

Review of TAD ME1 by T.J. Norton, 01/2018 on :



## TAD Micro Evolution One loudspeaker



Notwithstanding the twists and turns of Japanese corporate culture, the status of Technical Audio Devices Laboratories, Inc. remains unchanged. Founded in 1975 as a subsidiary of Pioneer to build loudspeakers for the professional market, TAD remains part of that corporation, even after the recent sale of Pioneer's home-audio division to Onkyo.

TAD has long been a highly respected name in pro audio, and for decades sold exclusively to that market. But 16 years ago, when they introduced a speaker designed for the home market—the Reference One—its five-figure price raised eyebrows in a market not yet saturated with speakers selling for more than \$50,000/pair. But it was less than a shock, given that speakers with pro-audio genes in their DNA are expected to be pricey.

A string of other new TAD models followed, including the [Compact Reference CR1](#), at \$45,000/pair plus \$4000 for the matching stands—still the costliest consumer stand-mounted speaker we know of.<sup>1</sup> All of these designs came from TAD Labs' main development center in Japan, led by chief engineer Toru Nagatani and the pen of content/surpassing-expectations-pioneers-andrew-jones">Andrew Jones (footnote 1), who alternated between creating TAD models for those who could casually write a five-figure check, and surprisingly good and affordable Pioneer speakers for the rest of us.

Now we have the new Micro Evolution One, or ME1, the first affordable speaker from TAD—though affordable only in comparison to the company's other models. At \$12,495/pair, just under one-third the price of the CR1, the ME1 will still put a significant dent in your savings.



## Design

The ME1 is the first TAD home loudspeaker not designed by Andrew Jones, who now works for Elac. But Jones's fingerprints are still clearly visible—the ME1 echoes many of the themes found in the CR1. It's a true three-way design in a size normally reserved for modest two-ways, though its design and appearance are anything but conventional.

The bottom end is handled by a 6.3" (160mm) woofer with a MACC diaphragm—TADspeak for Multi-layered Aramid Composite Cone. The rear radiation from this woofer exits the cabinet through small openings on each side that feed into narrow slots that vent to the outside at the enclosure's front and rear. TAD calls this bass-loading design bidirectional ADS, for Aero-Dynamic Slot.



Is ADS actually a variation of aperiodic bass loading—a technique first used by Dynaco in the 1960s? Based more on a cabinet with a controlled leak than a sealed or ported box, aperiodic loading produces the single impedance peak characteristic of a sealed box instead of the two peaks of a conventional ported system. It also reduces the amplitude of that peak, and is claimed to offer the bass extension of a larger sealed box while lacking what some consider to be the disadvantages of bass ports.

We'll see what John Atkinson's measurements show. In any event, aperiodic loading is rare today, perhaps because when it was first used, the rigorous, math-based techniques for the optimal design of a specific driver in a ported box hadn't yet been refined. Even today, manufacturers in search of more salable bass output from smaller ported boxes bend the rules a bit. They might get more extension, but often at the cost of a sloppy low end and/or an upper-bass emphasis that many consumers confuse with deep bass. This might be why audiophiles sometimes give ported boxes a bad rap.

TAD also uses coincident midrange and tweeter drive-units in its speakers for the home. Unlike coaxial drivers, in which the tweeter and its mounting bracket are positioned in front of the midrange driver, partially blocking the latter's radiation, a coincident driver's tweeter is placed at the throat of its midrange cone, leaving that cone free of obstructions. KEF, with its UniQs, is today's most prolific producer of coincident drivers, though Tannoy might justifiably claim it got there first. Other speaker brands that use coincidents today include Pioneer and Elac. It's no coincidence (sorry) that Andrew Jones did early work at KEF before moving on to Pioneer/TAD and then to Elac.



TAD calls its coincident drivers Coherent Source Transducers (CST), and the ME1's CST is the smallest yet. Its 3.6" (90mm) midrange cone is made of magnesium, which is lighter than aluminum, and is partnered with a 1" (25mm) beryllium-dome tweeter. TAD claims that this tweeter's response extends up to 60kHz, though that would be a challenge to verify. The crossover frequencies are 420Hz and 2.5kHz, though the slopes aren't specified.

Unlike the usual separate midrange and tweeter, with a coincident driver the frequencies from the bottom of the midrange to the extreme treble originate from the same point in space. This eliminates the erratic response (comb filtering) in the crossover region that can be produced by separate drivers when a listener isn't positioned within the optimal listening window. In a speaker with a coincident driver, the low end is typically handled by a separate woofer, as in the TAD ME1. But in some designs, such as KEF's smaller two-way stand-mount models, the cone of the coincident driver also handles the bass.

A coincident driver's midrange cone can also act as a waveguide for the tweeter, to equalize the radiation patterns of the midrange (or midbass) and tweeter in the crossover region. Sometimes, it can also widen the tweeter's dispersion at higher frequencies.

Also: a cone driver's effective acoustic center is somewhere between the cone's surround and its apex, but generally closer to the apex, particularly at a typical crossover frequency. But in a conventional speaker the tweeter is on the front baffle, perhaps as much as 1" forward of the midrange's acoustic center. This can result in response problems where the two drivers' outputs overlap. While this can be compensated for in the crossover, it's not trivial. But with the tweeter of a concentric driver at the apex of the midrange and closer to the latter's acoustic center, the two drivers' outputs can be closely aligned at the crossover frequency without complicating the crossover.

The ME1's enclosure is made of a combination of Baltic birch plywood and MDF. Inside, a 4mm-thick steel plate extends between the sides of the cabinet to further reinforce it, contributing to the speaker's robust weight of 44 lbs. Two pairs of high-quality speaker terminals on the rear allow for biwiring or biamping, if desired. If not, the speakers' heavy-duty shorting links—not the thin metal straps provided with many biwirable speakers—can be used to connect the terminals to each other, as I did for this review.

As I write this, the ME1 is available only in the impeccable piano black finish, with flat black side cheeks, of our review samples. At the 2017 Tokyo Audio Show they were reportedly shown in a titanium finish. When that becomes available, it will likely be an extra-cost option. In neither case will you have to decide between listening with the grilles on or off—there are no grilles, though a metal screen protects the midrange-tweeter CST from prying fingers.

TAD offers optional stands for the ME1s. They're attractive, a good match for the speakers, and solidly made. The heavy center support is pre-filled—no messing around with lead shot and/or sand—but the stands come in a flat pack and are a bit awkward to assemble. At \$1795/pair, I'd expect your TAD dealer to assemble them for you!

Fasteners at the rear of the stand let you secure the speaker cables to it with ties (not provided). Spikes are included, along with floor protectors for use under the spikes. I didn't use the spikes, as there are hardwood floors under the carpeting that covers most of my listening room. In any case, it may not have mattered; the spikes' soft points aren't thin or sharp enough to penetrate most carpets.





