Summary of Learning Objectives - Part 2

OFDM

Compute OFDM parameters including sampling rate, FFT length, symbol duration, guard time, subcarrier spacing, number of subcarriers used, constellation size and bit rate. Compute the required guard time as function of channel delay spread. Compute inverse and forward FFT. Identify some advantages and disadvantages of OFDM.

Log-Normal Fading, Link Budgets

Compute probability that a log-normal-distributed signal level lies between two values. Prepare a link budget and solve for unknown parameters.

The Cellular Concept

Distinguish between different types of cells (by size) and how they are typically sited. Define terms related to cellular wireless systems: re-use factor, cell splitting and hand-off. Identify the characteristics of the first four generations of cellular systems.

RF Design - IP3

Identify the purpose of the most common functional blocks used in RF equipment. Perform calculations involving gain, P1dB, IP3, and two-tone intermodulation levels.

RF Design - Noise

Compute thermal noise power. Convert between noise figure and noise temperature. Calculate noise figure from input and output noise power measurements. Calculate noise figure and input IP3 for cascaded stages.

RF Design - Receiver Architectures

Distinguish between different receiver architectures and their advantages and disadvantages.

Multiple Access and Duplexing

Distinguish between TDMA, FDMA, CDMA and CSMA/CA multiple-access techniques, TDD/FDD duplexing and their advantages and disadvantages.

Multi-Antenna Systems

Distinguish between MIMO and SDMA applications. Compute the effect of a channel on a multi-antenna communication signal. Determine if a channel allows SDMA or MIMO based on the channel matrix. Determine the maximum number of parallel channels that can be established based on the number of antennas.

PN Sequences and Scramblers

Distinguish between random signals, pseudo-random signals, PN-sequences and ML-sequences. Compute the period of an m-sequence and some of its properties. Explain how PRBS sequences can be used for scrambling and communication system testing. Generate Walsh-Hadamard matrices.

Spread-Spectrum

Determine if a spread-spectrum system is appropriate for a given application. Distinguish between DSSS and FHSS.