Report Title & Date

Descrption

Description of testing, notes, etc

```
clear all; close all; clc;
```

File Paths

```
dataFilesPath = "..\..\PSU_Normal_Impedance_Tube\ExampleData\";
processScriptPath = "..\..\PSU_Normal_Impedance_Tube\ProcessData\ProcessDataNIT_ASTM_E1050.mlx"
outputPath = "..\..\PSU_Normal_Impedance_Tube\ExampleOutputs\";
outputReportName = "ExampleOutput.pdf";
addpath("..\..\PSU_Normal_Impedance_Tube\Functions\")
```

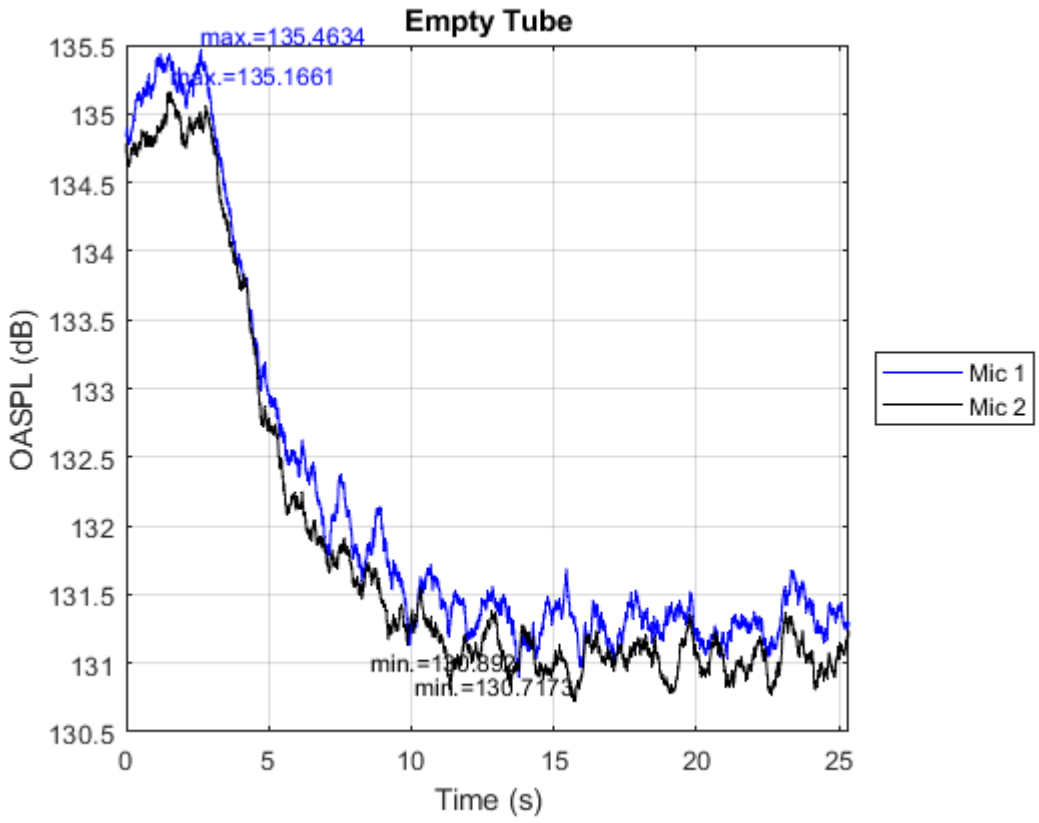
Read All Data

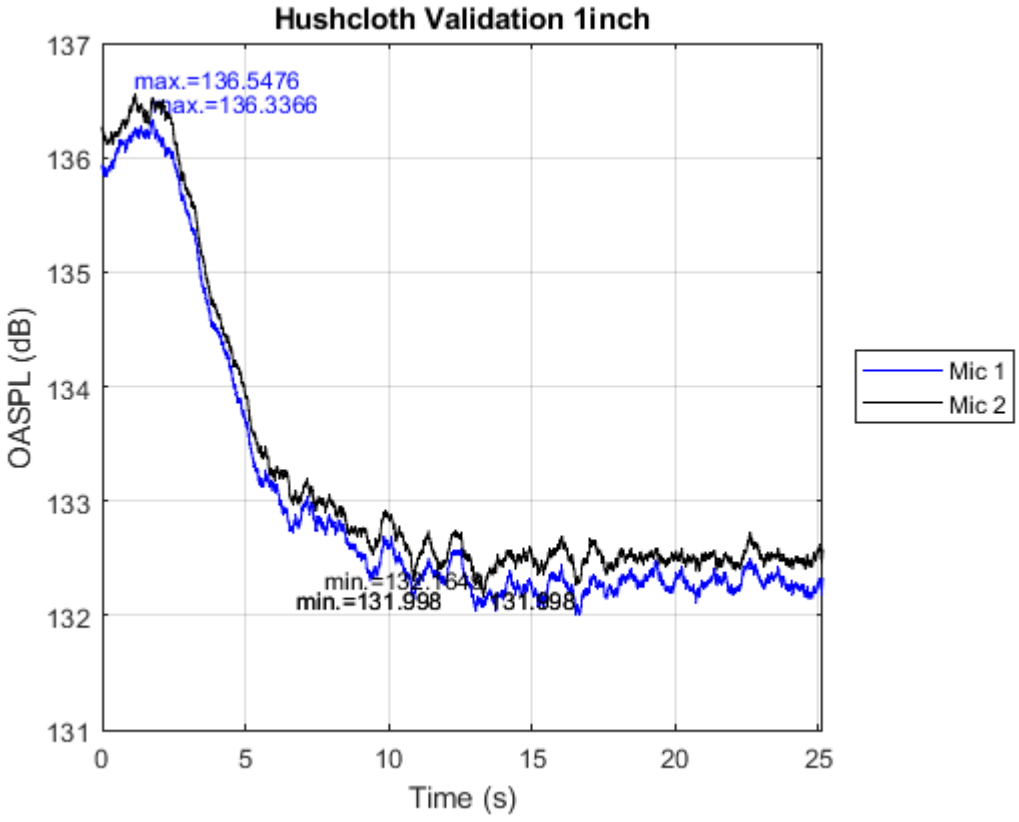
```
cd(dataFilesPath);
fileInfo = dir('**/*.h5');
fileCount = length(fileInfo);
for n = 1:fileCount
    fileName = fileInfo(n).name;
    Time = h5read(fileName,'/Table1/Ds1-Time');
    Mic1 = h5read(fileName,'/Table1/Ds2-Signal 1');
    Mic2 = h5read(fileName,'/Table1/Ds3-Signal 2');
    df = [Time, Mic1, Mic2];
    assignin('base', strrep(fileName(1:end-3),'-','_'), df);
end
clearvars Time Mic1 Mic2 df n
```

