

On Test March Audio Ukkonen AWG Loudspeakers



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March Audio Ukkonen AWG

Loudspeakers



- Unbelievable bass!
- Awesome mids and highs
- Your choice of colour finish



- 'Audionability'
- Efficiency slightly below average



RRP \$10,000

I have to admit, I wondered why March Audio's latest floorstanding design was called 'Ukkonen' because the word is Finnish yet the designer, Alan March, was born in the UK, the bass drivers are made in Denmark, the tweeters are made in East Java (quite close to Bali, in fact!) and the speakers themselves are designed and assembled entirely in Australia... Western Australia, to be precise.

According to March (who now calls Australia home, the reason for which can be found in the break-out box included with this review), 'Ukkonen' is the most appropriate word to describe "the incredible bass extension and dynamics" of his new loudspeaker because it translates in English to 'thunder'.

THE EQUIPMENT

As you have probably guessed from looking at the images accompanying this review, the Ukkonen AWG is a two-way, bass-reflex floorstander. It marries a 221mm mid/bass driver to a 29mm horn-loaded tweeter, and the bass reflex port front-fires via a thin slot at the base of the front baffle.

The Denmark-made bass driver is designed and manufactured by Purifi (PTT8.OX04-NAB-01) and has several unique features. For one, its half-roll surround is so different that it's not really a 'half-roll' at all, but instead uses an irregular geometry that Purifi calls a 'Neutral Surround'.

According to Purifi, cone drivers that use conventional half-roll surrounds (which is most of them!) are fundamentally flawed because during half of the cycle of an audio signal (when the

cone is moving inwards), the effective radiating area (Sd) of the cone plus surround increases and, conversely, during the other half of the same audio signal (when the cone is moving outwards), the radiating area decreases, so conceptually you're using one cone to produce half the waveform, and a totally different one for the other half. The result, as you'd expect, is increased distortion compared to if the effective radiating area remained the same throughout the full cycle of the audio waveform.

Purifi's director, Claus Neesgaard, says that the special geometry of its 'Neutral Surround' combats what he calls 'surround radiation distortion' (or 'SRD'): "This position-dependent effective radiating area — we refer to it as Sd(x) modulation — is a direct contributor to distortion and IMD (intermodulation distortion) and thus is a must-fix problem if the goal is excellent sound quality. Our proprietary surround geometry keeps Sd(x) modulation at a minimum, and practically eliminates SRD. We further optimise the geometry to deliver a number of other benefits by controlling the critical cone/surround edge break-up to improve the frequency response and to provide resilience against back-pressure, this last being especially useful when the driver is used in a cabinet with a constrained internal volume."

The cone suspended by this surround is made from black anodised aluminium and driven by a 52mm diameter voice coil that is 23.6mm long and wound using two layers of copper-coated aluminium wire and a proprietary coil-winding technique that reduces coil inductance compared to the usual industry-standard winding technique.

UNUSUAL MOTOR SYSTEM

In any moving-coil loudspeaker, the moving (voice) coil produces a varying magnetic field that interacts with the fixed magnetic field generated by the magnet to move the voice coil and thus the cone to which it is attached. However, the interaction is not constant because as the voice coil moves through the fixed field,

its inductance changes, meaning the coil's inductance is different for every position between the two extremes of excursion (from fully 'in' to fully 'out'). The result is that the force factor changes if a change in stored magnetic energy happens when the voice coil moves position.

This storage of energy causes an asymmetry between the force factor and the ratio between velocity and the back-EMF produced by the motor. Purifi calls these changes 'Force-Factor Modulation' (or 'FFM') and says that although loudspeaker designers have been aware of this problem for some time, the industry-standard model they have been using to predict this dynamic force — and thus design their drivers — has resulted in non-optimal motors. (The Purifi team delivered a paper on this very subject, titled 'Force Factor Modulation in Electro Dynamic Loudspeakers', at the 141st Audio Engineering Society International Convention in 2016).

