BRYSTON 14B³ POWER AMPLIFIER

Canada's Bryston Ltd. has been designing nigh-unbreakable amplification for a number of decades. Such is the reliability rep built by the company that many recording and broadcast studios around the world have adopted its products—Bryston's stable now includes a full suite of electronics and, more recently, a selection of high quality speaker systems and a turntable. The company confidently offers an industry-leading 20-year warranty on its amplifiers, and the new 'Cubed' series amplification certainly oozes longevity from the extraordinary build quality on display—the handcrafted 14B³ on review here is built like a tank, and weighs in at a chiropractor-friendly 42kg.

THE EQUIPMENT

Bryston amplifiers have traditionally been rather conservatively styled. The new Cubed amps may not send industrial design fashionistas agape, but there are noticeable aesthetic improvements over the previous 'Squared' generation that give them a more attractive presence. The amplifiers now feature a central plate attached to the thick aluminium fascia, with suitable three-dimensionality provided by a rounded trench-cut and deep etchings for company logo and model number, and the fascia is nicely machined to a curved chamfer edge.

The 14B³ is Bryston's top-of-the-line stereo offering, while the 28B3 monos are the flagships of the company's fleet of amplifiers, all of which are available with either black or natural aluminium high-quality front fascias in 17-inch or 19-inch widths, with front handles on the 19-incher (all models have handy rear handles to help with lifting them).

For this new 'Cubed' series, Bryston's Chief Engineer Christopher Russell teamed up with amplifier designer Dr Ioan Alexandru Salomie, jointly developing improvements over the previous generation just prior to Salomie's tragic death from a brain tumour at age 48. Circuit refinements are claimed to provide lower distortion in the input stages, increased overall bandwidth, reduced EMI and RFI noise, and improved overall CMR (Common Mode Rejection). These substantial improvements have real potential for elevated sonics. Oh, and a side bonus is a reduction in standby power, now down to 500mW.

The Bryston 14B³ is specified as offering 600-watts RMS into 8Ω and 900-watts into 4Ω, with a very low THD (Total Harmonic Distortion) of 0.005 per cent from 20Hz to 20kHz at full power (no 1kHz measurement at half power here). The solid power supply features twin 850VA transformers supported by banks of 88,000µF of capacitance per channel (total 176,000µF). There are 32 high-current bipolar devices (16 per channel) in the output stages, with each being rated at 16-amps. The power supply is not a limitation with the 14B³; this amp will drive anything both in terms of power and current. The damping factor is specced at 500, promising good speaker cone control.

> *The Bryston 14B³ lapped up the challenge, delivering tremendous control, power, and incredible detail.*

The real panel has a switch that allows you to choose between two different gain settings (23dB or 29dB) to allow wider compatibility with preamplifiers of varying voltage sensitivity—the 23dB gain setting will be ideal with the largest proportion of high-gain preamps. A 12V terminal allows for either remote or local turn-on options via a small switch, and there's a mains circuit-breaker switch at the rear, with the on/standby button located on the front panel. Input connectivity is via your choice of either single-ended (via RCA sockets) or balanced (via XLR sockets) inputs, and while the speaker posts are of high quality, are well-insulated and accept both banana plugs and spade connectors, they can only be accessed from above (there is no opening at the bottom of the plastic post insulator), which I personally found to be both impractical and unsightly.

IN USE AND LISTENING SESSIONS

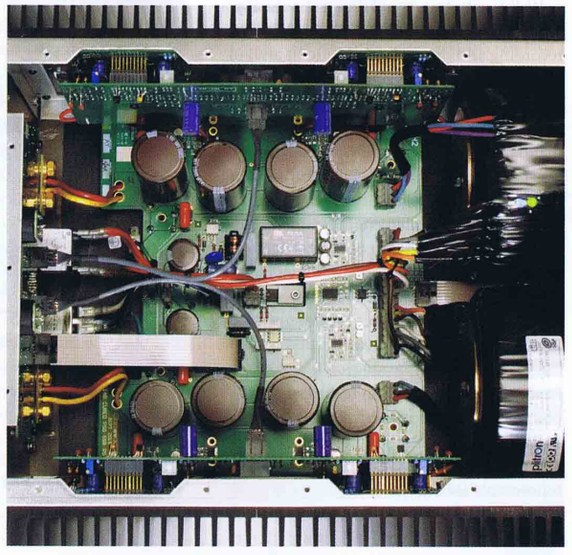
Given that my fairly demanding speakers have a very low impedance and high phase angle in the frequency region between 80Hz and 120Hz (and are fairly demanding in the octave below as well), this was a sensible place to start in order to test the control the 14B³ can exert over difficult-to-drive loudspeakers. One of the torture tests in this respect I like to use is the soundtrack from 'American Beauty'. The title track features a swelling subterranean bass that ebbs and flows across other musical textures. The 14B³ lapped up the challenge, delivering tremendous control, power, and incredible detail. The leading edge of each bass note was highly defined, while the notes in sequence properly exhibited a forceful tightness. It proved unshakeable in the toughest tests it was subjected to, such as the Blade Runner soundtrack, Sergio Leone from Jackson Browne's 'The Naked Ride Home', and many more. Not a bead of sweat…

