Test Results

The frequency responses returned by the Elac FS249 in all *Newport Test Labs'* tests were stunningly flat, showing that Elac's engineers have obviously made this a priority (which would no doubt greatly please Floyd E Toole, the famous Canadian loudspeaker researcher who established via hundreds of blind listening tests that this was a key factor in good sound). *Graph 1* is perhaps the quickest way to gauge the performance, and you can see that for the most part, the response curve on the graph fits within a 2.5dB window from 60Hz to 20kHz. In other words, the response is 60Hz to 20kHz ±1.25dB. I don't think I've ever before seen a conventional loudspeaker whose frequency response has been so flat, and so extended. Of course if you extend the 'window' to the industry-standard size, the Elac FS249 gets even more impressive, returning a response of 45Hz to 30kHz±3dB. As usual, you can't use figures to get the whole story, you have to look at how the level variations are distributed across the bandwidth, and you can see that here the Elac FS249 also excels, because the variations have a more-or-less even distribution, so the trace is not 'skewed' in any way. The only visible discrepancy is a shallow 'dish' in the response at 2kHz, where the response dips from being +1.25dB at 1kHz, to –1.25dB at 2kHz, then rises back up to +1.25dB at 3kHz. It's insignificant, because the total variation is just 2.5dB without smoothing, and less than 1.5dB with. Because it occurs at the transition from the midrange to the tweeter, it might also have diminished with a different choice of microphone position.

Graph 2 shows the high-frequency response of the Elac FS249, measured with and without the grille. For best performance, you'd listen without the grille, because the response (black trace) is smoother. However, Elac has done a great job with grille design, because even with the grille the variations are far less than I usually see, and constrained between 2.5kHz and 6kHz.

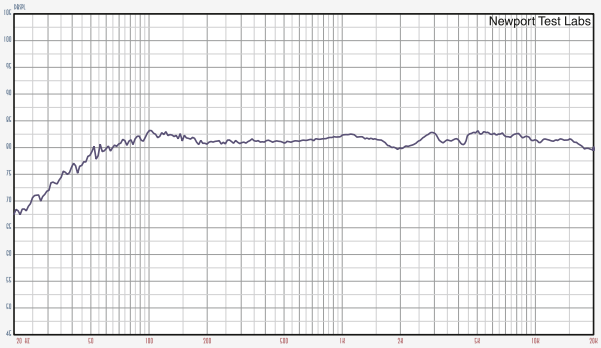
Low-frequency performance, as shown in *Graph 3*, shows only some of the possible variations of using the plugs to block the ports, but you can see that no matter what you do, the ports extend bass response considerably. Importantly, there's almost no leakage of high-frequency information through the ports, either. The midrange driver rolls on smoothly, and is superbly linear.

The impedance graph is proof that Elac's quality control is amazingly good. *Newport Test Labs* ran traces on both left (green trace) and right (yellow trace) speakers, and you can see that the two are almost identical, even below 100Hz. I've never previously seen such perfectly matched speakers—it's an incredible result. The impedance mostly remains almost entirely below 8Ω, so this speaker will place quite high demands on the driving amplifier, particularly between 80Hz and 200Hz, where it dips well below 4Ω, right down to 2.8Ω at 130Hz. The phase angle (blue trace) is well controlled, swinging only around +30°/–60°.

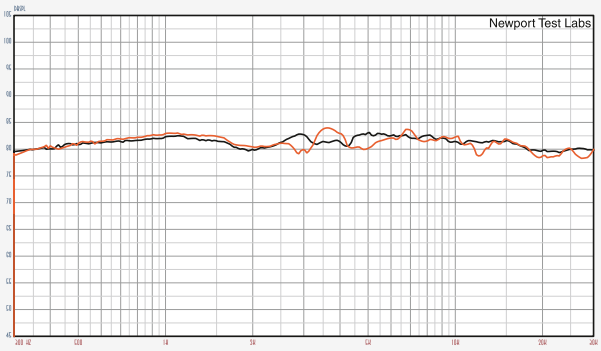
Graph 5 is a composite of most of the traces shown in the four graphs above, but with the various levels manually adjusted for clarity.