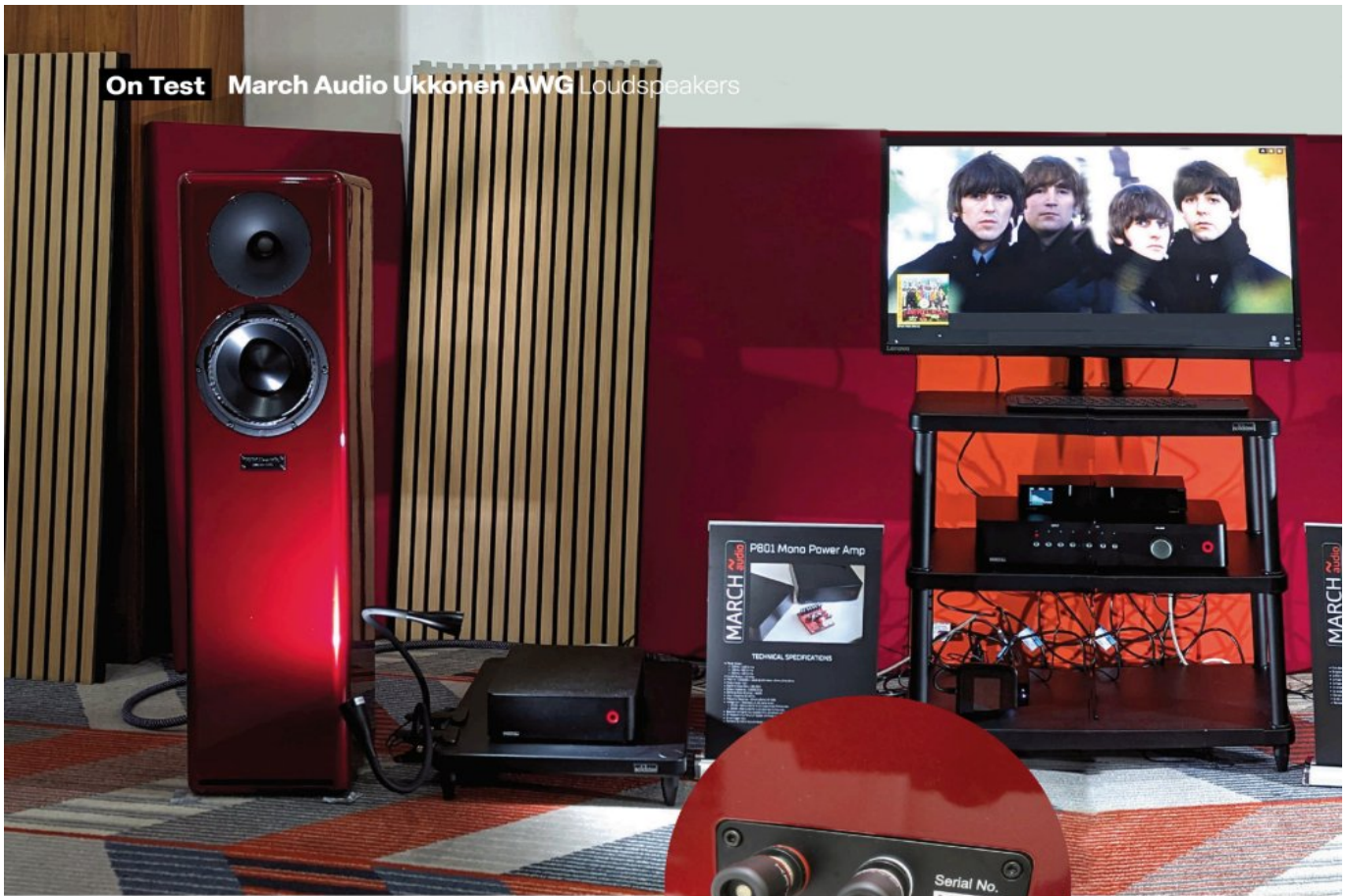
In the Purifi PTT8.OX04-NAB-01 driver used in the Ukkonen AWG, Purifi has minimised FFM firstly by reducing the permeability of the pole, resulting in a reduction in inductance primarily because FFM is determined by the absolute change in inductance versus position, not the relative change. At the same time, the company also replaces most of the pole with a permanent magnet, to the top of which it attaches a section



The 29mm Satori beryllium dome tweeter is manufactured in East Java, Malaysia by SB Acoustics

Your Ukkonen floorstanders can be painted in any colour you like from the RAL colour gamut

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of unsaturated material. This approach to pole design makes the driver more difficult (and thus more expensive) to manufacture, but it effectively eliminates FFM.

