Loudspeaker Production Test Report

ESOE Capstone :group1_0518

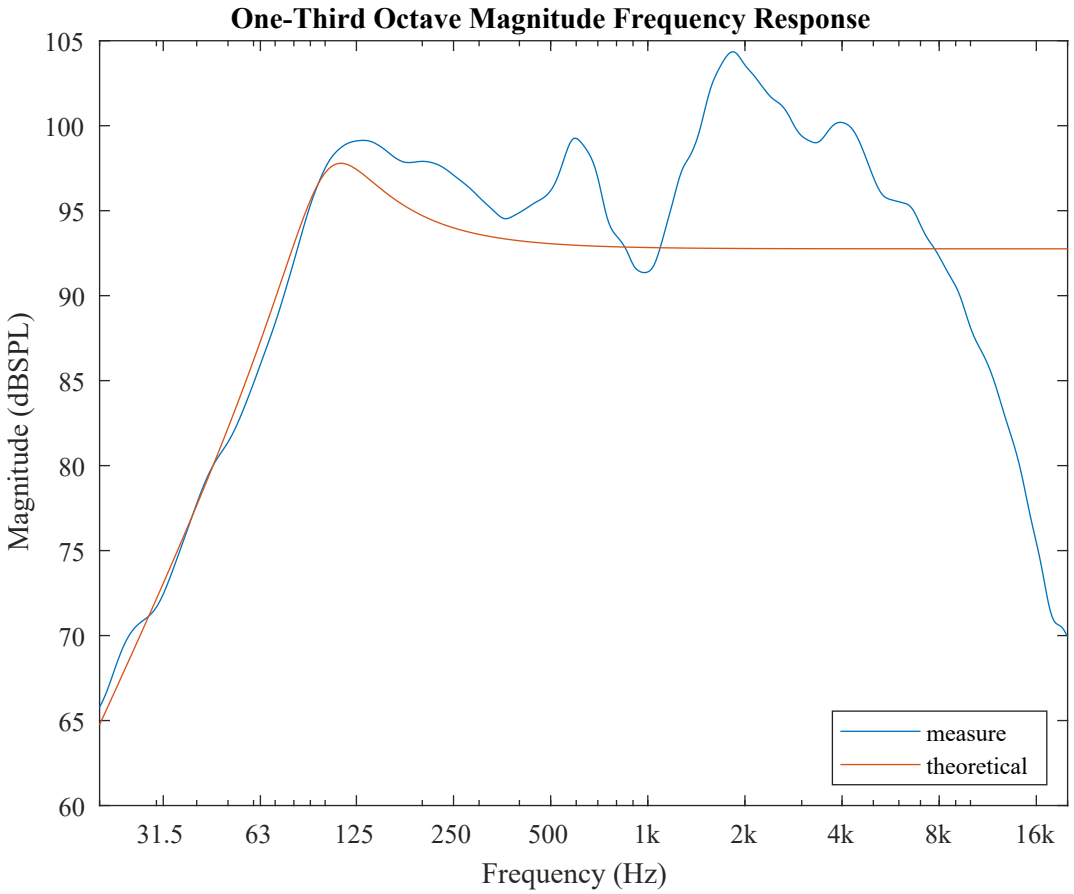
performed by NTU AA Lab.

17-May-2023

1. Magnitude Frequency Response

The on-axis rms SPL is measured at 0.50 m under input power of 1.00 w, the fitting TS model is given by the following parameters:

velocity resonance frequency = 101.84 Hz , total quality factor = 1.71 , equivalent piston area of diaphram = 113.10 cm^2 , equivalent coil and diaphram mass = 7.40 g , equivalent suspension stiffness = 3.03 N/mm , equivalent mechanical resistance = 0.56 N-s/m , coil electrical resistance = 4.67 Ohm