At the other end of the scale, the highs are pristine in terms of tonal colour, while being a tad laid back. Cymbals and bells, for example, are beautifully rendered with fine detail and air, while being somewhat layered back into the soundstage/mix—this also equating to an impressively deep soundstage. And if your metal tweeter is on the bright side the 14B³ will tame it somewhat and still preserve high frequency detail.

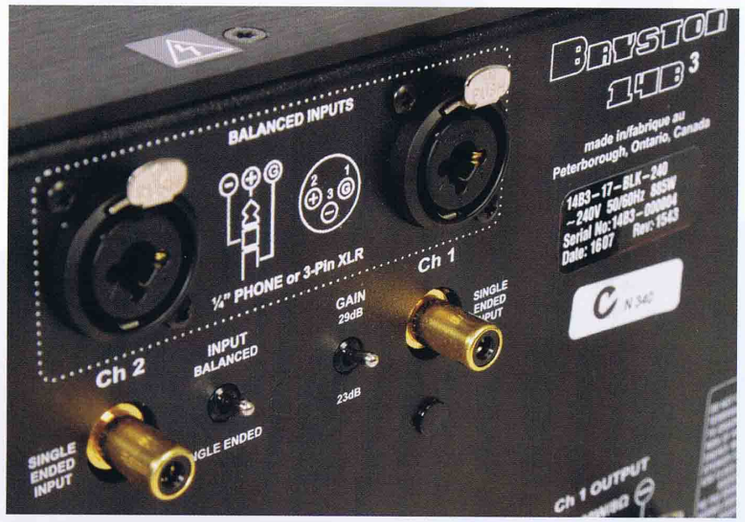
Conversely, the midrange spectrum is subtly forward and ever-so-slightly brilliant, providing oodles of detail and scalpel-like instrumental separation. This last trait is most evident with female vocals, as with Tracy Chapman's *Give Me One Reason* from her 'New Beginnings' album or Patti Larkin's *Helen* from 'Angels Running'—both singers are projected somewhat forward of the speaker plane.

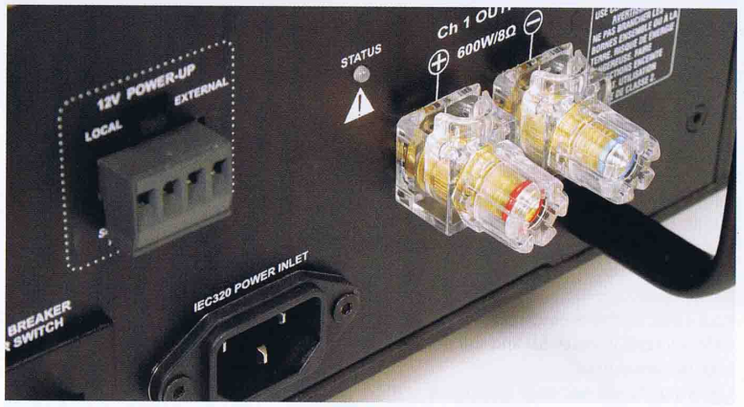
The two recordings mentioned in the previous paragraph are superb productions, but the Bryston will not lie about any that are less well-recorded—expose it to deficiency, be it from mediocrity in componentry or in recording—and the sonics will reflect those poor decisions from designer or audio engineer… and that's exactly what any accurate amplifier should do. Should you want colourations, feel free to add them at either source or preamplifier stages… the amp should tell the truth.