I have never (ever!) heard so much high-quality deep bass from any equivalently sized driver

SATORI TWEETER

The tweeter in the Ukkonen AWG is a Satori TW29BNWG, which has a 29mm-diameter beryllium dome driven by a neodymium motor system. The Satori tweeter (which is manufactured in East Java, Malaysia by SB Acoustics) is fronted by a very large horn — or, as March Audio prefers to call it, an ‘integrated waveguide’. Of its purpose, March says: “The waveguide controls the directivity of the tweeter, allowing it to perfectly match that of the mid/woofer at the crossover point. The controlled directivity also ensures the indirect sound from reflections within your room accurately match

the timbre of the direct sound from the tweeter. This provides a much more cohesive sound that is more consistent in different rooms.”

The Ukkonen’s bass reflex port (it would more accurately be called a ‘slot’ than a ‘port’) is, as you can see most clearly from the photo on page 56, located very close to the base of the cabinet on the front baffle. You needn’t worry if you have thick pile carpet that might otherwise have obscured this slot, though, as the loudspeakers come with outrigger feet that not only elevate the slot but also improve the stability of the tall, narrow Ukkonen cabinet, which would otherwise be rather tippy. (In fact,

ALAN MARCH

Before deciding to call Australia home, March Audio’s founder, Alan March, had been working for Rolls-Royce Aeronautical for almost 20 years in a role that saw him travel around the world recording noise, vibration and other data on everything from the Joint Strike Fighter in the United States to the Concorde in France. A few years ago, he and his wife decided they wanted

a sea change and that Australia was the place to do it.

The pair chose the state of Western Australia as their new home because it has more engineering opportunities than anywhere else in Australia due to the number of mining companies based there. Indeed, Alan isn’t the only engineer in the marriage; his wife is a civil engineer. So Alan switched from measuring noise and acoustics in aeroplanes to analysing the vibration and noise of the gas turbines and motors used in mining equipment... until he tired of the fly-in/fly-out lifestyle and decided to start his own

business manufacturing hi-fi equipment. He first manufactured amplifiers before turning his attention to loudspeakers.

This career change was not actually a big leap for Alan because he had been passionate about music and hi-fi equipment since his teenage years, during which he owned many of the ‘classic’ audio components made by the likes of NAD, Naim, Meridian and one of his favourites, TAG McLaren. So it was hardly surprising that Alan decided to marry his engineering abilities with his love of music and begin building hi-fi equipment for a living.

On Test



the speakers I was supplied for this review were the demo pair made especially for the Australian Hi-Fi Show in Sydney whose bases were not fitted with threaded inserts, so I had to improvise elevated outriggers to conduct this review.) My sample also came without speaker grilles, but this is standard because March says the overall performance — especially dispersion — is superior without them. However, if you (or your significant other) would prefer them with grilles, March Audio will supply them for free. These grilles are small circular types that affix to the drivers magnetically, so you would get two grilles per speaker.

The rear of the Ukkonen AWG cabinet is completely bare save for a single pair of ETI

Research speaker binding posts, which ETI describes as being made from 'Kryo tellurium copper with silver plating'.

CABINET FINISHES

Your Ukkonen floorstanders can be painted in any colour you like. The speakers I loaned for review were finished in Candy Red (as pictured), but March Audio prefers customers to order a colour from the RAL colour gamut. 'RAL' is an abbreviation of the German title 'Reichs Ausschuß für Lieferbedingungen und Gütesicherung', which means 'National Commission for Delivery Terms and Quality Assurance', and is a colour matching system that defines colours for paint, coatings and plastics.

