CLAIMS

1. An apparatus, comprising:

a processor and a memory operably coupled to the processor;

a first housing portion including at least one light-emitting diode (LED), the at least one LED including a green LED;

a second housing portion, distinct from the first housing portion and spaced from the first housing portion, the second housing portion including a photodetector; and

a connection member mechanically coupled to each of the first housing portion and the second housing portion,

the at least one LED configured, during operation, to emit light in a direction toward the photodetector, a portion of the emitted light passing through a portion of an ear of a wearer of the apparatus prior to arriving at the photodetector and during operation of the at least one LED and when the apparatus is worn about the portion of the ear,

the photodetector configured to detect the portion of the emitted light,

the memory storing instructions to cause the processor to:

calculate a blood oxygen saturation level of the wearer based on the detection of the portion of the emitted light; and

cause a vibration of the first housing portion and the second housing portion in response to detecting that the blood oxygen saturation level is below a predefined threshold value.

2. The apparatus of claim 1, wherein the photodetector is a first photodetector and the portion of the emitted light is a first portion of the emitted light, the first housing portion further including a second photodetector configured to detect a second, reflected, portion of the emitted light, the memory further storing instructions to cause the processor to calculate the blood oxygen saturation level of the wearer based on the detection of the first portion of the emitted light and the detection of the second portion of the emitted light.

3. The apparatus of claim 1, further comprising at least one of a microphone or a speaker operatively coupled to the processor, the memory further storing instructions to cause the processor to activate the at least one of the microphone or the speaker in response to detecting an alarm condition.

4. The apparatus of claim 1, further comprising a wireless transceiver, operatively coupled to the processor and configured to communicate with a mobile software application, the memory further storing instructions to cause the processor to send signals representing measurement data to the mobile software application via the wireless transceiver.

5. The apparatus of claim 1, wherein the memory further stores instructions to cause the processor to send signals, according to a predetermined schedule, to a mobile software application, the signals representing measurement data.

6. The apparatus of claim 1, further comprising at least one sensor operatively coupled to the processor, the at least one sensor including at least one of: a body temperature sensor, an air quality sensor, a humidity sensor, an altimeter, or a barometric pressure sensor, the memory further storing instructions to cause the processor to store, in the memory, data collected by the at least one sensor.

7. The apparatus of claim 1, further comprising at least one sensor operatively coupled to the processor, the at least one sensor including at least one of: a body temperature sensor, an air quality sensor, a humidity sensor, an altimeter, or a barometric pressure sensor, the memory further storing instructions to cause the processor to send signals, according to a predetermined schedule, to a mobile software application, the signals representing data collected by the at least one sensor.

8. The apparatus of claim 1, wherein the at least one LED includes a red LED, an infrared LED, and the green LED.

9. The apparatus of claim 1, wherein the at least one LED includes:

a first LED configured to emit light having a first wavelength compatible with transmissive sensing; and

a second LED configured to emit light having a second wavelength, the second wavelength different from the first wavelength and compatible with reflective sensing.

10. The apparatus of claim 1, wherein the connection member includes a deformable material and is configured to be deformed during positioning of the apparatus about the portion of the ear of the wearer.