The Russell/Salomie circuit redesign has certainly lived up to the claim in terms of noise and distortion reduction. I equate those as having an influence on the background levels of self-noise, and this is where the 14B³ displays an extremely quiet 'black' background. Such silence allows very good low-level and micro-dynamic information to be relayed unpolluted by circuit noise. This is also helpful in allowing the superb level of frequency-wide detail and instrumental separation the amplifier is generously capable of. And it's not just in the low-level stuff either—the Bryston amplifier is a bit of a dynamic weapon, along similar levels as other very expensive amplifiers that have graced this reviewer's listening room.



The two channels of the 14B³ are essentially monoblocs: they don't even share a power transformer. So in practise the maximum output power of the Bryston 14B³ will depend on how far your home is from the nearest electricity substation and your own home's 240V circuitry. So if you end up buying a 14B³, I'd certainly recommend you consider having an electrician install a dedicated 20-amp circuit specifically for it.





CONCLUSION

What should be expected of a high-power solid-state amplifier?

Well for starters, you'd demand accuracy and faithfulness of reproduction in both the recording and the sonic signature (if any) of the preceding componentry. Plus total control of whatever speakers are being driven, excellent tonality and timbral balance—all mandatory. And of course, wide electrical compatibility with preamplification, teamed with unbreakable reliability via the application of highly-skilled engineering. Knead the above with a sprinkle of styling flair and a squeeze of solid casework—and you have a magnificent blend, right there, all ingredients fused, in the essence of the superb Bryston 14B³... *Edgar Kramer*

Readers interested in a full technical appraisal of the performance of the Bryston 14B3 Power Amplifier should continue on and read the LABORATORY REPORT that follows this review.

BRYSTON 14B³ POWER AMPLIFIER

Brand: Bryston
Model: 14B³
Category: Stereo Power Amplifier
RRP: $13,999
Warranty: Twenty Years
Distributor: BusiSoft AV Pty Ltd
Address: Suite 4, 792–796 High Street Kew East VIC 3102
TF: 1300 888 602
T2: (03) 9810 2900
E: info@busisoft.com.au
W: www.busisoft.com.au

Sonic accuracy
Power, power, power
20-year warranty

Size & weight
Speaker terminals

LABORATORY TEST REPORT

Newport Test Labs measured the power output of Bryston 14B3 as being 685-watts per channel, single-channel driven into 8Ω right across the audio frequency band, from 20Hz to 20kHz. This initially seemed at odds with the hand-written test results supplied with the amplifier (each 14B³ is individually tested by Bryston prior to shipping and the test results are included with the amplifier), which had Bryston measuring it at 675-watts, until we realised that Bryston's measurement was taken with the amplifier connected to 110V/60Hz mains power, whereas *Newport Test Labs*, being based in Australia, was measuring using 240V/50Hz mains power. Other factors could be involved ('eyeballing' the onset of waveform clipping on an oscilloscope, which denotes maximum output has been reached, is influenced by the person doing the eyeballing, and you certainly can't use clipping indicators on the front panel of the 14B³ to determine the onset of clipping, because they don't start shining until after the amplifier is into hard clipping, with definite 'flats' across the tops and bottoms of the otherwise-sinusoidal test waveform.)

However, when it came to measuring the output of the Bryston 14B³ with both channels driven into 8Ω loads, the laboratory ran up against a problem, which was that as the amplifier's output approached rated output power, the current draw on the 240V mains supply was so great that the supply voltage sagged down to 230V, effectively 'strangling' the supply of electricity to the amplifier, and limiting its output to just 612-watts per channel... still 12-watts greater than Bryston's specification, but nowhere near the amplifier's potential 'both-channels-driven' output, which would be 685-watts, since the two channels of the 14B³ are essentially monoblocs: they don't even share a power transformer. So in practise the maximum output power of the Bryston 14B³ will depend on how far your home is from the nearest electricity substation and your own home's 240V circuitry. So if you end up buying a 14B³, I'd certainly recommend you consider having an electrician install a dedicated 20-amp circuit specifically for it, but even if you don't you are guaranteed an output of at least 612-watts into 8Ω, even with an ordinary shared 15-amp circuit.

