

COMMUNICATION THEORY, Homework Exercise 9, Fall 2023

A digital communication system uses orthogonal frequency division multiplexing (OFDM) to transmit three signals simultaneously over a given transmission channel, by mapping each signal to a different subcarrier, each of which uses its own digital modulation: BPSK, 4ASK and 16QAM respectively. Given that the subcarrier spacing is $\Delta f = 1$ MHz, calculate the following:

- a) the OFDM symbol duration in the time domain (assuming no cyclic prefix)
- b) the bitrate associated to each subcarrier, and the total OFDM bitrate
- c) as estimation of the required transmission bandwidth