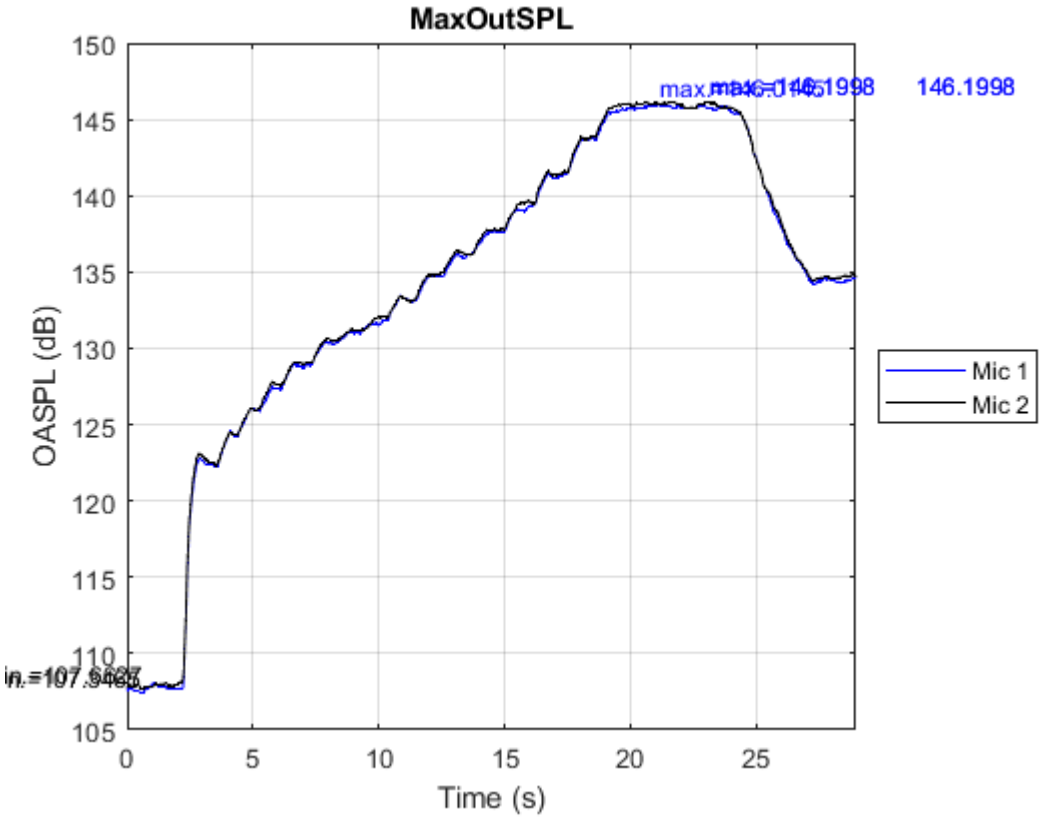
OASPL Vs. Time Plots

```
for j = 1:fileCount
    fileName = fileInfo(j).name;
    [SPL_Mic1, SPL_Mic2, Time] = SPLvTimePlot(eval(strrep(fileName(1:end-3),'-','_')));
    figure(j)
    plot1 = plot(Time, SPL_Mic1,'b-','LineWidth', 0.5);
    xValue1 = get(plot1,'XData');
    yValue1 = get(plot1,'YData');
    imin1 = find(min(yValue1)==yValue1);
    imax1 = find(max(yValue1)==yValue1);
    text(xValue1(imax1),yValue1(imax1),['max.=',num2str(yValue1(imax1))],...
        'Color', 'b','VerticalAlignment','bottom','HorizontalAlignment',...
        'left','FontSize',9);
    text(xValue1(imin1),yValue1(imin1),['min.=',num2str(yValue1(imin1))],...
        'Color', 'k','VerticalAlignment','bottom','HorizontalAlignment',...
        'right','FontSize',9);
    hold on
    plot2 = plot(Time, SPL_Mic2,'k-','LineWidth', 0.5);
    xValue2 = get(plot2,'XData');
```

```
    yValue2 = get(plot2,'YData');
    imin2 = find(min(yValue2)==yValue2);
    imax2 = find(max(yValue2)==yValue2);
    text(xValue2(imax2),yValue2(imax2),['max.=',num2str(yValue2(imax2))],...
        'Color', 'b','VerticalAlignment','bottom','HorizontalAlignment',...
        'left','FontSize',9);
    text(xValue2(imin2),yValue2(imin2),['min.=',num2str(yValue2(imin2))],...
        'Color', 'k','VerticalAlignment','bottom','HorizontalAlignment',...
        'right','FontSize',9);
    xlim([0,max(Time)])
    hold off
    xlabel("Time (s)")
    ylabel("OASPL (dB)")
    title(strrep(strrep(fileName(1:end-3),'-','_'),'_',' '))
    grid on
    legend('Mic 1','Mic 2','location','eastoutside')
end
```



