GÉANT Innovation Programme 2021 – showcase

March 1, 2022

Design and Implementation of an 802.11 Privacy Preserving Sub-Layer DI-P^{2}SL

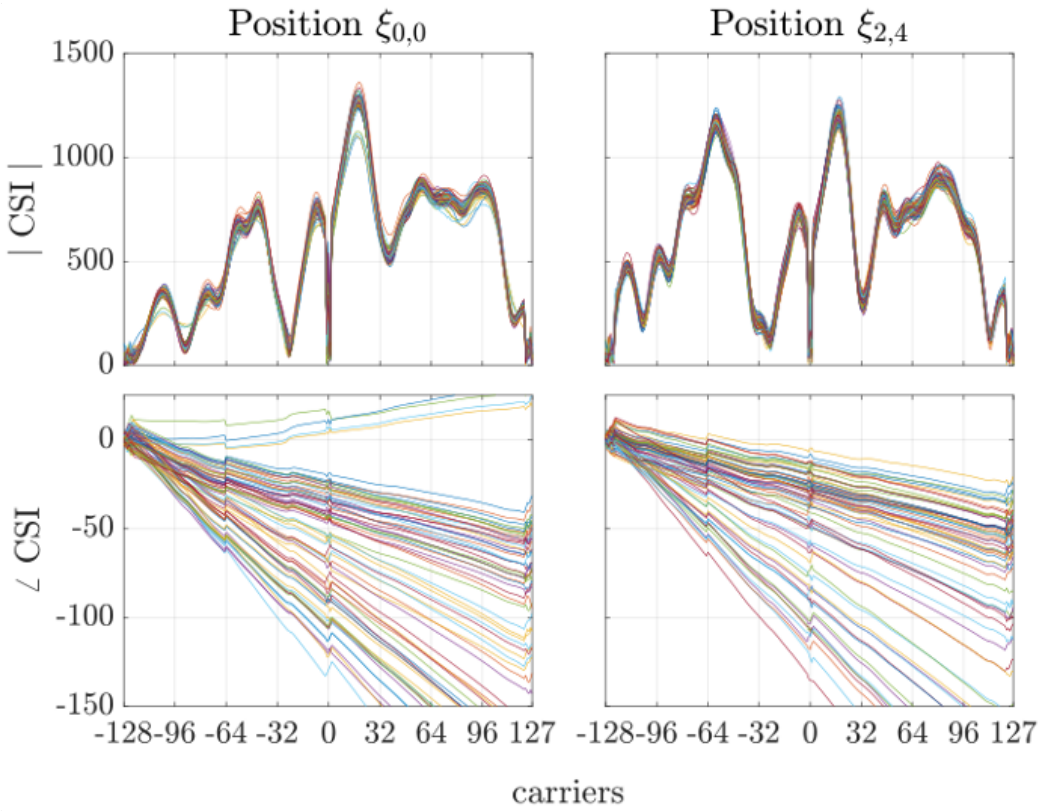
Renato Lo Cigno – Lorenzo Ghiro

Marco Cominelli – Francesco Gringoli

https://ans.unibs.it/projects/di-p2sl/

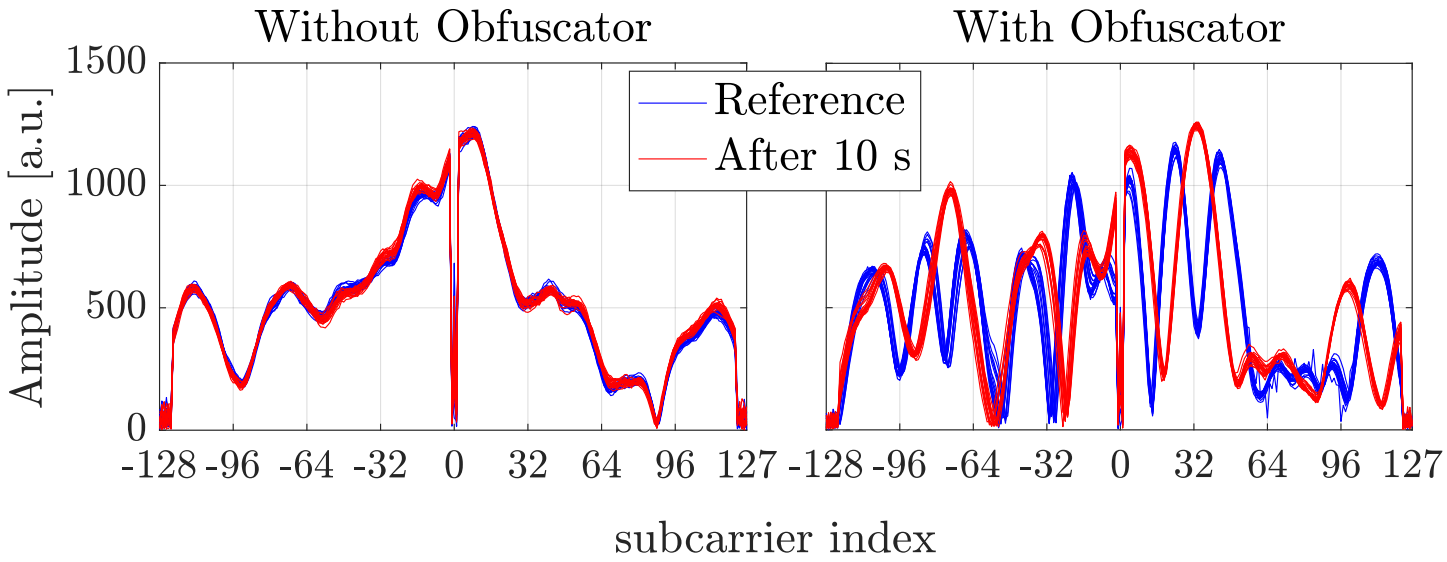
The Idea

