

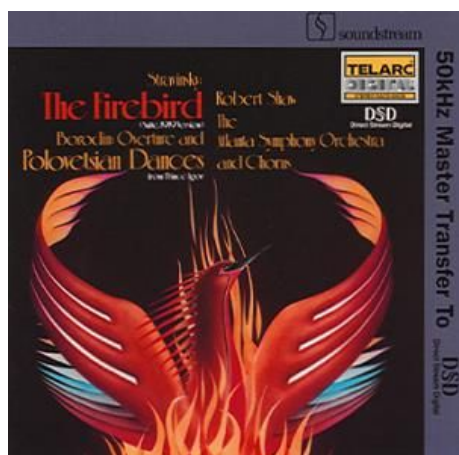
Innersound Kaya, Kachina, and Tehya Hybrid Electrostatic Speakers - iPower 750 and iPower 330 Power Amplifiers

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John E. Johnson, Jr.

The Listening

I used a McCormack CD transport and DAC, a Yamaha universal DVD player, a Lexicon MC-12 preamp/processor, Balanced Audio Technology VK-5i preamp, and various Nordost interconnects for the tests. Everything else in the chain was Innersound, including the speaker cables.



The two Kayas were used as the front left and right, the two Kachinas as rear surrounds, and the Tehya as the center.

Because of the narrow dispersion, I toed the Kayas and Kachinas in at an angle steep enough to point them directly at me, which was about 300. All speakers were several feet out from the rear and side walls. The Tehya center channel was placed on a stand 24" off the floor.

Although I am quite familiar with planar sound, my experiences are primarily with two-channel configurations. I was not prepared for ESL in 5.1 surround, which was, to say the least, spectacular.

It's all in the details, and that is where the Innersound ESLs excel. Such fine detail, coupled with the huge soundstage that large drivers give, is something that has to be heard to be believed.

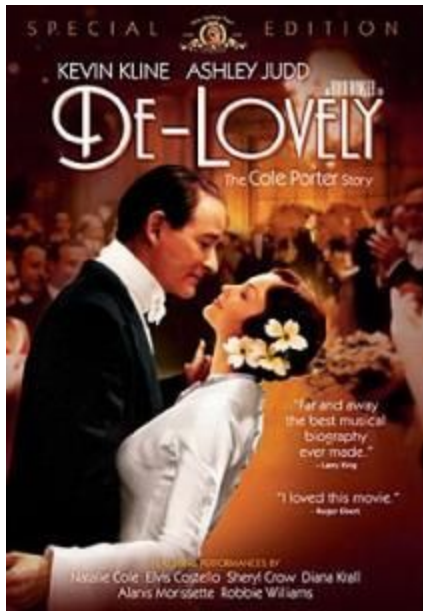
From the leading edge of classical guitar, to the leading edge of machine gun fire, this was jaw dropping sound.

I listened to stereo music, SACD and DVD-A music in 5.1 surround, and movies in 5.1 surround. There was not a single instance that did not amaze my ears.

One of the most interesting observations was how the lack of wide dispersion was made up for by the sound seeming to be projected. Voices were much easier to understand with most of the sound coming to my location rather than being spread out



over a wider area. This is a new discovery for me with regard to planar speakers, and probably because I had very little experience with a center channel ESL. Previously, voices had come from my front left and right ESLs, in stereo, rather than from a single ESL speaker in the center. Maybe there is an advantage to narrow dispersion as long as you are sitting in the sweet spot.



Transparency and clarity were all that I have come to expect from a fine ESL design. The bass had a wider dispersion than the highs, due to the wavelengths being longer than the width of the driver, but that is the case with any speaker.

There was no sibilance to voices, and I was surprised at how well the bass from the cone woofers blended with the ESL panels. It was also quite deep, a result of the transmission line loading.

As I get older, I find myself being more sensitive to high frequency distortion, the harshness that sometimes happens with various tweeters, but there was none of that with the Innersounds. It was a very natural, very open sound that is easy to love.

The Innersound power amplifiers were driven hard, and never sounded like they were losing their grip. They always sounded clean and crisp, and only got slightly warm with extended use.

The Kachina sounded much like the Kaya, only not quite as "big". Surprisingly, even though the Tehya is much smaller than either the Kaya or Kachina, it still had a large presentation, undoubtedly because the ESL panel is much bigger than any conventional cone tweeter or midrange driver. You could also use a Kaya for the center, but you would need a transparent projection screen. In any case, the Tehya seemed perfectly suited to the task.

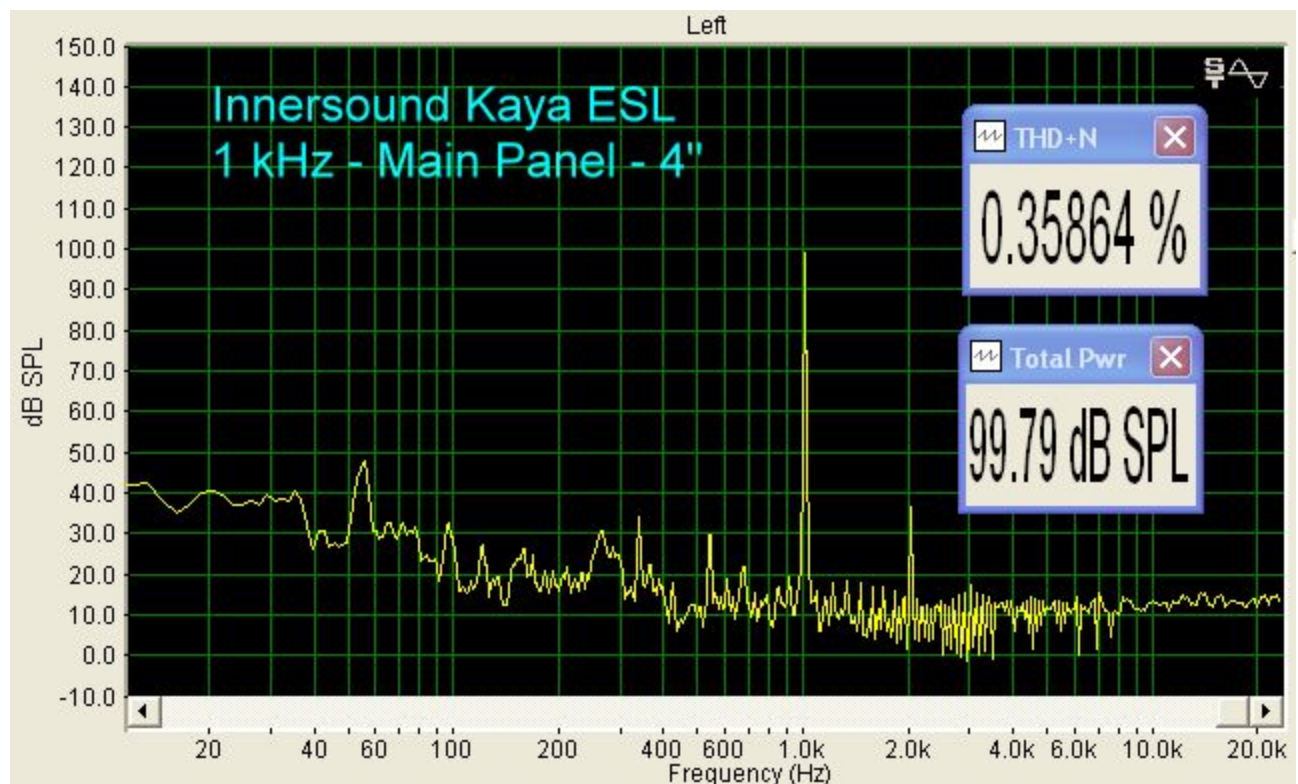
Although the adjustment knobs on the Kachina and Tehya work well for balancing the bass with the mids and highs coming from the ESL panel, I prefer the Kaya method which utilizes a separate power amplifier for the woofer, with the built-in EQ that allows for separate bass and mid-bass increments.