When it came to testing power output using 4Ω loads, *Newport Test Labs* ran into exactly the same problem as with the 8Ω testing. Although the mains power was 240V at the time of testing, as the amplifier's output increased, the mains power voltage sagged to 230-volts, at which point the amplifier was delivering 900-watts into 4Ω (and drawing 15-amps from the mains power supply). Obviously the mains power circuit was not going to stand up to testing the Bryston 14B³ with both channels driven into 4Ω but an attempt was made anyway, just to see if lab's own 240V circuit-breaker would trip, only to instead have the Bryston 14B³'s own circuit-breaker trip prior to the maximum output power being attained. Bryston's circuit-breaker is very easy to re-set from the rear panel, so it was reset and the test re-attempted, but after the circuit-breaker tripped for the second time—this time also tripping the lab's own 240V circuit-breaker—the test was suspended. However, just to make it

> *An amazing achievement by Bryston's design team*

clear, given a sufficiently stable 240V mains power supply, the Bryston 14B³ will be able to deliver more than 900-watts into 4Ω loads, single-channel and both-channels driven.

Distortion at 1-watt was very low, as you can see from Graphs 1 and 2, which show distortion at this output level into an 8Ω load (Graph 1) and into a 4Ω load (Graph 2). Into 8Ω, there's a second harmonic distortion component at –110dB (0.00031%), a third at –120dB (0.0001%), then a fourth at –113dB (0.00022%), followed by a fifth and sixth at –120dB. There are a few stray higher-order components, but all are more than 130dB down (0.00003%). Into 4Ω loads, distortion is almost equally low. The second and third harmonic components are slightly higher, at around –108dB (0.00039%), but all other components stay at almost the same levels. Note, too, that noise is very low, more than 130dB down across the majority of the audio band, and particularly low at the low-frequency end of the spectrum, where mains noise is usually an issue.

Increasing power output did not see much of an increase in distortion, which is particularly unusual with any amplifier, and most particularly so with such a high-power amplifier as the Bryston 14B³. In fact, into 8Ω loads, distortion is fractionally lower at an output of 600-watts than it is at 1-watt, with the same harmonic distortion structure essentially preserved to within a dB or so. Also, due to the higher power output, the noise floor has 'dropped' in relation to the output, so in this case it's below –140dB except at very low frequencies, where you can see some noise at the extreme left of the graph.

Graph 4 shows the Bryston 14B³'s output when it's delivering 900-watts into 4Ω. Into the more demanding load, distortion has increased somewhat, but the second and third-order distortion components are still more than 105dB (0.00056%) down, the fourth and fifth more than 110dB (0.00031%) down and all others more than 120dB (0.0001%) down. Noise was again more than 140dB down except at very low frequencies. Overall THD+N figures, as reported on the accompanying tables, were 0.0025% at one watt and 0.0007% at rated output.

Intermodulation distortion was also impressively low, as you can see from Graph 5. There are only two unwanted sidebands, either side of the 19kHz and 20kHz test signals, and both are sitting 100dB (0.001%) down. Down at 1kHz, the unwanted 1kHz signal regenerated by the 19kHz and 20kHz test signals is 111dB (0.00028%) down.

Wideband signal-to-noise ratios were exceptionally good, with *Newport Test Labs* measuring 94dB A-weighted referred to a one-watt output and 122dB A-weighted referred to rated output (both figures obtained using the balanced inputs and the 23dB gain setting). Input sensitivity using the balanced inputs was 200mV for one-watt out; 4.81V for rated output.

Frequency response into an 8Ω laboratory test load was impressively extended and superbly flat, with *Newport Test Labs* measuring

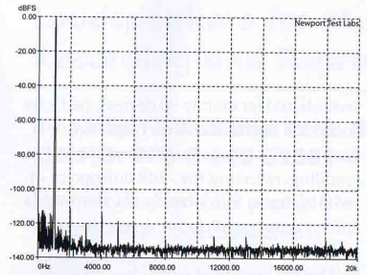


Figure 1. Total harmonic distortion (THD) at 1kHz at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Bryston 14B3 Power Amplifier]

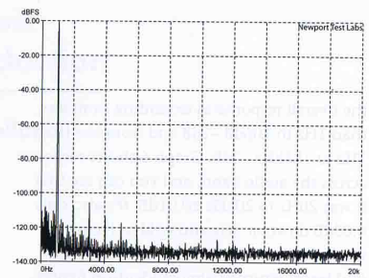


Figure 4. Total harmonic distortion (THD) at 1kHz at an output of 1-watt into a 4-ohmnon-inductive load, referenced to 0dB. [Bryston 14B3 Power Amplifier]