- Wi-Fi sensing (people localization in particular) is very intrusive
  - CSI carries a lot of information that can be retrieved / fingerprinted
  - ML and AI are normally used to perform the analysis



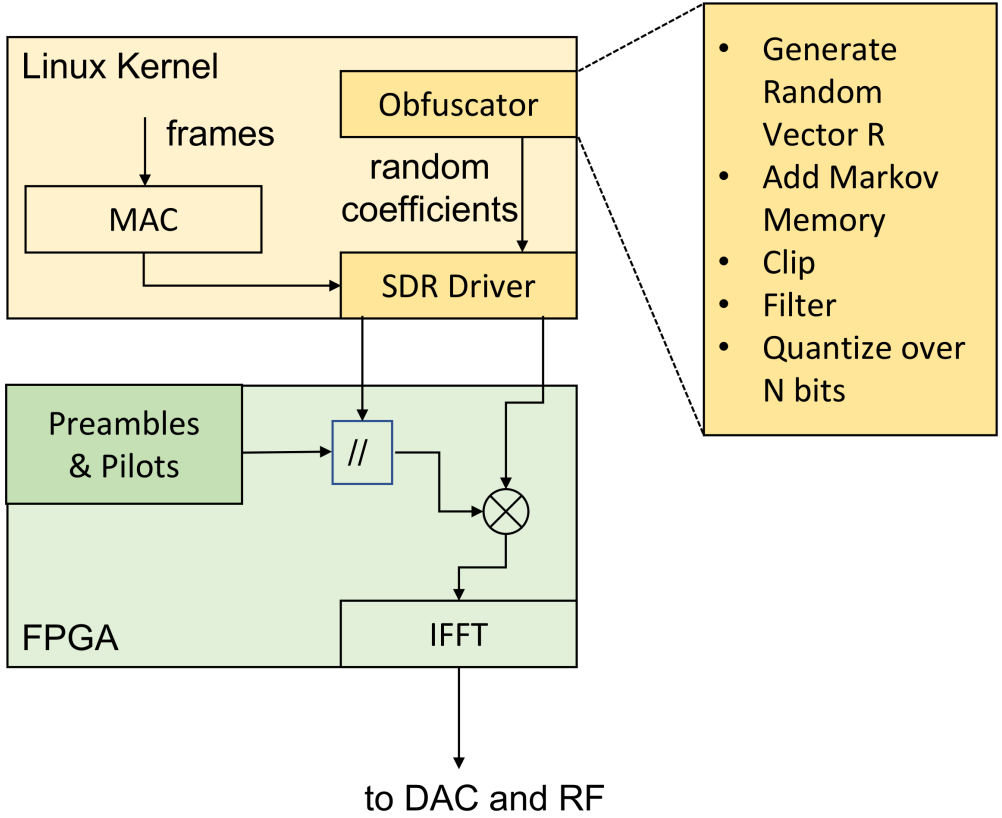
The Idea

- Counter sensing without hampering communications
  - Do it by randomly pre-distorting (obfuscate) the transmitted signal



