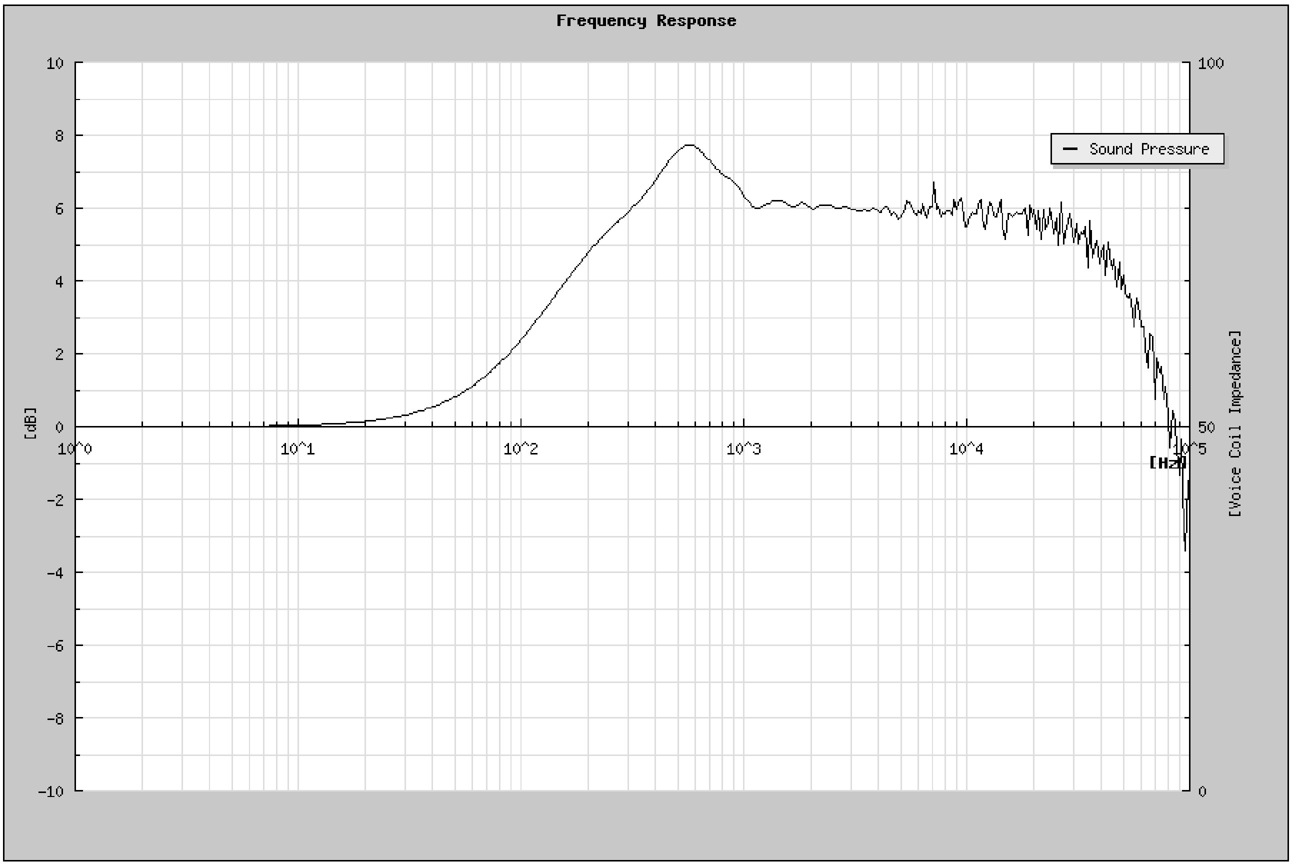
Baffle Step Diffraction:

A spherical source radiates sound uniformly in all directions. If this spherical source is mounted on an infinity baffle, the same sound energy radiates in a half-space. The sound pressure is now double (6dB). If the baffle is not infinite, sound waves of low frequencies are radiating in the whole space whereas sound waves of high frequencies are radiating in a half space. That is called Baffle Step diffraction. The frequency dependent transition of the sound pressure depends on the size and geometry of the baffle. My online baffle step simulation only takes a 2-dimensional baffle into consideration and not a 3-dimensional enclosure. The simulation does not take any notice of reflection and diffraction of sound waves in a room. The speaker in the baffle radiates all frequencies with the same sound pressure. Therefore the result of this simulation tool is most likely useful if the loudspeaker is placed in a big room far away from reflecting walls.

