


# Dataset: UWB Channel Impulse Responses Registered in a Furnished Apartment

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**Abstract**—This document describes a dataset of UWB channel impulse responses registered in a fully furnished flat for NLOS detection algorithms evaluation. The data were gathered using Decawave’s EVK 1000 modules, which were distributed among the apartment. The dataset contains CIR measurements performed for 57 transmitter-receiver geometrical configurations. For each configuration, at least 100 CIRs were collected. Besides the CIR measurements, the modules performed ranging. The results are stored in log files returned by the Decawave DecaRanging PC application.

**Index Terms**—NLOS detection, UWB

## I. INTRODUCTION

This dataset contains ultra-wideband (UWB) channel impulse responses (CIR) registered in a fully furnished apartment. The data were used to assess the effectiveness of a Non-Line-of-Sight (NLOS) detection algorithm described in our paper [1]: “Detection of direct path component absence in NLOS UWB channel.”

## II. FILES

The dataset consists of files containing measurement results, measurement locations and a Python script:

- `x.log` - where  $x = 1..57$  - output log files containing CIR and distance measurement results,
- `anchors.csv` - x-y coordinates of the transmitter (referenced as an anchor),
- `tags.csv` - x-y coordinates of the receiver (referenced as a tag),
- `pairs.csv` - list of anchor-tag location pairs for which the measurements were performed,
- `labels.csv` - LOS/NLOS labels assigned to the measurement results in paper [1],
- `loadCIR.py` - python script decoding the log file and loading CIR and ranging measurement results.

The format of the log files is described in the DecaRanging app manual [2].

## III. MEASUREMENTS DESCRIPTION

The UWB CIR measurements were collected using the Decawave EVK1000 Evaluation Kit [3] and the dedicated DecaRanging application [2]. The measurement campaign was conducted in a fully furnished flat, which layout is presented in Fig.1.

The flat consisted of 4 rooms, a kitchen and two small bathrooms. The walls are made of about 5-cm thick precast concrete.

During the campaign, the CIRs were collected for 57 different modules’ geometrical configurations. The modules were referenced as an anchor and a tag. Their locations are stored in appropriate files. The anchor-tag pairs for which the specific log files were registered are stored in `pairs.csv` file.

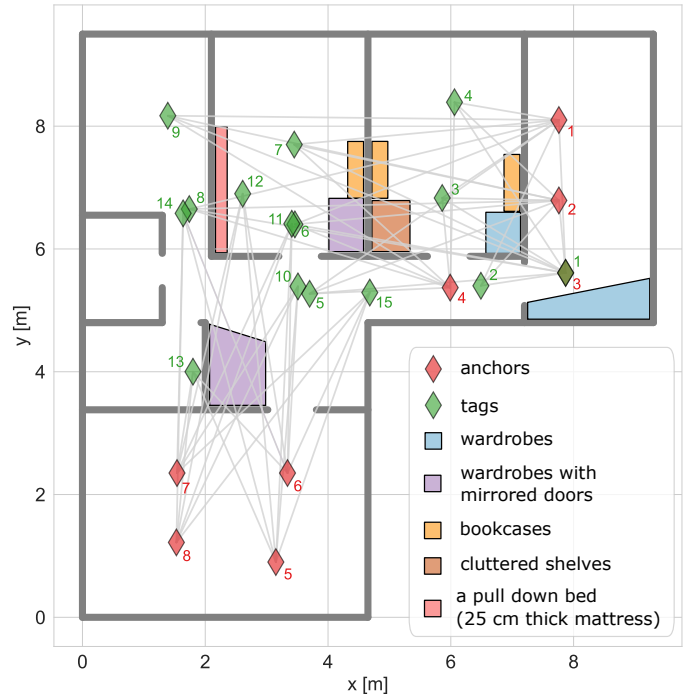


Fig. 1. Measurement environment with measurement locations and significant objects obstructing the path between the devices marked.

## IV. LICENCE AND ATTRIBUTION

The dataset is licensed under *Creative Commons Attribution 4.0 International* license. The actual citation data can be found in the metadata on Zenodo or Readme file on Github.

When using the data, please consider also citing the original paper, for which it was collected:

M. Kolakowski and J. Modelski, "Detection of direct path component absence in NLOS UWB channel," in *2018 22nd International Microwave and Radar Conference (MIKON)*, Poznan, Poland, May 2018, pp. 247–250 doi: 10.23919/MIKON.2018.8405190

#### REFERENCES

- [1] M. Kolakowski and J. Modelski, "Detection of direct path component absence in NLOS UWB channel," in *2018 22nd International Microwave and Radar Conference (MIKON)*, Poznan, Poland, May 2018, pp. 247–250, doi: 10.23919/MIKON.2018.8405190
- [2] Decawave Ltd, "DecaRanging (PC) User Guide." Decawave Ltd., Dublin, Ireland, 2016.
- [3] Decawave Ltd, "EVK1000 User Manual." Decawave Ltd., Dublin, Ireland, 2016.