
Subject: Distortion Measurements

Posted by [Wayne Parham](#) on Fri, 20 Oct 2006 18:28:35 GMT

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Many thanks to David Lee for making the Praxis measurements at this year's Prosound Shootout. He did a great job. We were able to gather valuable data on several subwoofers, and can compare response of each of them, seeing how they all perform outdoors, with no room interactions or boundary reinforcement.

We didn't perform distortion measurements at the 2006 Prosound Shootout, but we did in 2005. We measured response and distortion (THD+N) at 28.3v, 100 watts, 200 watts, 400 watts, 800 watts, and so on up to 2400 watts or the maximum allowed by the owner of the cabinet. Prosound Shootout 2005 - RESULTS You can easily read the LMS charts from the 2005 Prosound Shootout. The amplitude response (SPL) is shown as a blue line, with the distortion shown as a violet line. To know the amount of distortion present, simply subtract the distortion from the SPL to read a decibel value, -35dB, for example.

Then to convert to a percentage, use the following conversion chart:

-60dB = 0.1%
-55dB = 0.2%
-50dB = 0.3%
-45dB = 0.5%
-40dB = 1%
-35dB = 2%
-30dB = 3%
-25dB = 5%
-20dB = 10%
-15dB = 15%
-10dB = 30%
-5dB = 55%

If the distortion level falls below the line shown in the noise floor measurement, then distortion is unknown. One can only know it is below the noise floor. The noise floor was 65-70dB up to 50Hz and fell to 50-55dB above 50Hz. Typical amplitude response ranged from 105dB to 120dB, so the average dynamic range was approximately 40dB. That means distortion below about 1% was too low to measure in that setup. To get more resolution, we could have moved the microphone closer but since we were primarily concerned with high power levels, 1% resolution was sufficient.

I wish we had done distortion measurements this year too, so we could obtain that figure for all the systems tested. I'd also like to have measurements of the LABhorn and some other subwoofers that weren't represented at either the 2005 or 2006 events. Hopefully we will have samples of these other subwoofer systems next year. The only charts I've seen of the LABhorn were done indoors, and I'm not sure what power levels were used. This is significant for both response and distortion datasets. It would be nice to have all of the systems compared using the same measurement system and test plan, and performed in the same environment, preferably outdoors in a wide open space like we have had at the Prosound Shootout. So we'll continue to

gather information about more systems as time goes by at subsequent Prosound Shootouts, and we'll archive the data here.