I recommend the stands—the ME1s can be screwed securely to them using the preinstalled, threaded inserts in the speakers' bottom panels. Secured to generic stands with only a few blobs of Blu-Tack, the TADs would be too heavy to walk around the room without being dislodged, and anyway, most multi-use stands lack a top plate big enough for proper support. Even on TAD's dedicated stands, the ME1s were top-heavy and tricky to move around. Gloves with rubberized palms, cheap at any good hardware store, are a big help in ensuring a good grip to walk these or any speakers around the room.

### **Setup**

My listening room measures a modest 21' by 16', with a ceiling shaped like the inside of a four-sided pyramid and 11–12' high at its apex, with an estimated average ceiling height of 9'. A soffit roughly 18" deep (slightly deeper on one of the 16' sides) high runs the room's perimeter. This space is part of an open floor plan, with one of the 21' sides almost entirely open to the kitchen-breakfast area, which in turn is open through a large opening to the dining room. The acoustic space is therefore much larger than the 21' by 16' listening area, and also accommodates a home-theater setup, for my work for our sister publication *Sound & Vision*. (My two roll-up projection screens, of different sizes and aspect ratios, are fully retracted when I listen to music.)

The room isn't overly dead, but apart from the kitchen space, the floors are mostly covered with large, relatively thick, unpadded rugs. Shelves filled with books, CDs, and videos line the rear wall, several feet behind the listening seats, and acoustic panels of various sizes are scattered around the adjoining spaces to suppress any slap echo that might intrude into the listening area.

Except as noted below, I positioned the TAD ME1s about 6' out from one of the 16'-wide ends of the room. The entire wall behind them is segmented in a bay shape; each of its three facets has a window, but this isn't a conventional bay window. The TADs were a bit more than 8' apart, just slightly more than that from the main listening seat, and angled inward so that their axes crossed just in front of me when I sat in the main seat.

### **Listening**

I began with a Marantz UD7007 universal 3D BD player and AV8802A surround-sound processor (in stereo only) with two channels of a Proceed AMP5 amplifier (125Wpc into 8 ohms; each of the Proceed's five channels is driven by a completely separate power supply and transformer). The TAD ME1s immediately impressed me with their exceptional resolving ability—their beryllium tweeters were clearly the star of the show. This was the first chance I'd had in at least five years to live with beryllium tweeters (as opposed to hearing them often at audio shows), and I don't remember having ever been so impressed by them before.

The leading edges of the percussion instruments in Bizet's *Carmen Fantasy*, performed by the All Star Percussion Ensemble conducted by Harold Farberman (CD, Moss Music Group MCD 10007), exploded onto the soundstage without unnatural edginess. Subtle shadings of instrumental percussion textures were far more evident than I'm accustomed to hearing, and the distinct reproduction of the ambience of the recording venue added welcome helpings of air and depth. On vocal recordings, sibilants stayed natural as well, apart from poorly miked or overprocessed recordings. The ME1s were not forgiving with the latter, but neither were they ruthlessly revealing.

The midrange was similarly impressive. All we can reasonably expect of a midrange driver is that it be low in distortion, offer a believable balance that clearly reflects the recording quality—for better or worse—and avoid obvious colorations.

In my months of living with the ME1s, I can't recall a single instance of obvious midrange problems with otherwise good recordings. Instrumental timbres were convincingly reproduced, as were the voices of a wide range of singers, well known and obscure, such as Holly Cole, Norah Jones, Cyndee Peters, Sophie Zelmani, Sinne Eeg (the last two first heard on The DALI CD Vol.3, a sampler demo disc from Danish loudspeaker maker DALI), Muddy Waters, Leo Kottke, Leonard Cohen, the King's Singers, and many others. My in-room measurements (footnote 2) did show a peak just above 150Hz—which is either the upper bass or the lower midrange, depending on your definition—but I heard no evidence of it. Nor was I disappointed by the ME1s' excellent soundstaging, which excelled in both depth and width when the recording cooperated.

If the TAD had a weakness, it was one you might guess from looking at it. While larger than some stand-mounts, it's still a small speaker, and despite its unique bass loading it didn't dig particularly deep in the low end. My in-room measurements did show useful response into the mid-to-50Hz region (figs.1 & 2). (In my setup, any right-channel speaker is handicapped by the absence of a wall to the right of it; the left went slightly lower.) Listening to the warble tones on Stereophile's first [Test CD](#) (Stereophile STPH002-2) with both speakers playing, I heard just-audible output at 40Hz.

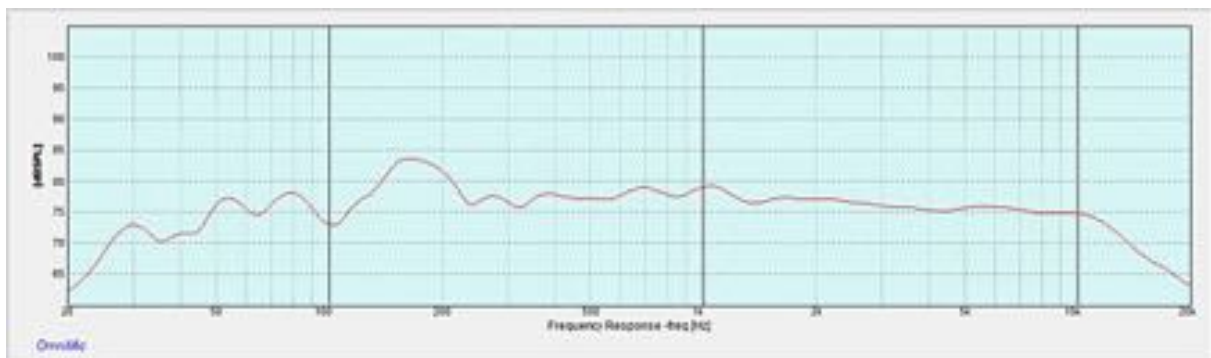


Fig.1 TAD Micro Evolution One, left speaker, averaged in-room response at listening seat.

