Orchard Audio Valencia Balanced Headphone Amplifier

By
Oliver A. Masciarotte

The Valencia balanced headphone power amplifier is available in anodized black or natural aluminum finishes, to match any preferred setup's aesthetic.

As the headphone market doesn't show any signs of a slowdown and enthusiasts continue to invest in ever more high-end products, Orchard Audio launched the Valencia, a Class AB, balanced headphone power amplifier. Leo Ayzenshtat, the mind behind all the brand's products, collaborated with experienced headphone reviewer Steven Ciofalo in this ultra-high-performance design.

Orchard Audio Valencia Balanced Headphone Amplifier
MSRP $1,999.95
Orchard Audio
Succasunna, NJ
www.orchardaudio.com

Orchard Audio has never been one to shy away from doing things a bit differently. Whereas most high-end audio manufacturers design as much for the eye as they do for the sound, Leo Ayzenshtat has always thought first of the reliability and value his products bring to the market. With casework best described as utilitarian, his designs surprise with fidelity well above what's expected considering their price point.

In maker circles, Orchard Audio is known for its GaN FET Class D amplifier and music streamer modules. Ayzenshtat doesn't worry about diluting his brand with DIY offerings, he's more driven by a desire to provide joy without needless cost. Back in 2017, Ayzenshtat partnered with Tommy O'Brien to field the CRISPIN, a 200W into 4Ω amplifier, which utilized Cherry Audio's Class D modules. That was before he explored to the fullest the merits of gallium nitride (GaN) semiconductors in a DC-coupled, fully balanced dual feedback loop system design in his Starkrimson line.

His latest, the Orchard Audio Valencia, is arguably unique: a fully balanced power amplifier built specifically for headphones. Valencia represents Orchard Audio's second collaboration, joining forces with popular jejune YouTuber Steven "ZeosPantera" Ciofalo of Z-Reviews [1]. (For those who don't spend time on YouTube and never heard of ZeosPantera, he is a reviewer that wears a camera on his head as he records the videos in real time, causing serious nausea after a few seconds. — Ed.)

The Design

As I mentioned, this is a power amp; no gain adjustment, one set of rear-mounted balanced inputs on XLR-3, and a balanced XLR-4 on the front as output (**Photo 1**). That XLR-4 is telling... there are no other headphone outs, no balanced 4.4mm Pentaconn available as seen on many portable Digital Audio Players (DAPs) and some headphone amps. Ayzenshtat told me that Pentaconns require a license from Sony, and "...(that) is not something I can take on as a small business. This is why each

Photo 1: With a balanced XLR-4 on the front as output, the review unit included an XLR-to-4.4mm adapter.

unit is supplied with an XLR-to-4.4mm adapter." My package included a FiiO-branded male XLR-to-Pentaconn female. There is a set of banana jacks that allow you to use Valencia as a low power amplifier for loudspeakers. "These can be used for high efficiency speakers (≥95dB/W), with Valencia driving 7W into an 8Ω load." When asked for details, Ayzenshtat told me via e-mail that the amp "...maintains the same pitch black background that headphones enjoy." He stressed that, "...these taps are active at the same time as the headphone jack so it is not recommended to use both simultaneously!" The speaker outs are no surprise, as Orchard Audio is known for its "regular" power amps. As ZeosPantera says, "You can take Leo away from speakers, but you can't take speakers away from Leo."

A fully balanced power amplifier from input to output, Valencia features independent linear power supplies for each channel. Ayzenshtat told me that his balanced approach lowers noise and distortion and brings along higher voltage swings for more power. "The design also minimizes noise and distortion through circuit path simplicity. This preserves the natural detail and nuance of your music." Unlike most hifi manufacturers, he provides detailed specifications on the product. Some highlights include 14dB of gain, an SNR of better than 134dB A-weighted, and output power of 17W into 32Ω complete the global picture.

"Everything is done with Burr-Brown op-amps. The input stage, providing ESD protection, uses op-amps as buffers with an input impedance of 44kΩ. There are ESD protection diodes on the inputs as well."

