

Report on the Creative Sound Solutions LD25X Tweeter

By Jeff Bagby

Nestled in our Northern neighbor (Canada, for most of us) lies a special mystical place of unique speaker drivers named Creative Sound Solutions (CSS) ran by our friend Bob Reimer. Bob is introducing a couple of elite and unique high-end drivers for the DIY speaker community: the new LD25X tweeter and the WVR126X wide range driver. These drivers are going to challenge the status quo of speaker design by offering some unique design features that may make us question what the very best drivers really are. Have I used the word unique enough? Well, there's a reason.

This report is on the LD25X soft dome tweeter. The tweeter arrives in a nice little square box and the first thing you notice, even before opening the box, is how light the weight is. I wondered, "Is there a tweeter in here?" Upon opening the box you get a little surprise that you don't find other places, sitting in little nests in the Styrofoam cover is a gasket, an "O" ring, three mounting screws, and a pair of crimp-on wire terminals – everything you need for mounting the driver.



A Tweeter with accessories –
Mounting gasket, "O" Ring, three black screws, and two gold plated crimp-on connectors. Something you don't get every day.

After carefully removing the Styrofoam cover so as to not spill the little parts, I find the tweeter in a plastic bag inside. When you remove the tweeter the next thought you have is, "this is so tiny, is this for real? It doesn't weigh anything at all." But in this world I've learned not to judge a book by its cover or a driver by its weight.

The little tweeter is a one inch silk soft dome in a small shallow horn and a face plate that measures about 3" in diameter, with a cut-out of just a 2" circle. Despite its light weight there's no plastic here, the face plate and the rear chamber are both aluminum. The small size and light weight are due to the use of Neodymium in the motor's magnet. This isn't the only thing that makes it special though. The motor also uses XBL^{^2} technology and possesses copper shorting rings to reduce inductive distortion. Because the of the XBL motor the tweeter's coil has an Xmax of +/- 1.8mm – a huge leap from the tweeters out there that range for .25 to .5 mm of Xmax. This is a state of the art motor design. Here's a look at the tweeter:



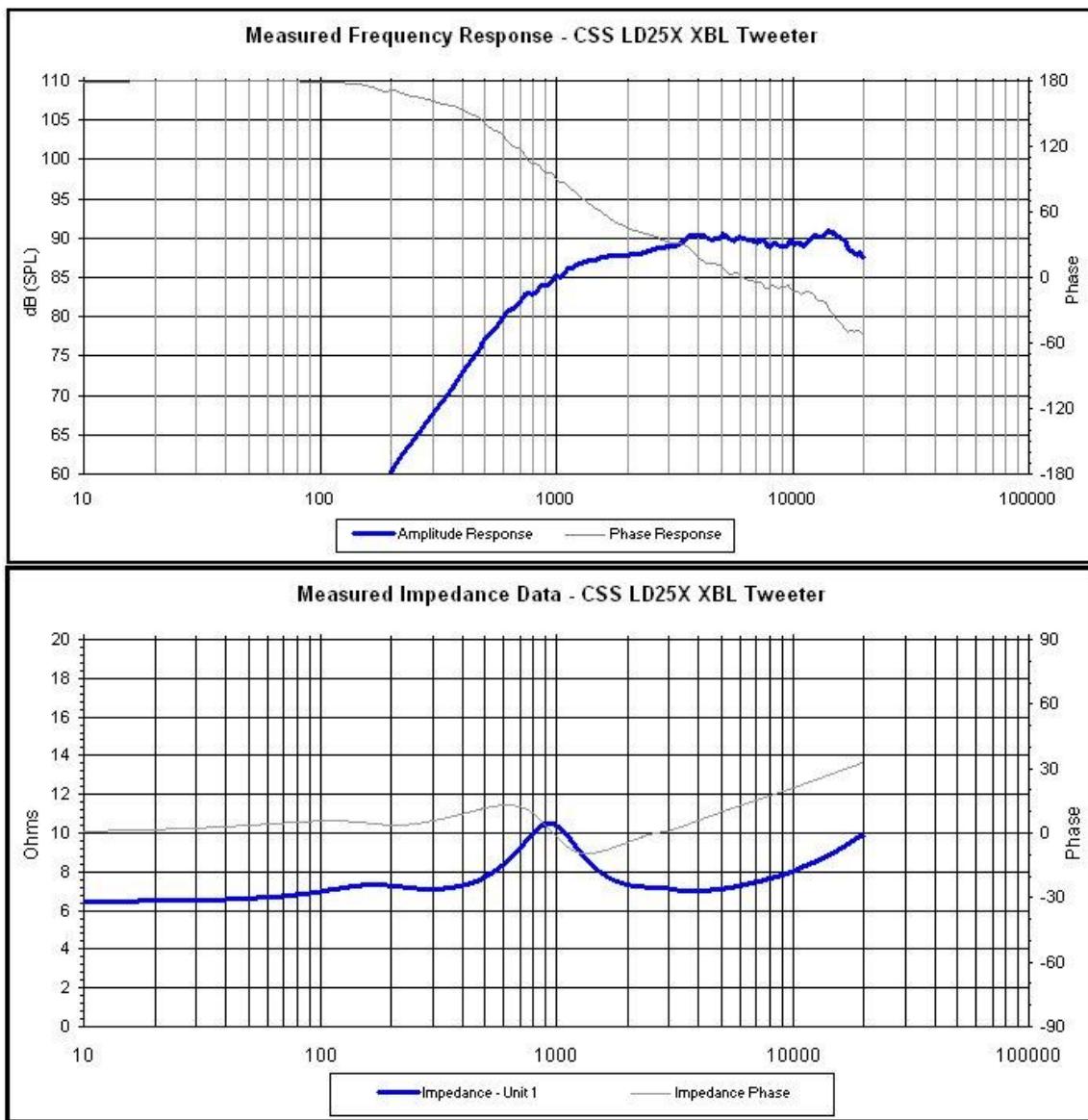
Aluminum face plate with shallow horn loading of silk dome