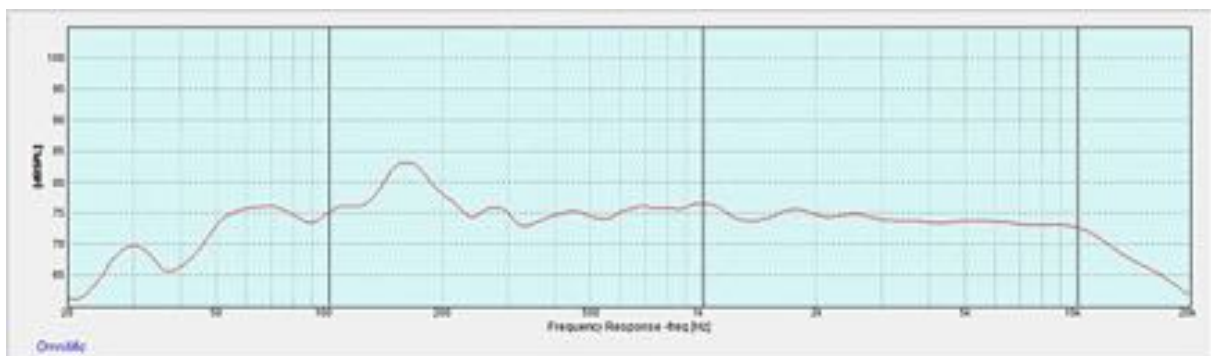


Fig.2 TAD Micro Evolution One, right speaker, averaged in-room response at listening seat.

Depending on the instruments involved, the TAD's bass was often more than adequate. Never boomy or bloated, it was consistently tight and well defined—until it gave up the ghost. Double basses, such as David Piltch's on Holly Cole's *Don't Smoke in Bed* (CD, Manhattan/Capitol CDP 7 81198 2), were often satisfying (the instrument typically bottoms out at around 40Hz). And the cleanness of that bass range always supported the music, even when it was obvious that I wasn't hearing everything the recording had to give. This was frequently the case with recordings of pipe organ, or of pounding drums such as those on Kodo's *Mondo Head* (CD, Sony Music Entertainment Japan WK 56111), a percussion recording produced by Grateful Dead drummer Mickey Hart, who co-composed all but one of the selections.

To further check this out, I went back and forth between the full-range ME1s alone, and the ME1s plus a properly set up and equalized subwoofer operating below 60Hz. In the latter case the TADs were still operating full-range, a setup that most audiophiles could achieve with a subwoofer having its own low-pass filter. But I used the low-pass filter in the Marantz pre-pro. The sub was a [Revel B15](#) (not a current model); I used it only for this bass comparison (except as noted), and not for any of the other listening observations in this review. My measurements (fig.3 & 4) showed that with the sub engaged, the system responded down to 20Hz. This was helped, of course, by room gain, though my open listening space likely offers less bass reinforcement than would a smaller, enclosed room. Also of help were the B15's three analog parametric equalizers, which I tediously tweaked with the help of the OmniMic measuring gear. No other equalization of any kind was used.

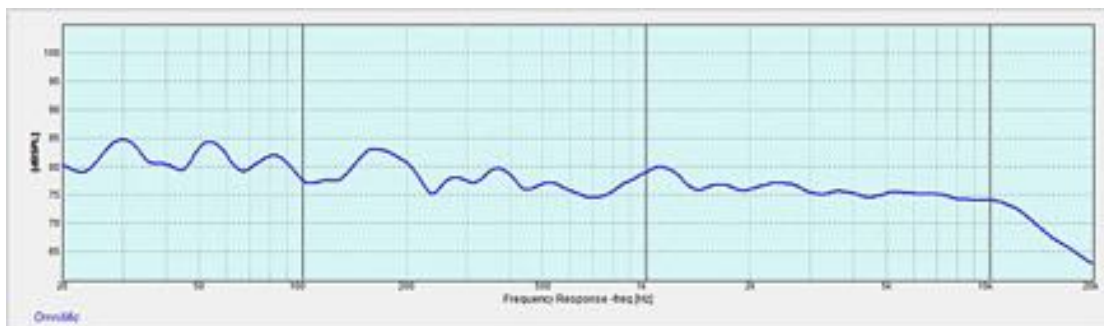


Fig.3 TAD Micro Evolution One, left speaker with subwoofer, averaged in-room response at listening seat.

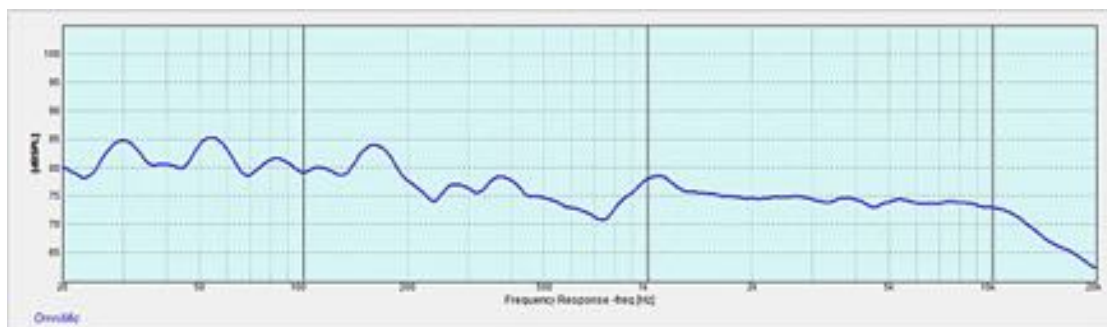


Fig.4 TAD Micro Evolution One, right speaker with subwoofer, averaged in-room response at listening seat.



On at least half of the selections I played, the subwoofer made little or no difference to the sound—not surprising, as many instruments and recordings have little or no significant content below 40Hz. But when they did, the effect was unmistakable, even with a subwoofer dialed in not to add boom or other tricks to the sound. Piltch's double bass on the Holly Cole CD sounded a bit firmer, though I hadn't before felt I was missing anything. Often, the change was dramatic. The drums on Kodo's Mondo Head had a palpable solidity they'd lacked through the ME1s alone. The heart-like beat that opens Pink Floyd's [The Dark Side of the Moon](#) (CD, Harvest CDP 7 46001 2) was weak through the TADs alone, but clearly present with the sub engaged. And while not exactly music, the thunder that opens and closes the Empire Brass Quintet's performance of Rolf Smedvig's Hopper Dance, from a Telarc recording excerpted on Test Tracks 01 (CD, Tag McLaren Audio 4101), was missing its low, guttural rumble with the ME1s alone. But while driving the TADs full-range with a sub worked fine with music—apart perhaps from the odd organ climax, passing thunderstorm, or rumble-generated infrasonics from LP playback—I would always add a high-pass filter to the TADs when using them with a sub in a home-theater system. As foolish as that might sound to many Stereophile readers, more than few dual-purpose high-end systems are out there using speakers pricier than and inferior to the TADs. A third ME1 could be used for the center channel for both movies and multichannel audio (and two more for surrounds, but let's not go over the top—Atmos 7.2.4, anyone?). And yes, I did also use the ME1s as the main left/right speakers in a surround system. Moving them in and out of position every day or two to do video work for Sound & Vision would have been tedious at best, and for me, evaluating video with films but without the sound system to support them quickly gets old. I won't address that application in any detail here—this is, after all, a review of a speaker to be used for listening to music in two-channel stereo. Still, I also used a nonmatching and far more modest center-channel speaker, a Revel Concerta1. I could have used a phantom center, but I've never liked them. Moonlighting as part of a surround-sound array, protected by a high-pass filter, and played at levels that weren't over the top but still might prompt an angry, late-night visit from the neighbors, the TADs worked superbly. Even in my large room, the Proceed amp's 125Wpc into 8 ohms—and considerably more into the ME1's 4 ohms—was more than adequate for any level I could stand with films—or with music, with or without the subwoofer. If you think film sound is slumming, it isn't. I'm a huge fan of film scores, and the best experiences I had with the TADs with large-scale music, such as symphony orchestras or elaborate electronic compositions, were when I played soundtracks from a film's original Blu-ray, not the separate release of the score on CD. For more on this subject I highly recommend Score, a superb documentary on BD about film scores, their composers, and how they're recorded. The final orchestral flourish on that release, appropriately titled "Finale," sounded spectacular through the TADs when supported by the Revel center and sub. My only frustration is that this selection isn't credited in more detail—I can't tell you what film it comes from.