Administered by the RAL Deutsches Institut für Gütesicherung und Kennzeichnung, located in Germany, it enables the precise matching of hundreds of colours, each identified by a unique four-digit RAL code. To determine the colour you want, purchase a RAL colour fan (\$33 from www.ralcolours.com.au), which shows all the



Purifi's driver promises 'uncompromised midrange performance' and "'Real' long-stroke performance with distortion remaining low over full excursion'

'RAL Classic' colours available in exactly the shade you will get when you order your speakers. You then advise March Audio of your chosen colour's RAL code and — voilà — that's the colour your speakers will be delivered to your door in. (Carmine Red is RAL3002, for example). You can also order the Ukkonen in a solid wood finish, and some of the timbers available include Jarrah, Blackbutt, Wandoo, Tasmanian Oak, Baltic Birch Ply, and Tasmanian Blackwood.

The final cost of any Ukkonen AWG pair will depend on your desired finish, but regardless of which you choose they will not be available ex-stock as they are specially manufactured to order. March Audio says the current lead time is approximately four weeks. If you aren't fussy about a specific finish, models are occasionally available for immediate delivery.

IN USE AND LISTENING SESSIONS

Just as I do not expect to hear deep bass from any small bookshelf loudspeaker, I confess that I also don't expect to hear deep bass from any largish floorstander. So I really wasn't expecting the amount of truly deep — dare I say thunderous? — bass that came out of the March Audio Ukkonen, nor its surprisingly pristine purity — particularly given that there's only a single mid/bass driver of relatively modest diameter in each cabinet. Quite simply, I have never (ever!) heard so much high-quality deep bass from any equivalently sized driver, and rarely even from much larger drivers.

The impressive depth of, and equally impressive lack of distortion in, the bass sound is obviously largely due to the unique design of the Purifi PTT8.OX04-NAB-01 driver that is doing all the heavy lifting, but March Audio's cabinet design clearly plays a huge part in the lift too — not only in its volume, dimension and front-firing reflex slot but also the fact that it is almost completely free of resonances due to the company's construction methods.

When I listened to one of the great lounge jazz albums of all time, Quincy Jones' 'Walking in Space', it was enormously satisfying to hear Ray Brown's fabled walking bass line front and centred from the first track, *Dead End*. The tonal accuracy delivered by the Ukkonen was exceptional, as was the accuracy of the pitching — you hear the fundamental pitches instantly and perfectly, there are no pitching machinations. On the title track that follows, Brown's bass lines are more in the background, but this simply offers an opportunity to hear the speakers' superb rendition of not only the sound of the drum but also that of the brass (indeed the musicians on this album include Freddie Hubbard, Snooky Young, J. J. Johnson and Alan Raph, amongst other luminaries), as well as Valerie Simpson's ethereal voice.

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Killer Joe also highlighted the unique sonic signatures of the musicians, but here I could also clearly hear the Ukkonen creating that mystical 'space' communicated by all superior-sounding loudspeakers. It also allowed me to appreciate the Ukkonen's beautiful reproduction of high frequencies, thanks to the lovely flute lines of Hubert Laws, who can also be heard playing his more usual instrument (tenor sax) on this album. *Love and Peace* is a great opportunity to hear some great electric guitar sound, and you don't have to be a drummer to appreciate the insane syncopation from Bernard Lee 'Pretty' Purdie, whose signature use of triplets against a half-time backbeat is now known as the 'Purdie Shuffle'. (If you've heard Steely Dan's *Babylon Sisters*, you will already have heard Purdie himself playing a variation of it.)

There's plenty of space and deep bass on Julia Holter's newest album, 'Something in the Room She Moves' (and yes, she credits the Beatles for the inspiration), not to mention wonderful sax, clarinet, flute and piccolo sounds that allowed me to evaluate the Ukkonen's midrange and high-frequency performance while I marvelled at the bass (opener *Sun Girl* is a standout!) Holter is a wonderfully creative composer, her sonic soundscapes (which include 'found' and 'manufactured' sounds as well as synthesised and true instrumental) are intellectually intriguing as well as aurally beautiful. Her own voice is also a glorious instrument, its sound unique in a world of increasingly 'samey' female vocalists (evidenced throughout the album but don't miss the title track or *Meyou* or *Who Brings Me*). The album is a studio creation and the production values are up there in the stratosphere. Is it as good as her 2015 album 'Have You In My Wilderness'? I think it is better.

