VOLUME 27, ISSUE 4 FEBRUARY 2013
VOICE COIL
THE PERIODICAL FOR THE LOUDSPEAKER INDUSTRY

Test Bench

High-Frequency Drivers from Max Speakers and Scan-Speak

by Vance Dickason

The D2908/714000

Scan-Speak, founded in 1970, remains at its original address in Videbaek, Denmark, and offers the same "no compromise" philosophy that has always been a part of the Scan-Speak mission. Perhaps that is one reason Scan-Speak is still the OEM driver darling of high-end loudspeaker manufacturers worldwide. (Scan-Speak exports 95% of its production.)

This month, Scan-Speak sent me its recently released D2908/714000, which is the company's second 30-mm beryllium dome tweeter (see **Photo 2**). Scan-Speak's first beryllium dome tweeter was the R3004 Air-Circ Illuminator tweeter, featured in *Voice Coil*'s January 2010 issue.

Basically, the new D2098 utilizes the Revelator D29 Revelator dome's wide surround concept, but with a 99% pure beryllium dome (sourced from Truextent) coupled to the highly effective and patented Symmetrical Drive (SD-2) neodymium motor system. Scan-Speak's SD-2 motor is composed of a shaped gap area in conjunction with a copper shorting ring (i.e., copper pole cap). Other features include a black anodized aluminum faceplate with a protective

Photo 2: Scan-Speak recently released the D2908/714000, a 30-mm beryllium dome tweeter.

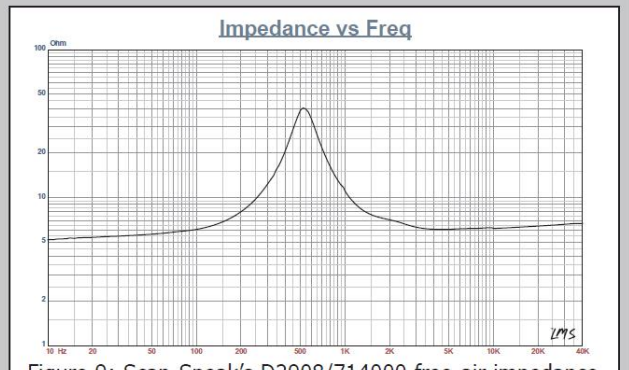

Figure 9: Scan-Speak's D2908/714000 free-air impedance plot

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grill, [You don't want your customer's child jamming his fingers into a $590 (retail not OEM!) tweeter!], a titanium voice coil former, a non-resonant aluminum

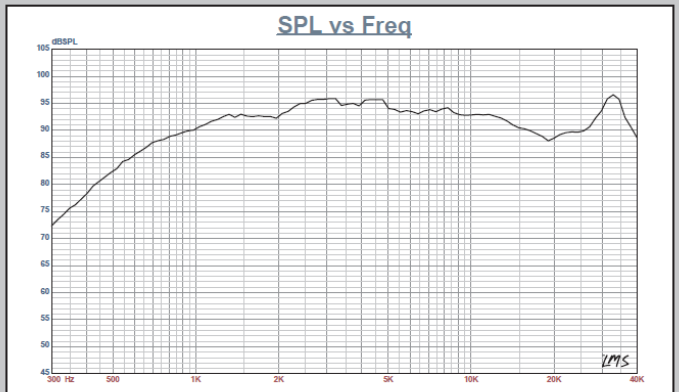

Figure 10: Scan-Speak D2908/714000 on-axis frequency response

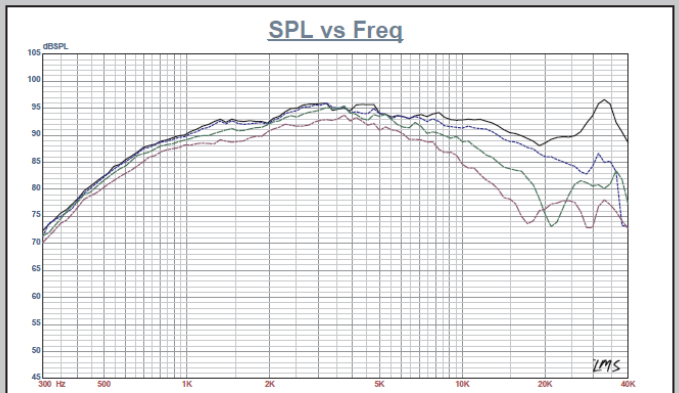

Figure 11: Scan-Speak D2908/714000 horizontal on- and off-axis frequency response (0° = solid black; 15° = dot blue; 30° = dash green; 45° = dash/dot purple)

