Subject: Re: 4Pi - alternate compression driver mounting?
Posted by Wayne Parham on Fri, 28 Jan 2022 18:13:49 GMT
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The quality of your environment will be reflected in the quality of your measurements. Oh, such a pun in that sentence. :lol:

For measurement charts that will be published, I would recommend no less than 30 feet of unobstructed reflection-free area. On the other end of the scale, if you just want to look at the frequency range near crossover - like during development or to see the position of the vertical nulls - then just a few feet is enough. You can use a gated pseudo-anechoic measurement for that.

Your backyard has a lot of items that will reflect sound, so it is really only suitable for the latter. But that's pretty good because the main thing you want to see is the position of the vertical nulls. Being outdoors, you won't have room modes, so you'll be able to see a general trend that is accurate down through the bass range. But it will be only the general trend that's accurate - you'll see plenty of peaks and dips that wouldn't be there is an anechoic environment. So expect that.

As for the amp, it's generally not an issue unless it is pushed into clipping. I doubt you'll do that, but just to be safe, don't push the amp hard. I don't think you're testing max-SPL, so keep the signal under 10v. And on that subject, the drive signal level isn't all that important. It just needs to be enough to overcome the noise floor. I tend to use multiples that easily calculate back to a 2.83v/1M value. This allows me to measure voltage sensitivity along with everything else I'm trying to see.

Which is what that "calibrate level" task is doing for you. If you measure the voltage at the speakers and enter that into your measurement system - and if the system knows the microphone distance too - then it can provide a chart that shows what SPL values would be measured at 2.83v with the microphone at one meter. This has become a standard, so it's useful for comparison with other systems.

Lastly, you're going to want to lay your speaker on its back, facing upwards. Measure it like shown in the video in the post below. Scroll down to the link that says "Vertical Nulls." It will show you how to position your microphone and what to look for.
Crossover optimization for DI-matched two-way speakers
Sadly, this won't be enough to verify the response in the 100-400Hz range, which is where I would expect to find problems from internal standing waves. The objects around the speaker will create reflections that will modify response in this region. What you might want to do is to clear out as many of the things in your back yard as you can, making it as reflection-free as possible. Then set the speaker in the middle of the yard as far from the house and the fences as possible. The further away you can get from reflectors, the lower in frequency your measurements will be accurate. Hopefully that will be enough to see smooth response in the 100-400Hz region, to verify that the port and driver arrangement is not causing any midrange anomalies.