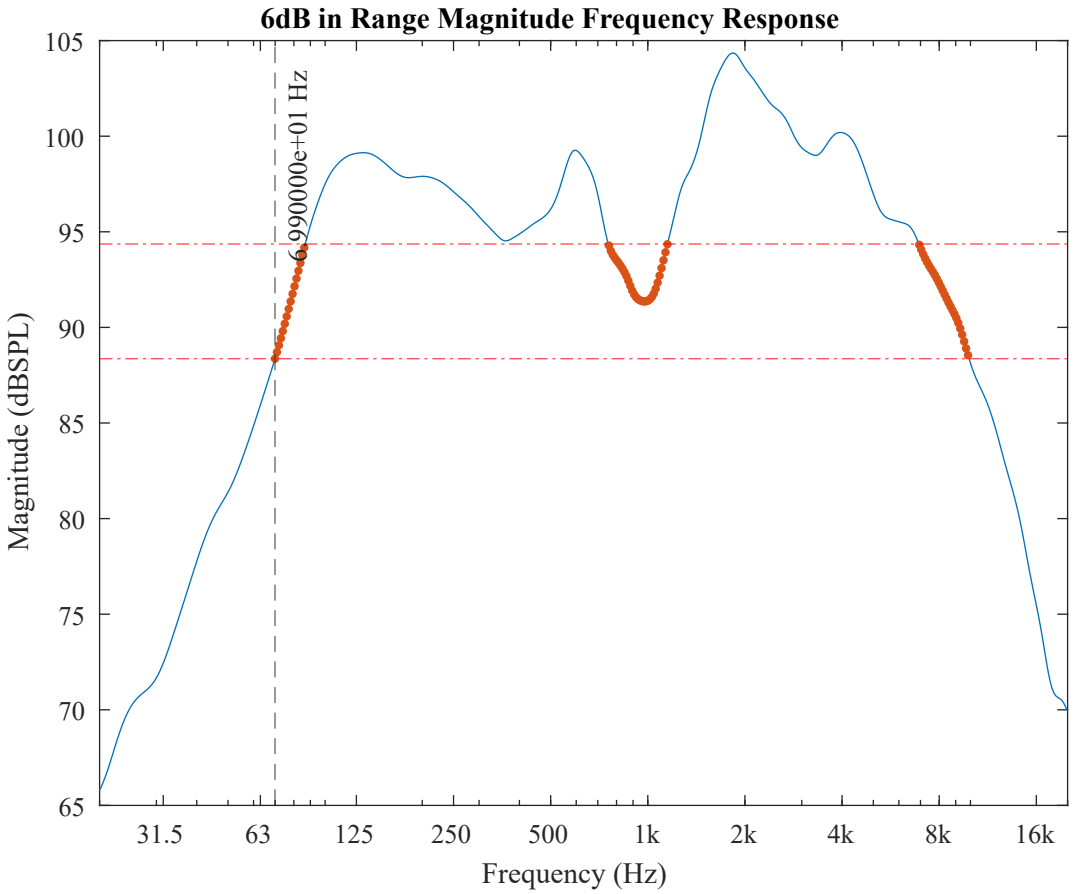


The on-axis rms SPL at f = f_s is 88.4 dB. And the usable frequency range within +0 ~ +6 dB relative to resonance level is

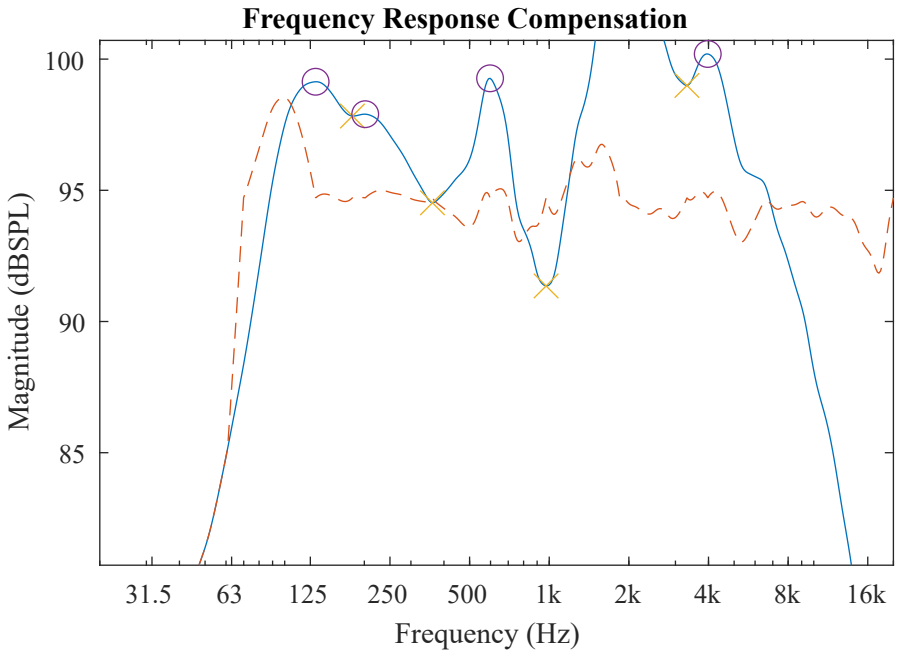
"1.46 Octave / 10.03 Octave"

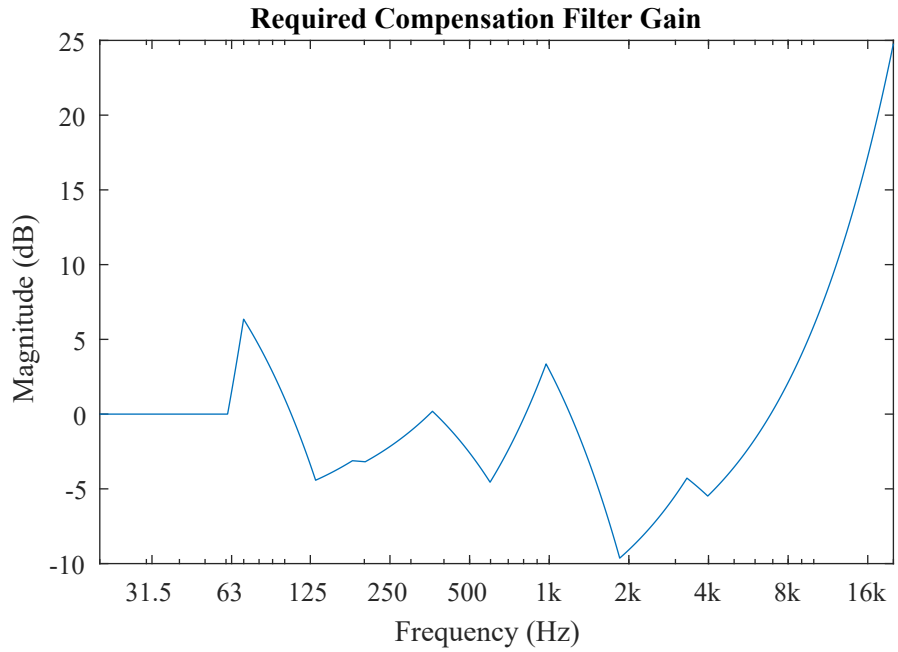
The sensitivity level is set to mean level of all in-range SPL