On the Bench

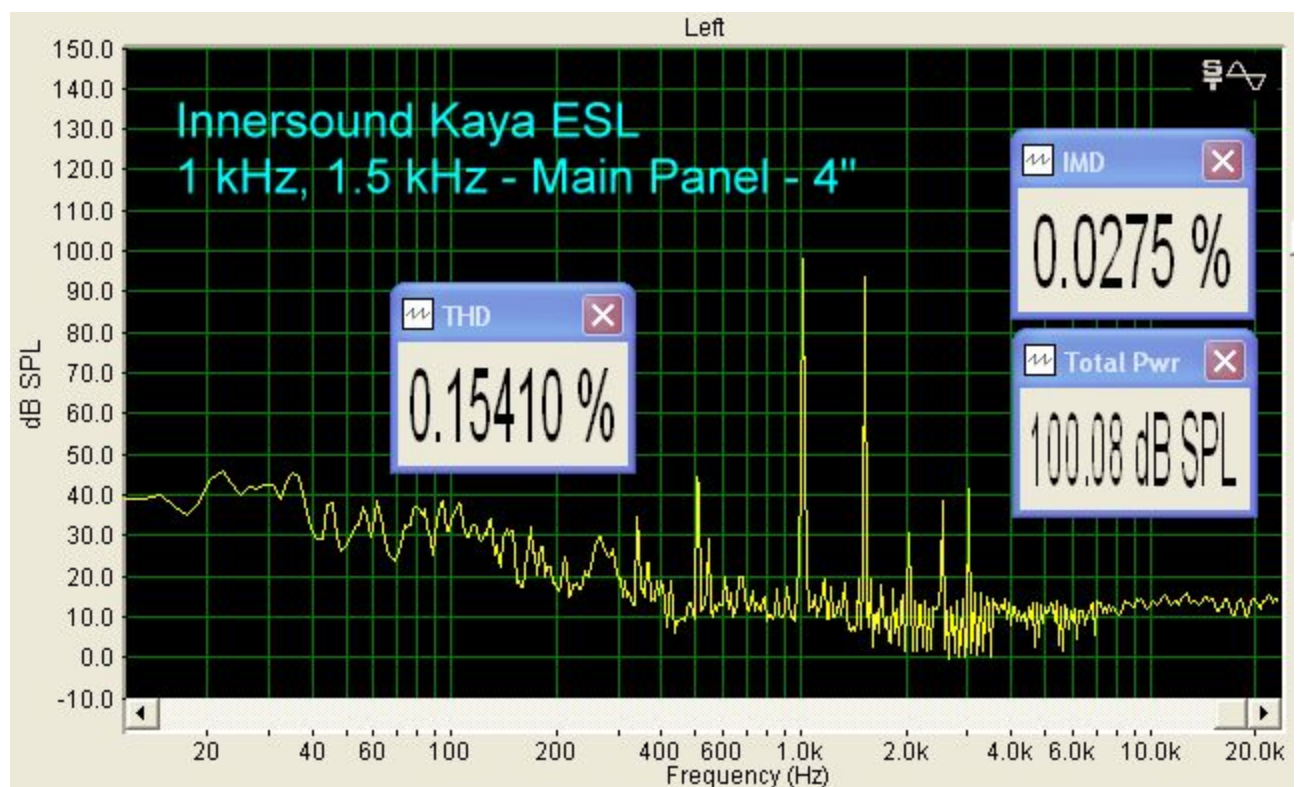
The Speakers

There are a lot of graphs to show here, so let's get started.

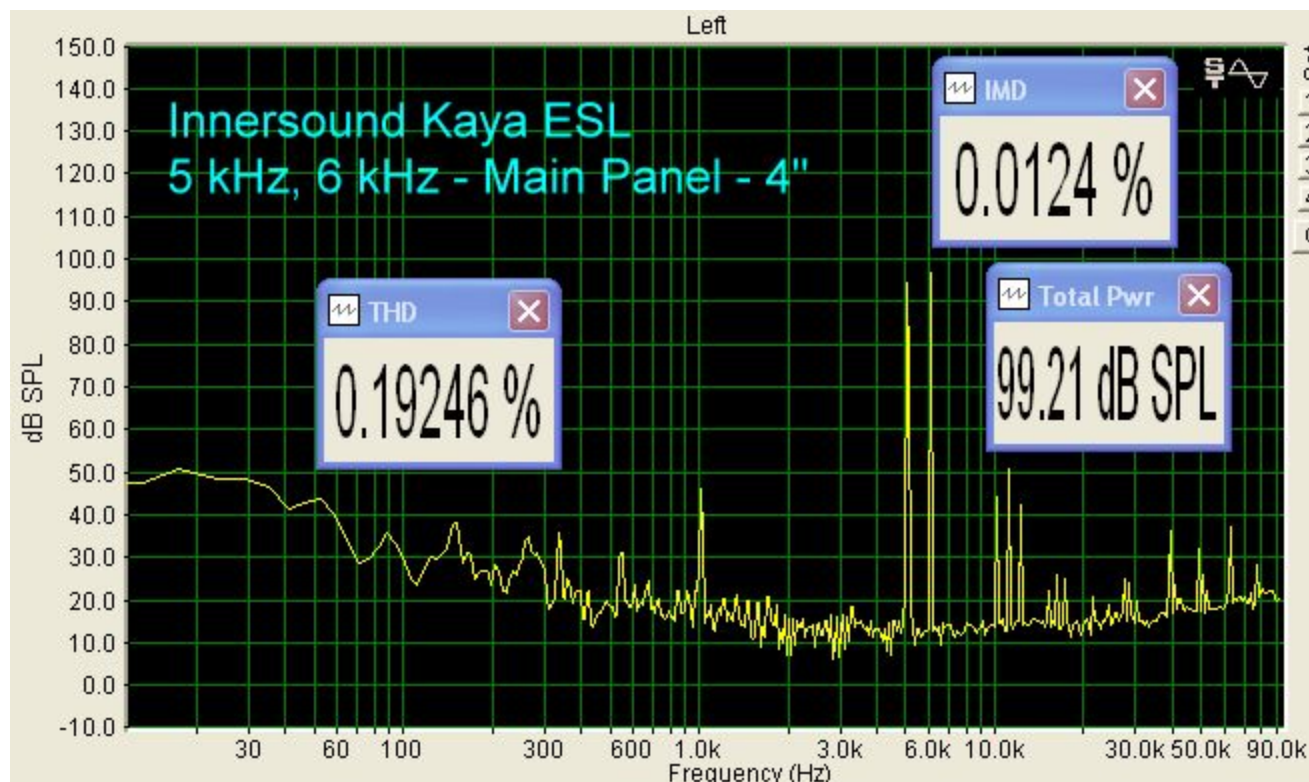
For the ESL main panel, at 1 kHz, and 100 dB, THD was a very low 0.4%.



