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HARBETH MONITOR 30.1

LOUDSPEAKERS

| *Hugh Douglas*



The bass/midrange driver is the second generation (RADIAL™) of Harbeth's own design, which Shaw developed in partnership with the University of Sussex, using grant money from the British Government.

The real wood veneers on my review sample were perfectly grain-matched and finished with a thin

coat of cellulose lacquer for easy care...

Harbeth's well-known M30.1 or, to use its 'posh' name, the 'Harbeth Monitor 3.1 Domestic' actually has its sonic roots in a commercial studio monitor, the BBC LS5/9, which was designed by engineers at the British Broadcasting Corporation for monitoring the quality of the audio transmitted by the BBC's radio and television stations.

You might well ask why the BBC, with its (then) almost limitless technical resources (and money) at hand, bothered to design small monitor speakers at all.

Strangely enough, the issue was the same one that continues to affect most modern consumers: cabinet size. The BBC did design many larger models—one excellent example being the LS5/8 which measured 760×460×400mm—but many of the BBC's control rooms, particularly those used for outside broadcasts, simply could not fit the larger and better-performing models. This is one reason the LS5/9 was developed, because it measured only 640×280×275mm.

Cabinet size was also the impetus for the development of the LS3/5a, indisputably the BBC's most famous design and, at 300×190×170mm, equally indisputably the smallest of them!

As it happens, Harbeth does manufacture a 'commercial' version of the M30.1 which is known as the Monitor 30.1 Pro... as well as a powered version of the Monitor 30.1 Pro called the Monitor 30.1 Powered.

THE EQUIPMENT

One of the designers at the BBC whilst the LS5/9 was being designed was one Hugh Dudley Harwood who, after retiring from the BBC in 1977, established Harbeth which, following Harwood's death, has been solely owned and operated by Alan A. Shaw. Despite Shaw's title as 'designer' at Harbeth, he says all his designs are simply evolutions of the original BBC designs, taking advantage of the more modern components and technologies now available. If you're wondering why he then doesn't use the BBC's original names for his speakers, like some of the other manufacturers that are still building the BBC's creations, my guess is that it's the cost of the licensing fees, which are rather steep and would increase the cost of the speakers for no audible gain at all. (The BBC has always been good at extracting licensing fees. Even now, every person in England who owns a television has to pay the BBC a licence to watch it, even if they never watch any BBC programs. Only pensioners are exempted from this fee.)

If you look at the Monitor 30.1 speakers—or any Harbeth loudspeaker—you will

immediately notice that one thing Shaw has not taken advantage of is modern cabinet manufacturing techniques. The cabinets are still built the same way the BBC engineers put together their ‘proof of performance’ samples back in the 50s, using cabinet-building techniques that were, even at the time, regarded as ‘amateur’. Why amateur? Simply because British cabinet-makers had been making fine furniture cabinets without visible joints and without the use of fasteners for several centuries before the BBC engineers made theirs, complete with visible joints and using dozens of fasteners, almost all of which were also very visible. It is said that even Dudley’s wife, Elizabeth (the ‘Beth’ in Harbeth), was less than enamoured by the appearance of her husband’s creations.

One improvement I suspect Shaw has made to the Monitor 30.1 is the way the grille fits to the cabinet, which is very clever. A very narrow channel runs around the edge of the front baffle. The grille frame, instead of being made from the usual plastic or wood, is made from thin, flat mild steel that has been formed into a rectangle. The grille cloth is then stretched over the resulting frame. This method of grille construction means the grille frame is enormously strong and presents no obstacles or obstructions to the path of the sound waves travelling through it. But what about the frame? I hear you ask. That’s the

clever bit! The frame slides entirely into the narrow channel around the periphery of the front baffle, which then completely eliminates the possibility of reflections.

If there’s a down-side to this grille-fixing technique I’d have to say it’s the difficulty of removing the grilles for vacuuming, which has to be done from time to time (at least it does according to my other half). I managed to remove the grille from one of the speakers, but I could not remove the other. Presumably there’s some simple technique involved, but it’s unfortunately not mentioned in the instruction manual. Perhaps a small note in future versions of the manual would not go astray?

The cabinet of the Monitor 30.1 Domestic is made from high-density fibre-board that is veneered on both sides. This is much better than using just a single veneer on the outer wall (a technique used by most manufacturers) as it seals the fibre-board better against climatic conditions and ensures dimensional stability. Only a limited range of finishes are available ex-stock in Australia: Cherry (which retails for \$5,590 per pair), Eucalyptus (\$5,790 per pair) and Rosewood/ Tiger Ebony (\$5,990 per pair). The other finishes—Black Ash, Maple and Rosewood—are available only by special order. The veneers (and yes, they’re real wood veneers) on my review sample were perfectly grain-matched and

finished with a thin coat of cellulose lacquer that apparently needs only to be wiped lightly with a damp cloth in order to be kept clean. Shaw says that the cabinets are made for him *‘in a small facility in a mediaeval village in West Sussex, England.’*

To my mind, the only thing marring the appearance of the Monitor 30.1 are the myriad brass screws on the rear of the speakers that very obviously fix it securely to the main part of the cabinet. I would not have thought quite so many screws were required, but I assume the BBC and Shaw knew what they’re doing. That said, the screws are on the rear, where you can’t see them. Although the front baffle is secured to the cabinet with the same number of screws, you can’t see them behind the black grille cloth... assuming you listen to the speakers with the grilles in place. But if you *do* listen *sans* grilles, you won’t be looking at bright brass screws, because Harbeth sensibly uses chemically coated (so they won’t rust) black steel ones on the front panel.