## Change of Amps, Change of Positions

After all of the above, I switched from the Marantz pre-pro and Proceed amp to a BAT VK-23SE preamp and BAT VK-255SE power amp. And in an attempt to perhaps extend downward a bit the ME1s' sub-free bass, I moved them to the long (21') wall of my room, flanking my equipment rack. The TADs were still well out from the wall behind them (about 4', to keep them far enough from the equipment rack to avoid adverse reflections). As before, they were roughly 8' apart, 9' from the listening seat, and toed in toward me.

I also continued to use vintage Cardas Hexlink cables of the same generation for all analog connections, including player to preamp. The connections from preamp to amp were balanced (the BAT power amp doesn't have unbalanced inputs). The speaker cables were the same as before.

In these positions, the ME1s' bass seemed to extend another 5–10Hz lower than before (fig.5 & 6). This increased the solidity of the low end, though it still didn't equal the extension with the subwoofer—or even of larger, competent floorstanding designs. But the most interesting change was in the timbre of the sound from the BAT pairing. It was less bright than with the Marantz-Proceed combo—though I hadn't been at all unhappy with that setup—and more liquid and rounded, though not in any way muddled or ill defined. The BATs were a superb match for the TADs, though at \$14,000 an expensive one. I'm tempted to say that they sounded tube-like, which would no doubt please BAT, who also make tubed gear (the BAT preamp and amp are strictly solid-state). But my experience with modern tubed gear is nil, so here I'll say only that the sound was more likely to please tube fans than the cool, somewhat more analytical, less organic sound of the Marantz pre-pro and Proceed amp (the latter ancient in audio years but still very much Levinson–lite).

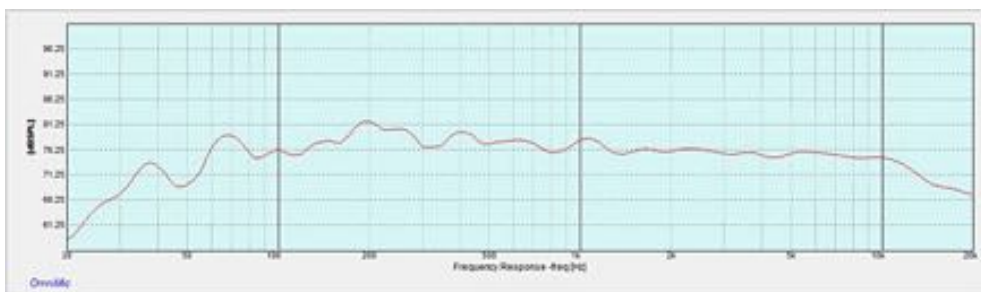


Fig.5 TAD Micro Evolution One, left speaker, long-wall position, averaged in-room response at listening seat.

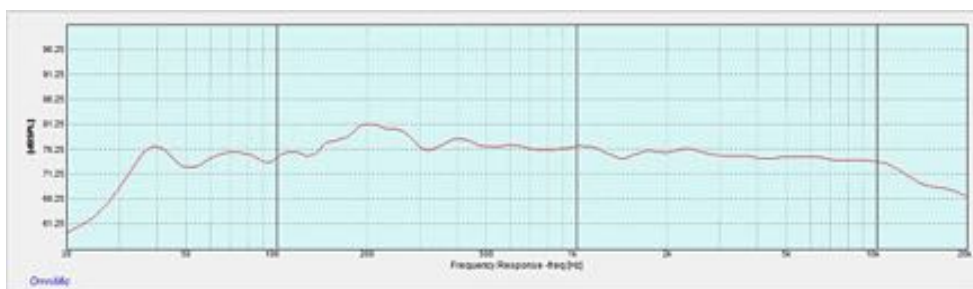


Fig.6 TAD Micro Evolution One, right speaker, long-wall position, averaged in-room response at listening seat.

Then, to reconfirm my earlier observations, I returned the TADs to their original positions and the Marantz and Proceed electronics. The ME1s continued to impress me in a big way. Yes, their bass was still limited, though by how much will depend on your room and setup. A smaller, more enclosed room than mine will inevitably reinforce the low end, and the speakers' inherently clean bass should work against the usual tendency of such rooms to produce too much and/or uneven bass.

### **Conclusions**

At \$12,495/pair, TAD's Micro Evolution One is a very expensive loudspeaker even in today's high-end market. Companies such as Bowers & Wilkins, Elac, GoldenEar, KEF, Monitor Audio, and Revel offer models that can give the ME1 a significant challenge for under \$15,000/pair, and offer more extended bass. But the appeal of the TAD sound, and the ME1's smaller, less obtrusive size, can't be denied, and deserve to attract enthusiastic buyers. However, those buyers should first confirm that a pair of ME1s will provide satisfying bass in their rooms. They can later add a subwoofer or two—and there are now many subs, even a few for less than \$2000, that can do the job without compromising the ME1s' sound. But you might be resistant to that extra expense—and/or prefer to keep your listening room free of subs.

That said, the Micro Evolution One is a remarkable speaker. Highly recommended, and clearly a solid candidate for Class A (Limited Bass Extension) of our "Recommended Components."

# TAD Micro Evolution One loudspeaker Measurements

## Sidebar 3: Measurements by John Atkinson

I used DRA Labs' [MLSSA system](#) and a calibrated DPA 4006 microphone to measure the TAD Micro Evolution One's frequency response in the farfield, and an Earthworks QTC-40 for the nearfield responses. My estimate of the TAD's sensitivity was 86.2dB(B)/2.83V/m, slightly higher than the specified figure of 85dB. Fig.1 shows how the impedance and electrical phase vary with frequency. Though the impedance has a minimum value of 3.9 ohms between 120 and 155Hz, and there's a combination of 5 ohms and  $-43^\circ$  phase angle at 33Hz, the ME1 is a relatively easy load for amplifiers to drive.