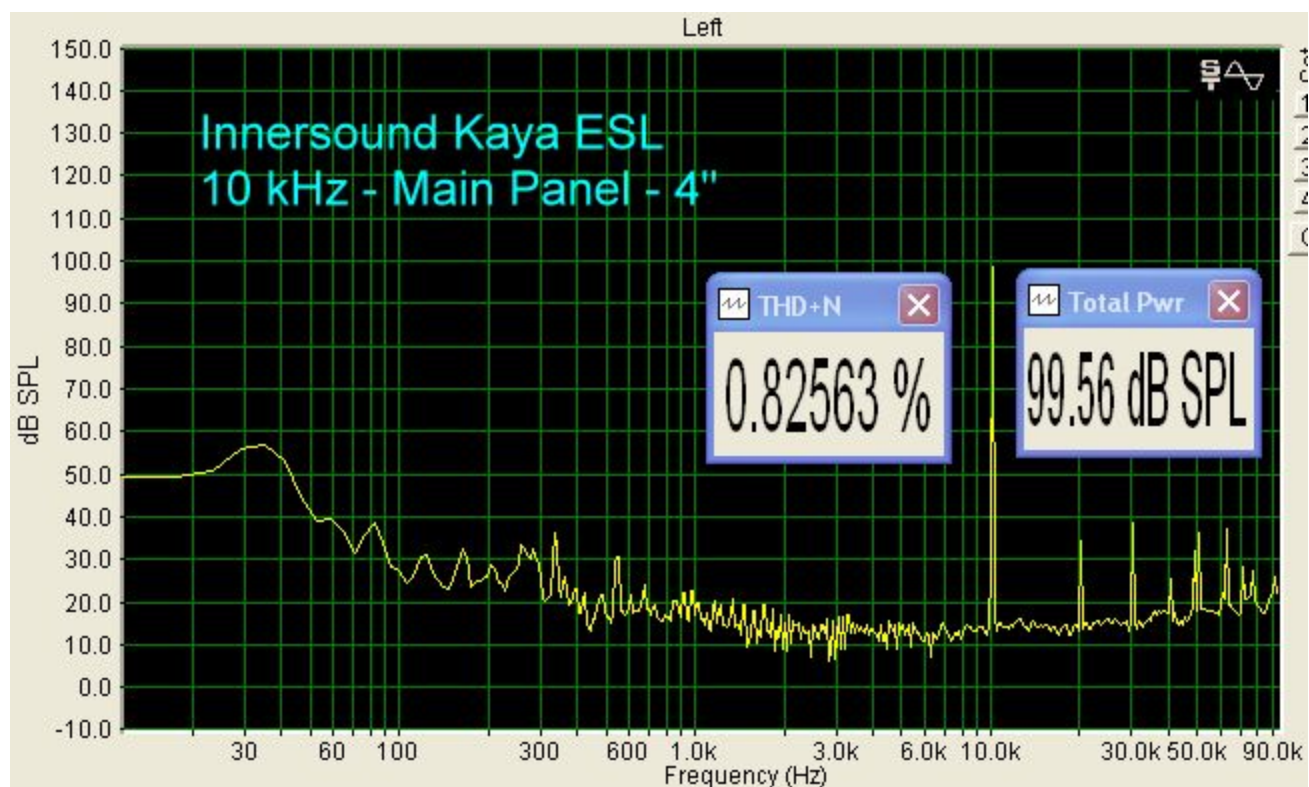
IMD, using 1 kHz and 1.5 kHz sine wave signals was also low.



Only 0.012% IMD was seen, using 5 kHz and 6 kHz sine wave input signals.



At 10 kHz and 100 dB, THD was less than 1%.

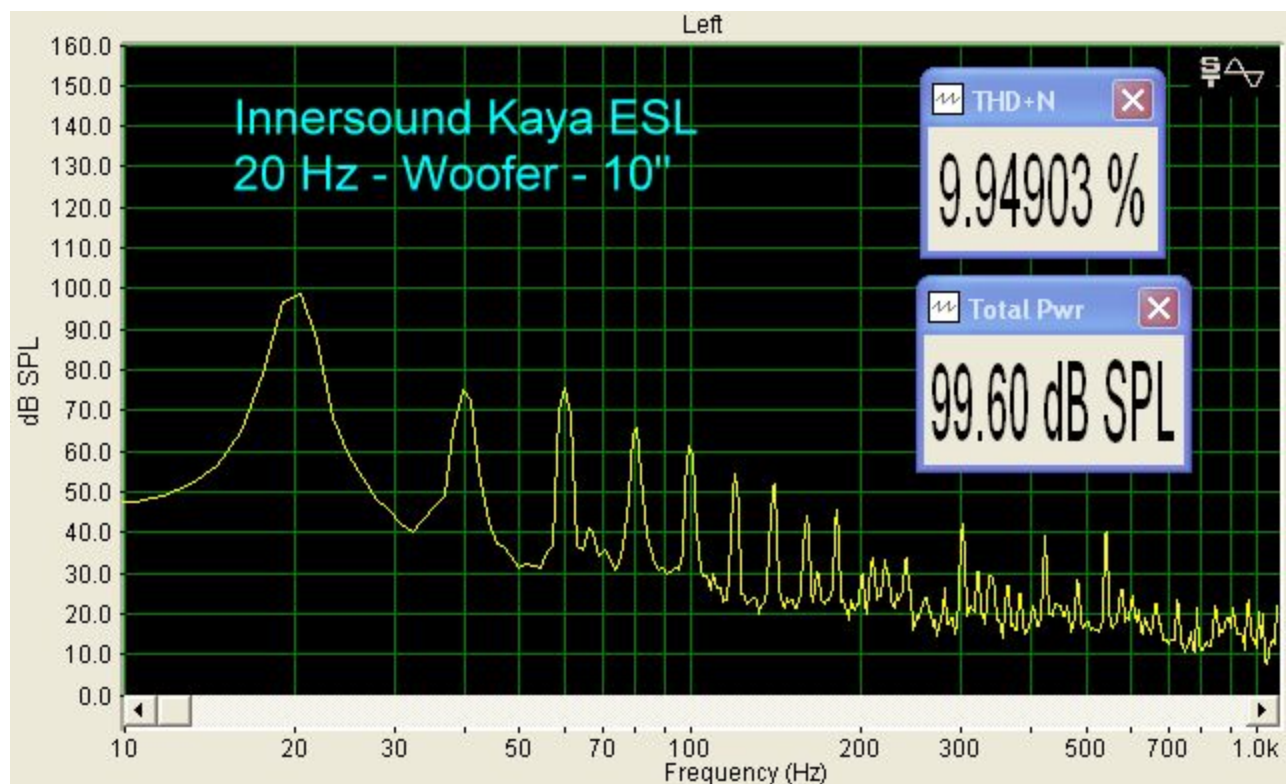


Again, IMD was low, when using 10 kHz and 11 kHz input signals.