The main reason I removed the grille (with difficulty, see earlier!) was to check out the drivers Harbeth was using on the 30.1. As I rather expected, the bass/midrange driver is the second generation (RADIAL™) of Harbeth’s own design, which Shaw developed in partnership with the University of Sussex, using grant money

from the British Government Science & Engineering Research Council (SERC). I personally find the name ‘radial cone technology’ as used by Harbeth rather confusing, because the cones are not radial at all: the word ‘RADIAL’ is Harbeth’s acronym for ‘Research And Development In Advanced Loudspeakers’, and the ‘radial’ it refers to is actually the material used to manufacture the cone... a specific formulation of polypropylene or, as Harbeth terms it, ‘a new polymeric composite.’

Harbeth says that unlike ordinary polypropylene, the ‘radial’ polymeric composite it uses to form the cones is able to be either injection-moulded or vacuum-formed, with Harbeth opting for injection-moulding because it says this method of manufacture delivers *‘the best sonic performance’*. The formula for the polymeric composite was recently changed slightly, and so Harbeth models are now specified as having ‘RADIAL2’ cones to indicate the use of the newer material. Harbeth says that although the word ‘RADIAL’ is an acronym, it is also a descriptor of the cone because the points at which the cone exhibits its greatest stiffness and efficiency are radially located on it. (At the time of writing, Harbeth had not updated the ‘Specifications’ section of its website to reflect the fact that the Monitor 30.1 is fitted with a RADIAL2

driver.)

The cone in the Monitor 30.1 is rated by Harbeth as being '8-inches' (203.2mm) in diameter but because it's mounted from behind the baffle, I could not confirm this measurement. However the most important diameter for any bass driver (or bass/midrange driver, in this case) is the Thiele/Small diameter, which is what's used by designers to determine the volume of the cabinet and the size and length of the bass reflex port in that cabinet and, for the Monitor 30.1 that diameter was 164mm. This gives a driver area (S_d) of 212cm².

The driver's suspension (or, if you prefer, the 'roll surround') is made from rubber, which will be much longer-lived than if it were made from foam. (Here in Australia, roll surrounds made from foam start disintegrating after about five years, primarily due to the extremely high levels of ultraviolet radiation in our antipodean atmosphere.) Neither is the roll surround a conventional geometry, because it uses an 'inverse' roll, rather than the more usual one. Although this is characteristic of many Harbeth drivers, it's particularly useful here because the driver is mounted from behind the baffle. If the driver had had a conventional roll surround, the baffle would have interfered with the movement of the cone.

The Monitor 30.1's single bass/midrange

driver hands over at 3.5kHz, with a reported 4th order acoustic slope, to a 25mm-diameter soft-dome tweeter whose dome is protected by a steel mesh that Harbeth calls a 'Hex-grille.' Fairly unusually, the Monitor 30.1's bass reflex port is positioned quite a long way from the driver whose output it is intended to augment, and it is also rather unusually positioned at the top of the front baffle. Looking at the size of the port (it's 50mm and 55mm long) and the width of the bass driver and the front baffle, it seems this position was forced upon Shaw in order to keep the cabinet compact—it is, after all, promoted by Harbeth as '*the space-saving reference monitor*'—but I would have thought that using dual ports, located slightly above and to either side of the bass/midrange driver might have been preferable, as he'd already done on the Monitor 40.2.

I really didn't like the way that if you operate the speakers without their grilles you can see a piece of white damping foam at the inside end of the port. It would have been better if black foam had been used at this point, or black cloth fitted to the rear of the port. But if you use the speakers with the grilles in place (as most people undoubtedly will) you will not be able to see the foam through the port anyway.

Although the front baffle of the Monitor 30.1 is made from 18mm-thick stock, all

other panels, including the rear baffle, are only 12mm-thick, which is one reason the speakers are so light (11.6kg). The lightweight construction is inherent in the original BBC design, with panel resonance being controlled by tuning devices (mats) attached to the inside of the panels. Unlike some Harbeth models, however, there is some cross-bracing inside the Monitor 30.1. The cabinet itself measures 460×277×275mm (HWD).

Rather than being mounted on a terminal plate in the conventional manner, the Harbeth Monitor 30.1's single set of gold-plated speaker terminals appear to be attached to the cabinet itself. They're not, of course. In fact, the terminals plunge through the cabinet where they attach directly to the printed circuit board (PCB) used to accommodate the components in the crossover network: four ferrite-cored inductors, nine capacitors and six cermet resistors.

In Australia, local distributor Audio Magic has two stands available that have been specifically manufactured for the Harbeth Monitor 30.1. One pair is made by TonTräger (pictured) which retails for \$1,700 and the others, which retail for \$1,190 per pair, are made by UK outfit HiFi Racks.



IN USE AND LISTENING SESSIONS

I am not sure how 'space-saving' the Monitor 30.1s actually are if you choose to mount them on stands, because they really wouldn't take up much more space than Harbeth's 40.2 design, which Harbeth itself

spruiks as ‘*Harbeth’s best loudspeaker, ever*’. It would certainly, however, apply if you mount the speakers on walls, or on bookshelves, or in soffits, which is pretty much how I imagine the BBC would be mounting them. (Commercial working environments are not conducive to the placement of loudspeakers on stands.)

That said, you will certainly extract the best performance when the Monitor 30.1s are mounted on stands, and even more so if you are able to position those stands (and thus speakers) well away from walls. If you are constrained to using your stand-mount speakers with the stands close to walls, you’d likely be best-advised to instead place them on shelves, or on a side-table, for reasons of sound quality, visual amenity, cost-savings and not needing to worry about the speakers accidentally being toppled by a boisterous dog, cat or small child.

Seeing that I already owned a pair of stands of the height recommended by Harbeth (“typically 20 inches”, says the printed material that’s packaged along with the speakers, which includes a ‘Harbeth Guide’ and an ‘Owner’s Certificate’) I started my listening sessions with the Monitor 30.1s on stands, well out into my listening room.