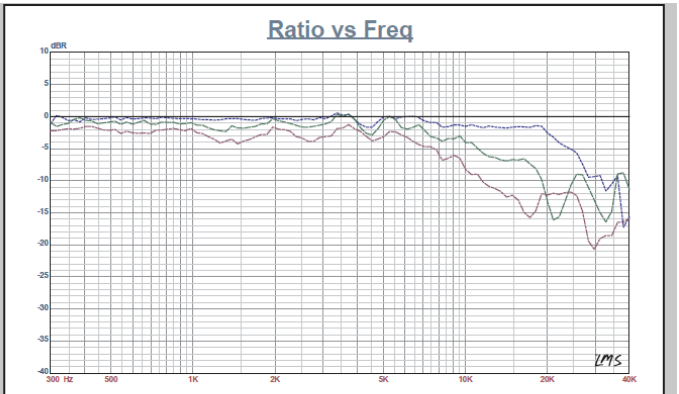

Figure 12: Scan-Speak D2908/714000 normalized on- and off-axis frequency response (0° = solid black; 15° = dot blue; 30° = dash green; 45° = dash/dot purple)

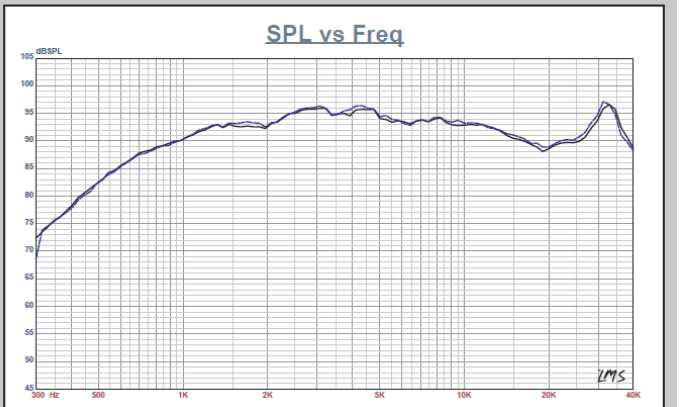

Figure 13: Scan-Speak D2908/714000 two-sample SPL comparison

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rear chamber, and gold-plated terminals.

I used the LinearX LMS analyzer to begin testing the D2908 beryllium dome by generating a stepped sine wave impedance plot. The result of the LMS 300-point impedance sine wave sweep is shown in **Figure 9**. The tweeter resonance is 525 Hz. Minimum impedance for this tweeter is 6.1 Ω at 4.8 kHz with a measured R_E equal to 5.69 Ω. The factory specification for the motor Q_{TS} is 0.47.

After completing the impedance measurements, I recess mounted the Scan-Speak tweeter in a small enclosure with a 7" × 12" baffle area and measured the on- and off-axis frequency response at 2.83 V/1 m. **Figure 10** shows the on-axis response. The D2908's frequency response is a very flat ±1.8 from 2 kHz to 12.8 kHz, with the beryllium breakup mode located at 32.8 kHz. **Figure 11** shows the Scan-Speak Revelator beryllium dome tweeter's on- and off-axis response. Off-axis, the device is –4.0 dB down at 10 kHz from the on-axis response with respect to the 30° off-axis curve and –8.2 dB at 45° off-axis, again with respect to the on-axis response. **Figure 12** shows the normalized version of **Figure 11**. In terms of production consistency, the two-sample SPL comparison is shown in **Figure 13**, indicating the two samples were well matched with some minor variation in the 3.5-to-10-kHz region.

