

```

clear
close all
clc

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%
% setup
%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

BW = 9e9;
N_c = 600;
channel_profile = [0e-9 0.485; 310e-9 0.3852; 710e-9 0.0611; 1090e-9 0.0485; 1730e-9 0.0153; 2510e-9 0.0049];

%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%

SNR = [0:2:40];
BER_4 = zeros(1, length(SNR));
BER_16 = zeros(1, length(SNR));
BER_64 = zeros(1, length(SNR));

for i=1:1:length(SNR)

    ber = ofdm_function(N_c, BW, 4, SNR(i), channel_profile);
    BER_4(i) = ber;
    ber = ofdm_function(N_c, BW, 16, SNR(i), channel_profile);
    BER_16(i) = ber;
    ber = ofdm_function(N_c, BW, 64, SNR(i), channel_profile);
    BER_64(i) = ber;
    disp("iterations completed:" + i)

end

hold on
plot(SNR, BER_4);
plot(SNR, BER_16);
plot(SNR, BER_64);
title("SNR vs BER performance of OFDM with various QAM constellations");
legend("M = 4", "M = 16", "M = 64");
xlabel("SNR");
ylabel("BER");

```

```

iterations completed:1
iterations completed:2
iterations completed:3
iterations completed:4
iterations completed:5
iterations completed:6
iterations completed:7
iterations completed:8
iterations completed:9
iterations completed:10
iterations completed:11
iterations completed:12
iterations completed:13
iterations completed:14
iterations completed:15
iterations completed:16
iterations completed:17
iterations completed:18
iterations completed:19
iterations completed:20
iterations completed:21

```