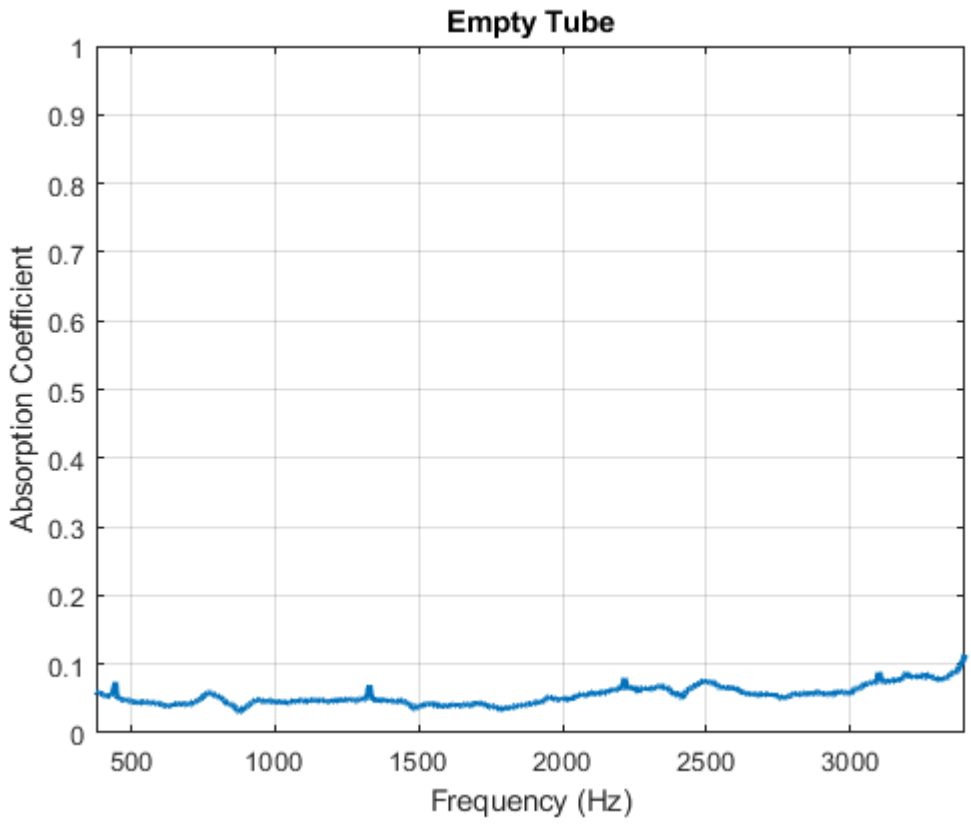


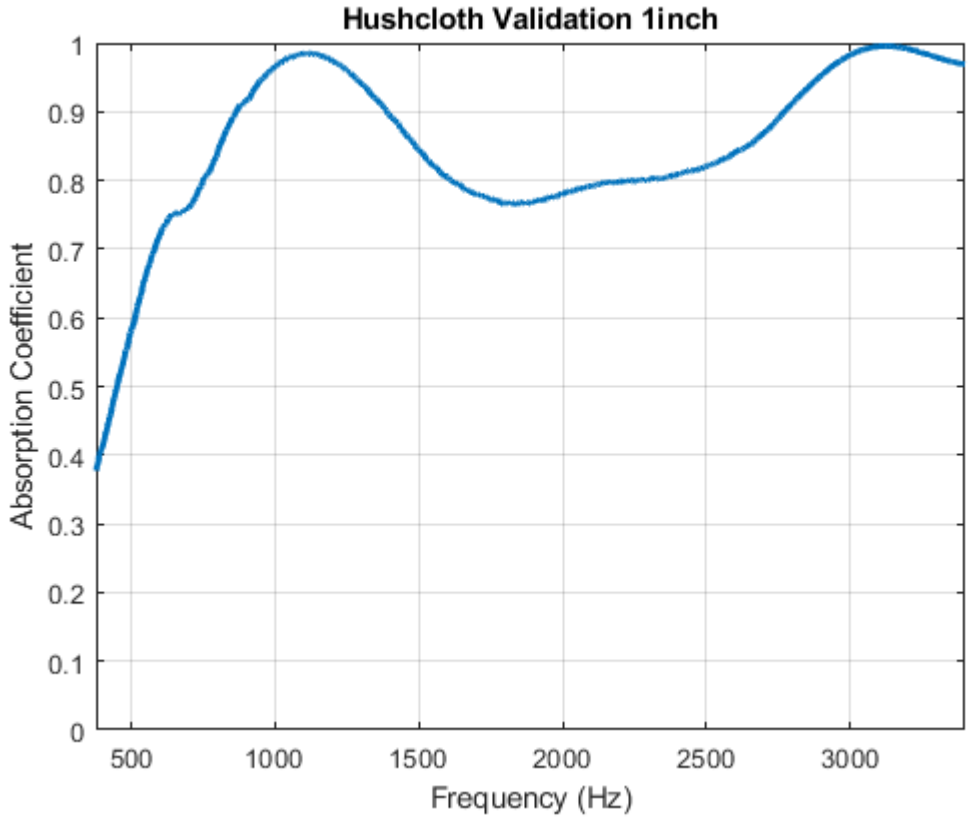


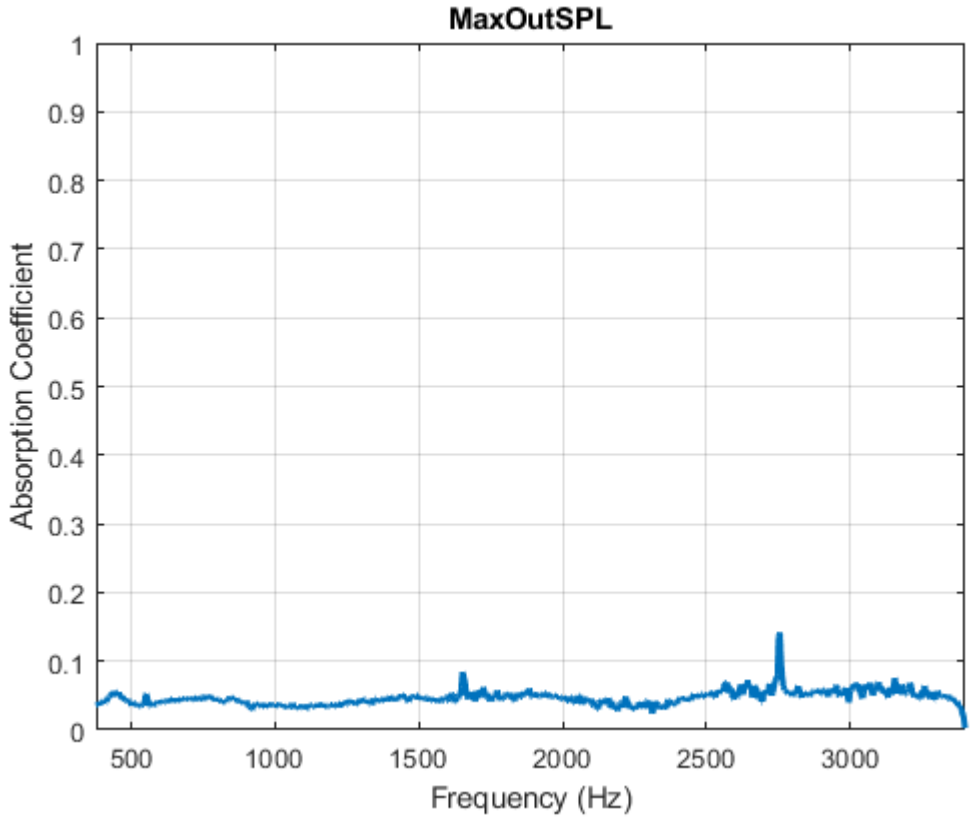
Absorption Coefficient Vs. Frequency Plots

```
for j = 1:fileCount
```

```
    fileName = fileInfo(j).name;
    [alpha, freq] = CalculateNormalIncidenceSoundAbsorptionCoefficient(eval(strrep(fileName(1:e
    figure(j)
    plot(freq,alpha,'LineWidth', 2)
    xlim([377,3.4e3])
    ylim([0,1])
    xlabel("Frequency (Hz)")
    ylabel("Absorption Coefficient")
    title(strrep(strrep(fileName(1:end-3),'-','_'),'_',' '))
    grid on
end
```