The gain stage uses a fully differential op-amp with a gain of 14dB (5x) and there is some filtering happening there as well. The output stage uses high current op-amps as buffers. Each output uses 12 op-amps in parallel. In total, there are 48 used for the output stages, with 24 per channel. "Paralleling op-amps like this also reduces noise. This was a big reason for using this many in parallel." Ayzenshtat provided a URL to an Analog Devices article by Kevin Scott that describes the technique quite nicely [2].

I have had some products in for review, a balanced "ferrous" HPA from Eastern Europe with matching external PSU being a prime example, where even though it spec'd well, it sounded sterile and totally boring. As my mastering colleague David Glasser calls that presentation, "Bleached." I asked how Ayzenshtat views the whole area of intangibles, citing the "If it measures well and sounds bad, then you're measuring the wrong things..." trope.

He told me he supports the idea that the "correct" parameters need to be measured. "While I provide a lot of the standard measurements on my website, there are other measurements which affect sound quality, which I also perform and keep proprietary." As to voicing, he was emphatic. "My products have no voicing. All product design is based strictly on objective results." He confided that, "The output stages dictate the performance the most... All of the op-amps I chose are what I believe to be the best for this application outside of using something discrete." Yes, he could use a discrete design for the op-amp subsections, even specialized versions from Sparkos or another manufacturer who make "...extremely high-performance discrete op-amps, but the price goes up significantly."

Photo 2: Valencia is intended as an ultra-high-performance design, able to drive the most demanding headphones while remaining clean enough to support highly sensitive ones.

The Listening

I started my listening with two circumaurals and two reference cables (**Photo 2**). The good folks at Apos sent me their XLR-4-equipped, balanced Apos x Z Reviews Magia cable, a purpose-built match to the Valencia. I also pressed into service my Hart Audio Cables CST-HC-10-5ft with Multi-kit 1. Using two different approaches to materials, the thin, pearlescent Hart Audio incorporates eight core, silver-plated copper for an equivalent thickness of 22 AWG, whereas the purple Apos weaves 152 strands of OCC 6N copper conductors in a 25 AWG equivalent.

As to cans, I chose two of my references, Audeze's current gen LCD-3, and Meze's OG Empyrean. Since the Valencia is all about cleanliness, I plugged in the Hart Audio wires and spent weeks listening while working. For a source, I first used Orchard's own $1500 PecanPi+ streamer connected balanced with Soundstring GEN II Beta 2-22S cables. This Orchard Audio stack on my desk consistently delivered engaging and unbiased sound, regardless of genre or sample rate. Crappy recordings were exposed with all their shortcomings clearly audible, while higher fidelity works shone with all their depth, breadth, and transient response laid out for my personal entertainment and edification. Although this

Photo 3: The modern, sandblasted aluminum chassis and unique angled fascia blend in with other high-end desktop gear or the Orchard Audio PecanPi+ Streamer.

is no knock on the PecanPi+, which is outstanding in its class, its headphone output was understandably less refined, more cluttered, and narrower than the Valencia.

As I write this, I'm listening to a 192kHz/24-bit tape transfer of Blue Train [Blue Train: The Complete Masters - Qobuz, Blue Note Records], John Coltrane's 1957 recording, with the legendary and famously secretive Rudy Van Gelder manning the knobs and Michael Cuscuna guiding the proceedings. Through the Valencia, the soundstage was wide and enveloping, and the timbre of each contributor spot on. I could tease Van Gelder's precious EMT hollow-state plate reverb returns from the natural room tone, just what I would expect from a colorless, high-performance headphone amp and wiring. Swapping out the Apos cable for the Hart, the

Photo 4: From Succasunna, NJ, Orchard Audio is a boutique audio company recognized mainly by the popular Starkrimson Class-D GaN-based amplifiers, all meticulously handcrafted in the United States. The Valencia adds a headphone amplifier to meet the needs of music lovers and personal audio enthusiasts.