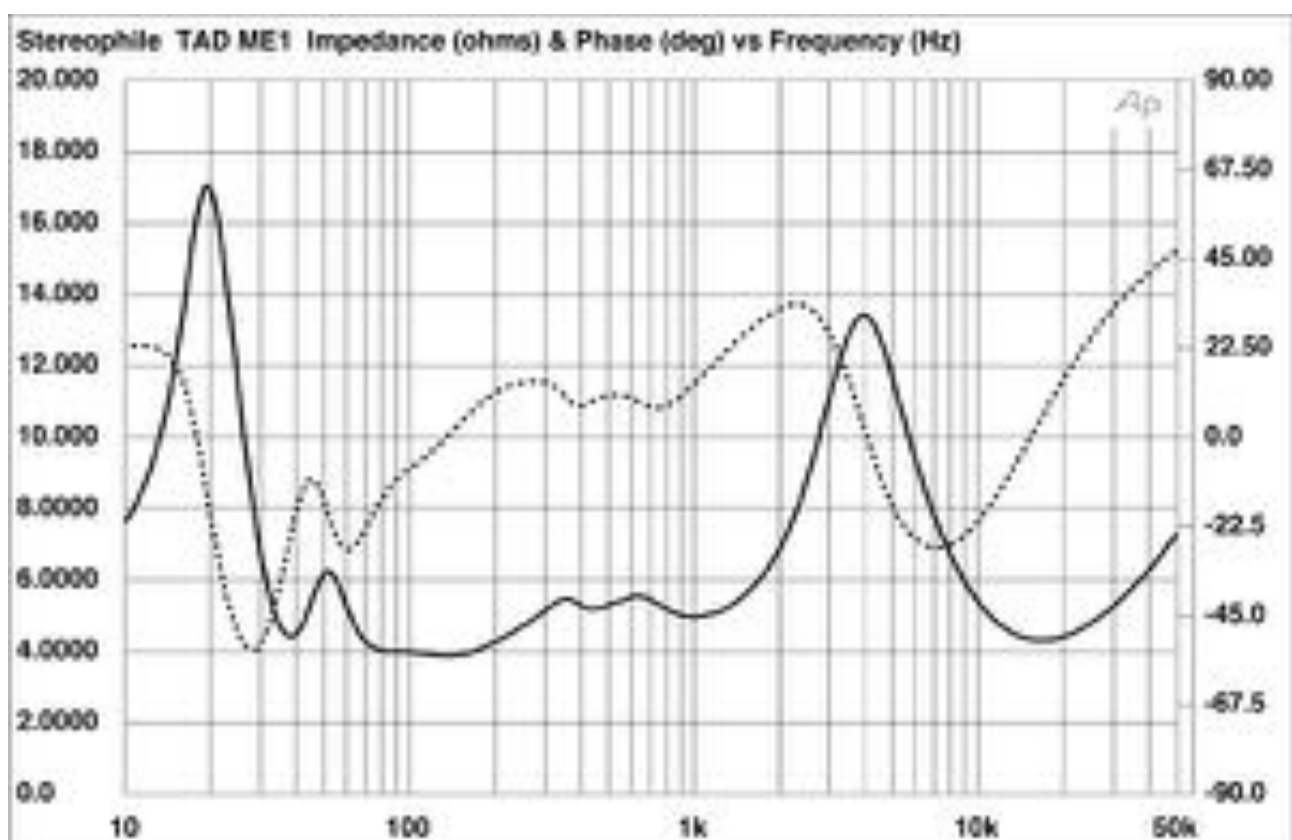


Fig.1 TAD Micro Evolution One, electrical impedance (solid) and phase (dashed) (5 ohms/vertical div.).

The traces in fig.1 are free from the small discontinuities that would suggest the presence of panel resonances. However, when I investigated the enclosure's vibrational behavior with a plastic-tape accelerometer, I did find a mode at 367Hz on the metal plates that cover the sidewalls (fig.2), though this was not present on other surfaces to any significant extent. Also visible in this graph is a lower-level mode at 1130Hz; this was more pronounced on the top panel (fig.3). As both the frequency and the Q (Quality factor) of this resonance are high, I doubt it will have any audible consequences.

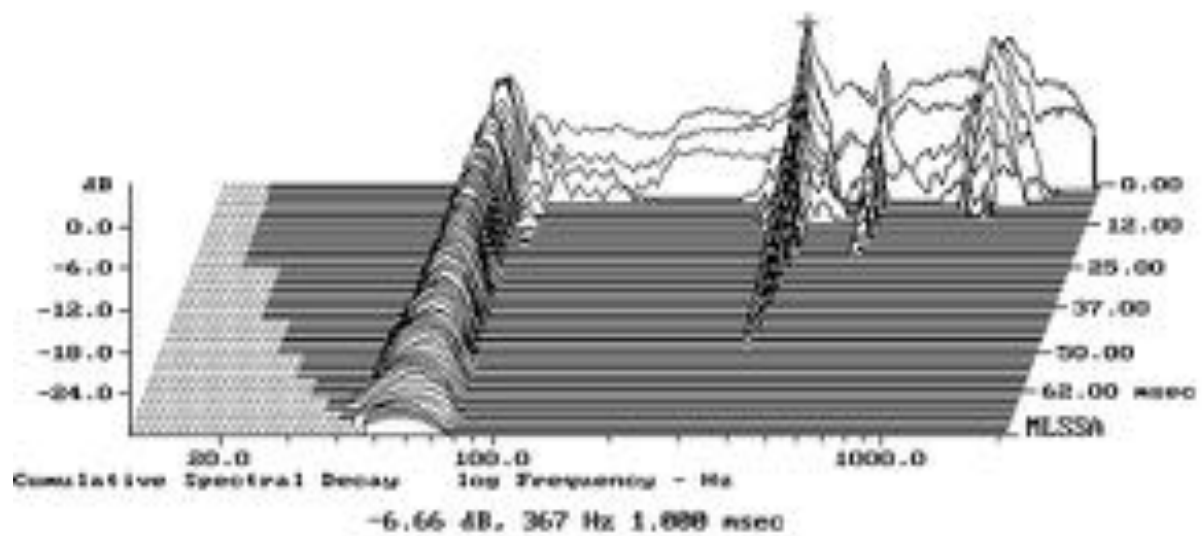


Fig.2 TAD Micro Evolution One, cumulative spectral-decay plot calculated from output of accelerometer fastened to center of sidewall (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

