VituixCAD Extended Impedance Model For Any Driver

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Revision History:

Date	**Description**
Nov 24, 2022	Initial Release

Loudspeaker T/S often includes only a single Le value for inductance, however driver motors are usually much more complex than a single coil of wire, so Le on its own is not a very good description of the driver characteristics. An extended impedance model, or “semi-inductance” model can provide additional characterization of the impedance curve for greater accuracy.

Many Scan-Speak drivers include this data in the “advanced parameters” section of their datasheets, however the parameters can be extracted from any datasheet that includes a plot of the driver impedance. This instruction will provide the steps required to extract this information for use in the enclosure model in VituixCAD.

Step 1 - Tracing the manufacturer data

VituixCAD includes a tracing tool that we can use to create the data sets we need. With the manufacturer’s PDF open, the simplest method is to us the Windows snipping tool. Simply press Windows Key + Shift + S, then draw a box around the chart.

In VituixCAD, go to tools -> SPL Trace. Then under the edit menu, select paste. The tool is fairly straight forward from there, you simply mark some low and high known reference points on the image for the X and Y axis. For impedance, use the y axis amplitude on the right. Then simply click the trace button, then on the line to trace it. If the image is black and white, you may need to erase some grid lines around the plot line for the tracing feature to succeed.

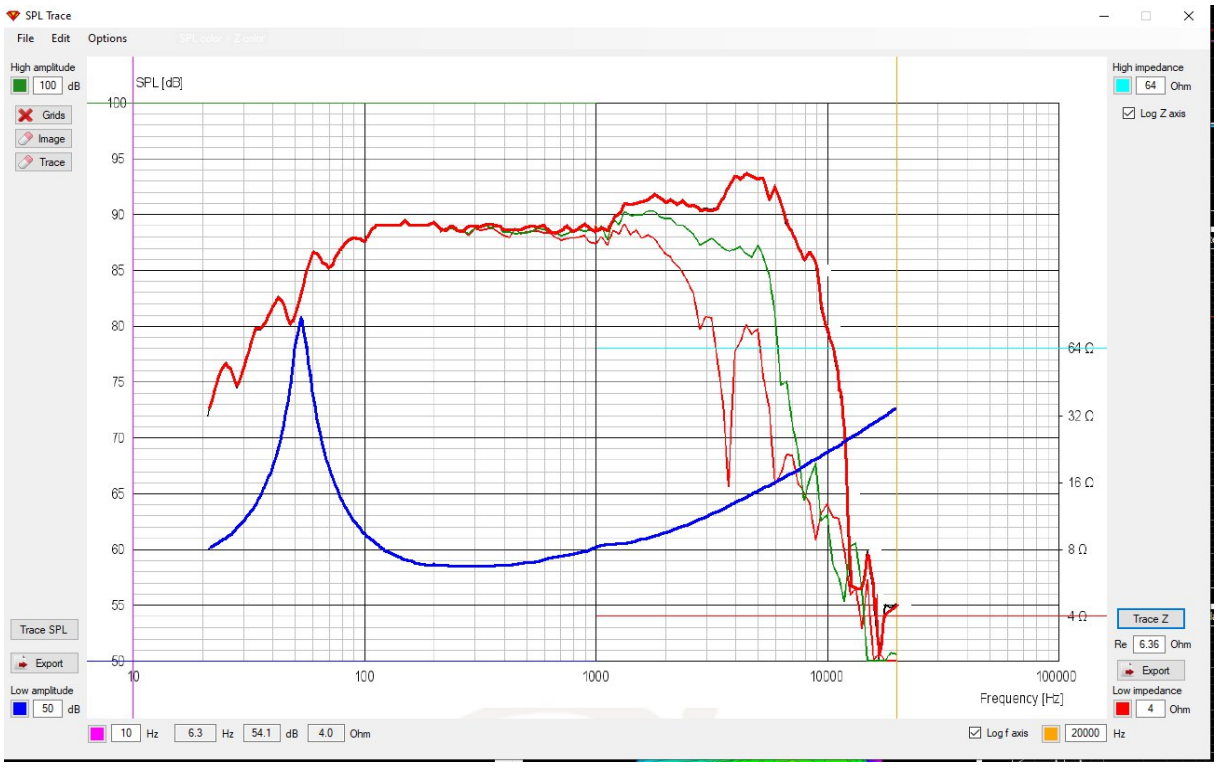

Figure 1 Trace Example

Once you have traced the driver impedance, simply export the result.

Step 2 – Add the driver to the Enlosure Database

Start by opening the enclosure tool, create a new driver and enter the T/S Parameters from the datasheet.

