

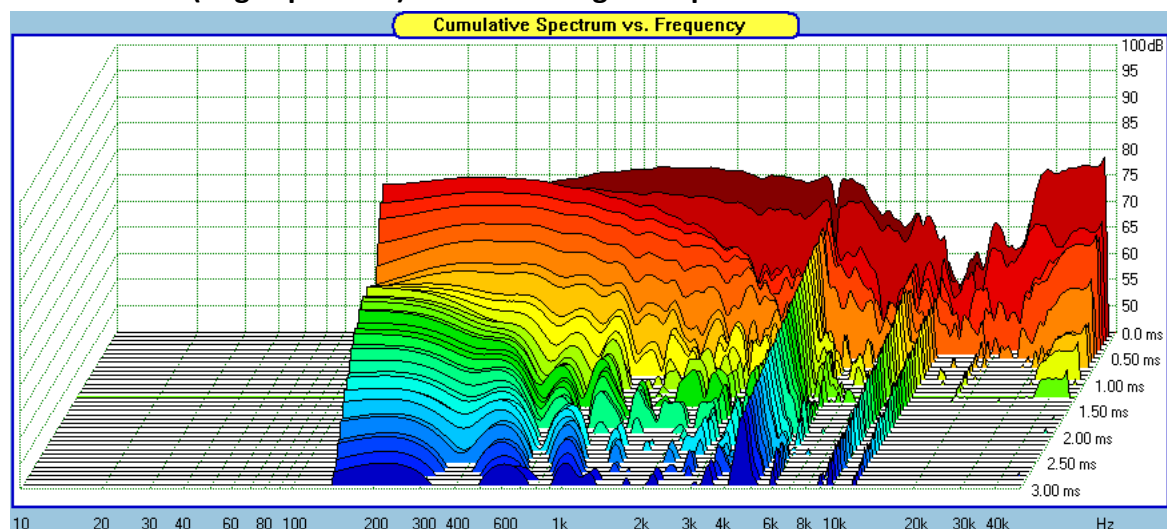
Comparison of two loudspeaker drivers time domain performance

Below is a quick comparison of two drivers CSD plots to show their time domain performance.

A CSD plot is the single most informative graph / test to determine energy storage / energy decay. In addition it shows real world frequency response (before Eq) along the top back wall of the graph.

I have chosen the legendary **ATC SM150 S** midrange dome as its ATC's current 2016 flagship driver used in their top studio monitors. This independent test was carried out by the very well respected Jeff Bagby. Full test report here http://studio-hifi.com/images/ATC75-150S_JeffBagby.pdf

ATC SM150 S (flagship model) dome midrange CSD plot



It is recommended that this driver is used from 500Hz up to approx. 4 KHz so it's a dedicated midrange and requires a very good high frequency to cover the top end.

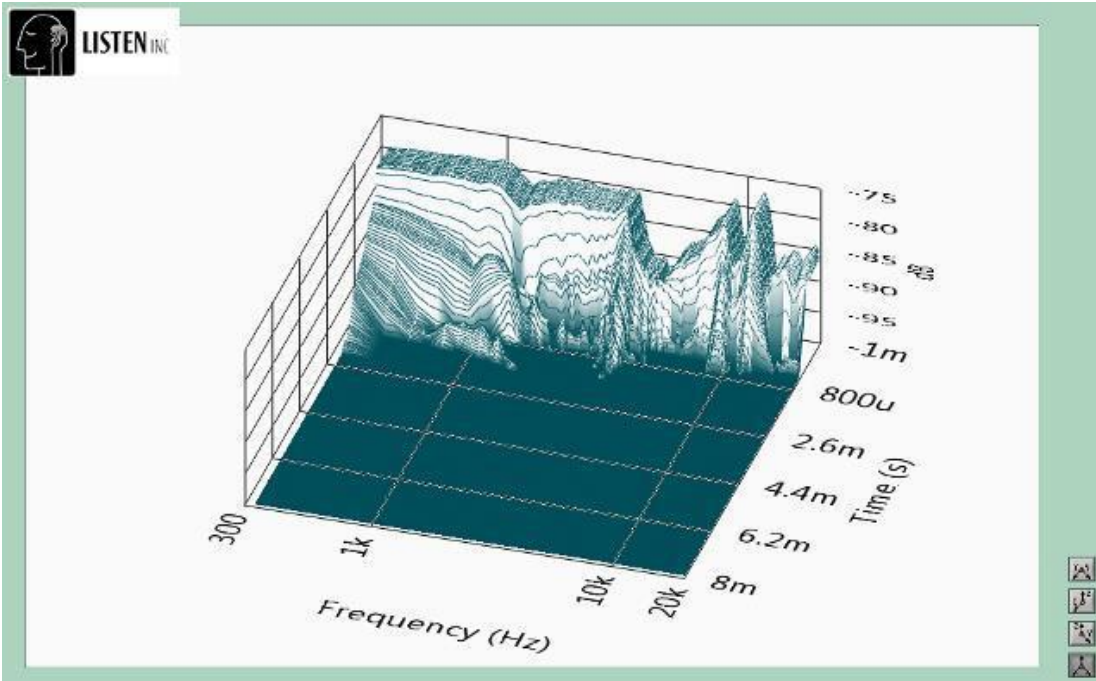
Looking at the graph one can see that between 1,000Hz and 3 KHz it offers a very good performance with most of the energy decaying in less than 2ms. At 4 KHz there is a very pronounced resonance, this should be avoided if possible i.e. a steep DSP crossover at 3 KHz would solve this problem.

In the 500Hz to 1KHz band the energy decay is not so good, (but still way better than most) with approx. 3ms to 4ms (off graph but estimated) settling time, where some of the resonances (ridges) run off the graph i.e. they continue to ring longer than the 3 Ms cut-off the graph displays.

On a practical note this huge driver weighs 9Kg most of which is the magnet. The Mms is only 2.3g with a powerful 8.4 Bl....This gives an incredibly "fast" ratio of 0.273. The best I have found!

This driver is not available to OEM or DIY customers, but the smaller (7Kg) lower efficiency (90dB) version is, all be it at a very high RRP of approx. £440 (\$625) per driver!

Custom Install Audio 4.5 inch flat coned driver with silk surround & spider



Looking at the energy decay performance there is not much to say....It is so clean with almost total energy decay in under 1ms....This is currently unmatched by any similar driver (4.5 inch wide band) in production today.

This driver has an Mms of 6g & Bl of 4.82 giving a ratio of 1.24, which is still very good for a high bandwidth driver with an Sd of 70.5cm and capable of covering 300Hz up to 20 KHz.

At just over 90dB sensitivity with 1watt @ 1 meter / 2.83 volts and capable of holding 100dB SPL continuous or 105dB peaks the driver is very flexible and can be matched with a variety of bass / low midrange systems.

The 10dB dip in frequency response at approx. 7 KHz is easily corrected with Eq and as the power response is so broad and even there is no off axis discrepancy or imbalance to worry about.

Subjectively the top end is remarkably natural and well extended and does not require a separate high frequency driver. One can Eq the top end to flat or whatever curve sounds best in the room. We are now developing a new design with an entirely new motor / suspension / cone which will improve even further on the above and have greater power handling.

On a practical note the driver is only 240g in weight, 112mm square chassis and only 60mm deep, all very easy to work with. Later in 2016 this new driver will be available to OEM's and in a range of DIY kits at approx. £135 per driver.