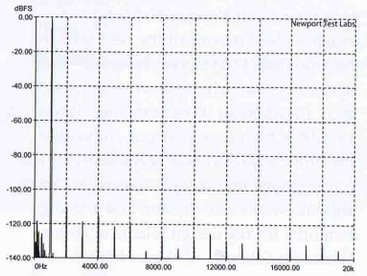


Figure 2. Total harmonic distortion (THD) at 1kHz at an output of 600-watts into an 8-ohm non-inductive load, referenced to 0dB. [Bryston 14B3 Power Amplifier]

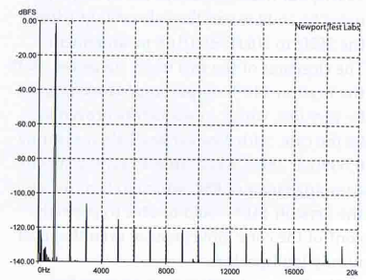


Figure 5. Total harmonic distortion (THD) at 1kHz at an output of 900-watts into a 4-ohm non-inductive load, referenced to 0dB. [Bryston 14B3 Power Amplifier]

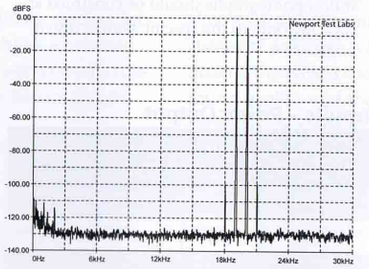


Figure 3. Intermodulation distortion (CCIF-IMD) using test signals at 19kHz and 20kHz, at an output of 1-watt into an 8-ohm non-inductive load, referenced to 0dB. [Bryston 14B3 Amp]

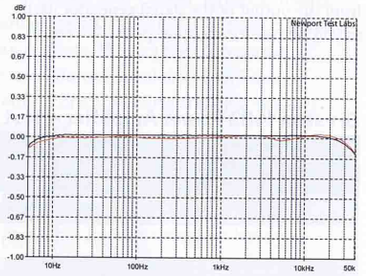


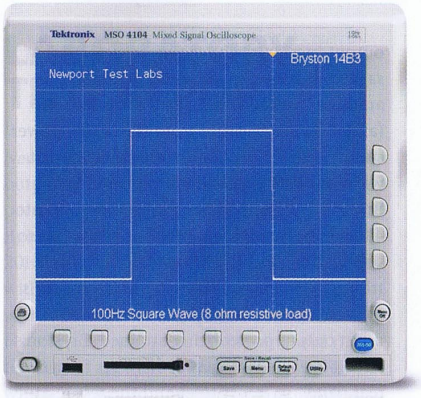
Figure 6. Frequency response of line input at an output of 1-watt into an 8-ohm non-inductive load (black trace) and into a combination resistive/inductive/capacitive load representative of a typical two-way vented loudspeaker system (red trace). [Bryston 14B3 Power Amplifier]

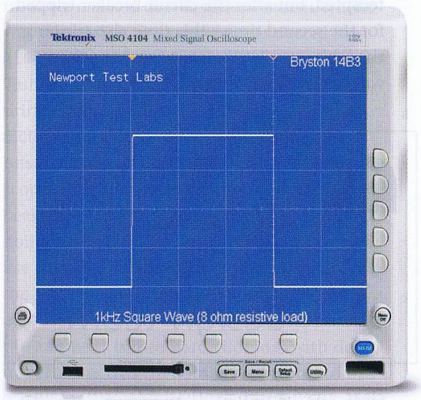
the overall response as extending from less than 1Hz to 106dB –1dB and from less than 1Hz to 185kHz –3dB. Graph 6 shows response across the audio band, and you can see that it was 20Hz to 20kHz ±0.01dB. It's also only 0.08dB down at 5Hz and 40kHz. Frequency response into a simulated loudspeaker load (red trace) returned almost-identical figures. There are tiny deviations in overall flatness of the response visible at 70Hz, 5kHz and 15kHz, but these deviations are so tiny they'd never be audible and they also still fit within the 20Hz to 20kHz ±0.01dB measurement. The closeness of the two traces suggested that the Bryston 14B³'s output impedance would be very low, which subsequently proved to be the case, with *Newport Test Labs* measuring 0.009Ω at 1kHz, which in turn gives a superb damping factor of 888, which in turn means the Bryston 14B³ would be able to perfectly control the cone movement of even the most unruly loudspeakers.

