An Experimental Framework for Channel Sensing through USRP / GNU Radios

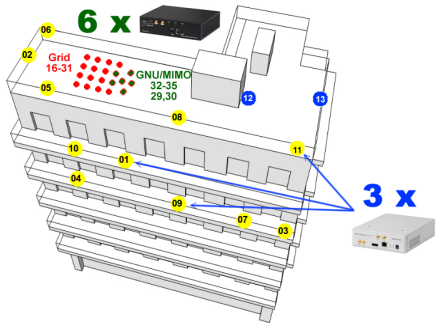
INTRODUCTION

✓ NITOS is a large scale, remotely accessible wireless testbed that is outdoor deployed and thus offers rich interference conditions.

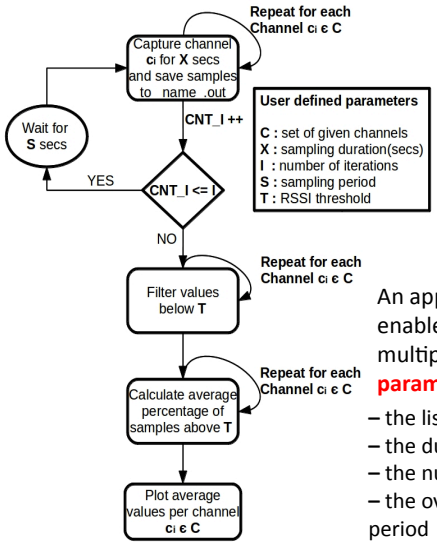
✓ Need for tools that sense external interference from packets that cannot be decoded or from common devices, such as microwave ovens that commercial cards cannot.

✓ How to compensate the high cost of equipment required for sensing of specific bands (**3G**, **LTE**, **WiMAX**).

✓ NITOS has developed a framework that provides experimenters with the ability of accurate channel sensing.



FLOWCHART



An application level **script** enables the definition of multiple sampling **parameters**, such as:

– the list of frequencies
– the duration of sampling
– the number of iterations
– the overall sampling period
– the RSS threshold

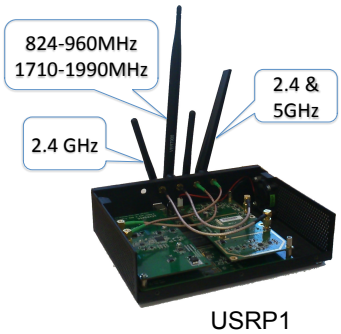
USRP SENSING FRAMEWORK

✓ Based on the **USRP** devices and the **GNU Radio** platform

✓ NITOS has 9 USRP's:

- 6 **USRP1** (up to 8 MHz of RF bandwidth)
- 3 **USRP N210** (up to 50 MHz of RF bandwidth)

✓ There are 2 **RF Daughterboards** embedded in USRP's:

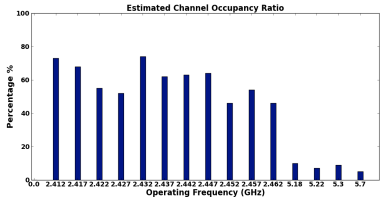


USRP1

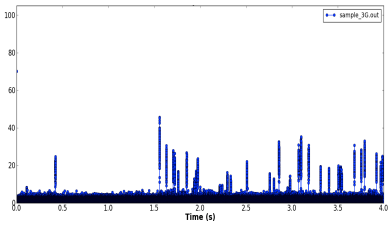
- **XCVR2450**:a tranceiver intended for operation 2.4-2.5GHz & 4.9-5.9GHz
- **SBX**: a tranceiver intended for operation 400-4400MHz

USRP N210

EXPERIMENTAL RESULTS

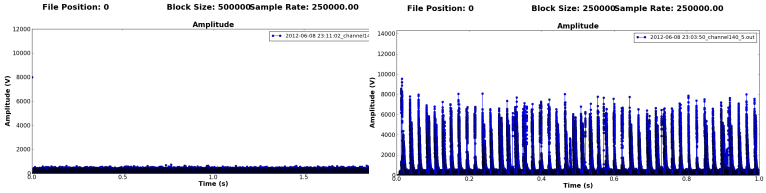


Plot of Channel Occupancy Ratio per selected frequency, with results in the **2.4** and **5 GHz**.



Capture in the **900 MHz** (**3G**) when data transmitted

Plots of sensing results in the **5.7GHz** for idle and busy medium (5Mbps).



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