Porch music has always been dear to my heart, not least because I was introduced

to it by the late Chris Green, an erstwhile reviewer for *Australian Hi-Fi Magazine* as well as for Brisbane’s *Courier Mail*, so it was with high hopes that I used the Harbeth Monitor 30.1s to spin the supposed debut album from The Pheasantry, (rather confusingly, the album is also named ‘The Pheasantry’) but is actually simply the first album to be released under the band’s new name, the first five albums having been recorded under their previous moniker, ‘The Pheasant Pluckers.’ It’s porch music, and so it largely falls under the ‘alt-country music’ genre, but the tracks on the *The Pheasantry* are so musically diverse that the album really falls under the ‘great-sounding, feel-good’ music genre, and the band members are so old (sorry guys!) that the lyrics are meaningful vignettes of the various situations that life throws at us as we grow older, so it’s very easy to empathise with their subject-matter.

All the band’s instruments (with the exception of the lower notes of Rod Boothroyd’s acoustic bass) fall comfortably within the ambit of the Monitor M30.1’s own range, so with the exception of those deep acoustic bass notes, I didn’t feel I was missing out on anything during my auditions using the Monitor 30.1. What I certainly gained from using the Monitor 30.1s was a liveliness and clarity that gave truth and meaning to the ‘good sounding’ aspects of this album. The respective

distinctive sonic traits of the acoustic guitar (Matt Campbell) and electric guitar (an unusual twist for Dan Kerr, who's usually on acoustic) were reproduced marvellously well, with the two different sounds also contrasting perfectly with the cut-through banjo sound of Pete Somerville. The truly delicious harmonising by Matt and Keith (Ludekens, also harmonica and percussion) were delivered by the M30.1s as if the two were singing in my own room. The album's close-out track *Simon* is my favourite on this album, but vies for such with the gospelly *Let Me In*.

Harbeth speakers are renowned for their ability to create acoustic space around works—ambience, to use the common parlance—and I found this attribute was demonstrated perfectly on 'Preservation', a new album by Kiwi songstress Nadia Reid. The clanks, clicks and myriad sonic effects on *Te Aro* are reproduced so accurately and so realistically by the Monitor 30.1s that you will be so totally immersed in the soundscape that when the sudden shock of sound chimes in at 4:20 (the first of several) I dare you not to jump in fright. Reid writes intensely personal songs with obvious insight (*Richard*) and sings them with a commitment that weaves you into the stories (*I Come Home to You*). Some may find the album a tad overproduced, and I wouldn't disagree, but you'll still be haunted by it.

Mightily impressed though I was with the Harbeth Monitor 30.1s when they were on stands, I became even more impressed when I switched them over to shelf-mounting, though in this case the shelves were not shelves as such but brackets fixed to the wall in a room I use a 'retreat'. The proximity of the rear wall boosted the low-frequency output of the Harbeth 30.1s handily, extending the response below that which I'd been able to extract when the speakers were on stands. I did lose some of the stage depth as a result of the near-wall placement, but because the Monitor 30.1s are so much more ambient-sounding than most other speakers, the diminution approached insignificance.

The proximity of the rear wall certainly gave the bass a boost, but the clarity and accuracy of the midrange remained completely unaffected by the change in room position... which was a very good thing, because the clarity and accuracy of the Monitor 30.1's midrange sound is second to none. Its ability to reproduce vocals is uncannily good, such that every nuance of a singer's voice will be delivered to perfection. I was so impressed I even pulled out one of my big guns for assessing vocal clarity, Dylan Thomas' famous 'play for voices', 'Under Milkwood'. If a speaker can't articulate correctly, you're going to miss half the dialogue of the play, and if it can't separate different voices speaking

simultaneously you'll miss the whole 'feel' of the play. The Harbeth Monitor 30.1s didn't merely rise to the difficult task of recreating this work, they smashed it out of the ballpark!

The transition from midrange to treble is handled beautifully, though I thought the level of the high frequencies was slightly held back in the overall presentation, but all the highs were still clear, clean and beautifully articulated.

I never expect much in the way of deep bass from a small two-way loudspeaker... and neither should you: If you're looking for deep bass in a hi-fi system, you should be looking at a large three-way design or at including a subwoofer in that system. The Monitor 30.1's bass is not overly extended, but in smaller rooms it should be more than sufficient, and the clarity and precision of the bass will certainly impress you, as it did me. Also impressive is the 'live' bouncy way the bass is delivered, with plenty of pace and everything you could ask for by way of dynamics. There's certainly nothing ponderous about it! A slight forwardness in the upper bass is just audible, but mostly works in favour of the music, delivering a little more punch that you will be able to ameliorate if you'd like by careful positioning.

CONCLUSION

Investing in a pair of Harbeth speakers is an investment in a piece of British audio history, thanks to a direct, unbroken lineage that traces back to the heady days of the BBC's finest achievements in audio reproduction. Designer Alan Shaw is often quoted as saying that he's 'continuing *the tradition*' and the appearance and performance of the Harbeth Monitor 30.1 Domestic are the proof that he's doing a fine job of it.

Readers interested in a full technical appraisal of the performance of the Harbeth Monitor 30.1 Domestic Loudspeakers should continue on and read the LABORATORY REPORT published on pages 24 and 26.