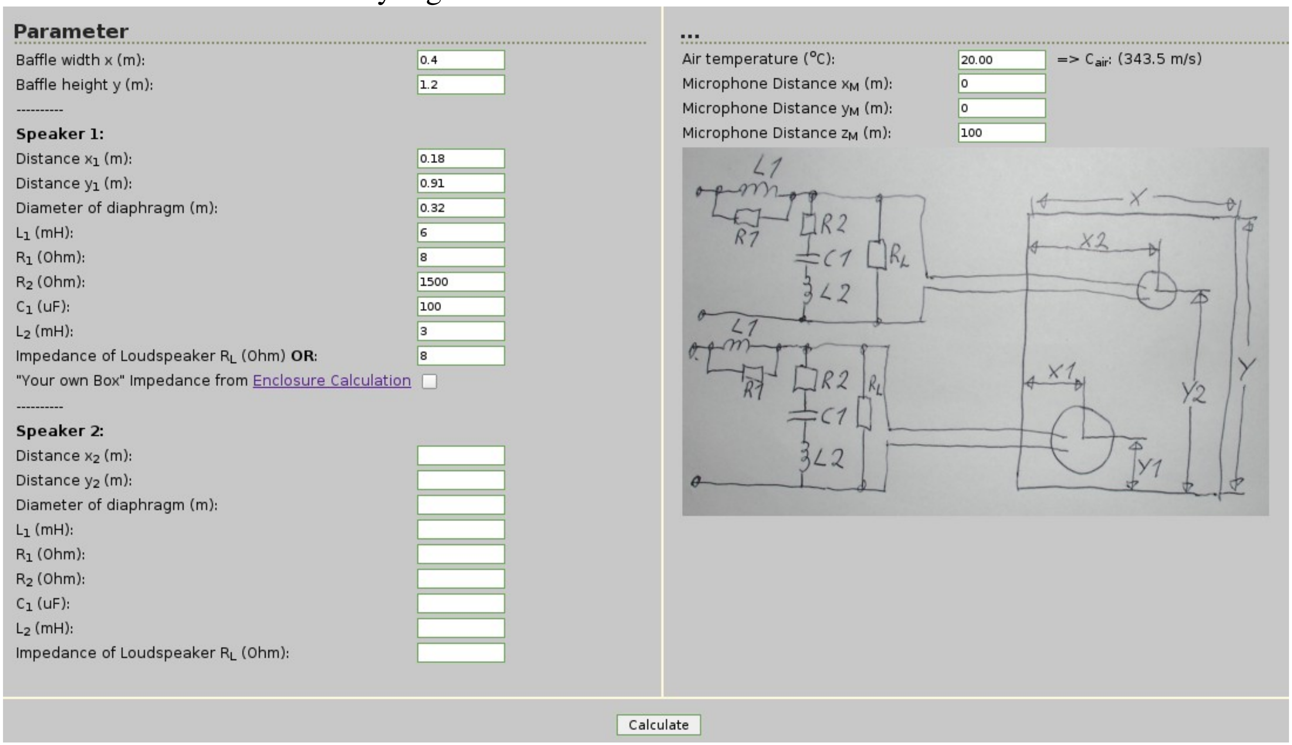
Example of a Simulation

The baffle has the dimension:
width 40cm, height 120cm
A speaker with a diameter of 32cm is mounted 18cm away from the left side and 91cm away from the bottom of this baffle.
With this data set we can calculate the sound pressure frequency response of the loudspeaker:



With a different speaker placement we are able to change the frequency response.

To compensate the 6dB difference in the frequency response, we are using a compensation circuit that we can connect in front of a crossover. In this case the cut off frequency should be far away from the transition frequency of the baffle step (here around 120Hz).
Now an example for a speaker with 8 Ohm impedance. To be able to make a simulation all components of the compensation circuit must have values. To disable the R2, C1, L2-network you can make the value of R2 very high.



