Four High Frequency Transducers

By Vance Dickason

This month's Test Bench reviews focus on high frequency transducers, which include three 1″ soft dome tweeters and a compression driver and horn. For tweeter domes, I received two 28mm soft dome models from Tang Band (the 28-1582S and the 28-537SH), plus one of the new 25mm models from SB Acoustics (the SB25STC-C000-4). From the pro sound side of the industry, Faital Pro sent one of its new compression drivers (the 1″ HR10RT) along with its Tractrix flare 60×50 horn.

The Tang Band 28-537SH (***Photo 1***) features a 28mm diameter silk diaphragm, vented pole, ferrite motor, magnetic fluid in the gap, metal faceplate, and a damped rear cavity. I used the LinearX LMS analyzer to produce the 300-point impedance plot shown in ***Fig. 1***. The primary resonance occurred at about 950Hz with minimum impedance of 7.1Ω at 3.6kHz. TB obviously used a fairly high viscosity magnetic fluid for both cooling and resonance damping. Following the impedance measurement, I recess-mounted the tweeter in an enclosure that had a baffle area of about 17″ × 8″ and measured the on- and off-axis frequency response at 2.83V/1m using a 100-point stepped sine wave sweep.

Figure 2 depicts the on-axis response. Overall response is a very flat ±1.6dB from 1.3kHz-22kHz. The off-axis response in ***Fig. 3*** is fairly typical for a 28mm soft dome and is -5.6dB down at 10kHz from the on-axis response to 30° off-axis. ***Figure 4*** shows the two-sample SPL comparison indicating the two samples submitted by TB for this model which were within about 1dB of each other.

Using the Listen Inc. SoundCheck analyzer with the tweeter recess mounted on a large 4′ × 2′ baffle, I produced the cumulative spectral decay plot (waterfall) in

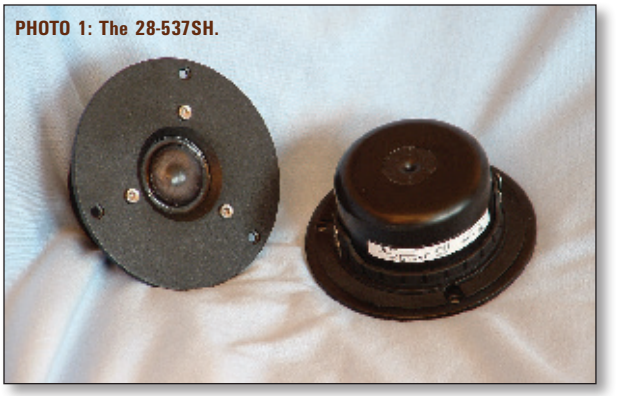

PHOTO 1: The 28-537SH.

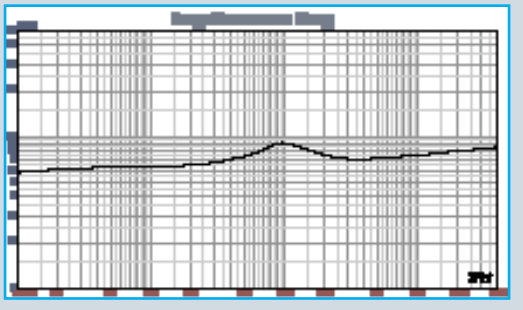

FIGURE 1: Tang Band 28-537SH free-air impedance plot.

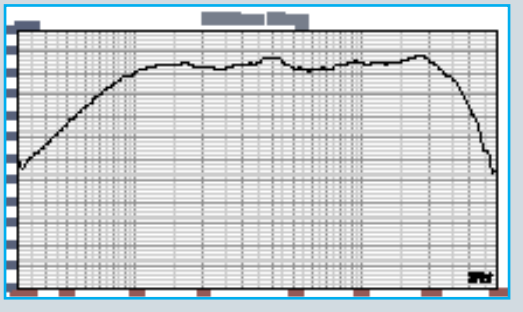

FIGURE 2: 28-537SH on-axis response.