PRODUCT & CONTACT DETAILS

Brand: Harbeth

Model: Monitor 30.1 Domestic

RRP: \$5,590-\$5,990* (See Copy)

Warranty: Two Years

Distributor: Audio Magic Pty Ltd

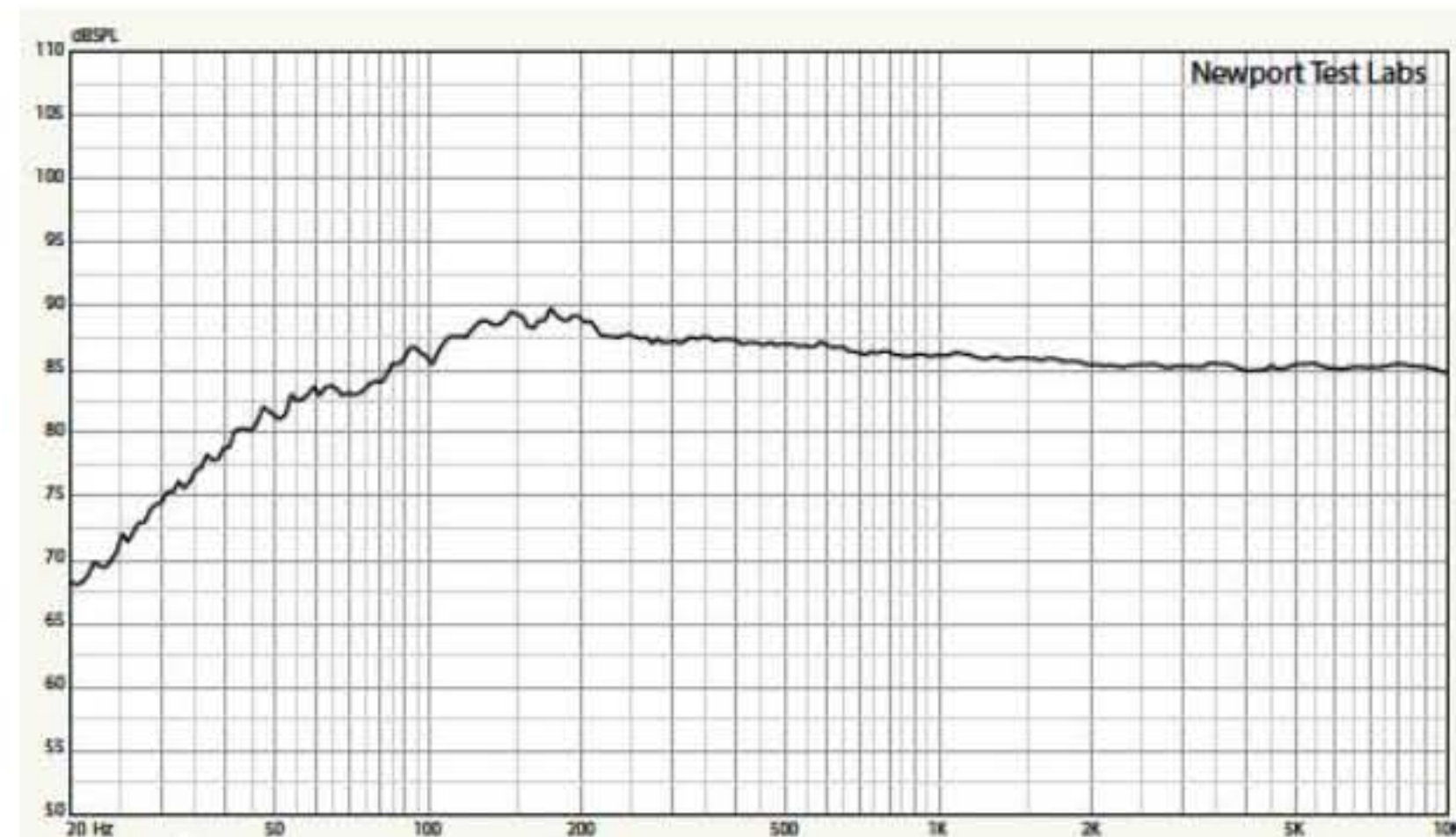
Address: 23/22 French Avenue Northcote
VIC 3070