Parameter

Baffle width x (m):	0.4
Baffle height y (m):	1.2

Speaker 1:	
Distance x_1 (m):	0.18
Distance y_1 (m):	0.91
Diameter of diaphragm (m):	0.32
L_1 (mH):	6
R_1 (Ohm):	8
R_2 (Ohm):	1500
C_1 (uF):	100
L_2 (mH):	3
Impedance of Loudspeaker R_L (Ohm) **OR:**	8
"Your own Box" Impedance from Enclosure Calculation	☐

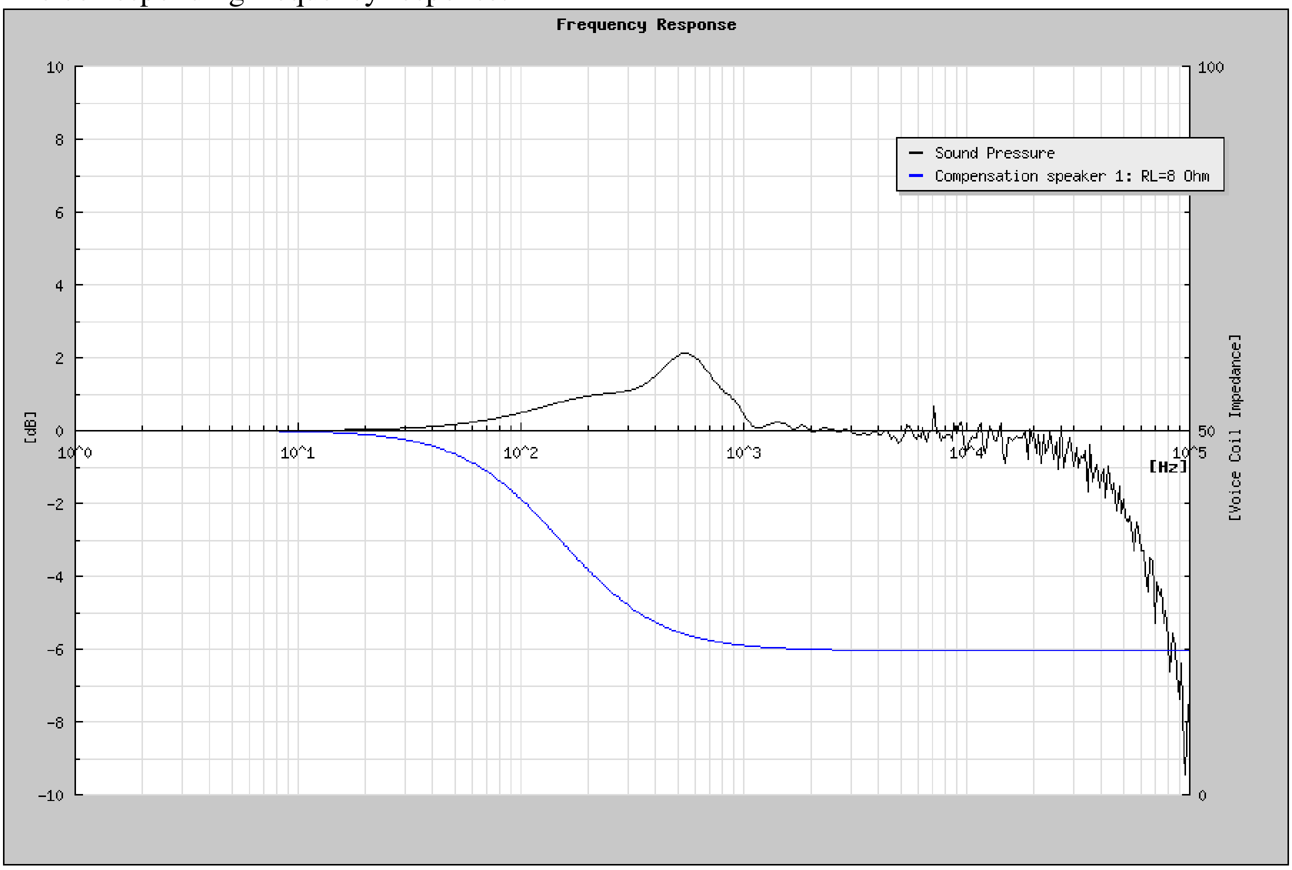
Speaker 2:	
Distance x_2 (m):	
Distance y_2 (m):	
Diameter of diaphragm (m):	
L_1 (mH):	
R_1 (Ohm):	
R_2 (Ohm):	
C_1 (uF):	
L_2 (mH):	
Impedance of Loudspeaker R_L (Ohm):	

...

