ECE 496A/519B 2019

Assignment 3

Due date: Feb. 28, 2019

1. What are the definitions of coherence time and coherence bandwidth?
2. What are the meanings of fast fading, slow fading, frequency flat fading and frequency selective fading?
3. Consider a time-invariant indoor wireless channel with LOS component at delay 23 nsec with mean power 0.7, a multipath component at delay 48 nsec with mean power 0.2, and another multipath component at delay 67 nsec with mean power 0.1. Find the mean delay spread, rms delay spread and maximum delay spread, assuming the demodulator synchronizes to the LOS component.
4. Consider a high-speed data signal with bandwidth .5 MHz and a data rate of .5 Mbps. The signal is transmitted over a wireless channel with a delay spread of 10 μsec. If multicarrier modulation with nonoverlapping subchannels is used to mitigate the effects of ISI, approximately how many subcarriers are needed? What is the data rate and symbol time on each subcarrier? (We do not need to eliminate the ISI completely. So Ts = Tm is enough)
5. Andrea Goldsmith book. Question 12-12
6. Andrea Goldsmith book. Question 12-13