CardioMEMS
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Atlanta, GA 30318
File Number: 0031-EX-PL-2003

Purpose

Development details of the CardioMEMS system with regard to bringing the device into FCC compliance.

System Description

The complete system comprises of three main units: the charging/pickup coil, the electronics, and the display. Other components include a printer and accessories.

Charging/Pickup coil: The coil consists of a single loop of copper band (8" in diameter) with switching and filtering circuitry contained within a proposed shielded box adjacent to the loop. Currently the structure of the loop (coil) is maintained by a circular piece of foam, 8" in diameter. The loop will be enclosed in a custom plastic enclosure for strength and support. Although not obvious from the figures, the proposed shielding is at one side (the rear) of the coil and comes up slightly over the sides.

The patient is intended to be laying on their back with the loop coil lying on top of or placed under the patient. Thus the body tissue absorbs a significant portion of the RF energy, thereby attenuating the electric field radiation. The shielding material has been optimally determined to be 4" in distance from the copper band (coil). The shielding is intended to provide attenuation of in-band noise increasing receiver sensitivity and will provide a reduction to the radiated emissions to the environment. Figure 1 shows the current implementation of the shield for the charging/pickup coil. Figure 2 shows a prototype of a charging/pickup coil design which would reside inside the shield shown in figure 1.

Electronics: The electronics consists of a sensitive receiver, signal processing circuitry, and charging circuitry with a RF power amplifier. The electronics sends data via a RS-232 link to a laptop computer for display. The electronics has recently been enclosed in a metal box to reduce EMI to acceptable levels as shown in figure 3.