About the Authors

Oliver A. Masciarotte has spent more than 40 years immersed in the tech space, working on manufacturing, marketing, and product development for many pro and CE audio manufacturers including dbx, a/d/s, Lexicon, Sonic Solutions, and Minnetonka Audio. His client roster is as diverse as Apple, Harper Collins, NASA Johnson, NPR, and Universal. His writings include a book covering file–based music for the home and more than 100 articles for sundry trade publications. A member of the Audio Engineering Society (AES), Society of Motion Picture and Television Engineers (SMPTE), Project Management Institute (PMI), and Digital Cinema Society (DCS), he is currently co–founder and CMO of MAAT Inc., a digital audio software manufacturer.

Stuart Yaniger has been designing and building audio equipment for nearly half a century, and is currently a professor at Alfred University in western New York. His professional research interests span quantum mechanics, glass and ceramics, electronics, chemistry, spectroscopy, and sensory science. One day, he will figure out what he would like to be when he grows up.

Magia added a touch of midband and low-frequency richness, bringing everyone forward while de-emphasizing the top end. With a lesser amplifier, that simple conductor swap would not have been audible. As I always say, when it comes to very high fidelity, everything matters!

Moving from the analytical to the sensual, I traded the Audezes for the Mezes. The Empyrean is voiced more toward the romantic than rigorous and, as expected, delivered a larger-than-life portrait of the players while still surrendering nothing in the detail and low level texture departments. The lovely Apos x Z Reviews Magia was the magic combo for those who simply want to vibe with their music, while the Empyrean + Hart Audio combo brought forth a big, lush sound that any tweakophile worth their salt would love.

Let's talk a moment about Orchard Audio's "timeless design," characterized by the manufacturer as sleek and modern. I would say it leaned more toward "Plain Jane" but cosmetics are not the point here. The chassis is sandblasted and anodized aluminum, available in a natural silvery finish or the Goth's preferred choice of basic black (**Photo 3**). In keeping with Ayzenshtat's vision, all fasteners are on display, and the angled front fascia carries only a backlit standby switch and the output jack. There is a power switch on the back next to the IEC AC inlet, my review sample came with a beefy but flexible, high-quality 14 gauge power cord. Hard rubber feet elevate the unit; I didn't try any of my fancy footer isolation products as that's outside the cost-most-definitely-an-object remit.

One last set of tests were in order, swapping out the Volumio-powered PecanPi+ for my current streaming hero, Wattson Audio's wonderful Madison LE. At $4,995, the little Swiss Madison LE is more than twice the price of the PecanPi+ but, boy howdy, it is one diminutive and sweet sounding piece. With the Madison LE driving the Valencia and, in turn, the Valencia driving the Empyrean via the Magia cabling, I was experiencing the finest headphone playback I have been privileged to enjoy in my home. Effortless and expansive; accurate and lush when the recording dictates while revealing any deficiencies in the stream when it's present. I can't wait to upgrade my IP path to maybe squeeze a touch more performance, knowing that the Valencia will convey any tiny audible upgrades.

Last but not least, I wanted to press the plucky Val into service driving speakers. Unfortunately, the most efficient ones I had in-house was Vienna Acoustic's wonderful little two-way, the stand-mounted Haydn SE Signature. At 88.5dB sensitivity, they weren't even in the same zip code as what Ayzenshtat recommended but, hey, I thought I'd try. With classical, a.k.a wide dynamic range content, in truth there just wasn't enough oomph available. However, with a variety of dynamically compressed popular music, I easily measured 85dB SPL A-weighted at my 7' listening position. I could get it uncomfortably loud if I got near maxing out the Madison LE's gain. Playing bass-heavy pop super loud, Angel from Massive Attack's 1997 release Mezzanine, I did get the amp to drop into protection mode until I reduced the gain. It recovered automatically and started playing again once I'd removed the threat.

I have to say that the Valencia is a brawny, cleverly architected and exceptional sounding piece (**Photo 4**). I do have one complaint,

and it's that the front panel power switch is aggressively illuminated. It's too bright by far if its only job is to indicate that the unit is powered. Notching up the resistor value would be appreciated. Speaking of too powerful, I also had one wish and that's to include user adjustable pre-gain control of some kind. In the current race for CE output to be ever louder, rear or bottom-accessible jumpers or switches to reduce the gain or pad the input would be nice.

