EE507-Project#2-Spring 2003
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Due: April 28, 2003 – Paper Copy
Presentations during the week of April 28, 2003,
and the final period – Wednesday, May 7, 2003, 2:15-4:15pm
All on-campus students are expected to attend the final exam period.

The specification for this project is purposely broad. Each student group (2 or 3 students) is to design their own system. Since the specification is very broad, the likelihood of any two project groups submitting the same system is anticipated to be zero.

The IEEE 802.11a specification has at least the following band allocations.

5.15–5.25 GHz
5.25–5.35 GHz
5.725–5.825 GHz

You are to choose one of the bands for your operating frequency and design a receiver system. You will do a geometric layout as well. However, the emphasis of this project is not the detail of the layout, but the detail of the system.

You will be using only a limited number of metal layers and a limited amount of dielectric.
M1 – 100 nm thick – aluminum
M2 – 750 nm thick – aluminum
Dielectric between M1 and silicon, 100 nm thick, $\varepsilon_r = 4$
Dielectric between M1 and M2, 1000 nm thick, $\varepsilon_r = 6$

Vias between the metal layers will be assumed to be shorts.

The nmos device parameters are given in the file projectnmos.lib
The pmos device parameters are given in the file projectpmos.lib

The source resistance (characteristic impedance) of the antenna is 50 ohms.

The maximum signal level is assumed to be –30dBm.

The bandwidth of the signal is 10 kHz. You choose the center frequency in the band of interest.

You follow the detector/mixer with a 1 bit sigma-delta A/D converter.

Consider whether you will need a AGC amplifier. If you do, consider that it could be implemented with a “gilbert-cell” and a “dc” input from a control loop.

The filters you need, you need to specify. You can put in a filter block or use an ideal filter.

The geometric layout should address inductive, capacitive, and ground issues.

Deliverables

Block Diagram
Signal Analysis
Cursory Geometric Layout showing inductive, capacitive, and ground considerations.
0100100111 repeating code for input FSK signal detected at the output – show transient analysis.