Next, I recess mounted the tweeter and used the SoundCheck analyzer and the 0.25" SCM microphone to measure the impulse response. Importing this data into the SoundMap software produced the waterfall plot shown in **Figure 14**. **Figure 15** provides the STFT displayed as a surface plot. Last, I used the SoundCheck noise generator and SLM utilities to set the 1-m SPL to 94 dB (3.5 V) and the sweep range to 2 kHz to 20 kHz and measured the second- and third-harmonic distortion at 10 cm (see **Figure 16**). This shows the relationship between the second- and third-harmonic distortion; however, the correlation to subjective preference based on the THD is not well established. For manufacturers who have wanted to field a beryllium tweeter in a no-compromise high-end product, Scan-Speak has come up with another best of all possible worlds, the Revelator SD-2 motor and a beryllium dome. For more information, visit www.scan-speak.dk. *VC*

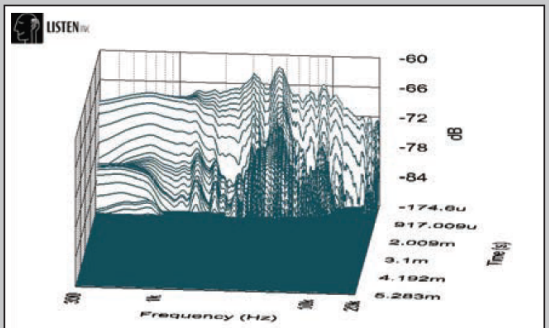

Figure 14: Scan-Speak D2908/714000 SoundCheck CSD waterfall plot

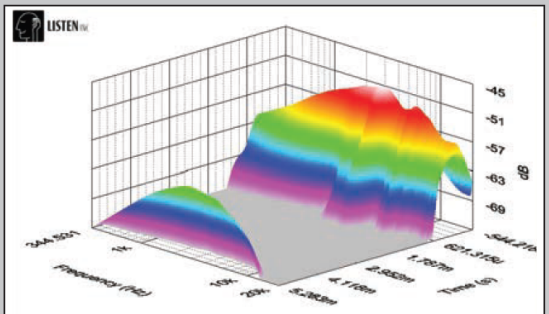

Figure 15: Scan-Speak D2908/714000 SoundCheck STFT surface-intensity plot

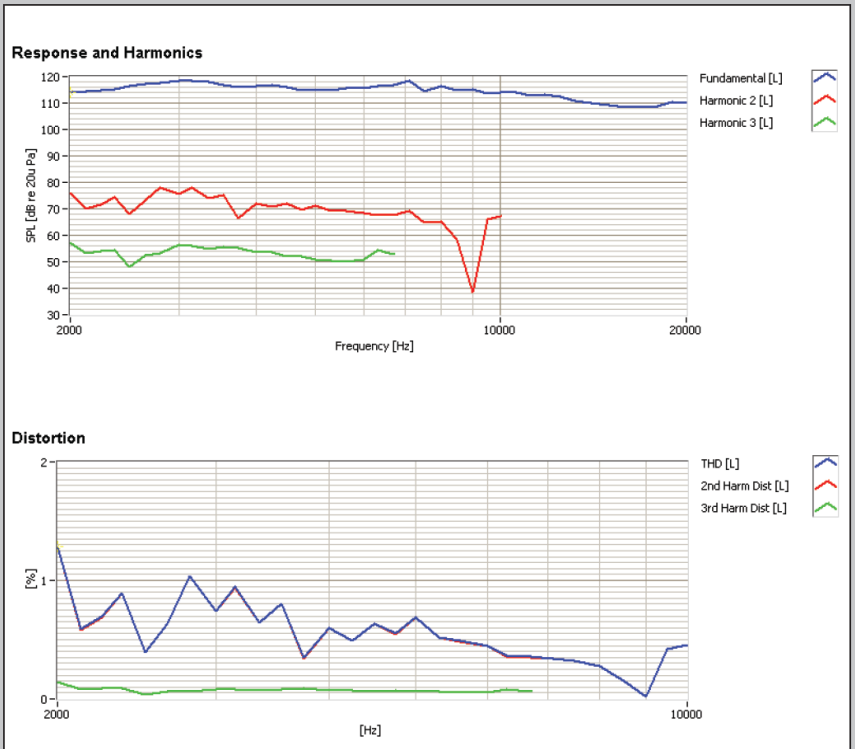

Figure 16: Scan-Speak D2908/714000 SoundCheck distortion plots