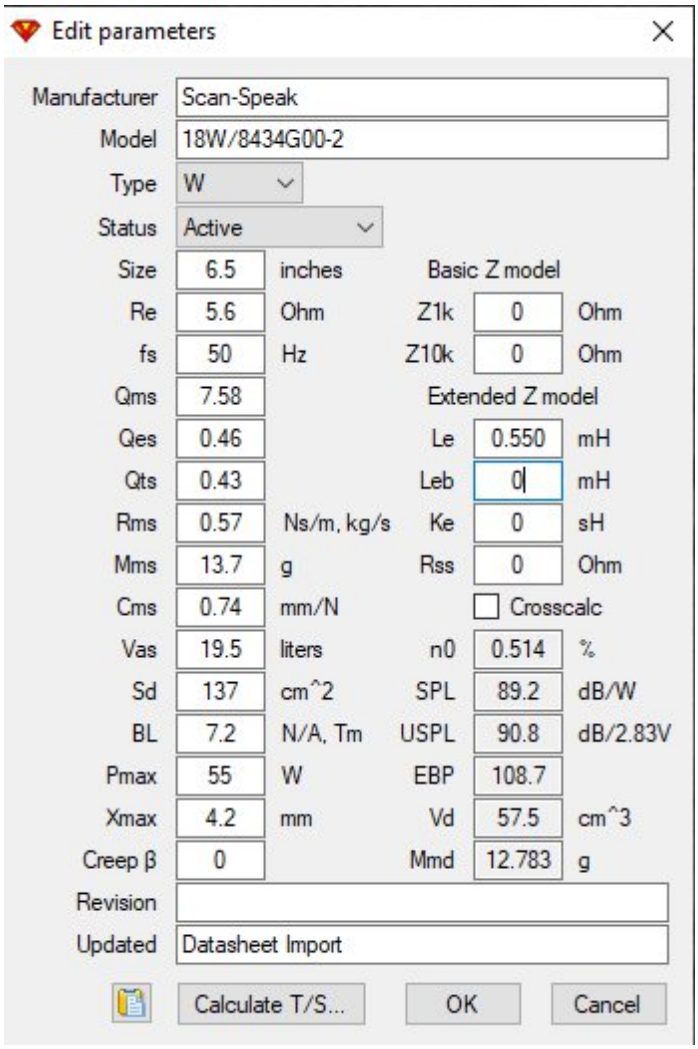

Figure 2 T/S Parameters Example

Step 3 – Extract extended impedance data

We can take the driver parameters a step further and use the traced impedance to determine a extended Z model for more accurate representation of the driver impedance in simulation. Select “Calculate T/S”, then load the traced impedance file under “Free air impedance response”. Provided that you have entered all the other T/S parameters already, simply press the “solve” button under the Extended Z model section. You will see a trace that should overlap the loaded impedance with a high degree of accuracy. Pressing the solve button a few times may achieve a slightly better result.

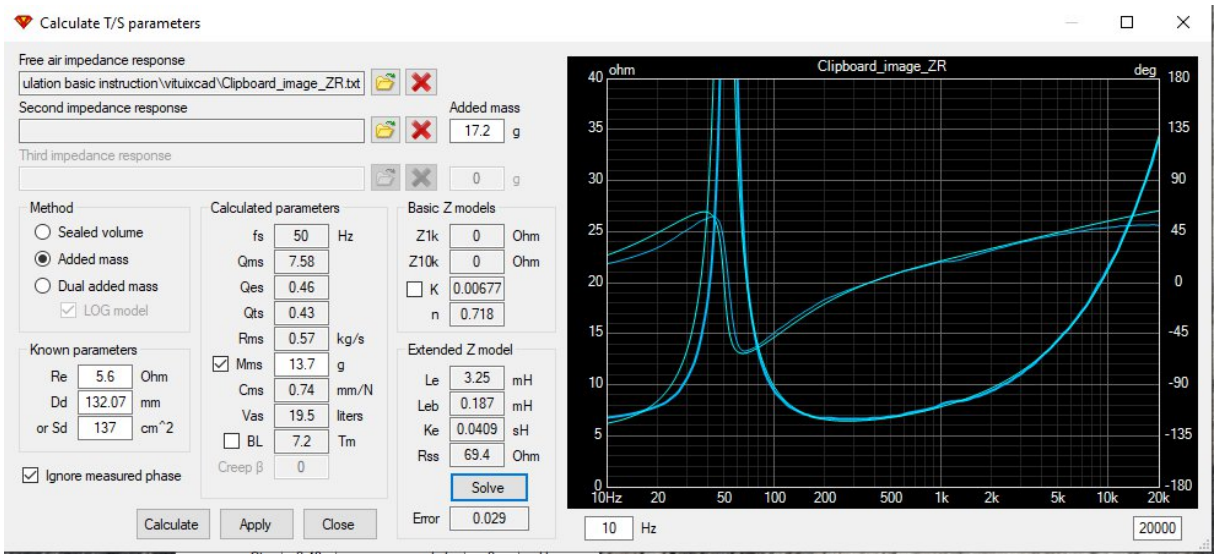

Figure 3 Extended Z model calculation

When complete, click “Apply” to save the result to the driver parameters.

To use the extended inductance model in simulation, simply right click on the SPL chart and select “show effect of inductance”.

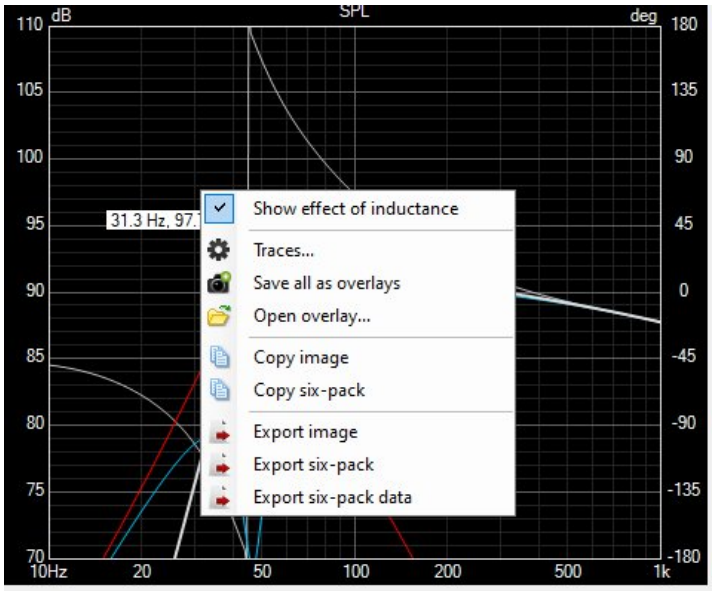

Figure 4 Show effect of inductance