

Batteryless data collection for Medical Devices

An inhaler checks whether the patient has taken medication regularly and sends the measured data to a smartphone. The current inhalers only work with a battery, but this is set to change.

In this bachelor thesis the feasibility of equipping such an inhaler with a self-sufficient system which sends the number of inhalations to a smartphone via Bluetooth Low Energy (BLE) is examined. The size of the inhaler should remain as constant as possible.

The energy for the system is generated by means of energy harvesting and converted with a buck-converter and temporarily stored in a storage capacitor.

Various energy harvesting methods and harvesting circuits are measured and then analysed. The gathered energy is used to operate a microcontroller.

It is checked whether enough energy can be generated to operate sensors to measure the patient's inhalation. The measurement of suitable sensors as well as the analysis of the results is also dealt within this paper. The data of the sensors are transferred to the microcontroller and there checked and send on to a smartphone.

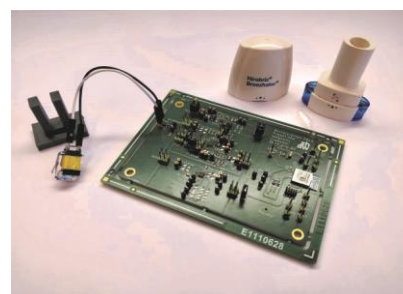
A NRF52840 microcontroller sends the number of inhalations via Bluetooth Low Energy (BLE) in advertising mode to a smartphone. For example, the treating physician could check whether the patient was taking the medication correctly and on a regularly basis. The created software is explained and tested in this document.

The findings showed that you can operate the inhaler autonomously, measure the inhalation and send the gathered and processed data on to a smartphone.



Diplomierende
Matteo Andrea Nüssli
Dominik Seeg

Dozent
Juan-Mario Gruber



Concept of a batteryless data collection for Medical Devices

Bild klein 2.