Overall Conclusion

My notes kept coming back to one perceived aspect of the Valencia: "resolution." Clarity, definition, those carefully noticed minutiae that elevate a playback system. Whatever works in your frame of reference, that's what I was enjoying.

While in college, Ayzenshtat double majored in Electrical and Computer Engineering. In a 2025 Q&A session, the interviewer stated that, "One of your goals has been to make high-end audio more accessible to enthusiasts who don't have unlimited budgets. How do you balance affordability with performance in your designs?" Ayzenshtat mentioned that he started his company because he wanted to bring high-fidelity sound to more people—not just those with the largest budgets. He does that by making smart trade-offs without sacrificing sonic quality. He explained, "I carefully select components, optimize circuitry for efficiency, and avoid unnecessary premium branding costs that don't contribute to actual performance. My goal is simple: whether you're a seasoned audiophile or just starting your journey, you should be able to experience outstanding audio without feeling priced out of the market." Delivering exceptional sound quality at a very reasonable $1999.95, I have to say that he's nailed it. ⓐ🅧

References

[1] ZeosPantera, https://www.youtube.com/@ZE0SPantera

[2] K. Scott, "Paralleling Amplifiers Improves Signal-to-Noise Performance," Analog Devices, July 9, 2015, https://www.analog.com/en/resources/technical-articles/paralleling-amplifiers-improves-signal-to-noise-performance.html

The Valencia Headphone Amplifier Measurements

By
Stuart Yaniger

Unpacking the Orchard Valencia, I was impressed with the construction and solidity. And (subjectively), it's an attractive package. After having had several Orchard products on my bench over the years, I had high expectations—they all perform extremely well, offer no surprises in the negative sense, and are absolutely self-effacing, just doing exactly what they're supposed to do.

I first gave a quick listen through my headphones (1MORE Over-Ear Triple Driver) and a pair of desktop speakers to make sure that things were all functioning properly, and indeed, all was well. I noted that without music playing, the headphones were absolutely silent, with no trace of hiss or buzz from the amp. So with that verified, the Valencia went onto the test bench for measurements.

The Valencia design features a fully balanced power amplifier from input to output, featuring independent linear power supplies for each channel. The design also minimizes noise and distortion through circuit path simplicity in an effort to preserve the natural detail and nuance of music.

Test Setup

As usual, the test gear included an Audio Precision APx525 audio analyzer, a Vicnic low distortion oscillator with various notch filters, a Hewlett-Packard digital multimeter, and 16R, 64R, and 300R test loads constructed from non-inductive wirewound resistors. After confirming that the banana jack outputs were identical to the headphone connectors on the front panel, all measurements were done with the analyzer's inputs connected to the banana plugs at the amplifier end to minimize error from the resistance of the cabling to the dummy loads. The analyzer output was connected to the balanced input of the Valencia via Audio Precision's XLR cables.

Measurements

Perhaps the most important characteristic of a headphone amplifier compared to a speaker amp is noise; the sensitivity of headphones and the proximity to one's ears make this a very critical measurement. I was able to confirm the voltage gain specification of 14dB, with less than 0.05dB variation between channels. Input impedance also matched specification at 44kΩ. Source impedance was below my measurement limit of 20mΩ across the entire 20Hz to 20kHz audio bandwidth.

I started my more detailed measurements with noise spectra, taken with a no-signal input with a 50R source resistance. **Figure 1** shows a wideband noise spectrum—for the usual Class D products sold by Orchard, there's ultrasonic switching noise

from the carrier, but its absence here confirms that the current buffers used in this design are linear. The worst ultrasonic spur was at about 540kHz and was under -108dBV (about 4µV).

Looking at noise in the audio band, using the same test setup, the results in **Figure 2** were obtained. With one exception, all noise spikes were under -140dBV (0.1µV), which is extremely good. The exception was a small spike at 1kHz, which I believe to be a measurement artifact corresponding to the USB frame rate of the audio analyzer to computer connection. Even so, at -137dBV, it's nothing close to audible even if it were actual noise.

