Target Summary

The following targets for the Detector Baby correspond to the developed functions created based on the customer needs. One of the main functions the device should have is an ability to detect a baby in the car seat. According to KidsHealth the average weight of a newborn is five to eight pounds (Desiraju, 2018). Therefore for the device to work for the majority of babies, it was determined that the device should be able to detect a minimum weight of five pounds.

The next important function of the device is its ability to read the temperature inside a car and then alert the user of life-threatening temperatures. The critical temperature for alerting users was determined based on information that reports children tend to experience a fever when their internal body temperature reaches 100 degrees Fahrenheit, experience heat stroke at 104 degrees Fahrenheit, and death at approximately 107 degrees Fahrenheit (Gaggel, 2018). Using the following equation, a linear ratio between the rise in car temperature and the rise of internal body temperature was approximated:

[1]

In an evaluation of contributing factors, it was determined that the rise in temperature between the car and infant is approximately 4.5:1 degrees, and using this ratio, the baby could start experiencing a fever after the car’s temperature rises above 84 degrees Fahrenheit; additionally, based on current operation distances for long range key fobs, a target distance was set for the device to operate at a maximum range of 100 to 200 meters. The practicality of this distance range was determined by approximating the distance from the end of the FAMU-FSU College of Engineering parking lot to the opposite end of the school using the Google Maps scale. This distance is assumed to be a representation of the average distance between a parked car and the opposite end of a store. The reaction time of the device is desired to be within one second of the minimum critical temperature to alert users as fast as possible and informing the user of the current situation of the child. If the user chooses to ignore the alert the device will be silenced and re-alert the user after four minutes. The time interval of four minutes was determined based on the fact that a car’s internal temperature can rise from 70 to 115 degrees in about an hour or 0.75 degrees per minute (Jon, 2018). Using the Car:Baby Temperature Ratio, the change in temperature of the baby after four minutes will be about 0.67 degrees, well under the temperature in which health is affected. To encourage users to carry the device sizing of the secondary device was set to similar dimension of a key fob, which would allow the user to carry the device along with their keys. In addition, the device should be compatible with all car seats, display temperature ranges and passenger vitals, and alert users and emergency personnel.