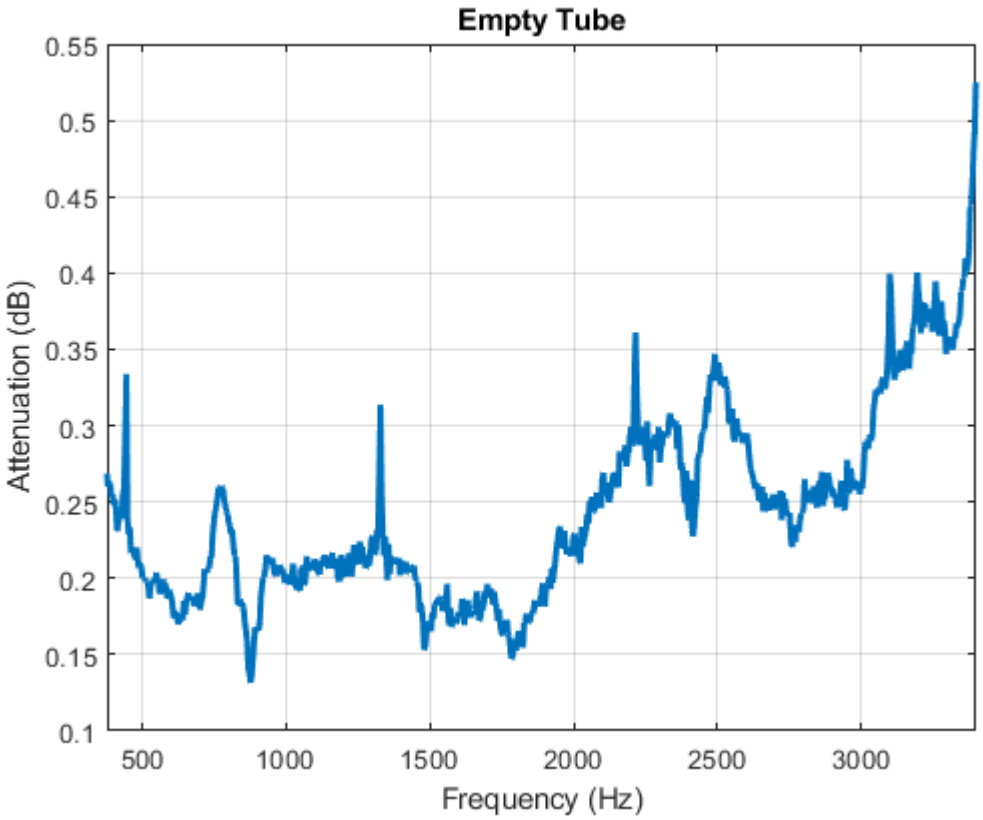


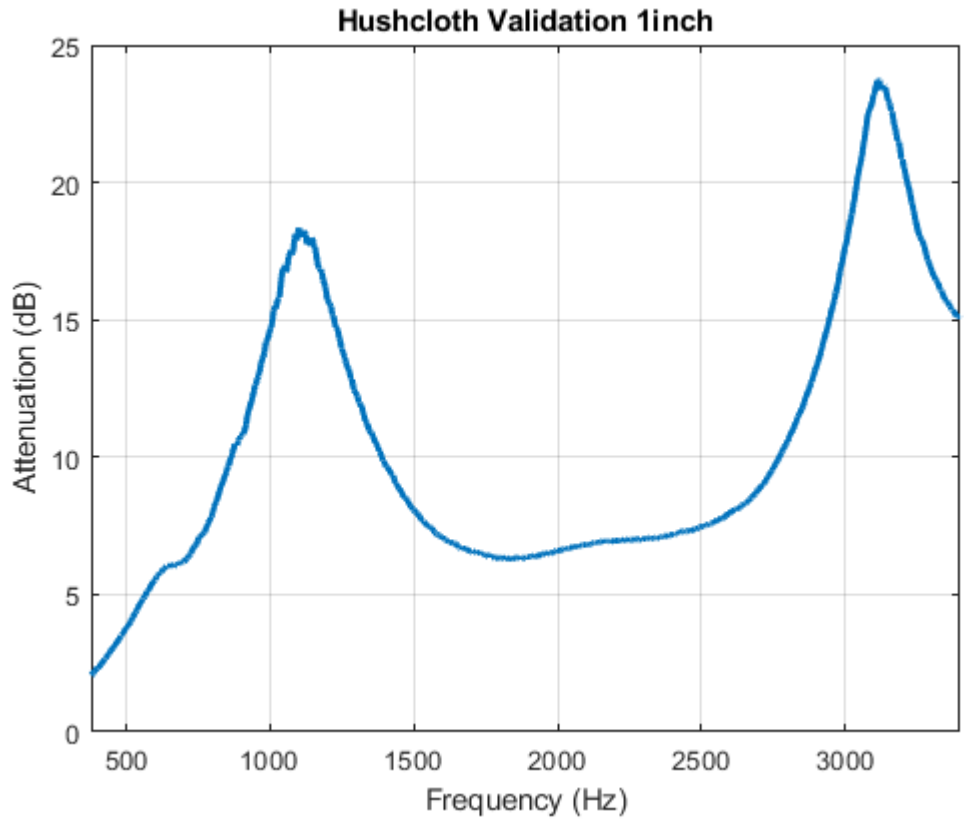


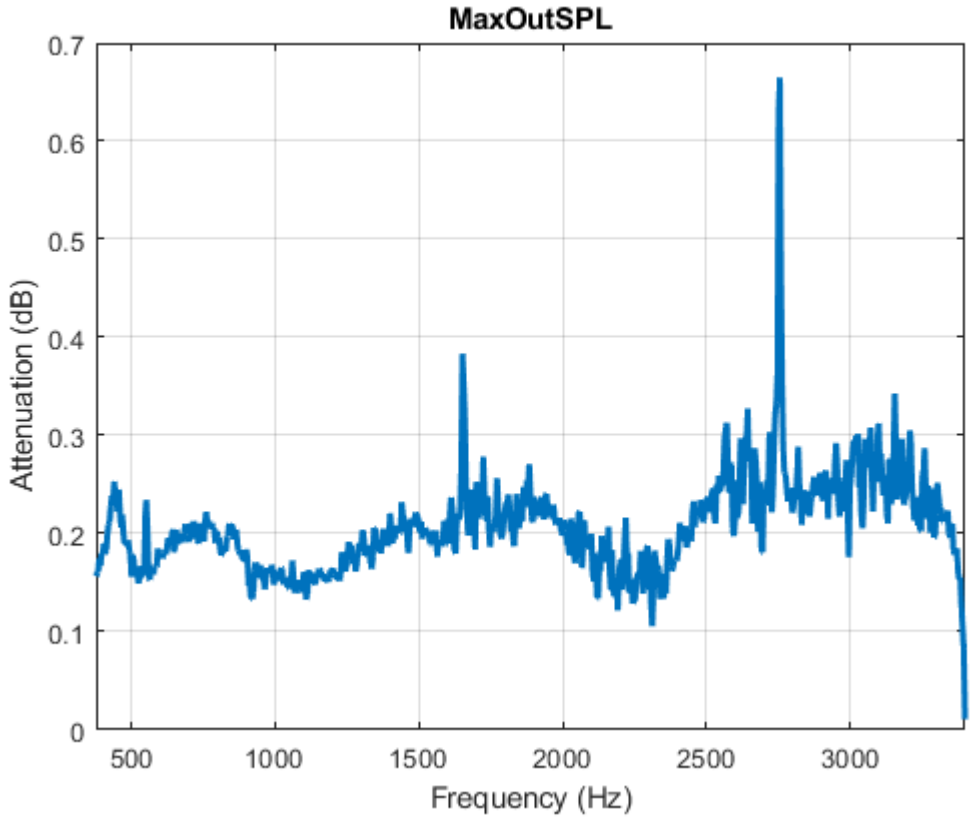
Attenuation Vs. Frequency Plots

```
for j = 1:fileCount
```

```
    fileName = fileInfo(j).name;
    [aten, freq] = CalculateNormalIncidenceAttenuation(eval(strrep(fileName(1:end-3),'-','_')))
    figure(j)
    plot(freq,aten,'LineWidth', 2)
    xlim([377,3.4e3])
    xlabel("Frequency (Hz)")
    ylabel("Attenuation (dB)")
    title(strrep(strrep(fileName(1:end-3),'-','_'),'_',' '))
    grid on
end
```



