ME Gethain RL944K

KEITH HOLLAND

The RL944K monitor from Musikelectronic Geithain GmbH in Germany is unlike most other speakers.

Most speakers are omnidirectional at low frequencies, but this one is a cardioid. This means that the sound radiated to the rear of the speaker is considerably lower in level than that radiated forward (about 8dB lower on average) thereby minimising reflections from rear walls. The cardioid pattern is apparently realised using acoustic networks to the rear of the cabinet in a similar manner to the way in which cardioid microphones work. The speaker is a 3-way active design with an unusual near-concentric driver layout with a 4-inch (100mm) cone midrange driver mounted in front of an 8-inch woofer; the ¾-inch (19mm) dome tweeter is further mounted in front of the midrange but displaced vertically from the axis. The midrange and tweeter drivers are mounted on a sculptured grille that sits in front of the woofer. Geithain claims power outputs of 180W for the woofer and 100W each for the midrange and tweeter endowing a single speaker with a maximum sound pressure output of 113dB at 1m. Crossover frequencies are specified as 800Hz and 3.8kHz. The electronics are all housed on a rear panel that can be hinged out for access. The rear panel carries a balanced XLR-type input socket, an IEC mains socket and power switch. The cabinet has overall dimensions of 480mm high by 285mm wide by 330mm deep and each speaker weighs a hefty 24kg.

Figure 1 shows the on-axis frequency response and harmonic distortion performance for the Geithain. The response lies within ±4dB limits from 32Hz to 18kHz with a very respectable low frequency extension to -10dB at 28Hz with a 4th-order roll-off. The response is smooth at low frequencies but there is some unevenness at high frequencies. The harmonic distortion, measured at a level of 90dB SPL and a distance of 1m, is seen to lie below -40dB (1%) at all frequencies above 55Hz for both 2nd and 3rd harmonics with a maximum of -26dB (5%) at 35Hz.

The off-axis frequency responses can be seen in Figures 2 and 3 for the horizontal and vertical planes

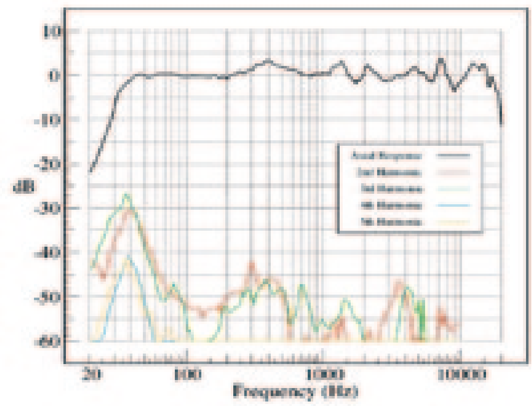

Fig. 1. On-axis frequency response and harmonic distortion.

respectively. One benefit of adopting near-concentric drivers can be seen in these figures; the directivity is very well behaved for angles up to 30 degrees off axis in both planes, with no evidence of the interference notches at the crossover frequencies that are common in speakers with spaced drivers. The output waveform in response to a step input signal is shown in Figure 4. This reveals a driver time-alignment problem, which is not uncommon for three-way speakers, with the mid-frequency components of the response arriving about 0.4 milliseconds after the high-frequency parts and the low frequencies delayed a further 1 millisecond. The delay in the low frequencies is also evident in the acoustic source position plot (Figure 5) with a shift to about 0.5m behind the speaker at about 300Hz. The shift at very low frequencies is quite respectable at about 2.5m, however, indicating that the cardioid arrangement carries no additional phase response penalty compared to an equivalent

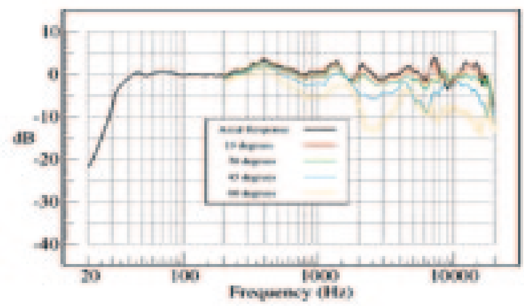

Fig. 2. Horizontal off-axis response.

