Part 1

i) When reducing the bandwidth to 25 % the width of the pulse frequency response got narrower. The PSF in spatial got smaller and with worse resolution, in frequency it also got shorter (lesser frequency range). The Pulse frequency response got narrower and the pulse response got bigger. It went from approximatly 0.5 mm to 0.8 mm (measured by eye).

The ultrasound image lost some contrast/resolution. and the frequency domain of the image decreased.

ii)

When increasing the bandwidth the opposite happend. The PSF in spatial got bigger and with betterresolution, in frequency it also got longer (bigger frequency range). The Pulse frequency response got wider and the pulse response got smaller. It went from approximatly 0.5 mm to 0.4 mm (measured by eye).

The ultrasound image gained some contrast/resolution. and the frequency domain of the image increased.

Part 2

i) The PSF in frequency domain got narrower and it is now centered around 5MHz instead of 8MHz.

ii) The PSF in frequency domain got wider and it is now centered around 10MHz instead of 8MHz.

The frequency dependent attenuation can recduce the SNR of the images when we increase the frequency.

Part 3

i) by doing this it seems to increase the resolution as i can see. But thought a bigger apperture would give a worse resolution

ii) Reducing the apperture then seems to decrease the resolution.

Part 4

For some reason it seems to just ignore the vertical line. But that would correspond to a horisontal line in frequency space.

You can see the frequency contribution from the different lines in the, and it seems that the brighter color gives a more energetic frequency response (brighter).

Part 5

I now switched to default settings. not sure what we were supposed to use here.

The frequency is now zero centered when the image is dots in circles.

Also i can see some dots spread around in the frequency domain, looks evenly distrubuted.

Part 6

Here we get a ringing effect on both the fourier transform and the simulated image. The ringing effect is not equally spaced but seems to have a sinc function apperance.

The simulated image is very noisy and have alot of ringing effects.

Part 7

Dont know how to solve this.