The rear cup is aluminum also with easy-to-use, and clearly identified terminals protruding from the back.

So, it appears to be designed and constructed very well, but how does it measure, and how does it compare to other tweeters out there. Let's find out.

Here's the infinite baffle frequency response and impedance that I measured with my own test set up. I normalized the level to be equivalent to 2.83V at 1 Meter:

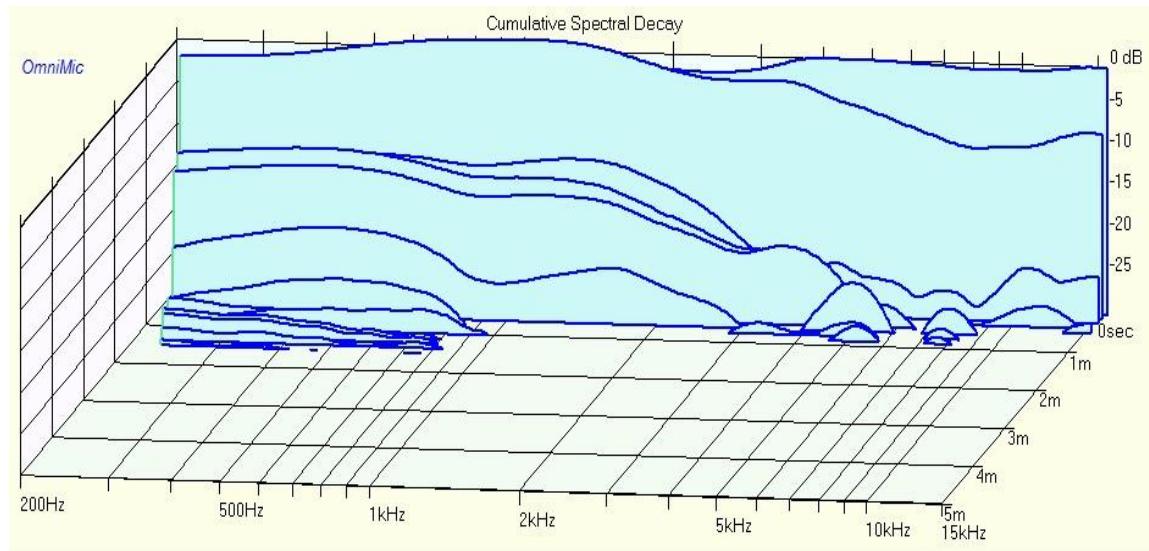


On my sample the F_s was 913Hz (right out of the box) with a R_e of 6.42 Ohms. There appears to be a small extra bump in the impedance in the range of 170Hz. I believe this is due to the tunnel to the rear chamber, but appears to be well-damped and not an issue.

The shallow horn loading also appears to give the tweeter's response a very small rise in the region around 4khz, but I found this very easy to work with in crossover design.