T: (03) 9489 5122

E: info@audiomagic.com.au

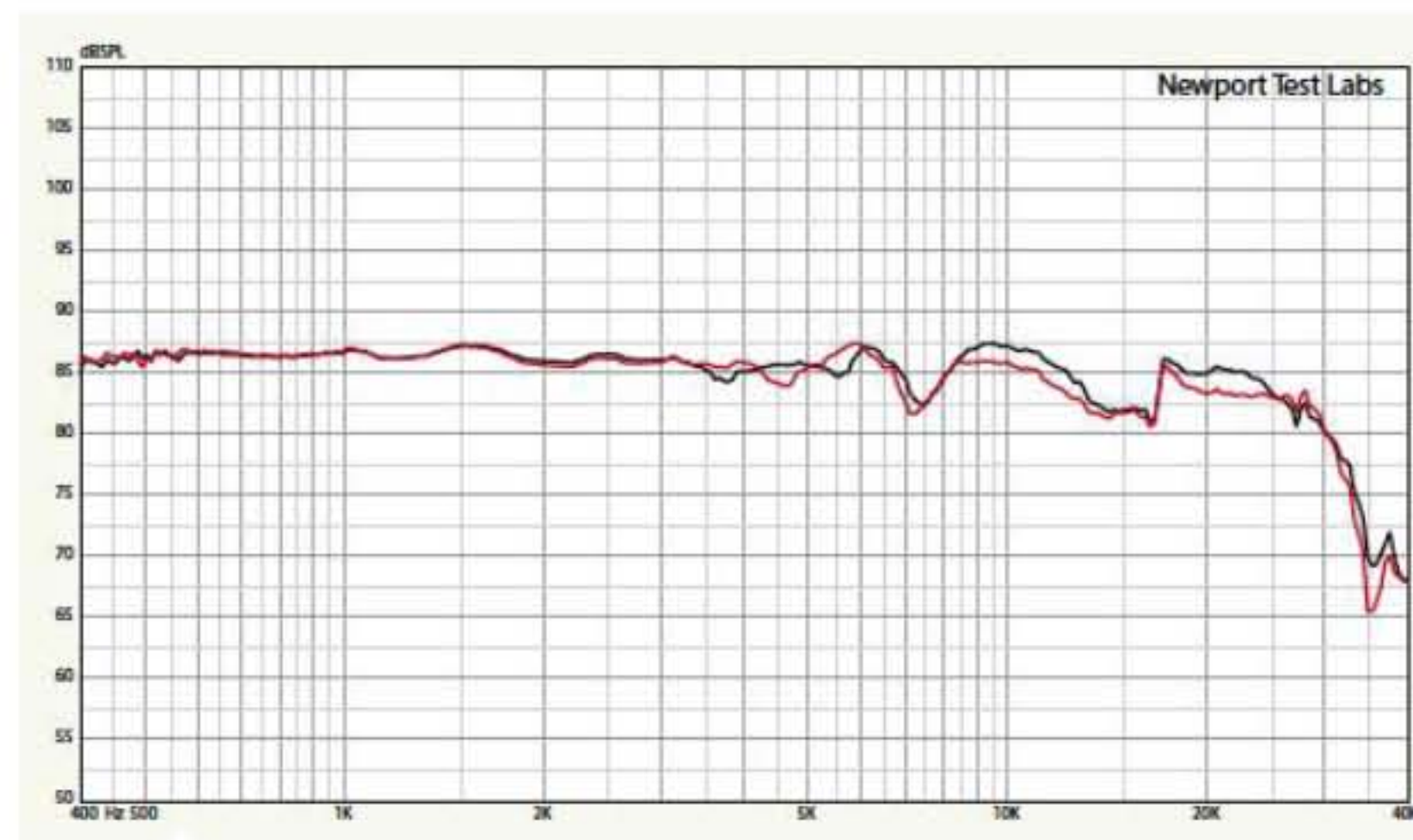
LABORATORY TEST RESULTS

| Steve Holding

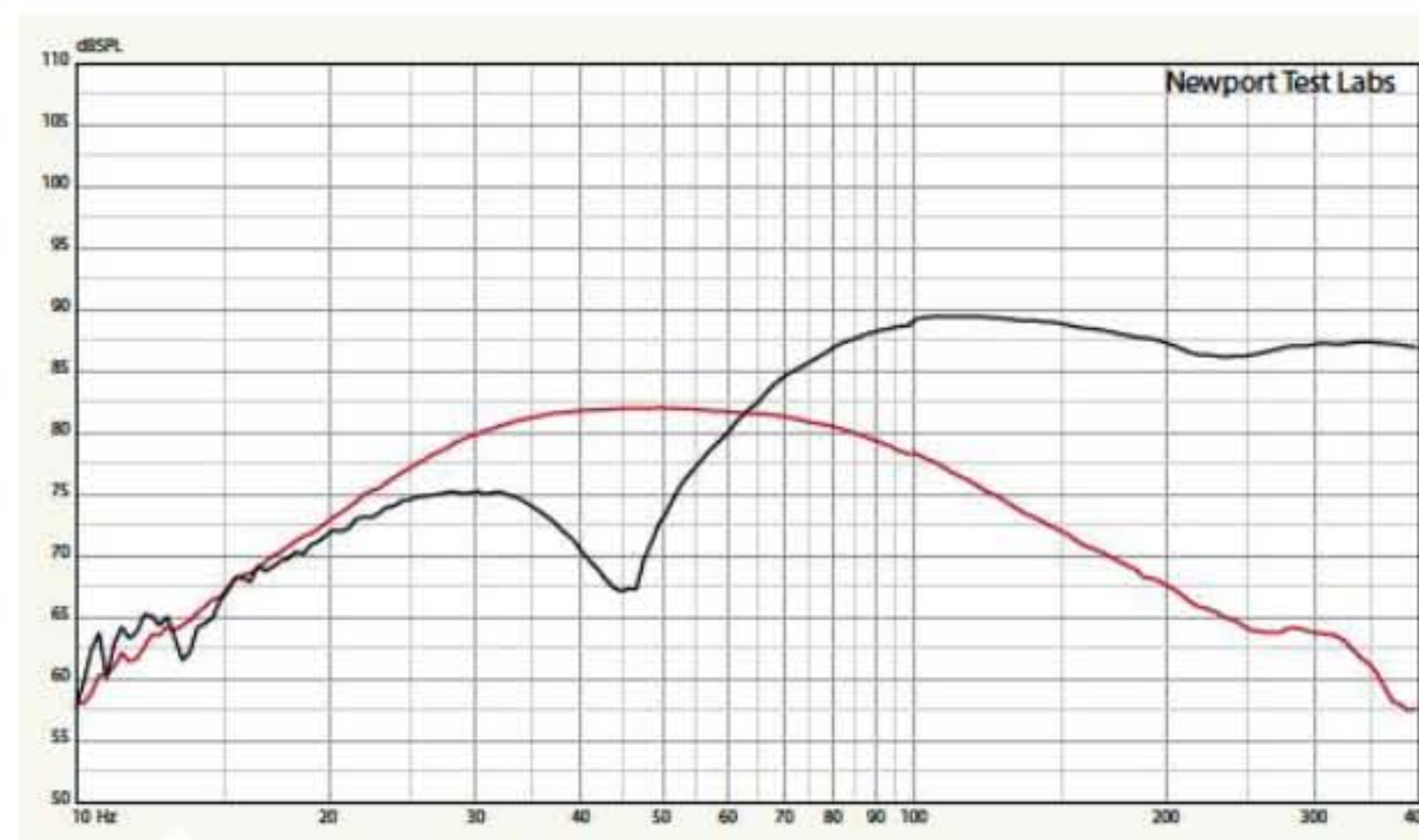


Graph 1. In-room frequency response using pink noise test stimulus

with capture unsmoothed. Trace is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter. [Harbeth Monitor 30.1 Loudspeaker]