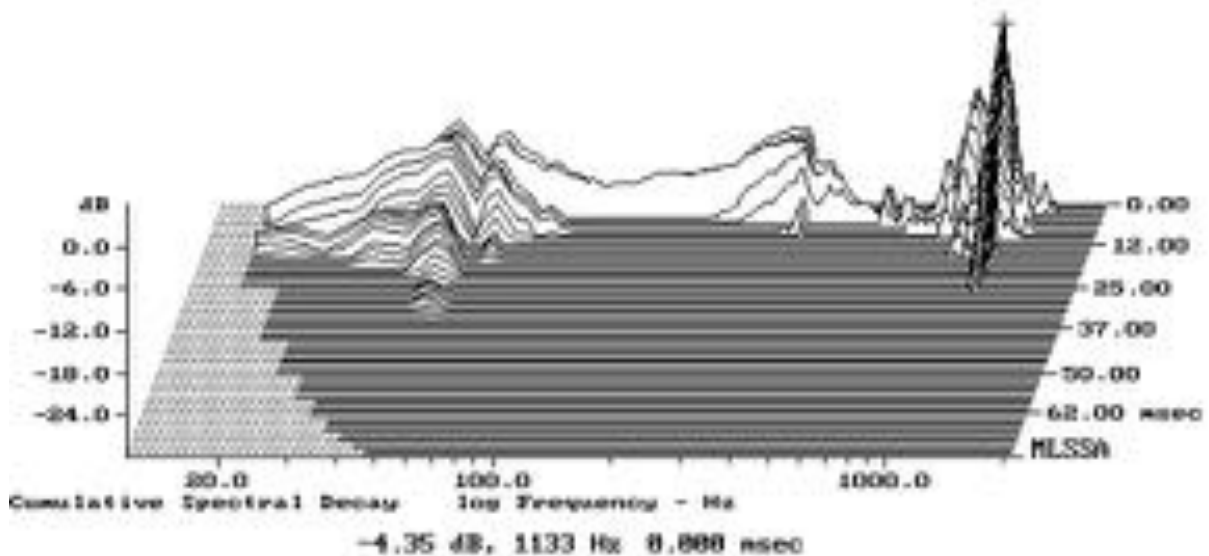


Fig.3 TAD Micro Evolution One, cumulative spectral-decay plot calculated from output of accelerometer fastened to center of top panel (MLS driving voltage to speaker, 7.55V; measurement bandwidth, 2kHz).

Tom Norton speculated that the woofer alignment was aperiodic in nature rather than being a traditional reflex (ported) tuning. The blue trace in fig.4 shows the summed output of the four slots to the front and rear of the metal plates on the ME1's sides. It peaks at 40Hz, as suggested by the impedance traces in fig.1, which coincides with the frequency of the notch in the woofer's output (red trace), as is to be expected with a traditional reflex tuning.



The slots roll off above their passband, but don't fully support the woofer's midbass output. The crossover between the woofer and the coaxial drive-unit (blue trace) appears to be set at 440Hz, with fairly steep high- and low-pass filter slopes. The coaxial unit's response on the tweeter axis is relatively flat, though small peaks and dips can be seen throughout the treble, these perhaps due to spatially symmetrical reflections of the tweeter's output from the edges of the midrange diaphragm. There is also a slight discontinuity just above 1kHz in the midrange diaphragm's output.

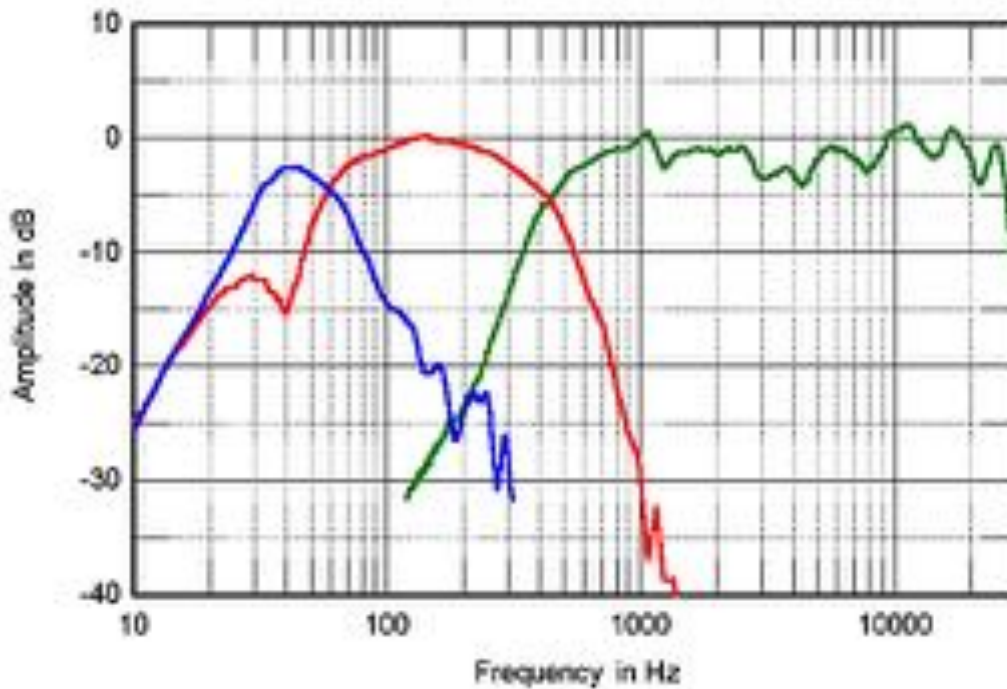


Fig.4 TAD Micro Evolution One, acoustic crossover on tweeter axis at 50", corrected for microphone response, with nearfield responses of midrange unit (green), woofer (red), and port (blue), respectively plotted in the ratios of the square roots of their radiating areas below 350Hz, 1200Hz, and 230Hz.

Fig.5 shows how the outputs of the individual drive-units sum in the farfield, with the response averaged across a 30° horizontal window centered on the tweeter axis. The usual rise in output in the upper bass due to the nearfield measurement technique is very slight, suggesting that the TAD's woofer alignment is overdamped. And, as TJN found, the output rolls off rapidly below 50Hz. Higher in frequency, the slight discontinuity in the upper midrange is still apparent, and while the treble response is even, it appears to slope down slightly in the top octave compared with the trace in fig.3. The horizontal off-axis behavior (fig.6) is both even and very well-controlled, which tends to correlate with stable, accurate stereo imaging. However, the ME1 does become more directional than usual above 8kHz, explaining the difference between the traces in figs. 3 and 4 in the top audio octave. In the vertical plane (fig.7), the tweeter again becomes directional above 8kHz, but the speaker otherwise maintains its balance over a wide window.

