RF Test Results

| Product | Test | Result |
|---------|--|----------|
| NF0108 | Conducted power after matching network | -10.5dBm |
| NF0108 | Radiated Power (EIRP) | -7.8dBm |

Antenna Gain

Antenna Gain = Radiated Power – Conducted Power

$$(-7.8 \text{ dBm}) - (-10.5 \text{ dBm}) = +2.7 \text{ dBi Gain}$$