The Elac FS249s are of above-average efficiency, with *Newport Test Labs* putting their sensitivity at 89dBSPL under its normal, very stringent test conditions.

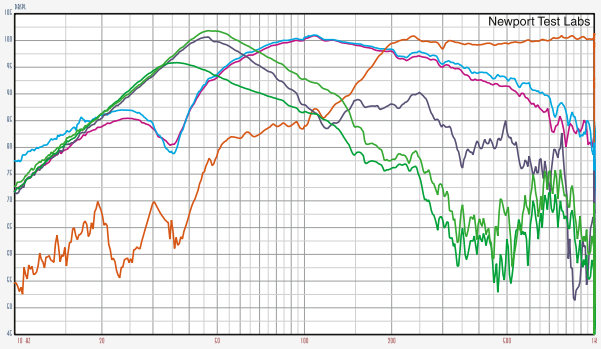
My judgement on the basis of these results is that not only are the Elac FS249s superbly engineered, but that their standard of manufacture is second to none. ***Steve Holding***



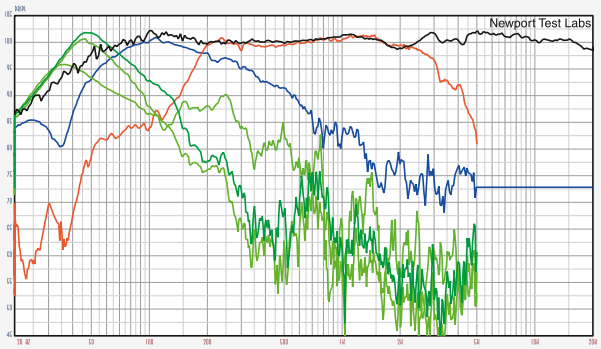
Graph 1. Frequency response. Below 500Hz, the curve is the unsmoothed averaged result of nine individual frequency sweeps measured at three metres, with the central grid point on-axis with the tweeter frequency response using pink noise test stimulus. Above 500Hz, the trace is the gated sine response on axis with the tweeter, at a distance of one metre, an expanded version of which is shown in Graph 2. [Elac FS249 Loudspeaker]



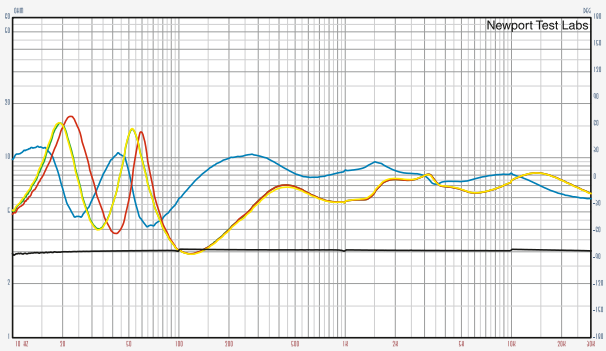
Graph 2. High-frequency response, expanded view. Test stimulus gated sine. Microphone placed at one metre on-axis with tweeter. Black trace shows response without front grille fitted. Red trace is with grille in place. Lower measurement limit 300Hz. [Elac FS249 Loudspeaker]



Graph 3. Low frequency response of bass reflex ports [down-firing bung out (dark green) vs bung in (light green), and rear-firing (black)], both woofers (light blue and purple) and midrange (red). Nearfield acquisition. Port/woofer levels not compensated for differences in radiating areas.



Graph 5. Composite response plot. Green traces are the outputs fromt the bass reflex ports. Blue trace is anechoic response of lower bass driver. Red trace is sine response of midrange driver. Black trace is averaged in-room pink noise response (from Graph 1). [Elac FS249 Loudspeaker]



Graph 4. Impedance modulus of left (green trace) and right (yellow trace) speakers with bung in vs with bung out (red trace) plus phase (blue trace). Black trace under is reference 3 ohm precision calibration resistor. [Elac FS249 Loudspeaker]