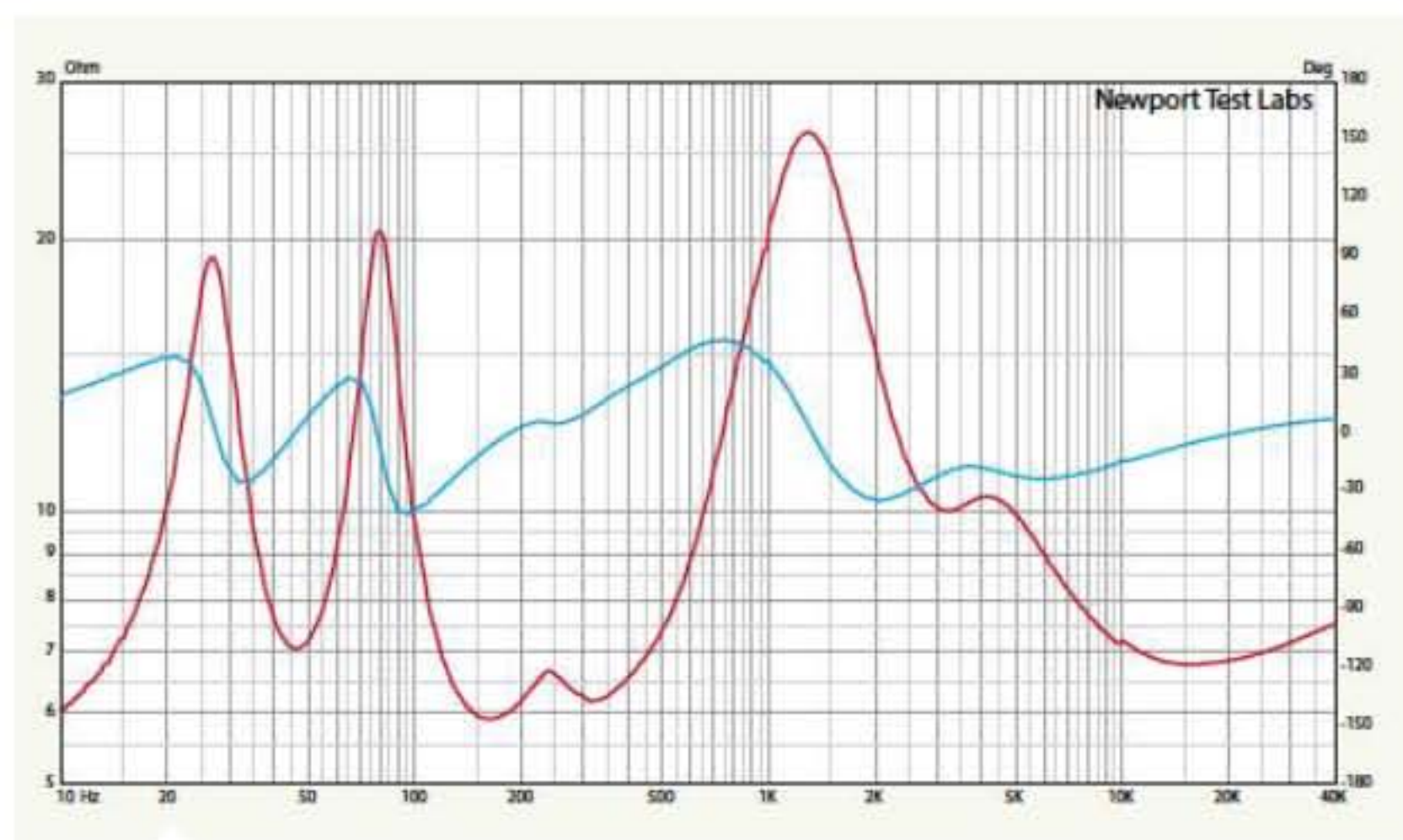


Graph 2. High-frequency response, expanded view, showing response with grille fitted (black trace) and with grille removed (red trace). Test stimulus gated sine. Microphone placed at three metres on-axis with dome tweeter. Lower measurement limit 400Hz. [Harbeth Monitor 30.1 Loudspeaker]

