Wireless Systems Lab

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Objective

This course is intended to give students from a broad set of backgrounds a hands-on introduction to wireless communication systems. Its intent is to demonstrate the main concepts without bogging down in detailed mathematics. The labs are associated with a wireless systems course which introduces many of the theoretical concepts.

Structure

The labs are intended to be completed in 3-4 hours. The labs often involve making measurements outside, over multiple floors, and so on in addition to making measurements at the lab bench. Several experiments use the roof of the engineering building but any clear area above the clutter can be used. The first five labs introduce basic issues of spectrum analysis, antenna design, modulation, FCC spectrum allocation, and propagation.

Equipment

- Agilent ESA-L1500A Spectrum Analyzer: 9 kHz - 1.5 GHz (All Labs)
- Agilent E4400B Signal Generator: 250 kHz - 1GHz (Labs 2, 4, 5)
- Agilent ESG-D4000A Signal Generator (Labs 1,3)
- Antennas made in the second experiment
- Walkie-talkie systems provided
- Audio source (radio)

Experiments

- TLEN 5320 Wireless Systems Syllabus
- Lab 1: Spectrum Analysis
- Lab 2: Antenna Design
- Lab 3: Analog Modulation
- Lab 4:Frequency Allocation Plan and Spectrum Utilization
- Lab 5: Indoor Radio Propagation
- Lab 6: Outdoor Radio Propagation
- Lab 7: Interference in Cellular Radio Systems