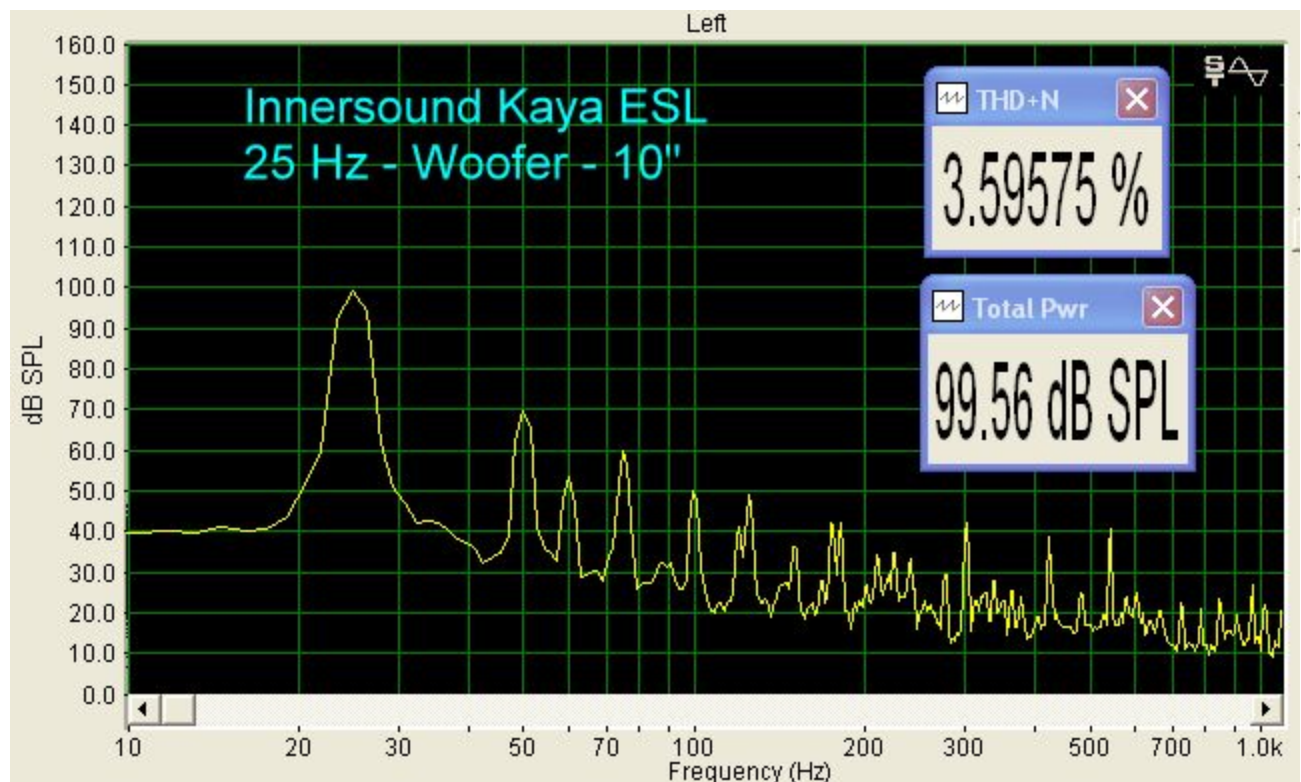


Now for the woofer.

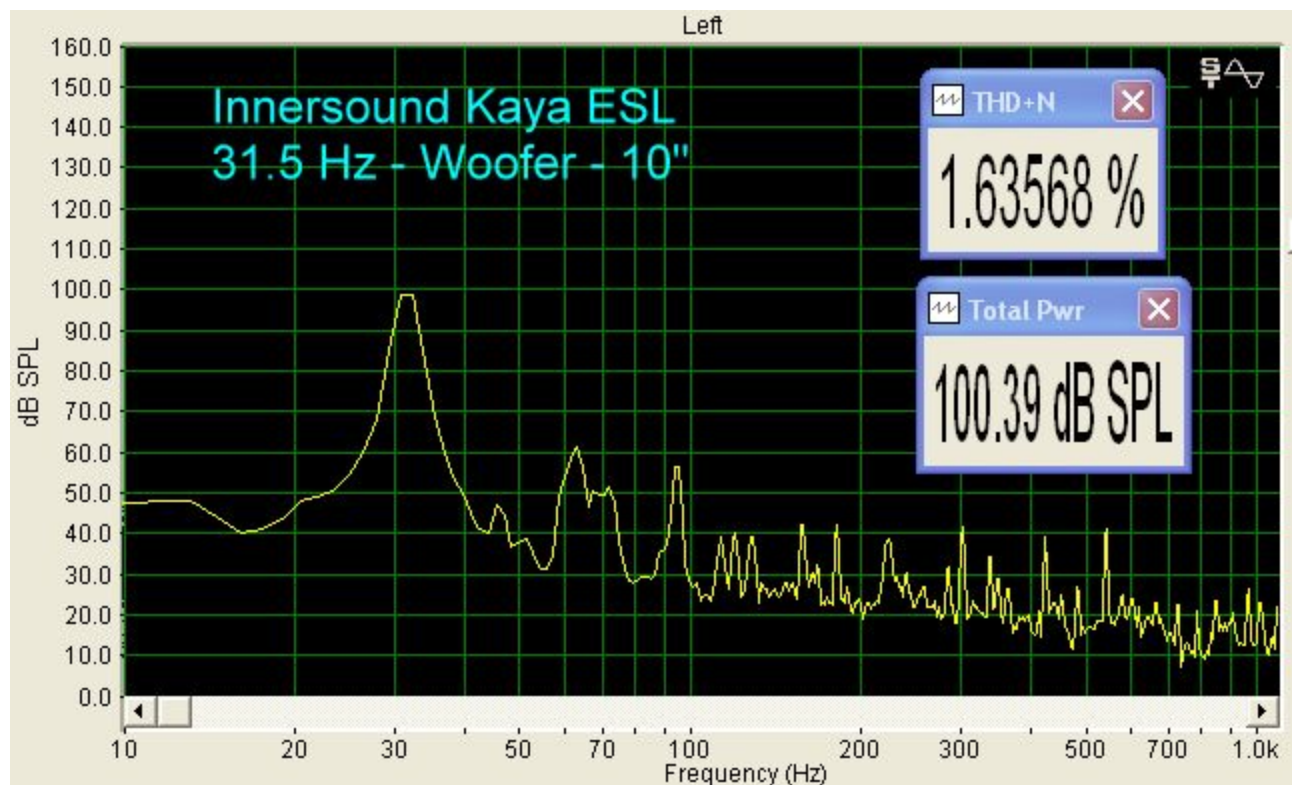
For a 10" woofer, having less than 10% THD at 20 Hz and 100 dB is excellent performance. I was surprised.