CONCLUSION

March Audio's new Ukkonen loudspeakers

sound absolutely superb. The depth, breadth and extension of the sound will take your breath away. Your only problem might be being able to experience all this amazingness because at the time of writing you have to fly to Western Australia to hear a pair. The good news is that Alan March is in the process of finalising an arrangement to have the Ukkonen (and his smaller Sointuva loudspeakers) available for audition in Sydney and Melbourne — maybe even by the time you're reading this review. I, for one, certainly hope this will be the case, but in the event that it isn't, the Ukkonen sound so good that you may well find an audition is worth the price of an airfare. **— Greg Borrowman**

TECH SPECS & CONTACT

Brand: March Audio
Model: Ukkonen AWG
RRP: From \$10,000
Warranty: Five years
Frequency response: 32Hz – 20kHz ± 1.5 dB
Low freq response: 28Hz (–3dB); 24Hz (–6dB)
Nominal impedance: 6 ohms
Minimum impedance: 3.6 ohms @150Hz
Sensitivity: 85dB SPL @ 1M @ 2.83V
Dimensions (HWD): 105 x 28 x 26cm
Weight: TBA

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**Laboratory Test Report**

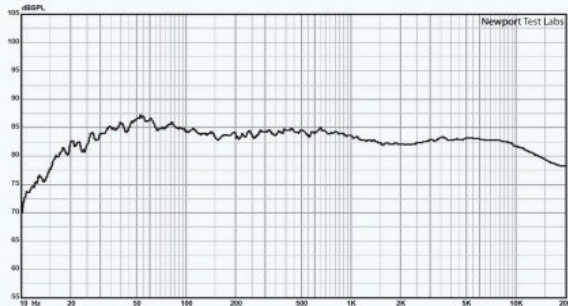
Readers interested in a full technical appraisal of the performance of the March Audio Ukkonen AWG loudspeakers should continue on and read the LABORATORY TEST REPORT published on the following pages. Readers should note that the results mentioned in the report, tabulated in performance charts and/or displayed using graphs and/or photographs should be construed as applying only to the specific sample tested.

Newport Test Labs first looked at the in-room response of the March Audio Ukkonen, with the speakers distant from any room boundary (except the floor!) and using pink noise as the source. The measured result is shown in Graph 1, where you can see that the response extends from 16Hz to 20kHz ± 6 dB. This level of bass extension is extraordinary for any two-way loudspeaker system... or any three- or four-way design for that matter. Narrow the level window to look at a smaller, industry-standard ± 3 dB envelope, and the response is 20Hz to 13kHz, so only the very highest frequencies do not fit into that smaller window.

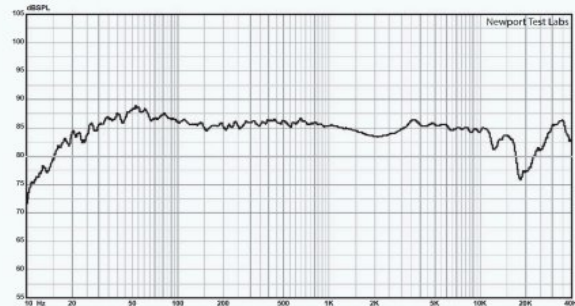
Newport Test Labs examined the Ukkonen's high-frequency response in more detail using a gated sine technique, the result of which is shown in Graph 2, where the high-frequency response has been spliced (at 1kHz) via post-processing to the room response. You can see that this response shows dips in output at around 13kHz and between 16kHz and 20kHz. The higher

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Lab Report March Audio Ukkonen AWG Loudspeakers



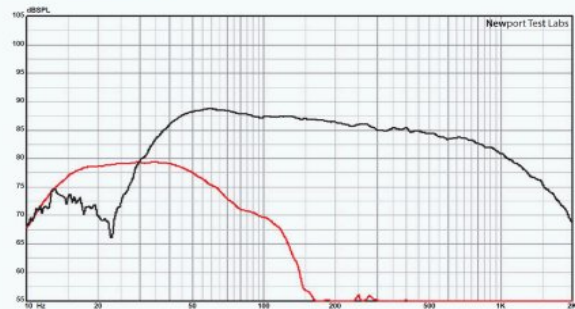
Graph 1. Frequency response (in-room) at one metre, on tweeter axis.



