ECE 445 Project Proposal

**Title:** **Continuous Positive Airway Pressure (CPAP) Performance Verification Device**

**Objective:** Develop a device to measure and record CPAP (Continuous Positive Airway Pressure) machine performance throughout a patient’s sleep period (6-8 hours). The device should sample air pressure (6-20 cm H2O column) at a rate sufficient to detect maximum and minimum values during each breath cycle to within +/- 3 percent. The maximum and minimum values are to be recorded, exported to a home computer, and processed (data to information) to verify the CPAP machine is performing to specification. The device must have a means to calibrate its measurements to known pressures in the 6-20 cm H2O column range.

**Background:** Obstructive sleep apnea is the most common category of sleep-disordered breathing affecting more than 12 million Americans. For moderate to severe sleep apnea, the most common treatment is the [continuous positive airway pressure](http://en.wikipedia.org/wiki/Positive_airway_pressure#Continuous_pressure_devices) (CPAP) machine,which applies positive pressure during sleep to open the airway. Many CPAP devices change pressures during each breath cycle -- inhalation (high pressure to open airway) and exhalation (low pressure to facilitate exhalation).

The desired device would give patients a home tool to verify machine performance.

A recent market survey showed no-low cost device for measuring and verifying CPAP device performance in the home setting. The devices are also not readily available from (or at) medical equipment suppliers selling CPAP machines.

I am a CPAP user – and am willing to assist the device development and testing using my CPAP. My CPAP internally records its performance – sample data can be downloaded to support development and testing.

Many times since beginning therapy, I have doubted whether my CPAP was performing properly due to poor quality sleep. I am frustrated by the lack of a device to verify CPAP performance. In multiple interactions with medical equipment suppliers, I have not found one that has a device with this specification to verify CPAP performance.

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