

Introduction

- Mobile and Personal Communications Laboratory is an advanced course in communication engineering where the focus of study is on next generation wireless systems.
- Next generation wireless systems have to meet the challenges of having high data rates, low power consumption and low BER (bit error rate) at the same time.

Simulation Software

- LabVIEW

Lab Equipment



NI USRP Software defined radio platform interfaced with LabVIEW

- NI USRP-2943R
- NI USRP-2922

Scope of the Lab

- During the course the student will learn how to use "LabVIEW" in general. They will focus on signal processing and USRP libraries of LabVIEW. They will also learn how to use code written in MATLAB as part of LabVIEW project.
- Students will learn how to configure and interface NI USRP hardware module with LabVIEW.
- They will design, implement and test various pulse shaping and modulation schemes for next generation wireless communication systems.
- Performance measures like BER are calculated and various schemes are compared.

Application Areas

- Machine to machine communication system
- Software defined radio
- Cooperative networks
- Heterogeneous networks
- 5G cellular networks
- MIMO communications

List of experiments

- Familiarization with LabVIEW
 - (i) Loops, Arrays
 - (ii) Signal acquisition, Signal operations
 - (iii) Math Script
- Analog to Digital Conversion
 - (i) Sampling, Quantization
 - (ii) FFT
 - (iii) Filter: FIR, IIR
- Pulse Shaping
 - (i) WCDMA
 - (ii) CDMA2000
 - (iii) WiMAX
 - (iv) LTE
- Modulation Schemes
 - (i) BPSK
 - (ii) QPSK
- Channel Modelling (MATLAB + LabVIEW): Rayleigh
- Channel Modelling (MATLAB + LabVIEW): Gaussian
- Demodulation Schemes
 - (i) BPSK
 - (ii) QPSK
- Overall Communication System using USRP
 - (i) BER
 - (ii) Constellation Diagram
- OFDMA communication system using USRP

Contact Details

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