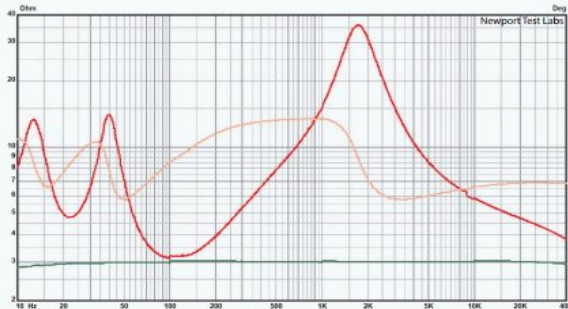
Graph 2. Frequency response with in-room response spliced to anechoic (gated) response at 1kHz.



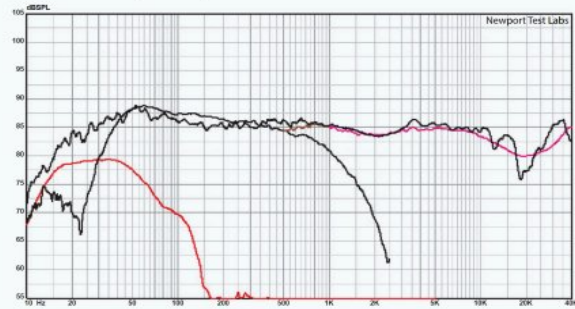
Graph 3. Nearfield response of port (red trace) and nearfield response of mid/bass driver, with far-field tweeter.



Graph 4. Nearfield low-frequency responses of slotted port (red) and mid/bass driver. No port compensation.



Graph 5. Impedance (red trace) and phase angle (orange trace) vs frequency. Green trace is reference 3-ohm resistor.



Graph 6. Composite frequency response (see copy).

of these two dips was completely expected because it is almost identical to the response SB Acoustics shows in its data sheet for the Satori TW29BNWG-8. The smaller dip isn't explained as easily but it is sufficiently narrow in bandwidth and sufficiently high in frequency that it would not be identifiable as a dip when listening to music, as evidenced by the smooth high-frequency roll-off shown in Graph 1.

Graph 3 is another post-processed graph, this time showing the nearfield response of the mid/bass driver and the front bass-reflex port (red trace) spliced to the gated high-frequency response. Again, the bass extension of the Purifi driver is exceptional, its output not rolling off appreciably until 38Hz, at which point the slot's output is at its maximum to compensate. Note that the slot has considerable acoustic output

from 15Hz right up to 60Hz, and that there are no unwanted 'leaks' higher up the frequency spectrum. Graph 4 shows this excellent performance in greater detail.

The impedance modulus and phase angles of the March Audio Ukkonen, as measured by Newport Test Labs, are shown in Graph 5 as the red and orange traces respectively (the green trace being a contemporaneous measurement of a precision 0.5% three-ohm resistor included for graph calibration purposes). Here we see a minimum impedance of around 3.2 ohms at 100Hz. Although slightly different from the specification, the differences are not great and could be due to the on-test pair being an early demo model rather than an actual production sample, although given that these speakers are built to order, 'production sample' doesn't

really apply. That said, the overall impedance is such that I'd prefer to consider the 'nominal' impedance as being four ohms rather than six.

Newport Test Labs measured the sensitivity as 85dB SPL at one metre for a 2.83V_{eq} input, which is exactly the same as March Audio's specification but does mean that the Ukkonen's efficiency is a little below the average for floorstanding designs, most of which are at least 2-3dB more efficient. You should, therefore, ideally use a more powerful amplifier to drive them — though any competently designed amplifier rated with a power output of more than 90 watts per channel into eight ohms will be powerful enough to ensure realistic playback levels in any ordinary sized listening room and undistorted peak playback levels of at least 105dB SPL. **Steve Holding**