Battery Life Estimation

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# Purpose

This calculation derives the expected battery life for the EK No Trespasser Door Alarm.

# System Overview

* This is an alarm system using a hal- effect sensor to detect when the door opens, and then create a sound.
* There will be a module installed in the door to detect when the door is opened or closed.
* It will be a BLE module which will broadcast the door state in its advertising manufacturer data
* There will be a Raspberry Pi that listens to the manufacturer data, and will turn a buzzer on when the door is open, and off when it is closed.

# Design Basis

* Battery powered
* LiSO-Cl2
* Nominally use Tadiran AA-size SL-360 battery (3.6V) - see: <https://tadiranbatteries.de/wp-content/uploads/2023/02/SL-360.pdf>
* Minimum time between battery changes = 2 years.
* use TCS40DLR for hall effect sensor
* use BT832AF for BLE SoC

# Calculation Approach

Given a target battery life, one can derive an average current draw. Subtracting from this value, the current consumption of the hall-effect sensor, one can estimate the permissible average current draw of the BLE SoC. Based on this average current draw, one can determine a suitable advertising rate.