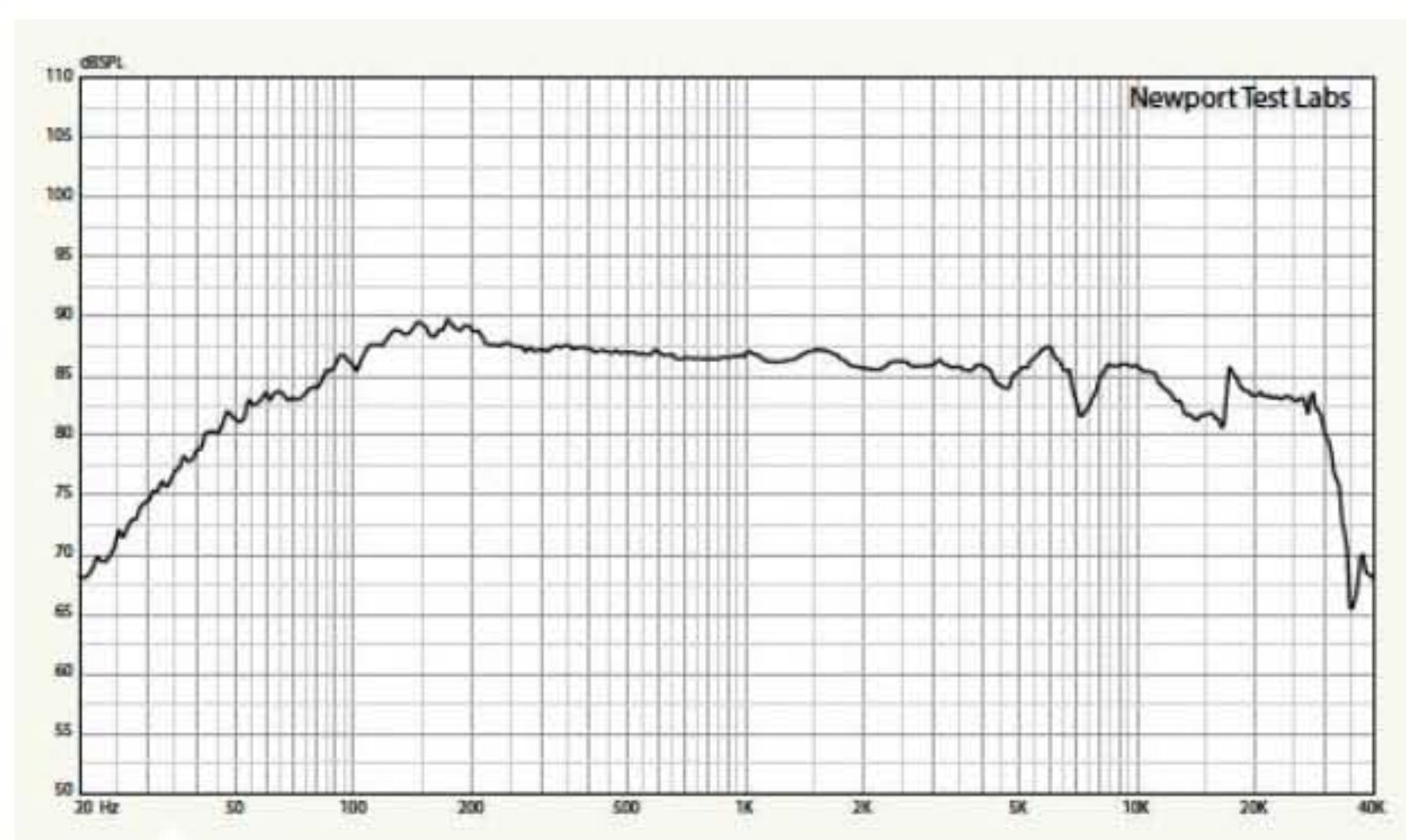


Graph 3. Low frequency response of front-firing bass reflex port (red trace) and woofer. Nearfield acquisition. Port/woofer levels not compensated for differences in radiating

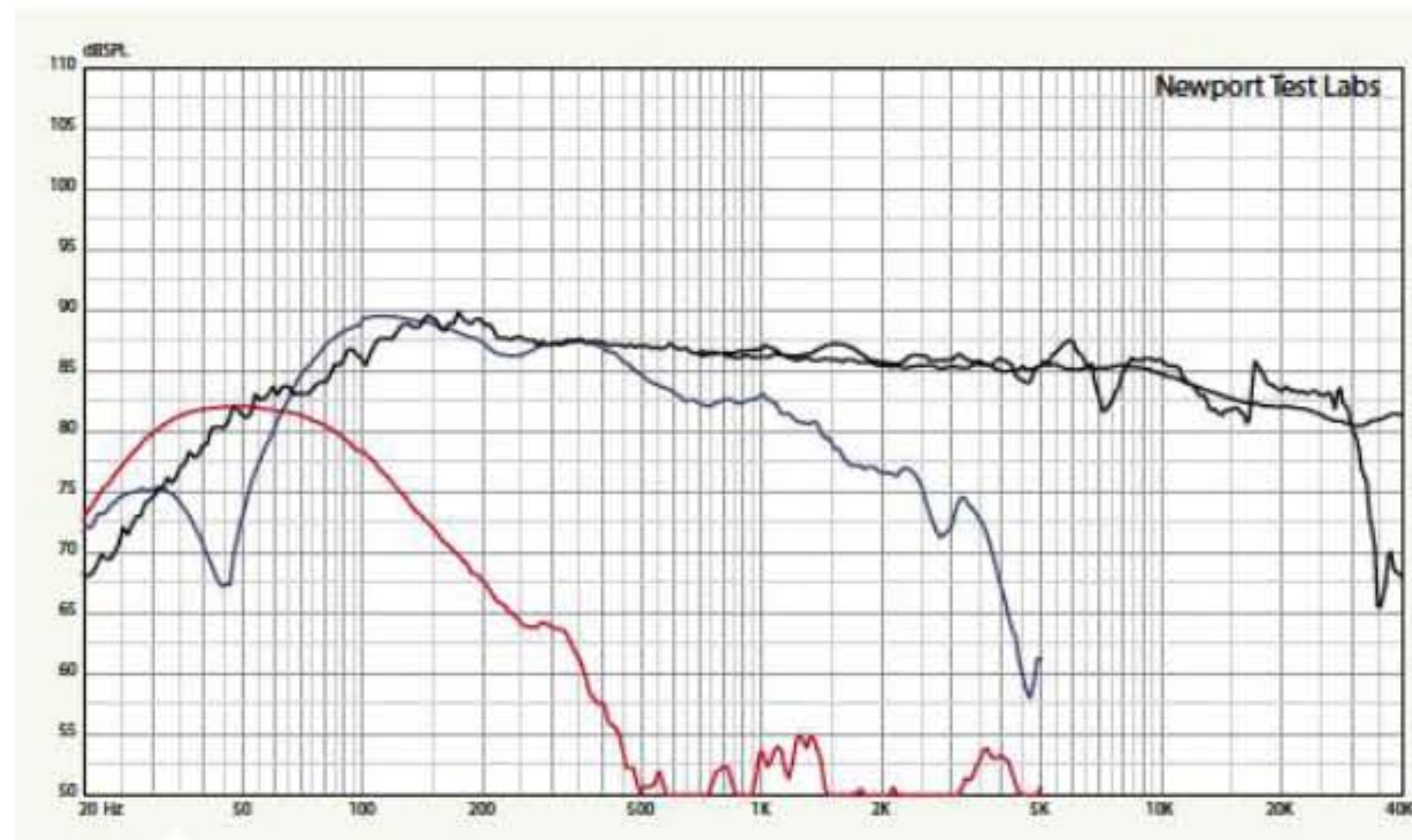
areas. [Harbeth Monitor 30.1 Loudspeaker]