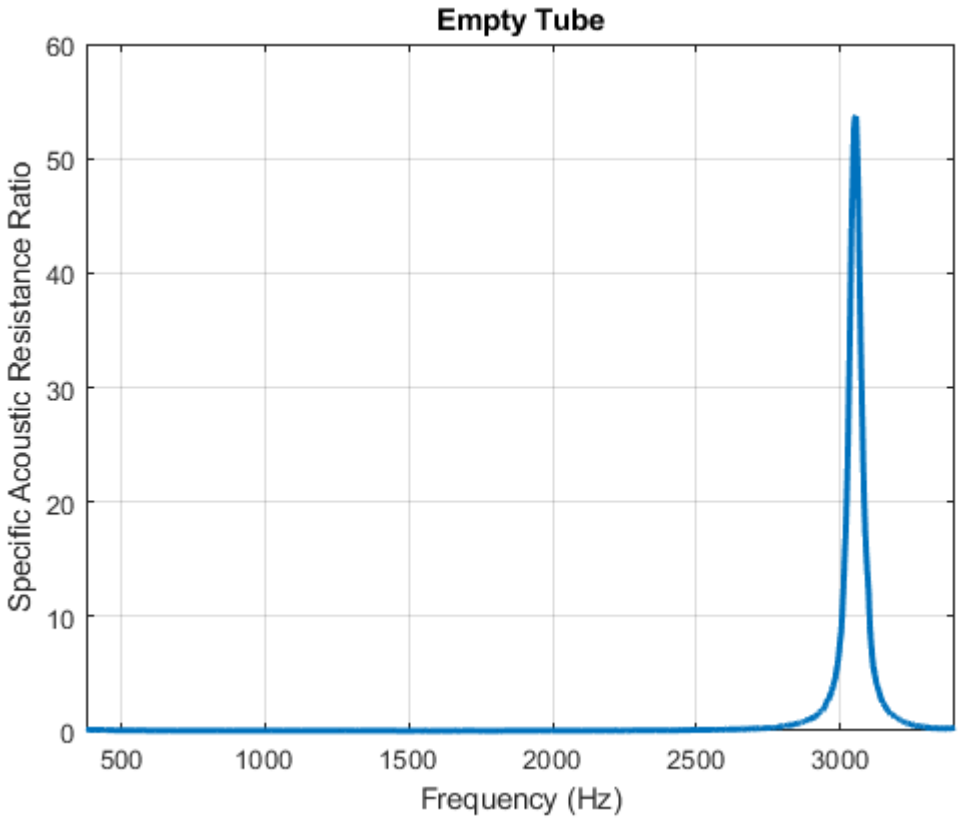


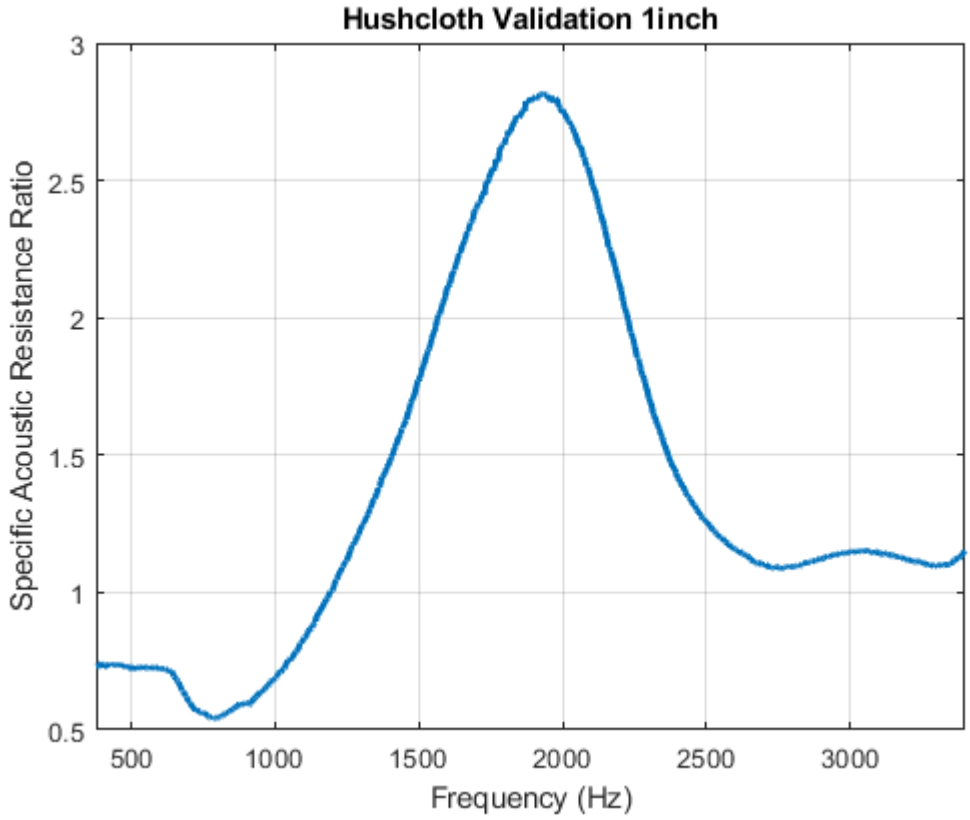


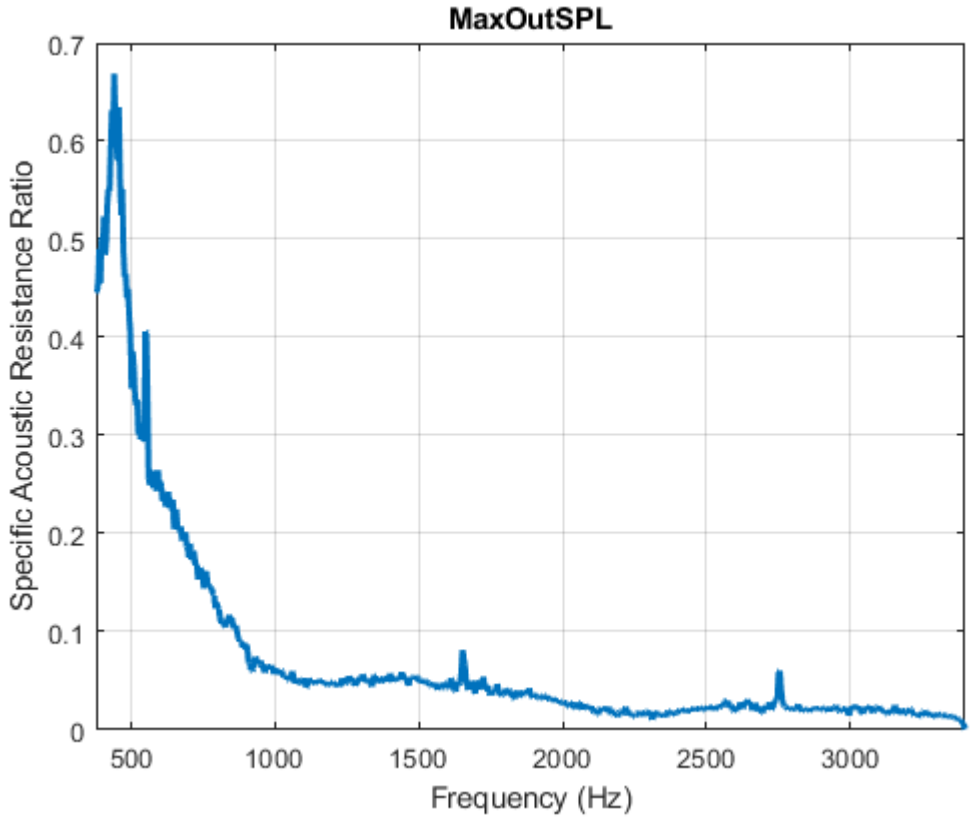
Resistance (real component of impedance) Vs. Frequency Plots

```
for j = 1:fileCount
```

```
    fileName = fileInfo(j).name;
    [z_pc_real, z_pc_imag, freq] = CalculateNormalSpecificAcousticImpedanceRatio(eval(strrep(fi
    figure(j)
    plot(freq,z_pc_real,'LineWidth', 2)
    xlim([377,3.4e3])
    xlabel("Frequency (Hz)")
    ylabel("Specific Acoustic Resistance Ratio")
    title(strrep(strrep(fileName(1:end-3),'-','_'),'_',' '))
    grid on
end
```