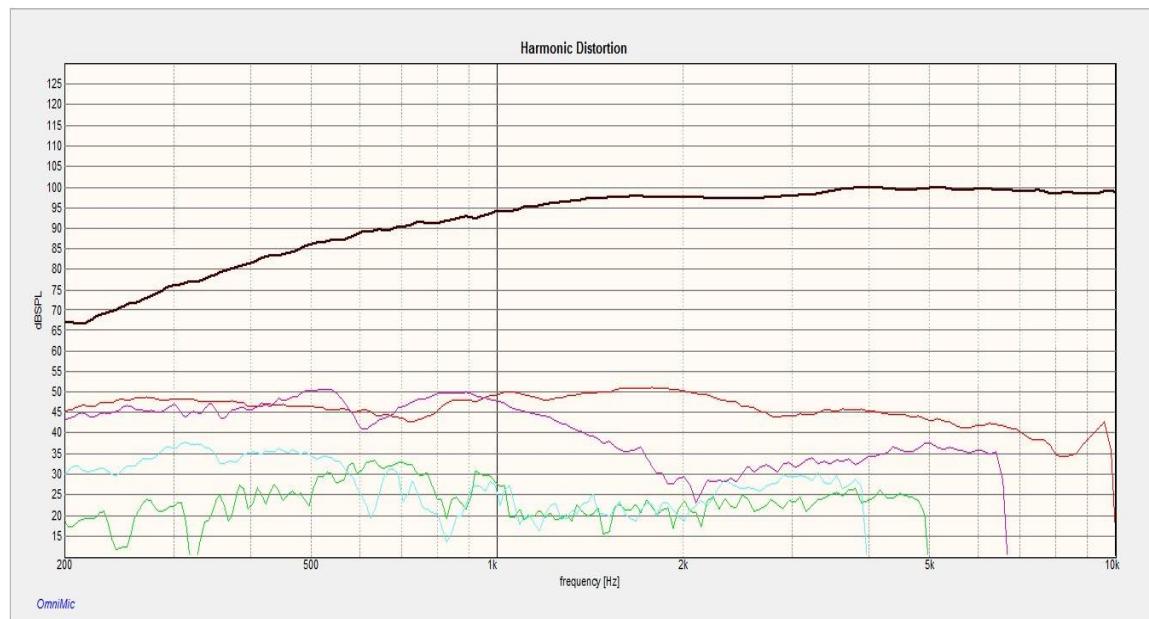
The next measurement is one that has revealed significant issues if some other drivers. It is called the Cumulative Spectral Decay. Think of this as a frequency response plot over time. Therefore if the driver has some mechanical resonance that rings or decays slowly with time compared to other frequencies we will see this manifested as ridge along the time axis at that frequency. We also call this a waterfall plot because of its appearance.

Here's the Cumulative Spectral Decay waterfall for the LD25X tweeter:



This is the cleanest Cumulative Spectral Decay waterfall I have ever measured. I would consider this state of the art for dome tweeters, or any other driver for that matter.

Next let's move to the area of harmonic distortion. The chart below shows the fundamental tone with a black line at 100dB. The harmonic components are shown in actual SPL and are represented by Red = Second order, Pink = Third order, Green = Fourth order, and Light Blue = Fifth order:



This is world class distortion. At 2 kHz Third order harmonics are at -70dB! And -65dB at the peak at 5khz. Even at lower frequencies the distortion remains very well controlled.

Summing it up

Every aspect of this tweeter, whether it is the construction, motor design, or measured performance reveals it to be a world class tweeter capable of going toe to toe with some very big name, very expensive tweeters that sell for two to three times as much money, and may not be superior in any way. The motor design alone is an innovative, benchmark design that leaves behind most of the tired old dome tweeters available today regardless of price. An XBL motor with 1.8mm of Xmax allows for some interesting possibilities. Despite its small size it should easily cross over with shallow slopes and at fairly low frequencies.

So, how does it sound? We will soon find out. I am currently working to use it in an MTM, taking advantage of its small flange diameter to yield a fairly tight driver spacing. The midbasses in this this kit are the new Creative Sound Solutions VWR126X drivers – a 5" cast frame “Very Wide Range” driver with an unusual cone construction and an XBL² motor as well. It is possible that this speaker will become a kit design for CSS. It is planned to make its public debut at the Indiana DIY gathering in Fort Wayne in April (2012). Anyone who would like to is welcome to come and enjoy the many speakers that will be auditioned, including this one. I am sure others will be reporting back on their impressions of the design.

As a final note, I have samples on the way that have removable face plates that will allow the integration of various sizes of waveguides to be added to the driver. A proper waveguide could easily extend the usable response of this driver to 1 khz with very low distortion. Oh, the possibilities.....

You can contact Bob and visit Creative Sound Solution's website at:
www.creativesound.ca/

Respectfully submitted,
Jeff Bagby, 2/14/2012