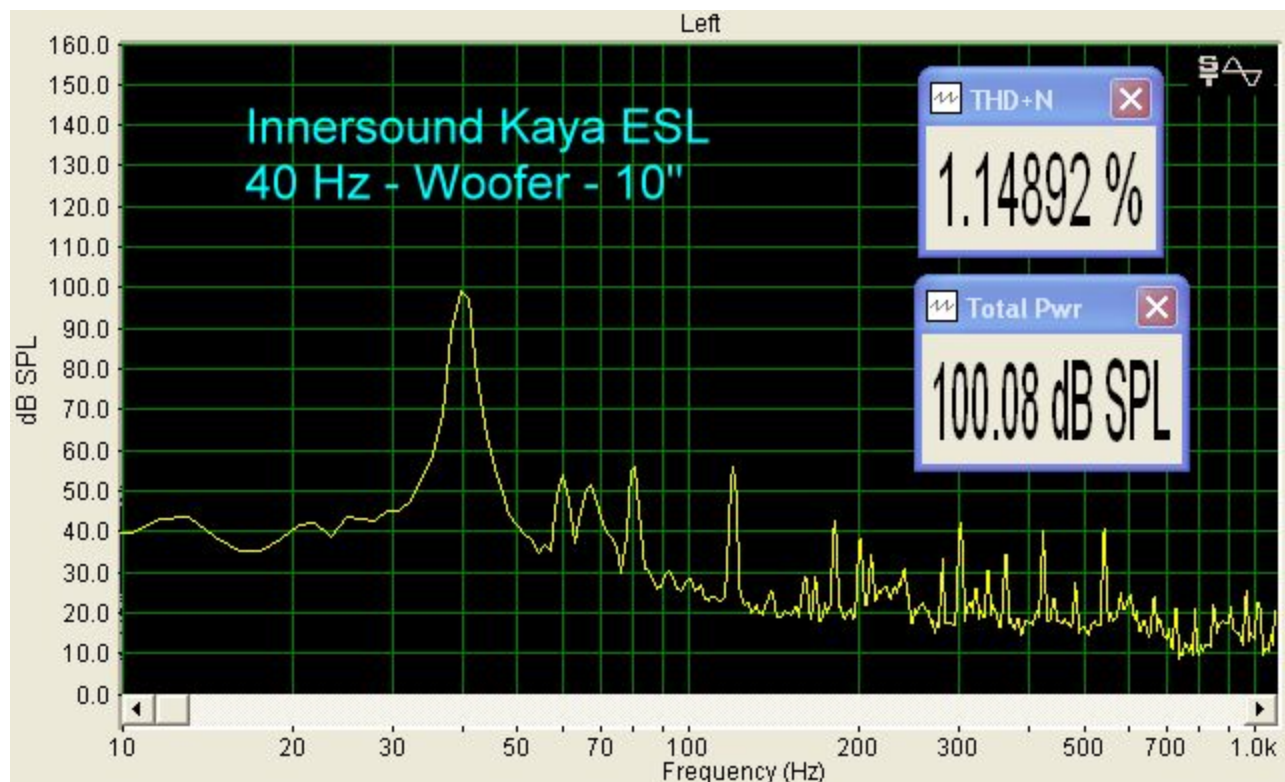
At 25 Hz, THD plummets to less than 4%.



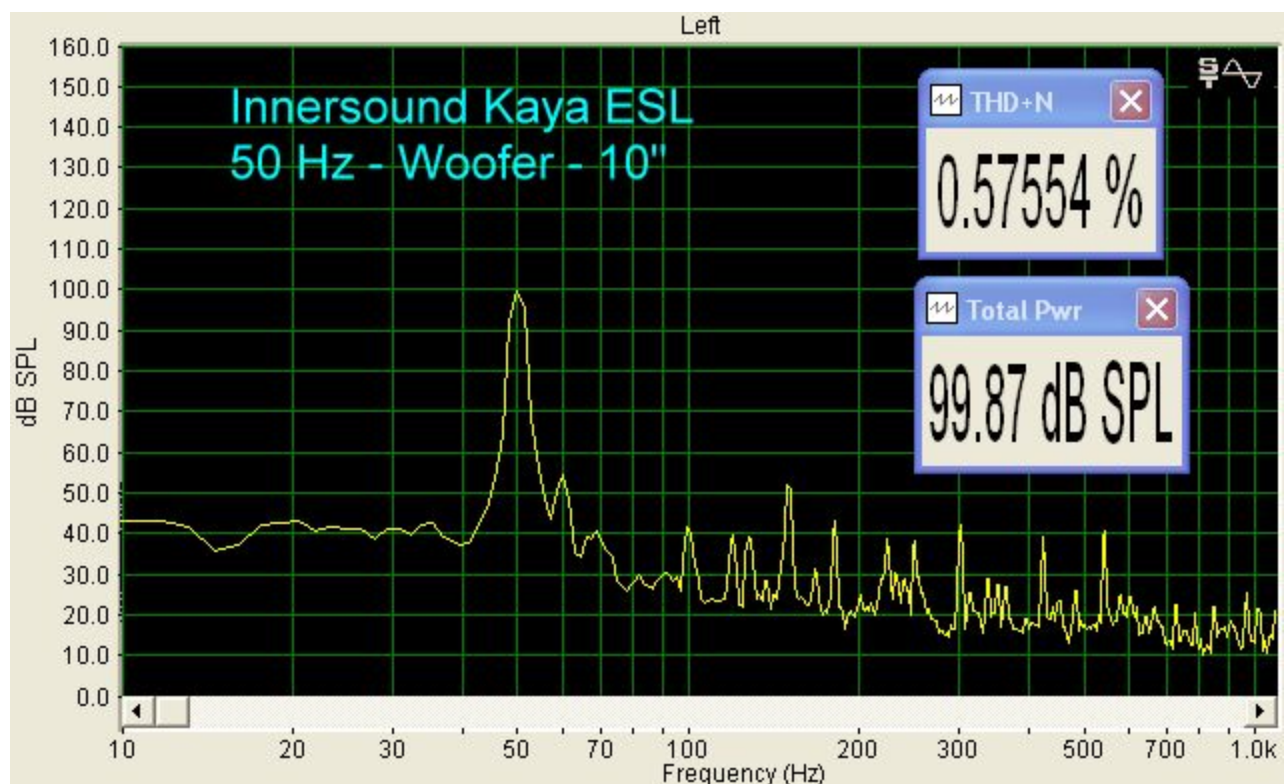
Only 1.6% THD was measured at 31.5 Hz. Very good.



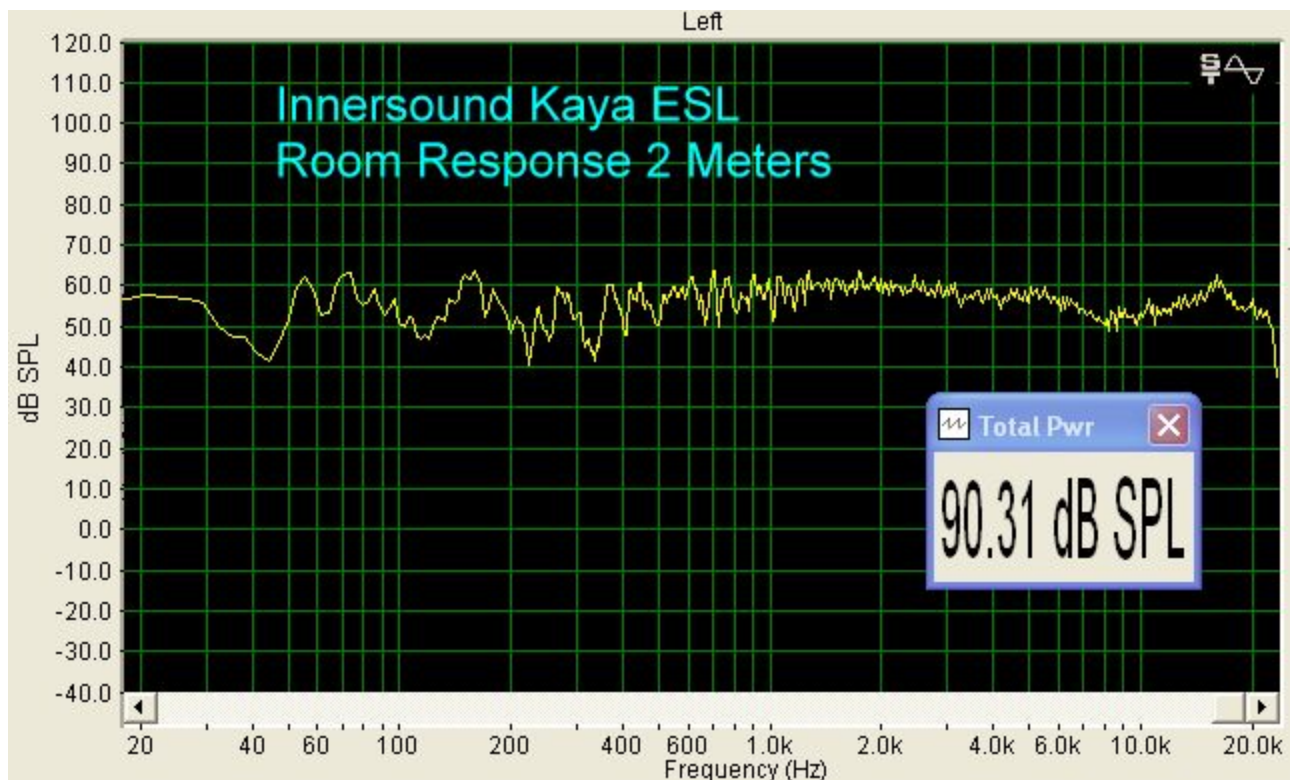
40 Hz only produced about 1% THD.