Graph 4. Impedance modulus (red trace) plus phase (blue trace). [Harbeth Monitor 30.1]



Graph 5. Frequency response. Trace below 500Hz is the averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter using pink noise test stimulus with capture unsmoothed. This has been manually spliced (at 500Hz) to the gated high-frequency response, an expanded view of which is shown in Graph 2. [Harbeth Monitor 30.1 Loudspeaker]



Graph 6. Composite response plot. Red trace is output of bass reflex port. Dark blue trace is anechoic response of bass driver. Black traces are in-room and spliced responses. [Monitor 30.1]

Newport Test Labs first measured the in-room frequency response of the Harbeth Monitor 30.1 using a pink noise test stimulus, averaging nine different sweeps measured at three metres, the result of which is shown in Graph 1. You can see the response is very flat across the midrange. From 220Hz up to the graph limit of 10kHz, it's within ± 1.25 dB. The plus/minus decibel level variations are not uniform, however, with the response at +1.25dB at 220Hz then reducing gradually in level with increasing frequency to be -1.25dB at 2kHz, after which the response continues almost ruler-flat at this same level right out to the graph limit. So, overall, the output level drops 2.5dB over the decade from 220Hz to 2kHz.

The anechoic high-frequency response of the Harbeth Monitor 30.1 is shown in Graph 2, with the gating technique used by

Newport Test Labs making it impossible to measure below 400Hz for this particular test. The graph shows both the frequency response without the grille fitted (the black trace) and with it fitted (the red trace). Perhaps the first thing to note is that Harbeth's grille design is excellent, because unlike most grilles, it is truly acoustically transparent, having very little effect on the performance of the speaker. Because of this, I would recommend you leave the grilles in place when listening—even for critical listening sessions. You can see the response is very flat and linear out to 5kHz, where there's a slight rise followed by a 2.5dB suck-out centred at 7.5kHz, followed by a rise to +2.5dB at 9kHz, after which the response gradually rolls off to -2.5dB at 17kHz, after which it abruptly picks up and extends out beyond 20kHz before rolling off to be around 20dB down at 35kHz.

I assume the abrupt transition at 17kHz is an artefact caused by the metal grille protecting the dome tweeter.

Although interesting from a technical viewpoint, it will have no bearing on the speaker's sound as it happens at a frequency higher than most people are able to hear, and even those people who can hear 17kHz signals could not hear such a small difference in the level of a signal at this frequency. As for those variations below 10kHz that I drew to your attention,

the human ear would not perceive those either, as they're too narrow in bandwidth and too small in level to be audible. It's only the extreme precision of the measurement technique used that makes them visible on the trace at all.

Newport Test Labs measured the low-frequency response using a near-field technique to simulate how the Harbeth Monitor 30.1 would respond in an anechoic chamber, the result of which is shown in Graph 3. You can see that the bass/midrange driver's output starts its roll-off at 100Hz and then rolls off at 18dB per octave to a minima at 45Hz. Of course the output of the front-firing bass reflex port partially compensates for the losses, as you can see from the red trace. The port's contribution is fairly limited, however, though it does deliver that contribution over a wide range of frequencies, being -3dB at 27Hz and 95Hz.

The impedance of the Harbeth Monitor 30.1 only drops below 6 at 160Hz (and then only to 5.8), and is also mostly above 8 , so it's higher than I usually see on most modern speaker designs with 8 nominal impedance ratings, but it means that the Monitor 30.1 is really a true 8 design. The kink in the impedance trace reveals the presence of a (presumably panel) resonance at this frequency, and the effect can also be seen both on the phase

response and on the frequency response of the bass/midrange driver. The saddle between the two resonant peaks is at 45Hz, showing that you will get no effective output below this frequency. The rather high impedance of the system around 1.3kHz (it peaks at 27) means some amplifiers might reduce their output in this region as a result, so amplifier matching will assume greater importance with this design than it might with some other speakers.

Graph 5 shows the overall response of the Harbeth Monitor 30.1, as measured by *Newport Test Labs*, and you can see that despite the overall linearity and the flatness of the midrange, there's still a slight spectral tilt to the spectrum that sees the output higher at low-frequencies than it is at higher frequencies. Despite this, the overall response measured by *Newport Test Labs* for the Harbeth Monitor 30.1 was 48Hz to 30kHz \pm 4dB, which is self-evidently excellent.

Newport Test Labs measured the sensitivity of the Harbeth Monitor 30.1 as being 86.5dB SPL at one metre for a 2.83V_{eq} input. This is a touch higher than Harbeth's own specification of 85dB SPL, proving that Harbeth is obviously being conservative with its rating, but it is lower than the average for all speakers, so I'd suggest that you use a fairly high-powered amplifier, of

at least 60 or 70-watts per channel to drive them unless you have a small room and listen at lower levels, in which case 40–50-watts would likely be sufficient.

Overall, the measurements of the Harbeth Monitor 30.1 show it to be a very well-designed loudspeaker, with a higher efficiency than I would have expected for its size and driver configuration.

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.