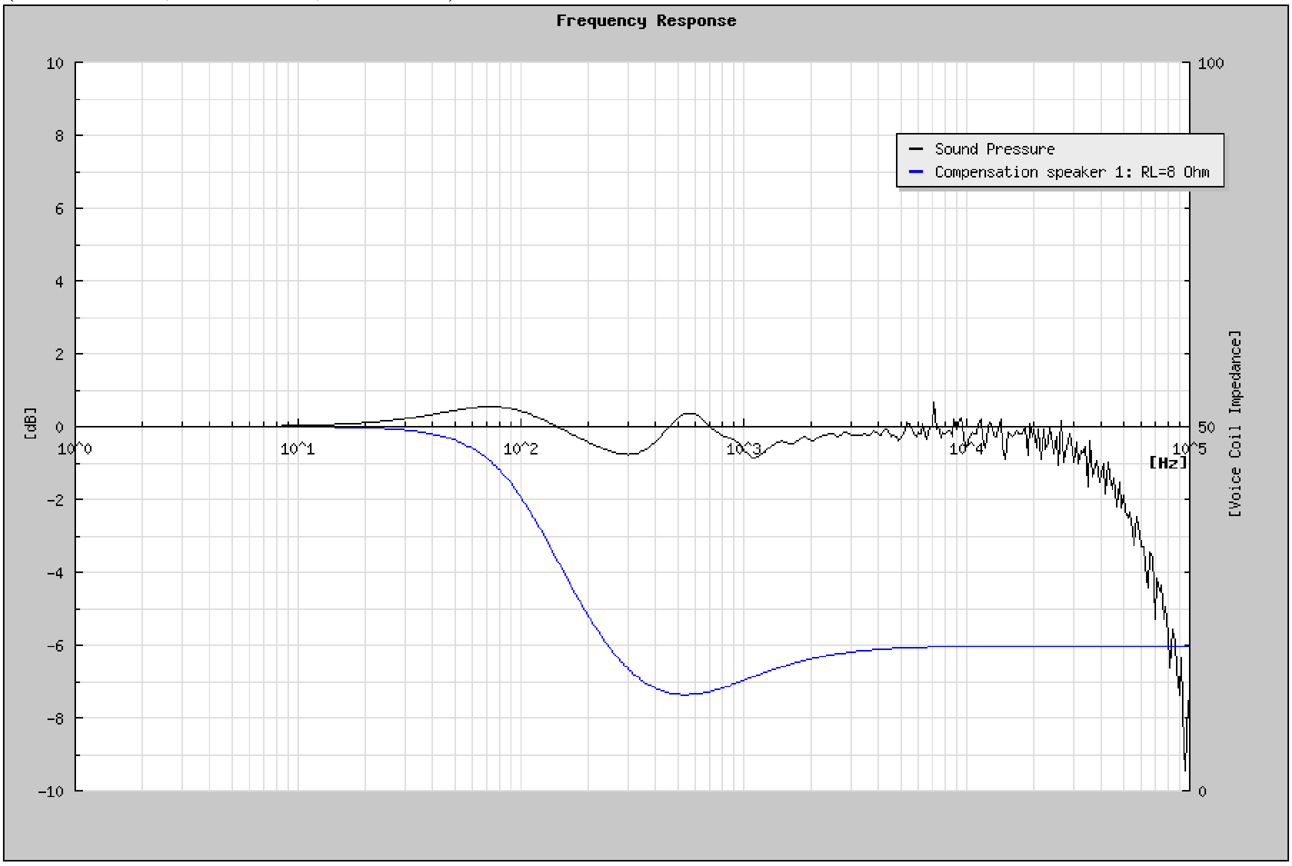
Air temperature (°C):	20.00 => C_{air}: (343.5 m/s)
Microphone Distance x_M (m):	0
Microphone Distance y_M (m):	0
Microphone Distance z_M (m):	100