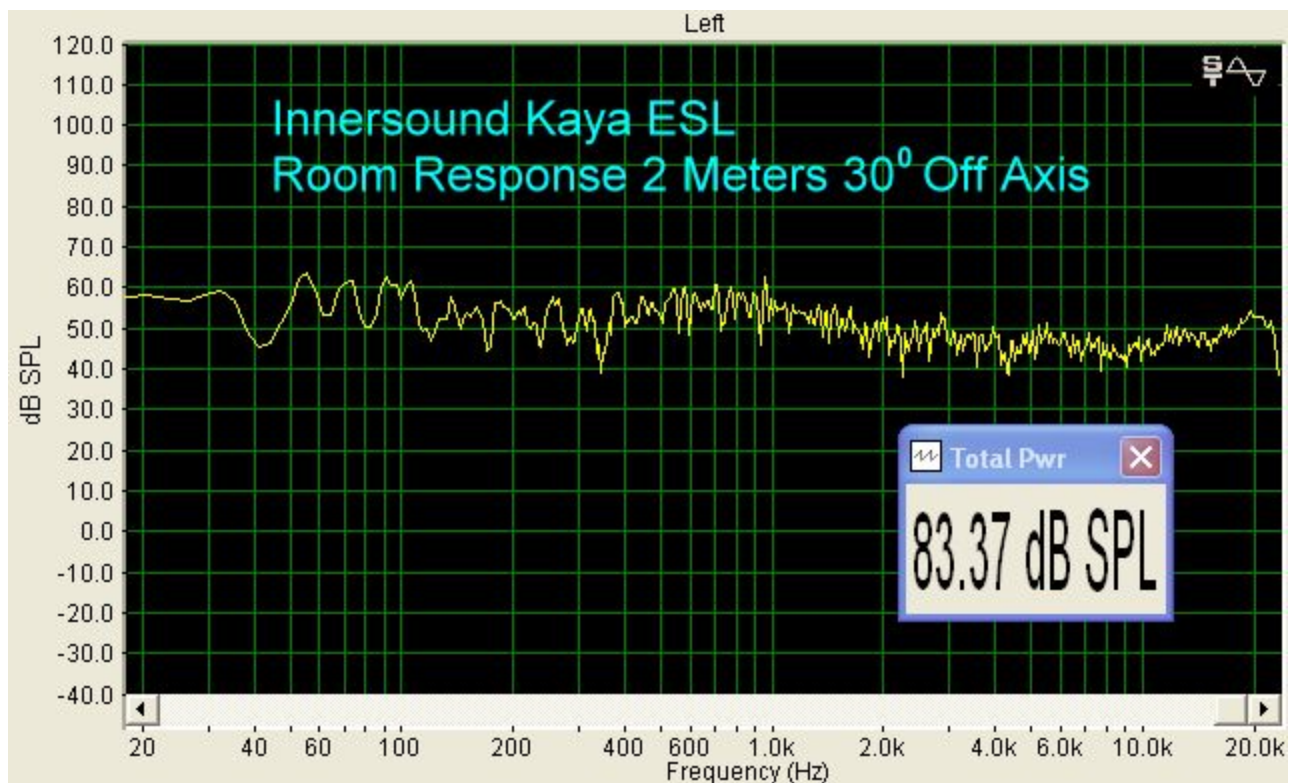
Less than 1% THD at 50 Hz and 100 dB.



Here is the room response for the Kaya, at 2 meters, on-axis. Note the high frequencies.

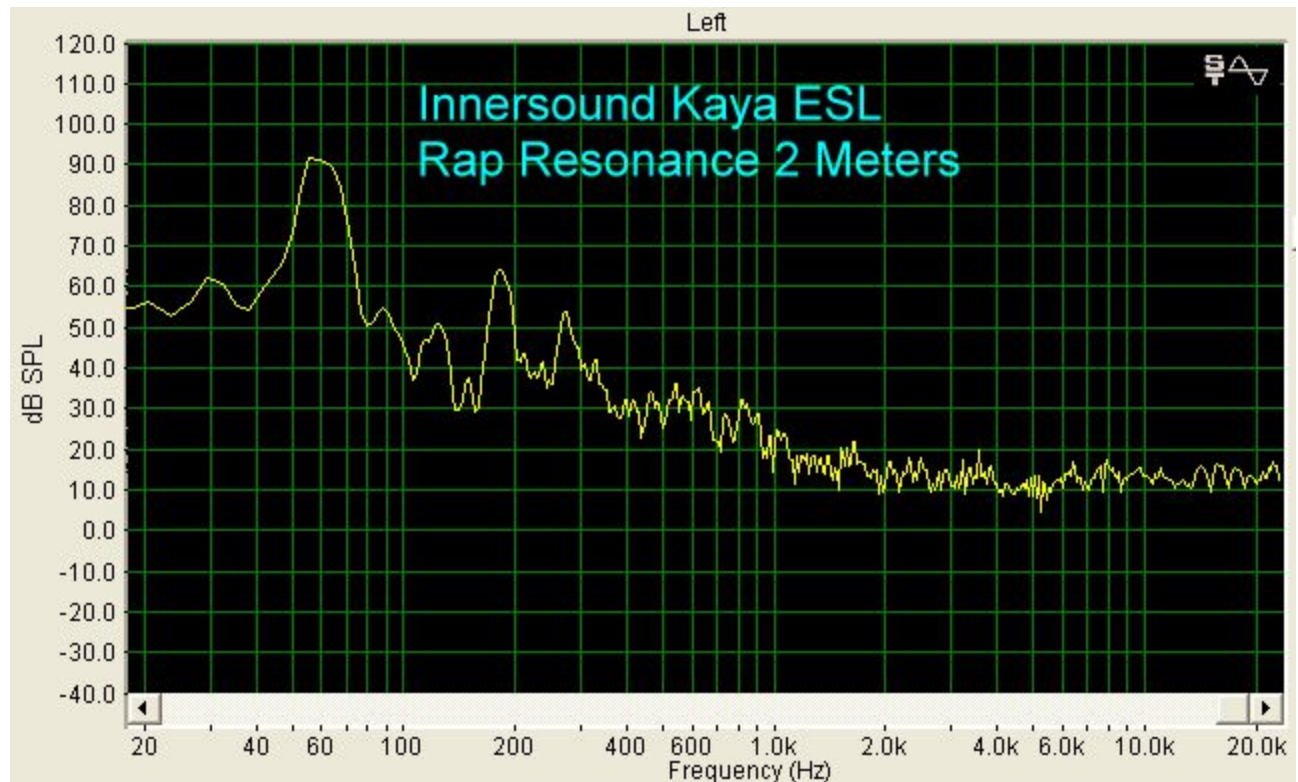


Now look at the room response, at 2 meters, but 300 off-axis. See how the high frequencies fall off in relation to the low frequencies. This is one of the problems with planar speakers. Aficionados of planar speakers just learn to live with this, and sit on-axis when doing critical listening.