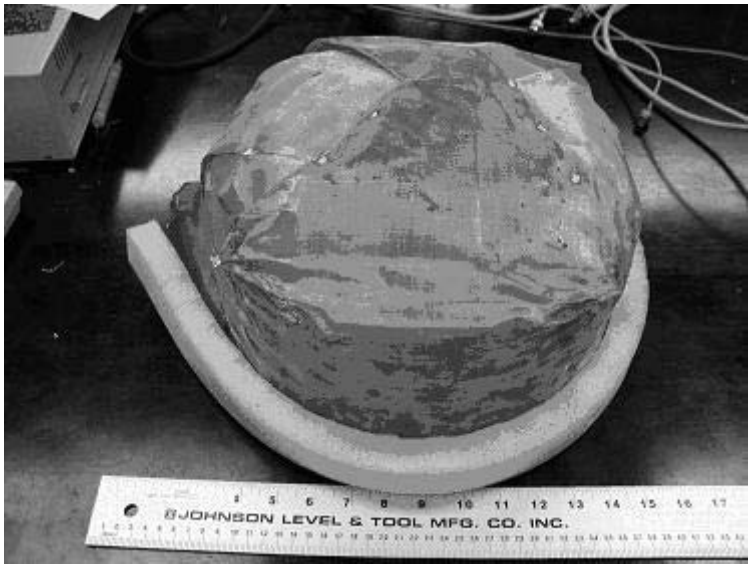

Figure 1 – Prototype Shield

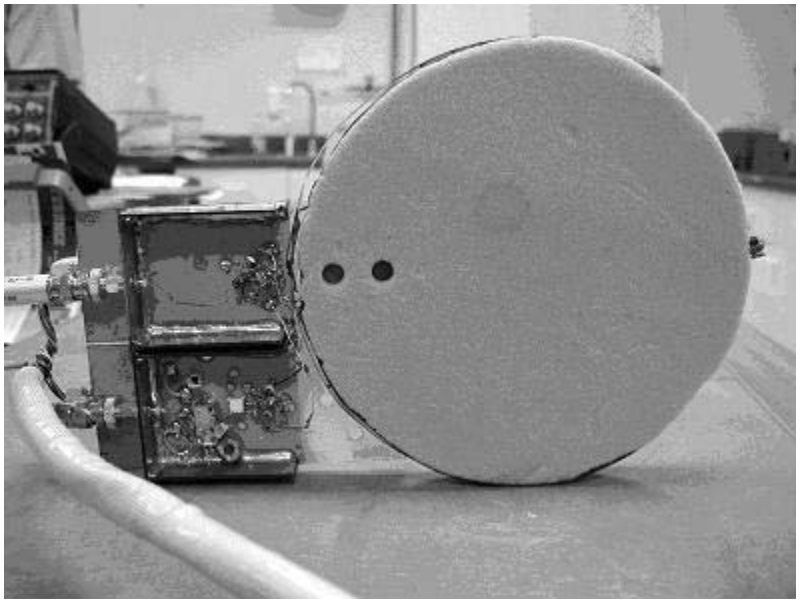

Figure 2 – Charging/Pickup Coil

Display unit: The current display unit is a laptop computer running Labview VI. This software generates the graphics, stores and organizes data, and performs simple calculations for calibration and normalization purposes. In the future, this functionality will be embedded within the complete electronics unit. Figure 4 shows the laptop and the functioning display.

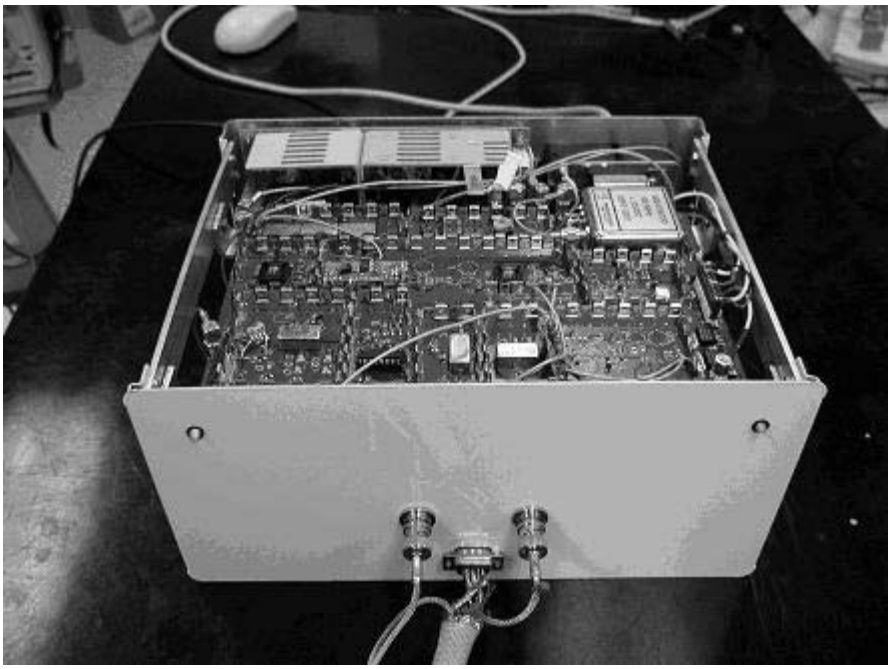

Figure 3 –Electronics

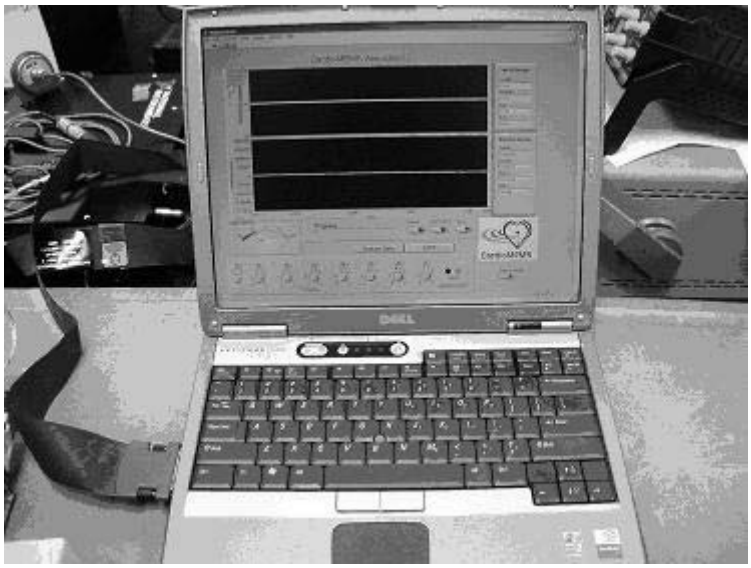

Figure 4 – Display Unit