Calculate

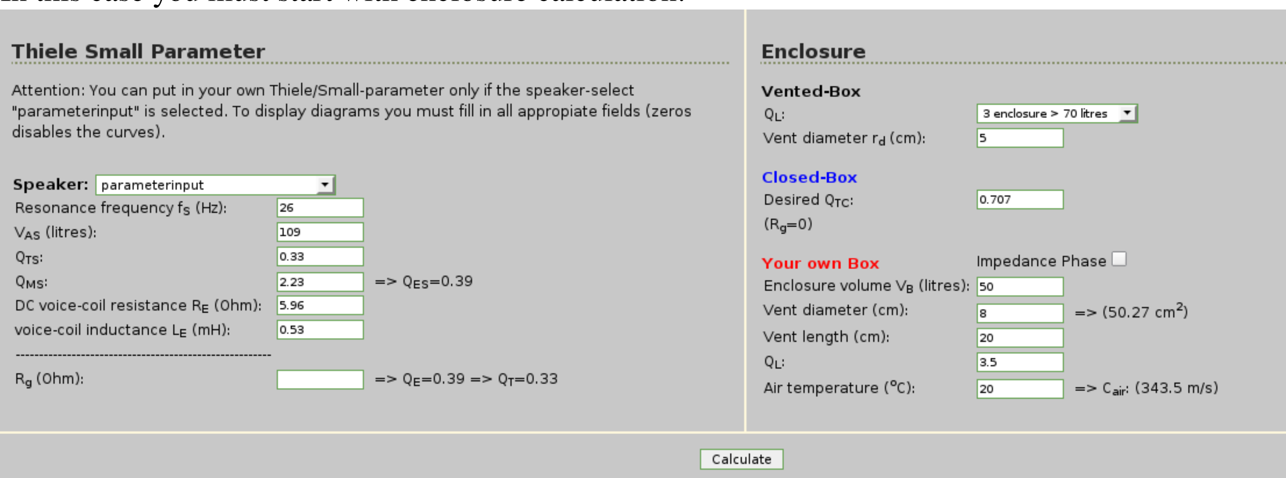
The corresponding frequency response:



You can use the R2, C1, L2-network to attenuate another frequency:
(R2=15Ohm, C1=100uF, L2=3mH)

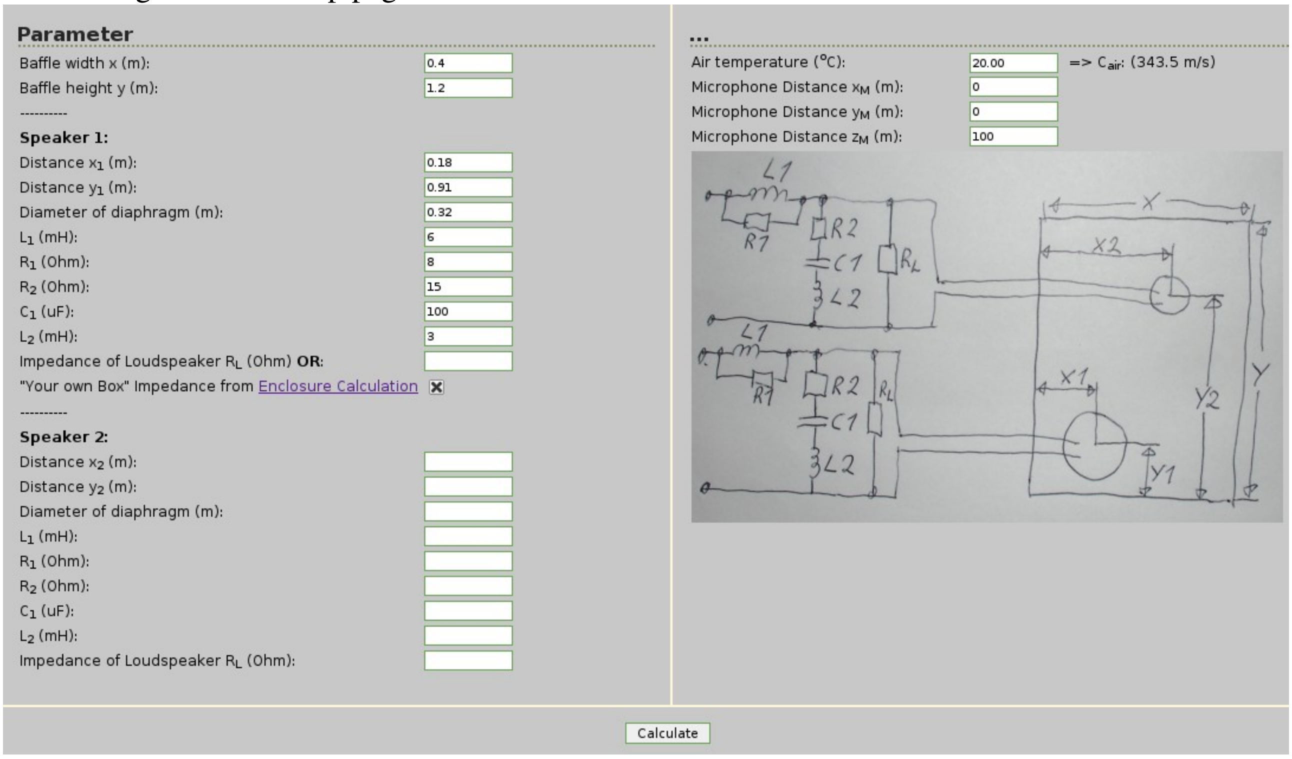


If you know the Thiele Small parameter you are able to use a better speaker impedance.
In this case you must start with enclosure calculation:

