

## **EE 225C VLSI Signal Processing**

### **Homework 3**

**Due on March 12, 2003**

There are two documents in this homework that are actual measurements of two analog direct conversion transceiver boards designed to meet the 802.11a specifications. The task is to develop the simplest possible Simulink transmitter and receiver baseband analog models that simulates the performance of these two receivers as closely as possible with only a change of parameter. Use an oversampled discrete time approximation to model the analog effects. Calibrate your plots with the signal power levels given on the plots (i.e. Stefan gave the frequency and power numbers for his reference signals such as “Input Signal 5.244 GHz. -65dBm, CW” ). CW means Constant Wave.

The RF impairments block set in the Communications library should be a good start and may be adequate, but you are not restricted to it.

The data will allow you to calculate the noise generated in the receiver, non-linearity's, I Q mismatch, DC offsets, filtering and A/D converter accuracy.

For the transmitter you will need to model the power amplifier non-linearity's, the RF and baseband filter responses as well as the phase noise.

- a) Compare the results of your model with the actual data for as many of the numbered plots in the two documents as you can, by showing your plot next to the actual data.
- b) Show a plot of your Simulink model and the parameters you change to model the two different boards.