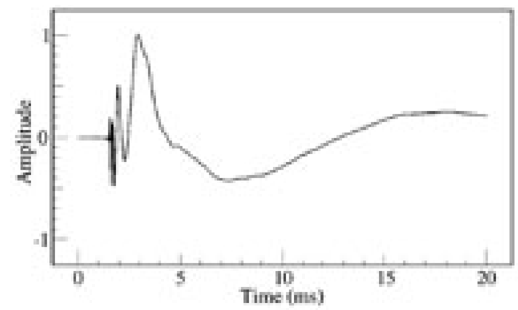

Fig. 4. Step response.

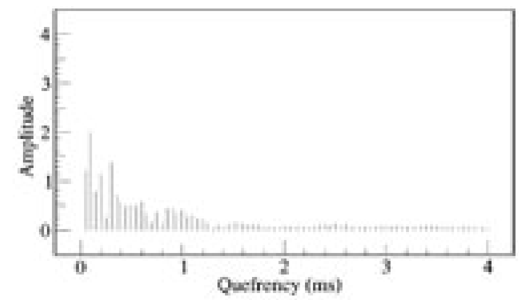

Fig. 6. Power cepstrum.

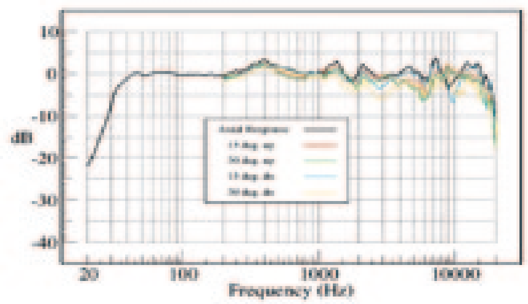

Fig. 3. Vertical off-axis response.

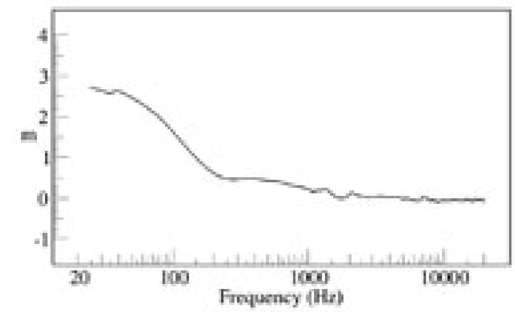

Fig. 5. Acoustic source position.

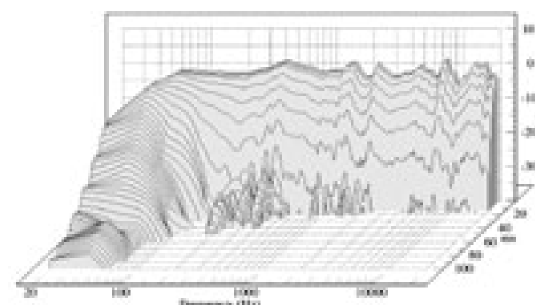

Fig. 7. Waterfall plot.

omnidirectional speaker. The power cepstrum (Figure 6) shows evidence of some echoes after about 0.1 and 0.3 milliseconds that are probably responsible for the slightly uneven high-frequency response noted above. Figure 7 shows the waterfall plot for the RL99K. The low frequencies are seen to decay initially quite quickly with a slower low-level tail; this performance is similar to other speakers with a 4th-order roll-off. There is evidence of some resonances between 200 and 400Hz.

The Geithain RL944K is an unusual monitor that possesses some very real strengths and few weaknesses. On the down side the driver time-alignment is not particularly good and there is some irregularity in the frequency response at high frequencies. However, on the up side the cardioid low-frequency radiation pattern should improve the performance in real rooms compared to conventional speakers and the near-concentric driver arrangement means that the speaker acts as a point source, which is of particular benefit for near-field listening. A further benefit of the driver layout is the well-controlled off-axis response. The low-frequency response is very extended for a speaker of this size without any compromise in distortion performance or transient response.

Contact

MUSIKELECTRONIC GEITHAIN, GERMANY:
Website: www.me-gethain.de