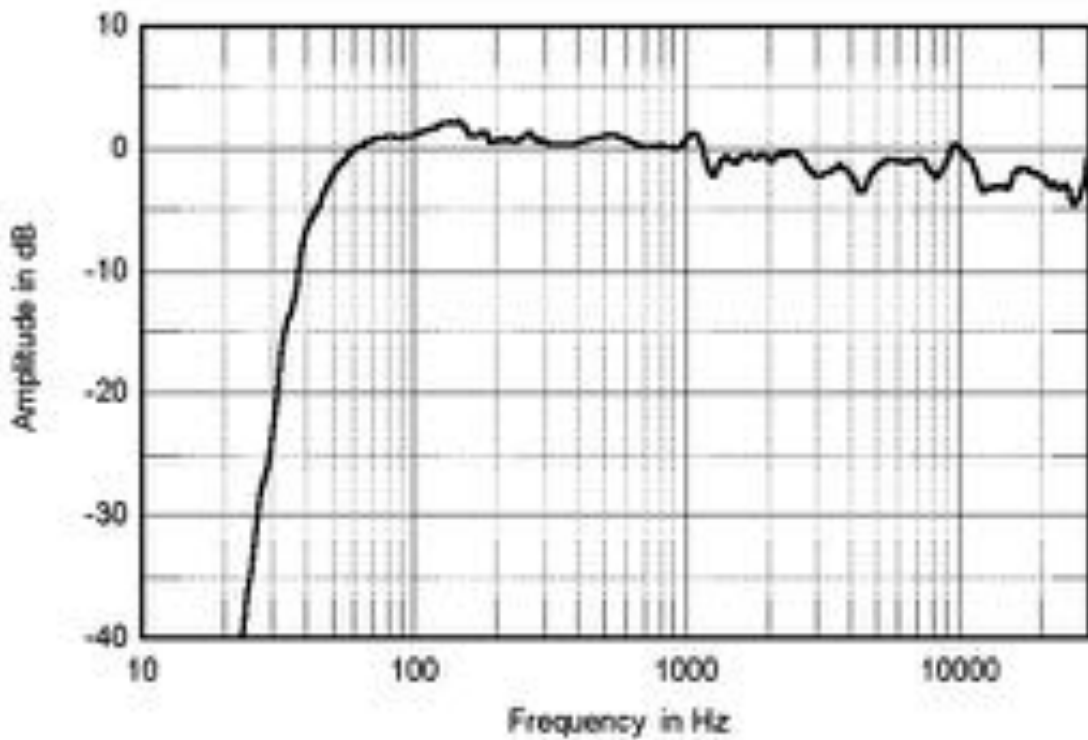


Fig.5 TAD Micro Evolution One, anechoic response on tweeter axis at 50", averaged across 30° horizontal window and corrected for microphone response, with complex sum of nearfield woofer and port responses plotted below 300Hz.

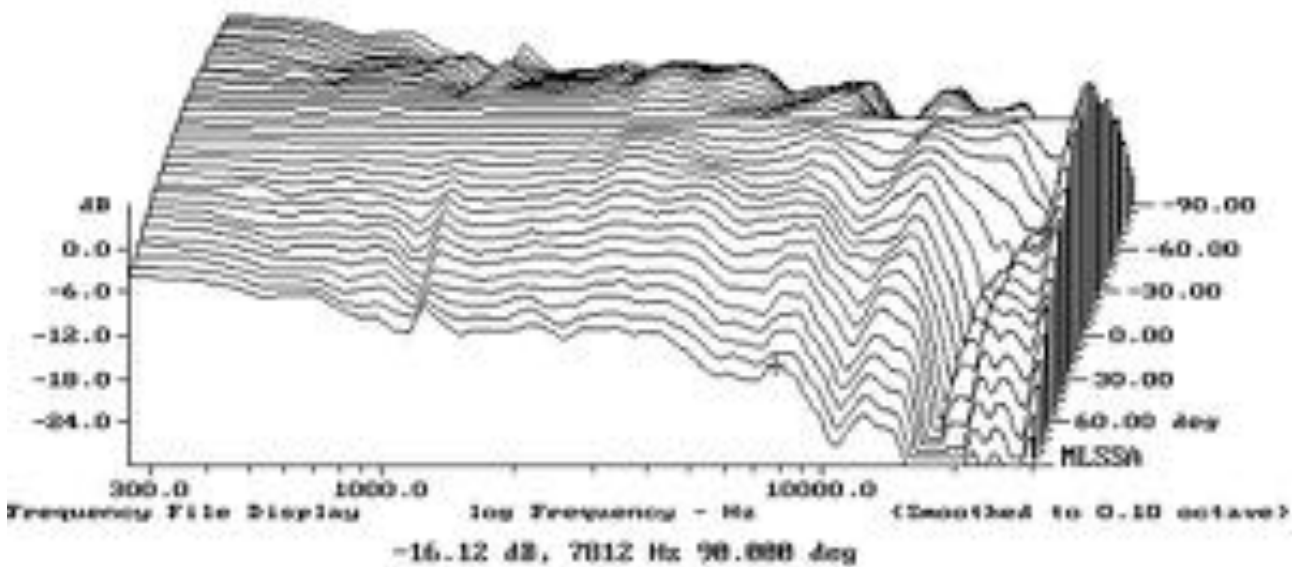


Fig.6 TAD Micro Evolution One, lateral response family at 50", normalized to response on tweeter axis, from back to front: differences in response 90–5° off axis, reference response, differences in response 5–90° off axis.

