Homework 1 of "Broadband Circuits and Systems"

Using the following conditions to construct and show the spectrum shapes of QAM and VSB transmitter.

Common spec.:

1. Random data sequence with data rate 32.28Mbps
2. Transmission efficiency: 6 bits/Hz
3. Square-root raised-cosine pulse shaping filter
4. Stop band attenuation: 50 dB
5. ADC sampling rate for oversampling: 21.52MHz

QAM spec:

6. Roll-off factor of PSF: 0.25
7. Carrier frequency of QAM system: 5.38MHz

VSB spec:

8. Roll-off factor of PSF: 0.125
9. Carrier frequency of VSB system: 8.07MHz

A. Please show the following results of QAM transmitter:

1. Designed coefficients and frequency response of PSF
2. The spectrum (magnitude and phase) of real part signal and imaginary part
3. The spectrum of passband QAM signal

B. Please show the following results of VSB transmitter:

1. Designed coefficients and frequency response of PSF
2. The spectrum (magnitude and phase) of real part signal and imaginary part
3. The spectrum of passband VSB signal
4. Show why the upper side band can be cancelled.