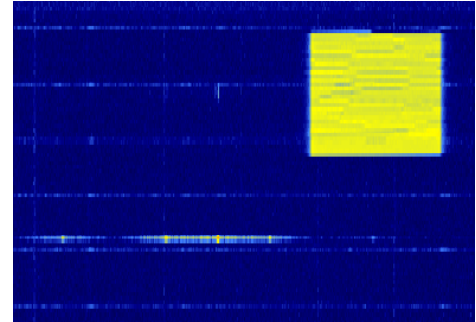


Frequency Spectrum Logging for FlockLab

The Computer Engineering Group (TEC) operates the FlockLab testbed [1] for testing wireless communication protocols on real hardware. This testbed features different services such as GPIO and power tracing and GPIO actuation. Up to now it does however not provide a service for logging the frequency spectrum. This additional information is important to verify the correct operation of the wireless communication protocol under test as well as to understand the environment (e.g. interference) during the time of the test.



Tasks

The idea of this project is to use a software-defined radio (SDR), e.g. an rtl-sdr dongle, to sense and characterize the spectrum while tests are running on the FlockLab testbed. Recording the frequency spectrum with an SDR generates a lot of data. The challenges are to process/aggregate the recorded data in order to obtain interesting metrics and to synchronize the timestamps of the collected data with the traces of the other FlockLab services. In the end, the measurement data is provided to the user of the FlockLab. The tasks of this projects are:

- Familiarize yourself with the SDR hardware and software tools.
- With a single transmitting device, collect frequency power spectrum traces, log them as csv and visualize them.
- Investigate other important metrics of the frequency channel and examine the temporal resolution / quality which are required for interpreting the FlockLab test results.
- Investigate the possibility of logging multiple frequency channels at the same time.
- Evaluate the implemented system.

Requirements / Skills

- Motivation to investigate multiple approaches
- Data processing with Python (numpy, pandas, matplotlib)
- Knowledge with SDR and signal processing is advantageous

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References

- [1] FlockLab. <http://flocklab.ethz.ch/>.