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***Proposal Title:*** Heart Rate Measurements in the Anechoic Chamber.

Herein is listed the goals, parameters, settings and risks for an FYP experiment proposal in the Anechoic Chamber located in the main building, C-block, floor 0 of UL Campus. This missive is sent with the purpose of requesting permission to use the anechoic chamber for the experiment outlined below.

Within this document reference is made to “The Subject”, meaning the volunteer who agreed to take part in this experiment. Bob Strunz has agreed to step in as the subject for this experiment. Given his experience using the chamber this also removes the need for a third supervisor to be present.

**Goals:**

The FYP title I am working towards is: “An Application of 24GHz RADAR as a means of Contactless Heart Rate Monitoring”. Both the RADAR platform being used for this project as well as the software/firmware required to accomplish this task have been provided by Analog Devices Inc. Limerick. A working prototype is now fully engineered and ready to be tested. To provide ideal-scenario measurements an anechoic chamber is required. The goal of this experiment is to acquire data from live Human volunteers (both using my non-contact RADAR measurements and using an SpO2 fingertip measurement as a reference) from within a noiseless environment.

**Parameters:**

This experiment will measure only two metrics: The Heart Rate of the subject using the RADAR method, and the Heart Rate of the subject using the SpO2 fingertip sensor. No other devices will be necessary. The RADAR will be positioned 1m away from the subject at chest height with the antenna parallel to the subject’s chest wall. The fingertip sensor will be attached to the subject’s right index finger. Both devices will be connected to a laptop being operated immediately outside the chamber.

**Settings:**

The RADAR will be positioned as specified in the Parameters section. The subject will be seated on a plastic chair placed in the middle of the catwalk in the chamber. The subject will be facing in the direction of the door, with the RADAR between the subject and the door.

**Risks:**

Medical risks are at a minimum for this experiment. The maximum power level permitted for unlicensed 24GHz microwave transmission is 1mW (0 dBm), though most domestic appliances are well below this level. When last checked on site in Analog Devices Inc. the Demorad’s power output averaged at -10dBm (though no image of this was saved. This is worth measuring on campus if possible to confirm).

There is also the possibility of damage to the foam lining of the chamber itself. Supervision from an experienced user of the chamber will be necessary to minimise this risk.

***Conclusion:***

Given the above experiment description I would like to request permission to use the anechoic chamber to run 10 experiments on the subject, who has been briefed on the nature of the experiment, each experiment lasting a maximum of 10 minutes. The most efficient organisation of the total 100 minutes would be to spread them out over the course of 3 weeks at most.