"92.0 dBSPL @ 0.50 m /1.00 w"



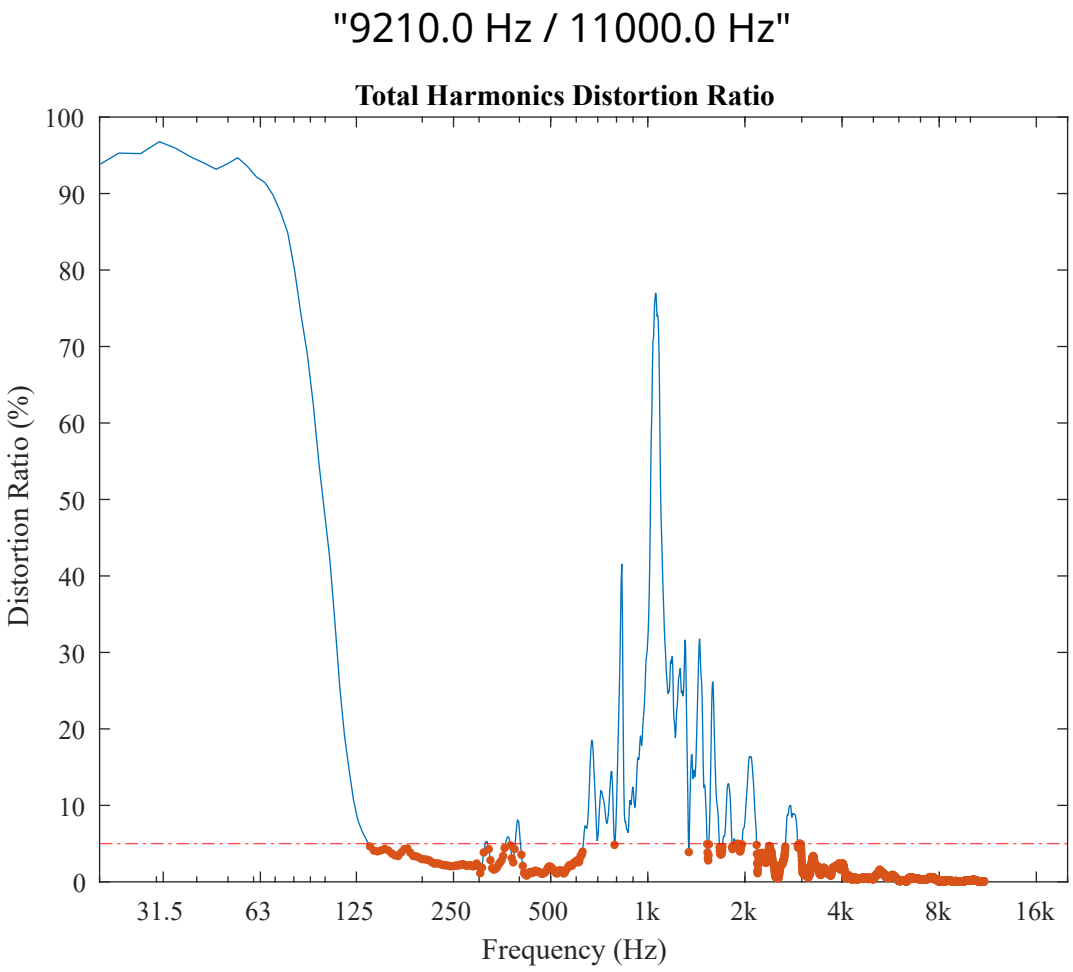
The compensation filter can be achieved by a 13 pole FIR filter, the simulated rms SPL response and filter gain response are shown as follow


Frequency Response Compensation
Magnitude (dBSPL)
100
95
90
85
31.5
63
125
250
500
1k
2k
4k
8k
16k
Frequency (Hz)


Required Compensation Filter Gain
Magnitude (dB)
25
20
15
10
5
0
-5
-10
31.5
63
125
250
500
1k
2k
4k
8k
16k
Frequency (Hz)

2. Total harmonic distortion ratio

The range of THD ratio less than 5.0 % under input power of 1.00 w



3. Directional Response

The relative error of -6dB using target angle 90.3 degree as reference is