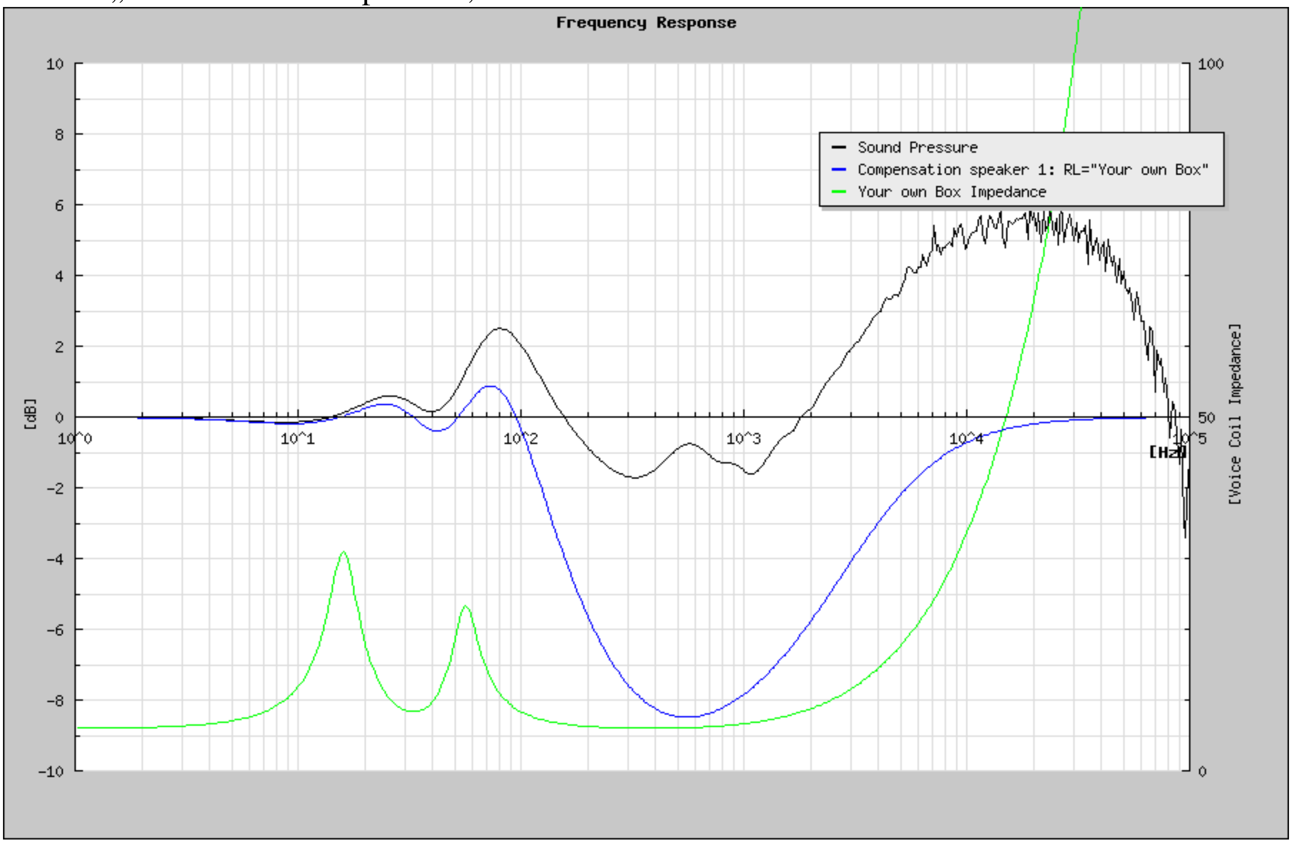


Fill in all appropriate fields for Thiele Small parameter and „Your own Box“ and calculate.

After that go to baffle step page.



activate „Your own Box“ impedance, then calculate:



You see there is a need for a better compensation ;-)

Much fun!

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