One main feature of the Valencia is its ability to drive a variety of loads with high power. **Figure 3** shows the drive capabilities into loads of 16R, 64R, and 300R, spanning the likely use-cases. At 16R, the current gives out first, but not until the output voltage reaches nearly 16VRMS at 1% THD. For the higher loads (64R and 300R), the limitation is voltage, which is a hefty 23VRMS before the distortion hits 1%. This is exceptional drive capability for a headphone amp, and it certainly more than adequate to drive higher impedance speakers to a healthy level.

The harmonic distortion profile is also textbook good. **Figure 4** shows the spectrum of a 1kHz tone at 10W into a 16R load. The harmonics hug the residual levels of the AP analyzer and decrease monotonically with order. The highest level ones are ridiculously lower than any possible audible threshold. At higher load impedances, one would expect the distortion to decrease, but since even with a 16R load the distortion is already close to measurement residual, I did not repeat the measurements with gentler loads.

Intermodulation distortion (IMD) tends to be more audible than simple harmonic distortion. **Figures 5–7** show the IMD spectra at 16R, 64R, and 300R loads, respectively. These measurements were done with a pair of tones at 19/20kHz and +8dBV (2.5V) level, a rather severe test; since each of the two tones is at 8dBV, the overall applied power is doubled. Worst case is -120dB for the 1kHz intermodulation product with a 16R load, and the results at higher load impedances hugging nearly -125dB to -130dB. The sideband products are similarly low. This is a superb result.

Of course, getting distortion low in the midrange does not mean that it is similarly low at other frequencies. Very commonly, distortion rises in the bass and treble ends of the spectrum. The

Figure 1: The wideband noise spectrum of the Orchard Valencia is admirably clean, with all ultrasonic spurs at microvolt and lower levels.
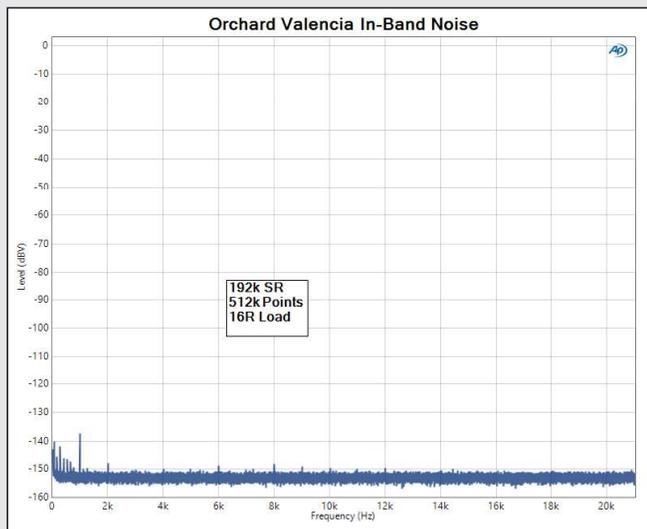

Figure 2: In the audio band, the noise peaks from the Valencia are in the nanovolt range. The spur at 1kHz is likely a measurement artifact from the USB connection.
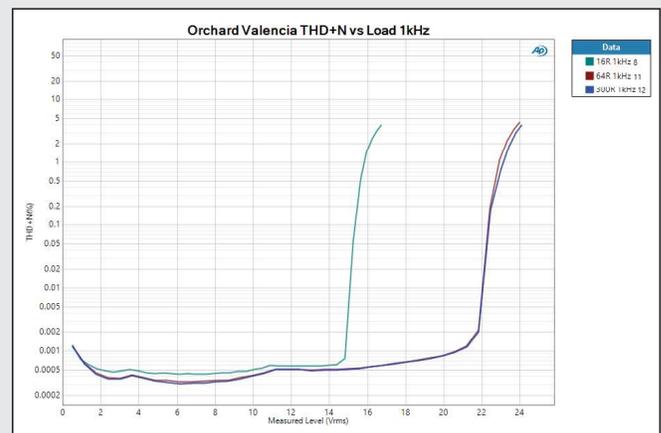