The Implementation

- Modify openwifi[1] to include the predistortion
  - Both kernel driver and FPGA



[1] https://github.com/open-sdr/openwifi

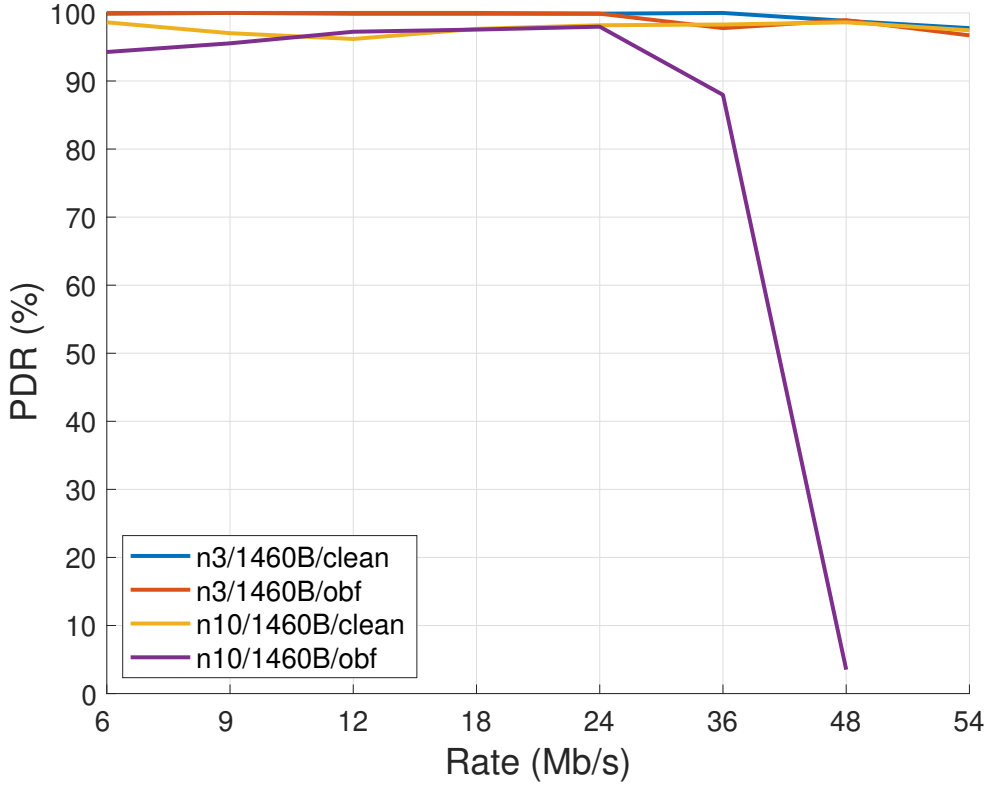
The Results

- Good obfuscation
- Localization is not always perfect even without obfuscation → probably due to the use of 20MHz only
- Apart from one case obfuscation is effective → a random guess returns 12.5% accuracy

Test 1				
	L1	L2	L3	L4
Clean	63%	76%	72%	65%
Obfuscated	27%	11%	9%	5%
Test 2				
	L1	L2	L3	L4
Clean	66%	69%	69%	64%
Obfuscated	27%	7%	21%	19%
Test 3				
	L1	L2	L3	L4
Clean	99%	89%	99%	96%
Obfuscated	80%	37%	55%	46%

The Results

- Good communications
- Coherent with SDR-based results
- Location-dependence still to be studied / understood



GÉANT Innovation Programme 2021 – showcase

March 1, 2022

Design and Implementation of an 802.11 Privacy Preserving Sub-Layer DI-P^{2}SL

Questions and Details in the Breakout Session

https://ans.unibs.it/projects/di-p2sl/