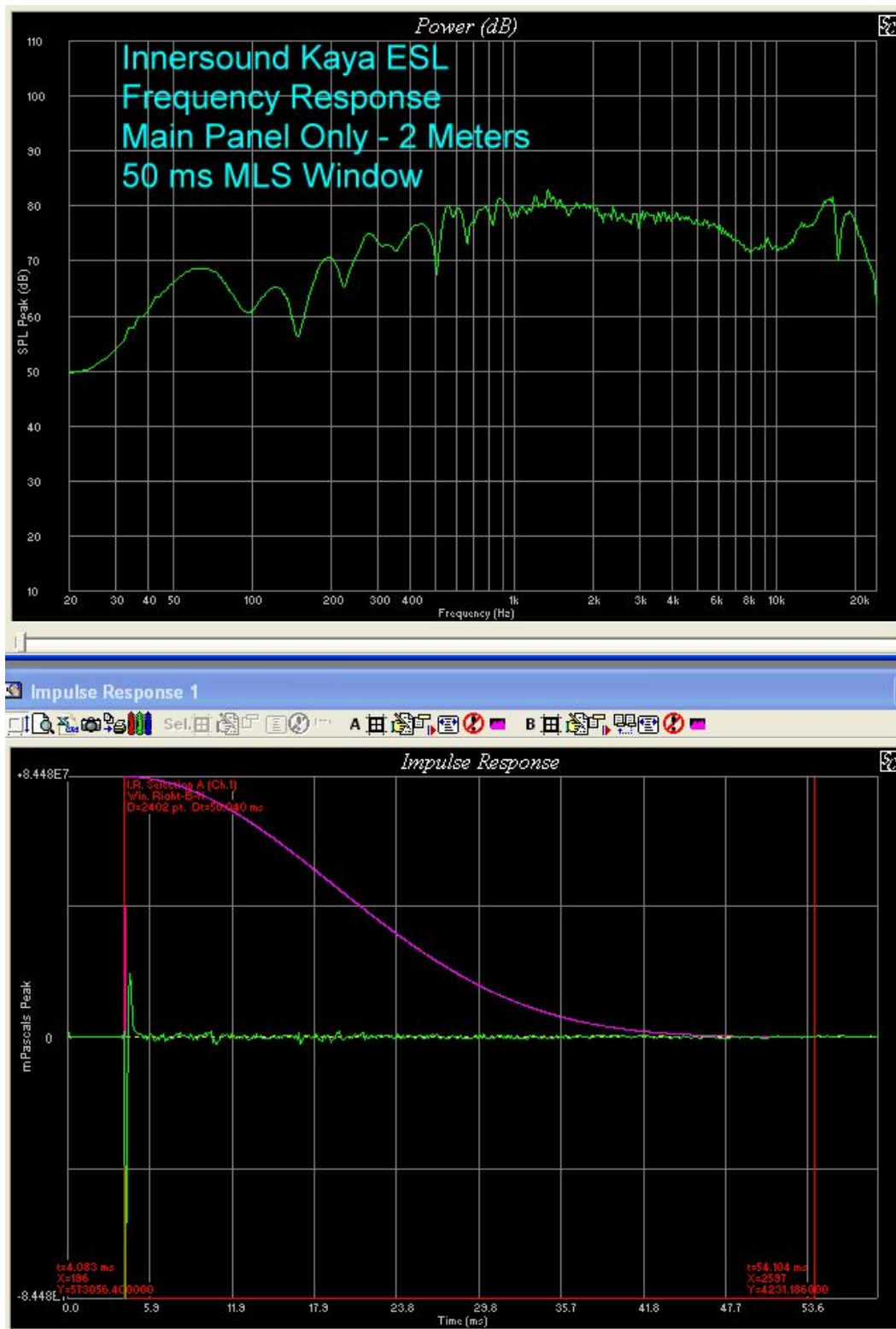


I did notice a significant amount of resonance when I rapped on the side panels near the main ESL panel. So, I measured the rap resonance. It has peaks at 60 Hz, 180 Hz, and 270 Hz. But, they did not show up in full spectrum white noise frequency response measurements to any significant degree.

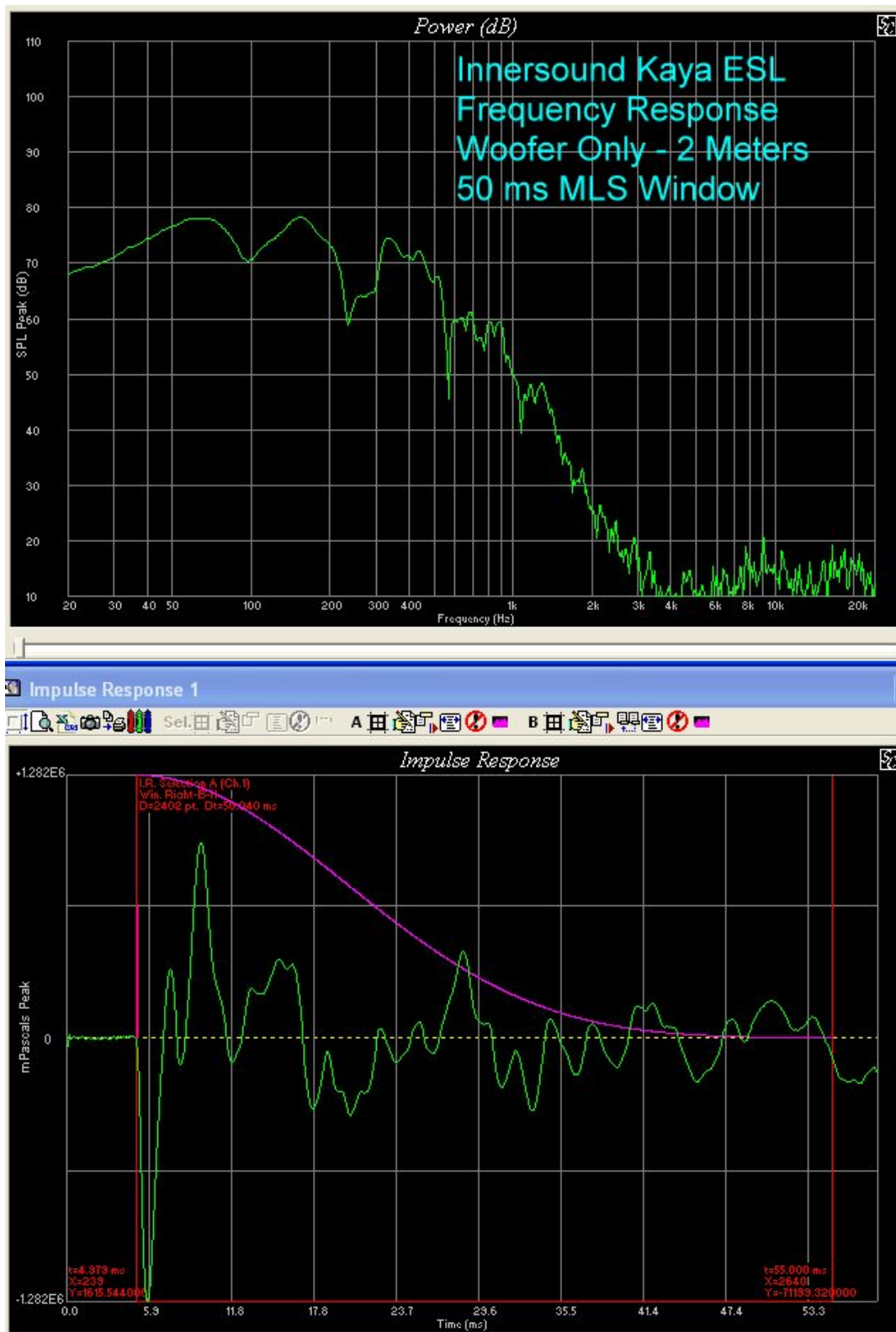
However, peaks for these resonance frequencies did show up in the woofer tests with single input frequencies (see above). In any case, I would suggest taming them with vibration damping pads (e.g., NAVCOM) mounted on the inside of the panels where they would not show, if the same color as the enclosure is used. I would probably also use a couple of small round dowels that would span across the panels, near the outer edges, attaching the panels together, damping their tendency to vibrate individually. (The reason the wood panels are there is to reduce the cancellation that occurs between the sound coming out the front and back of the ESL driver.)