Figure 3: The power capabilities of the Valencia are good enough to drive loudspeakers as well as the intended use for headphones.
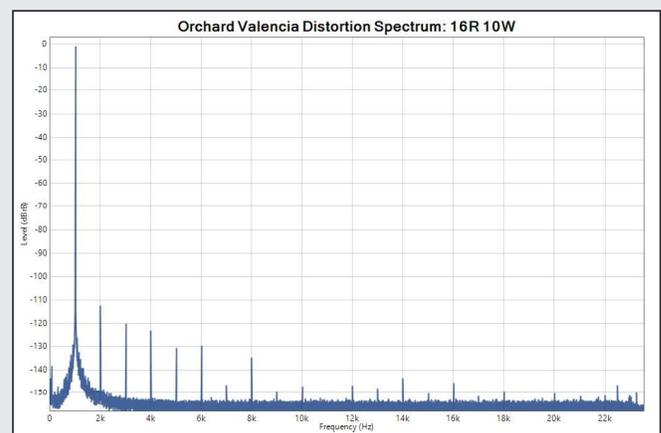

Figure 4: The distortion spectrum of a 1kHz sine wave at 10 watts into 16R approaches the test instrument residual.

latter is usually due to falling open-loop gain-reducing feedback in the top octave or two. **Figure 8** shows distortion versus power with a 16R load taken at midband, 20Hz, and 10kHz.
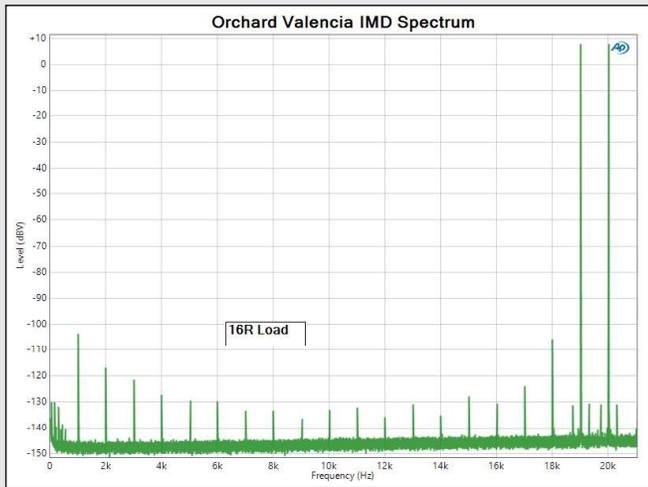

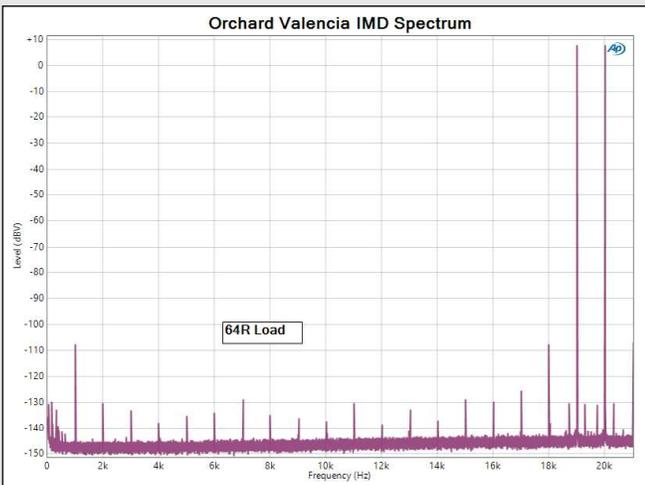Figure 5: The intermodulation distortion with two 2.5V signals is better than -120dB with a 16R load.