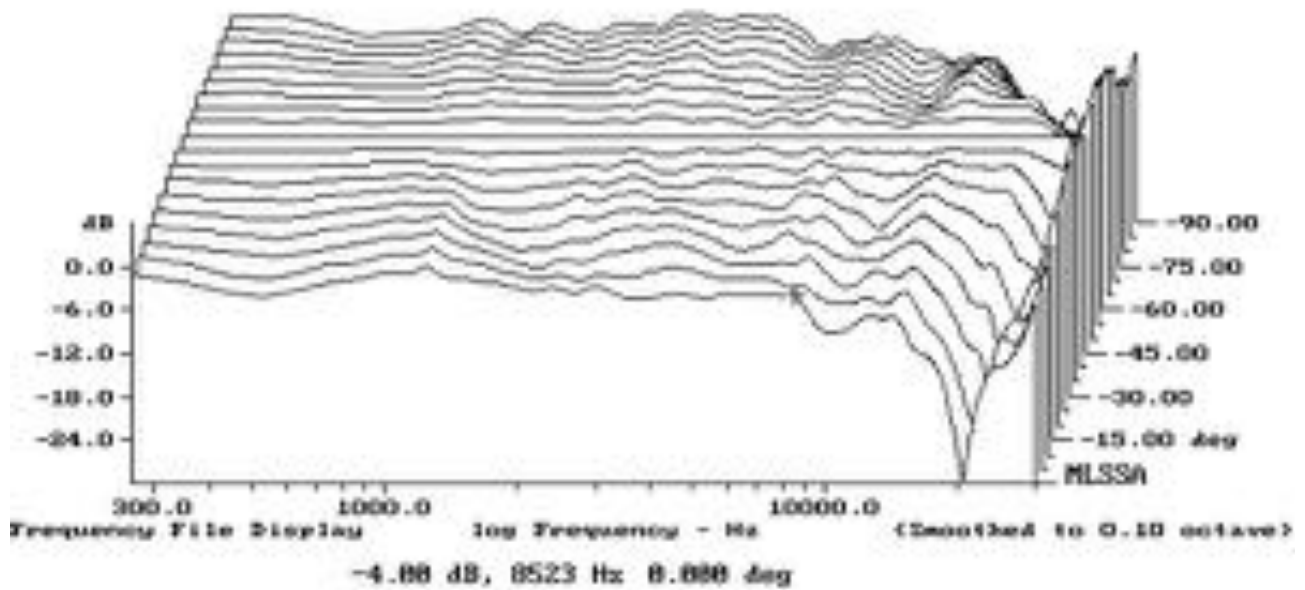


Fig.7 TAD Micro Evolution One, vertical response family at 50", normalized to response on tweeter axis, from back to front: differences in response 45–5° above axis, reference response, differences in response 5–45° below axis.

In the time domain, the speaker's step response on the tweeter axis (fig.8) indicates that all drive-units are connected in positive acoustic polarity. Although the tweeter's output leads that of the midrange, which in turn leads that of the woofer, their outputs meld well, suggesting optimal crossover implementation. The cumulative spectral-decay plot on the tweeter axis (fig.9) is generally clean.

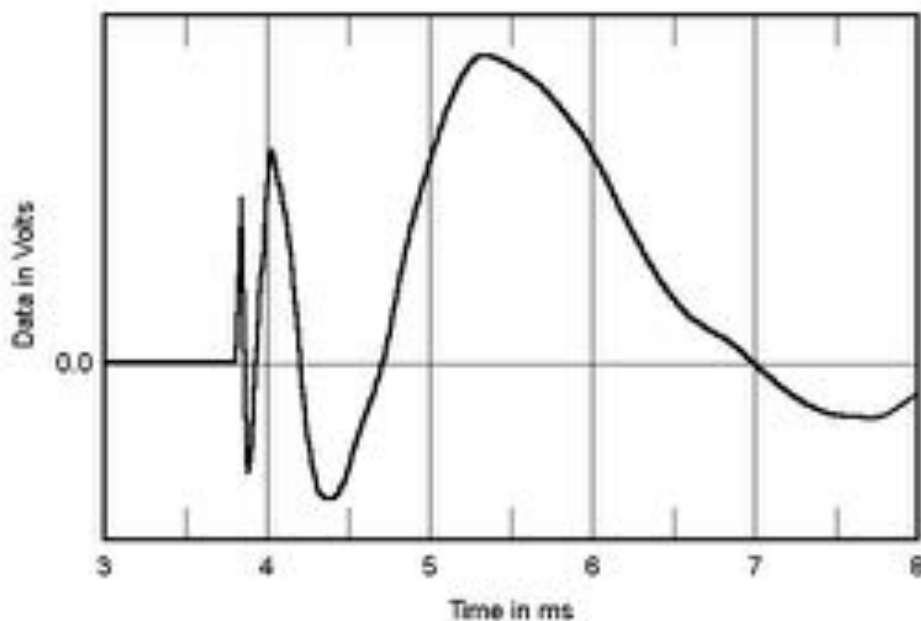


Fig.8 TAD Micro Evolution One, step response on tweeter axis at 50" (5ms time window, 30kHz bandwidth).

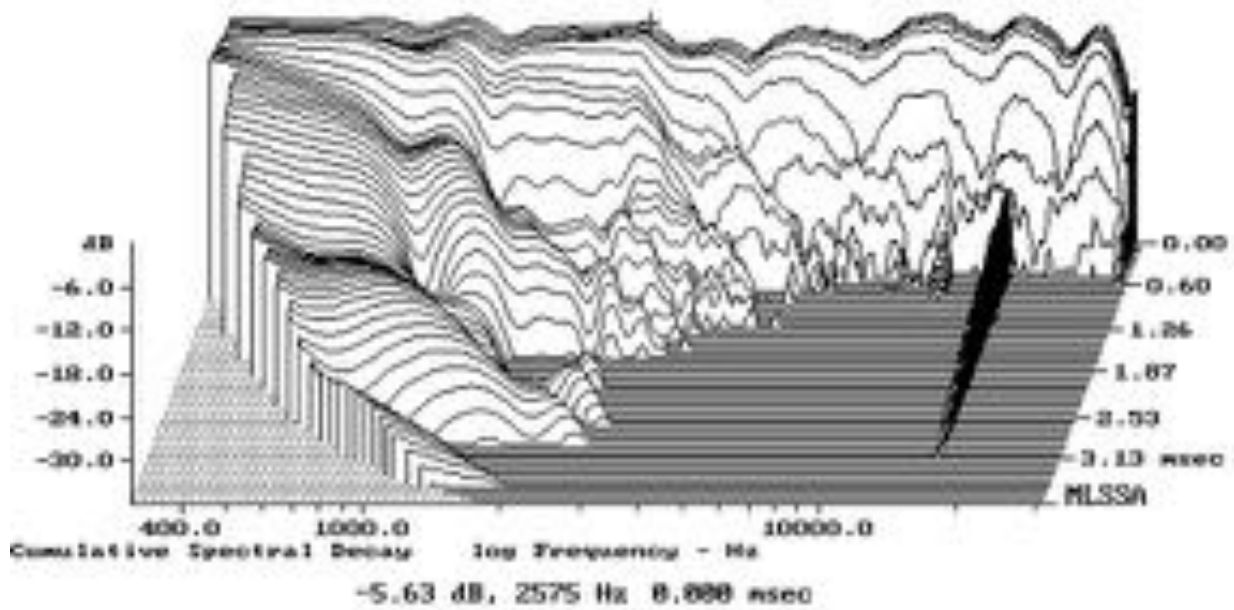


Fig.9 TAD Micro Evolution One, cumulative spectral-decay plot on tweeter axis at 50" (0.15ms risetime).

Other than its limited low frequencies, TAD's Micro Evolution One offered excellent measured performance, not dissimilar to that of TAD's pricey Compact Reference CR1, though with reduced low-frequency extension. I am not surprised that TJN was impressed by its sound quality.

—**John Atkinson**