01-04-2022

Assignment 2 – Sensing

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Question 1

Write a program to measure the noise/interference signal strength of different channels (from channel 11 to channel 26)

The code for the program can be seen in the attached files. Using the "cc2420" library in contiki to initiate the radio, turning it on and setting the channels for which the RSSI can be read. The library also takes care of the RSSI offset, which is –45.

The measuring time of the RSSI should be atleast double the time of the RSSI measuring time. In the datasheet it can be seen that it takes 128 µs for the RSSI to be measured, therfore it should only be checked atleast after 256 µs, such that it is not possible to read the same value.

There is a tradeoff between how many times to read the RSSI before choosing the right channel and the time that the radio is on. The longer the radio is on the more energy it consumes therefore in, this program it is only measured 2 times. On the other side only measuring two times can create unreliable communication results since it is hard to read the stability of the channels with only 2 measurements.

During testing it seemed liked the RSSI changed rapidly per read, which could indicate that, when checking for the right channel, it would be somewhat hard to know if it is the right channel the next second, meaning that the communication could be unreliable still. This could probably be predicted by having a long averaging of signal strength, while still having the last RSSI in perspective before sending. This would result in some kind of knowledge of the behaviour of the channels RSSI.

Question 2

Compare noise/interference status at different channels and select the best channel. The Fig. 1 shows the 16 channels of 802.15.4 coexist with the channels of Bluetooth Low Energy and the Channels of WiFi.

In the code, a while loop is used for switching through the channels (11-26) measuring the RSSI. This is done two times before choosing the best channel with the best RSSI. The test can be seen in figure 1, and shows that it chose channel 17.

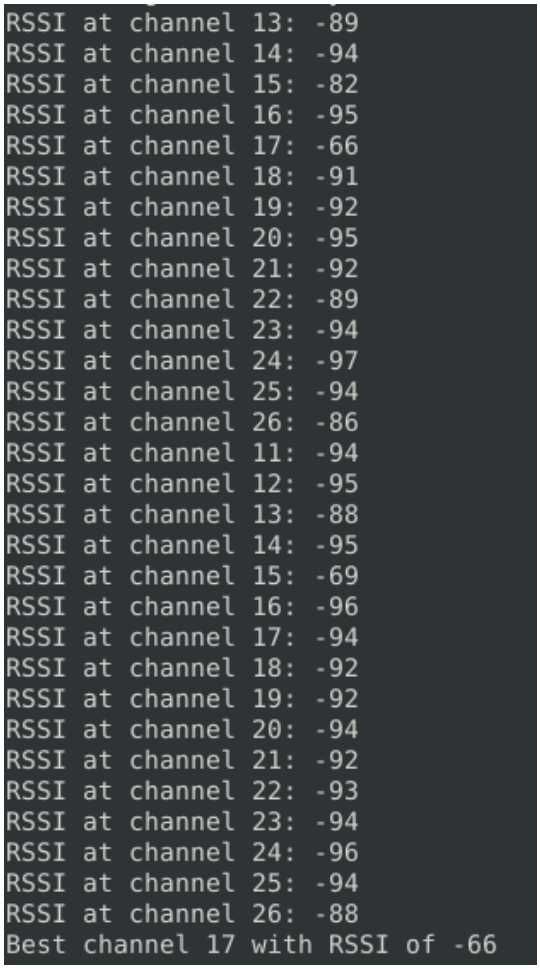

Figure 1: RSSI Test