Figure 6: With the same test as shown in Figure 5 and a 64R load, IMD is better than -125dB.
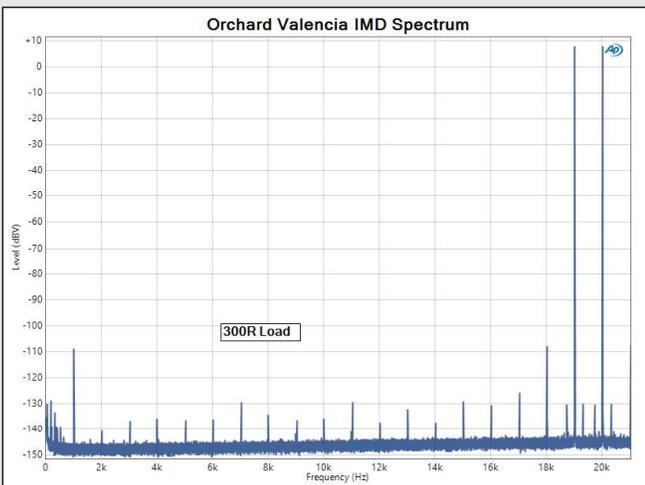

Figure 7: With the same test as shown in Figure 5 and a 300R load, IMD is better than -130dB.

The distortion at each frequency tracks closely up to the power limits of 14W to 15W. The departure of the 10kHz curve from the other two is an artifact of the 48k sample rate used in the measurement, which excludes third and higher order harmonics due to Shannon-Nyquist.

Bringing the point home further, **Figure 9** shows THD+N versus frequency at 10W into the same 16R load, taken at two sample rates (and thus measurement bandwidths). The lower curve, taken at a 48k sample rate (22k measurement bandwidth), shows very low distortion and noise at low frequencies and midband, with a very small rise in the top octave. Nonetheless, it remains well below 0.001%. The upper curve, taken at a 192k sample rate (90k measurement bandwidth), is noise dominated, but shows that the top octave still has extremely low distortion.

Conclusion

As expected, the Orchard Valencia turned in a superb set of measurements, reflecting careful engineering and impeccable execution of the circuit. In use, it should be absolutely neutral and transparent, and it can drive nearly any imaginable headphone load to ridiculously high levels. 🅰️🅡
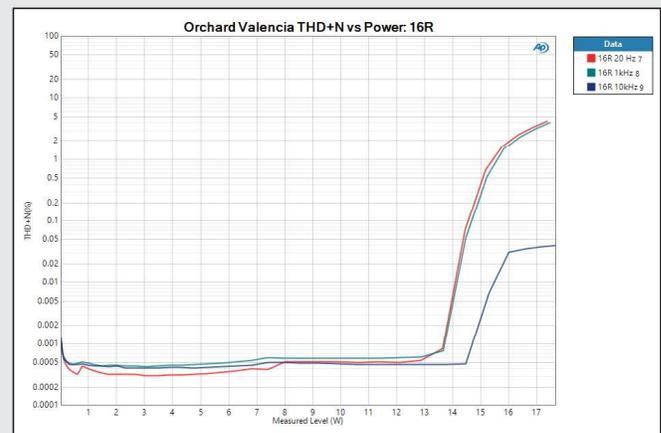

Figure 8: Distortion at bass, midrange, and treble versus power with a 16R load track closely at about 0.0005%.
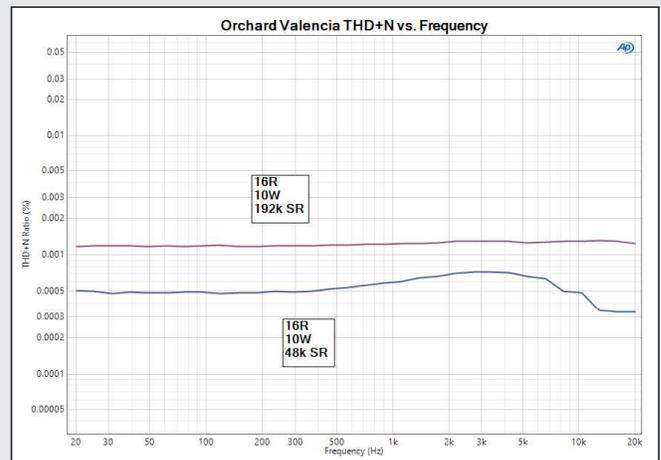

Figure 9: Distortion versus frequency traces at 48k sampling show a very moderate rise at high frequencies. The 192k sample rate curves are noise limited and remain below 0.0012%.