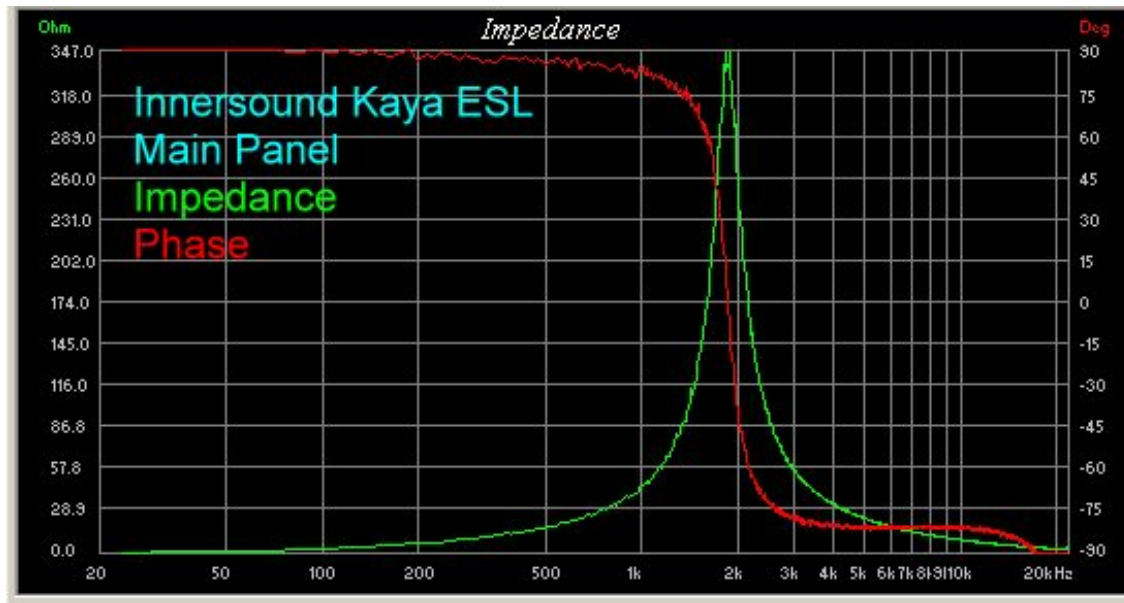
Here is the MLS quasi-anechoic response of the ESL panel. It falls off below 500 Hz.



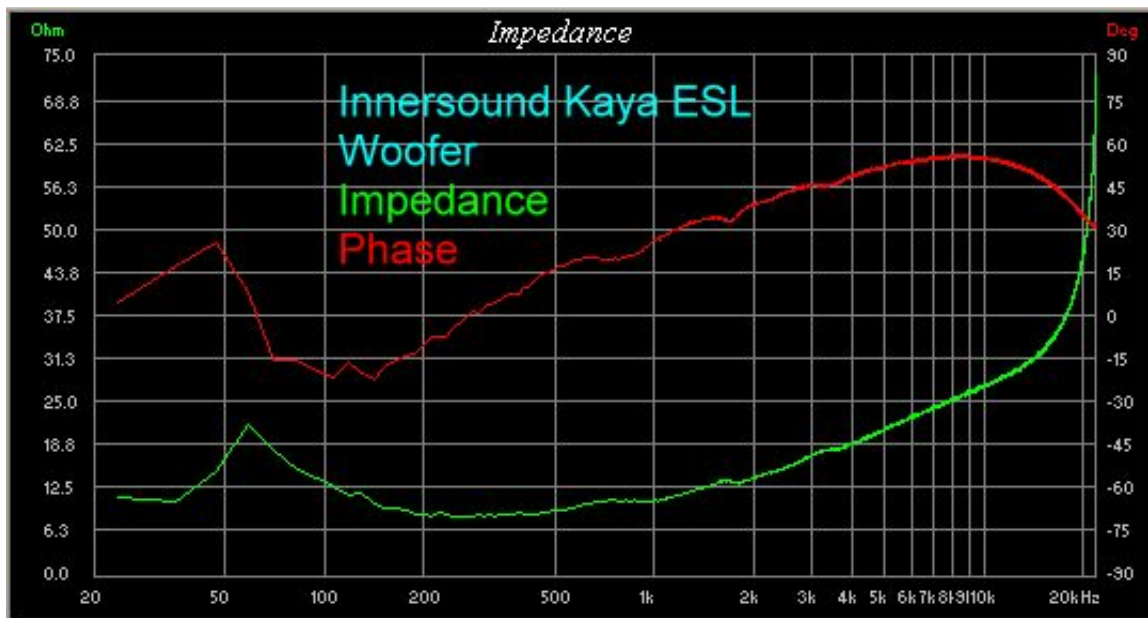
And, the MLS response of the woofer. It falls off above 500 Hz. The two drivers are well matched to one another.



The impedance and phase measurements for the ESL panel give unusual results, due to the presence of the transformer in the signal path. The peak in impedance at 1.8 kHz is the transformer inductance. The review unit was an early model, and the latest ones have the peak at 500 Hz. Capacitive reactance causes the electrical phase reversal at 1.8 kHz.



The impedance of the woofer averages about 8 Ohms in its useful frequency range. The phase stays within ± 300 in that range also.



The room response for the Tehya center channel speaker was about the same as the Kaya, perhaps even a little smoother.