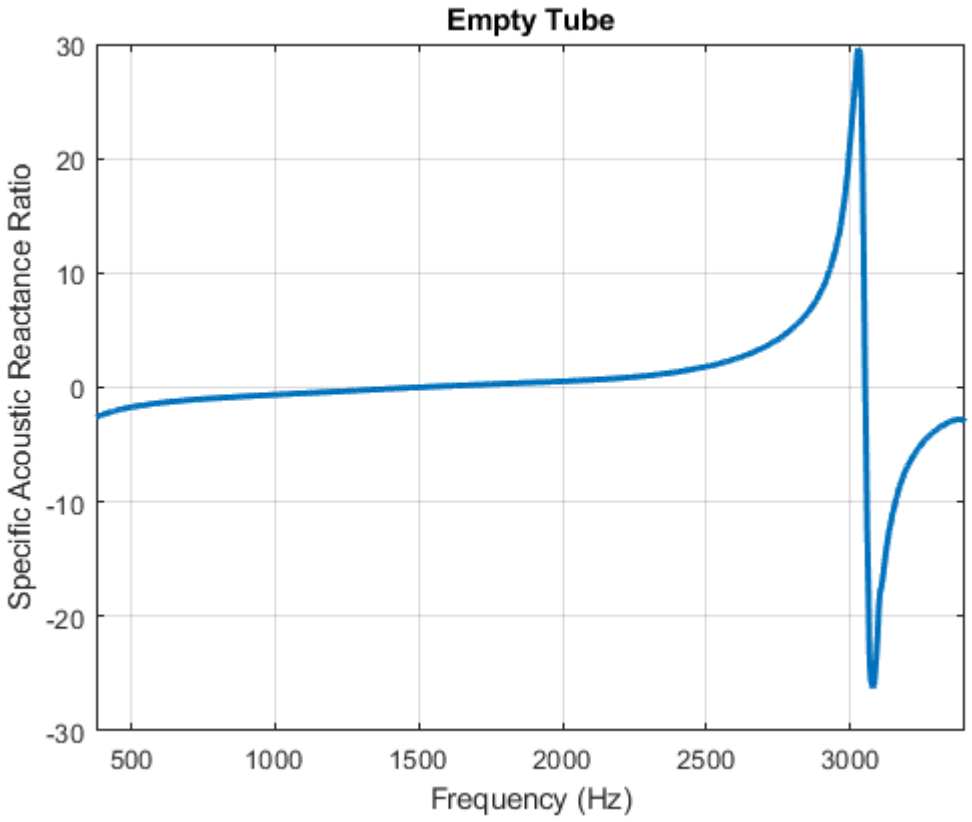


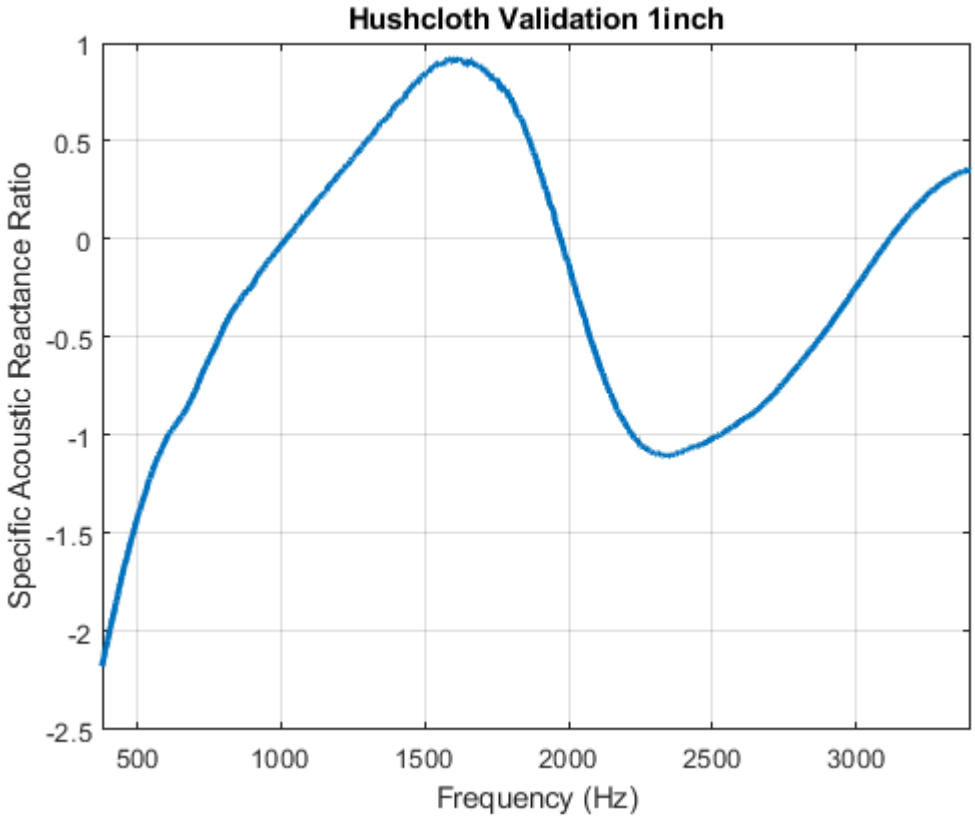


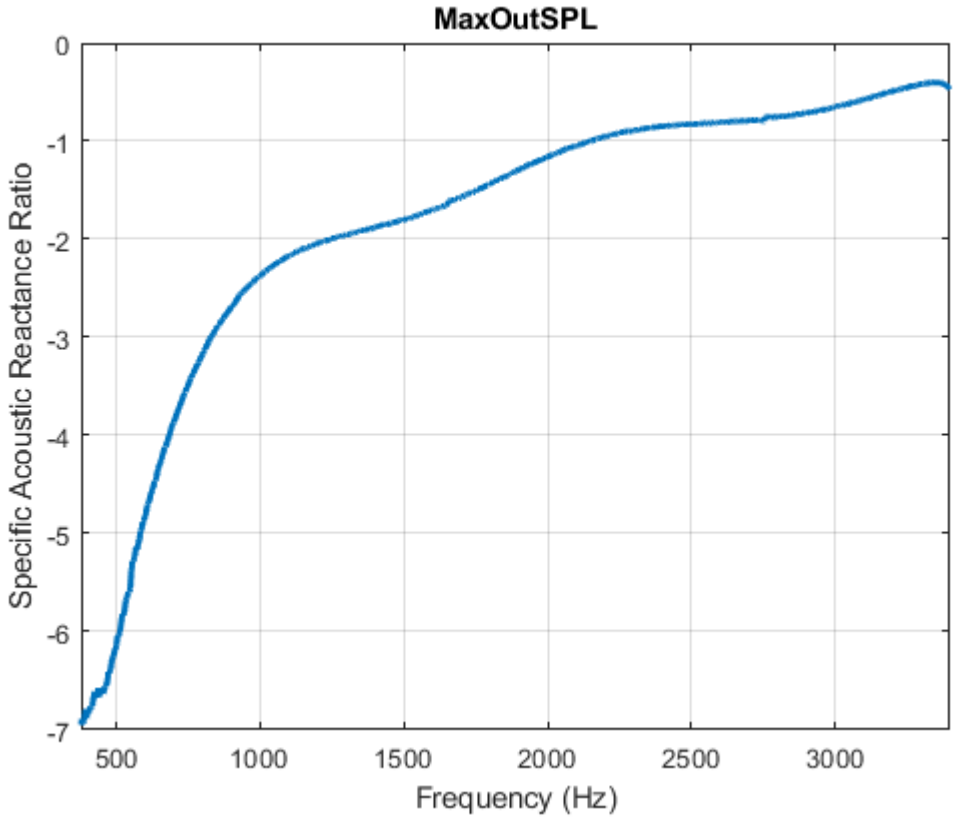
Reactance (imag component of impedance) Vs. Frequency Plots

```
for j = 1:fileCount
```

```
    fileName = fileInfo(j).name;
    [z_pc_real, z_pc_imag, freq] = CalculateNormalSpecificAcousticImpedanceRatio(eval(strrep(fi
    figure(j)
    plot(freq,z_pc_imag,'LineWidth', 2)
    xlim([377,3.4e3])
    xlabel("Frequency (Hz)")
    ylabel("Specific Acoustic Reactance Ratio")
    title(strrep(strrep(fileName(1:end-3),'-','_'),'_',' '))
    grid on
end
```







Excel Export All Data

```
for j = 1:fileCount
```

```
    fileName = fileInfo(j).name;
    cd(outputPath);
    ExportCSV(eval(strrep(fileName(1:end-3),'-','_')), strrep(fileName(1:end-3),'-','_'));
    cd(dataFilesPath);
end
```

PDF Export

```
cd(outputPath);
matlab.internal.liveeditor.openAndConvert (convertStringsToChars("C:\Users\19139\Downloads\PSU_
    convertStringsToChars(outputReportName), 'HideCode', false);
```