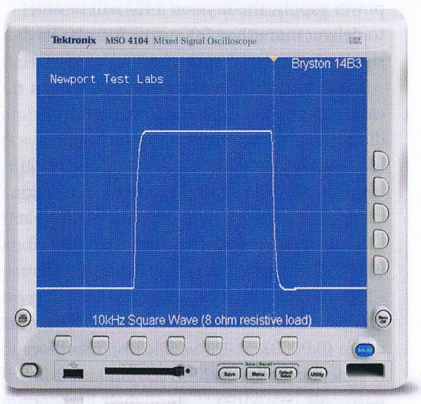
The Bryston 14B³'s square wave performance was pretty-much perfect at 100Hz and 1kHz, with the square waves that are used for these tests looking like they've come straight from the output of the signal generator itself, as you can see for yourself: perfectly vertical verticals and, at exactly 90 degrees, perfectly horizontal horizontals. The 10kHz square wave shows a tiny amount of leading-edge rounding, reflecting the –3dB downpoint of 185kHz. Tested into a highly reactive load (a 2µF capacitor paralleled with 8Ω) the 14B³ was completely untroubled, exhibiting a half-height overshoot which it completely damped within five cycles. This amplifier is, therefore, completely stable.

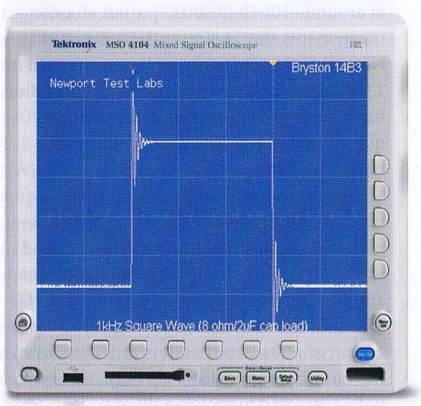
Overall, the Bryston 14B³ delivered superb performance on *Newport Test Labs'* test bench: indeed it's one of the best-performing amplifiers I have ever evaluated—maybe even the outright best—with no weak spots anywhere in its performance. It has incredibly high power output, incredibly low noise and distortion and a superbly flat and extended frequency response. An amazing achievement by Bryston and a fitting memorial for the design talents of Dr Ioan Alexandru Salomie. *Steve Holding*

Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.









Bryston 14B3 Power Amplifier – Test Results – Power Output

Channel	Load (Ω)	20Hz (watts)	20Hz (dBW)	1kHz (watts)	1kHz (dBW)	20kHz (watts)	20kHz (dBW)
1	8 Ω	685	28.3	685	28.3	685	28.3
2	8 Ω	612*	19.3	612*	19.6	612*	19.6
1	4 Ω	900	21.3	900	21.8	900	21.6
2	4 Ω	Pro		Pro		Pro	21.3

Note: Figures in the dBW column represent output level in decibels referred to one watt output. Pro indicates protection circuit triggered. *240V mains power sagged below 230V, limiting maximum power output (See copy).

Test	Measured Result	Units/Comment
Frequency Response @ 1 watt o/p	<1Hz – 106kHz	–1dB
Frequency Response @ 1 watt o/p	<1Hz – 185kHz	–3dB
Channel Separation (dB)	128dB / 127dB / 118dB	(20Hz / 1kHz / 20kHz)
Channel Balance	0.02	dB @ 1kHz
Interchannel Phase	0.00 / 0.01 / 0.03	degrees (20Hz / 1kHz / 20kHz)
THD+N	0.0025% / 0.0007%	@ 1-watt / @ rated output
Signal-to-Noise (unwghted/wghted)	90dB / 94dB	dB referred to 1-watt output
Signal-to-Noise (unwghted/wghted)	116dB / 122dB	dB referred to rated output
Input Sensitivity (Balanced input)	200mV / 4.81V	(1-watt / rated output)
Output Impedance	0.009Ω	at 1kHz
Damping Factor	888	@1kHz
Power Consumption	0.23 / 118.53	watts (Standby / On)
Power Consumption	223 / 1,172	watts at 1-watt / at rated output
Mains Voltage Variation during Test	230 – 241* (See Copy)	Minimum – Maximum