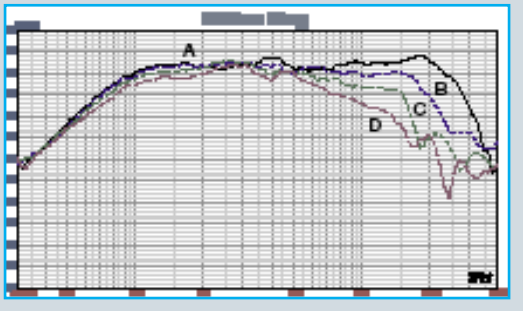

FIGURE 3: 28-537SH horizontal on- and off-axis frequency response (A = 0°; B = 15°; C = 30°; D = 45°).

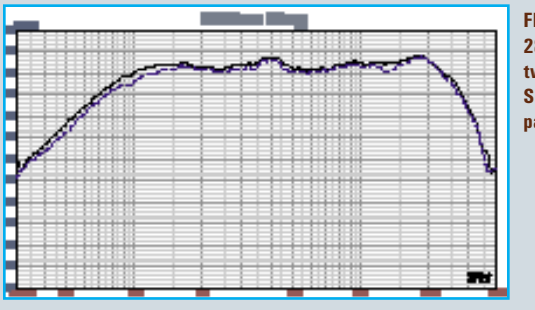

FIGURE 4: 28-537SH two-sample SPL comparison.

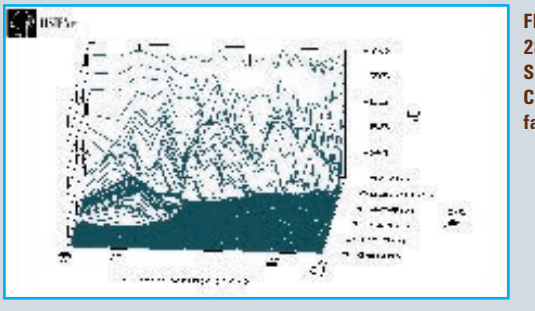

FIGURE 5: 28-537SH SoundCheck CSD waterfall plot.

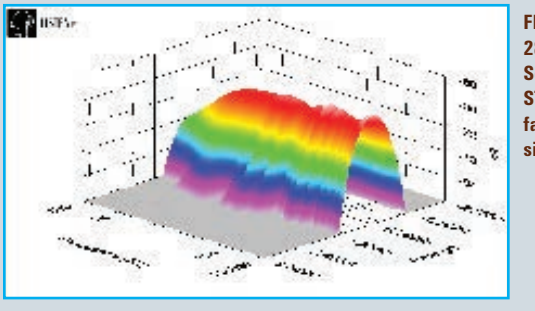

FIGURE 6: 28-537SH SoundCheck STFT surface intensity plot.

Fig. 5. For this, the impulse response from SoundCheck was imported into the Listen Inc. SoundMap software. ***Figure 6*** is a Short Time Fourier Transform (STFT), which is like a smoothed Wigner-Ville presentation. Unlike the CSD type plot which starts at decay at maximum SPL, the STFT also depicts the rise from zero SPL. This display is a surface plot with variegated colors indicating sound intensity. While the device was still mounted on the large baffle, I set the 1m SPL to 94dB, and measured the 2nd and 3rd harmonic distortion at 10cm (***Fig. 7***).

Tang Band's other new 28mm tweeter is the model 28-1582S (***Photo 2***). The two models both appear to use the same silk dome and metal faceplate. Features for the 28-1582S are similar to the 28-537SH, but with a

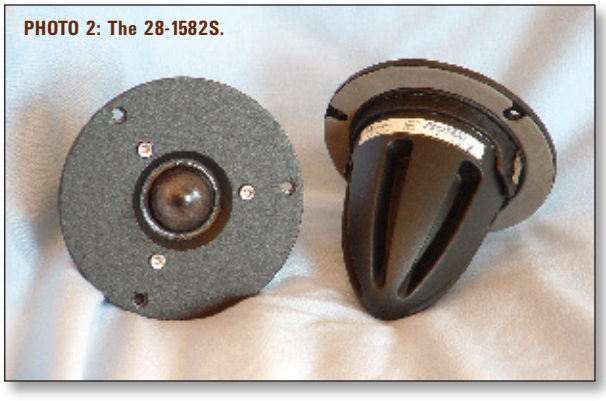

PHOTO 2: The 28-1582S.

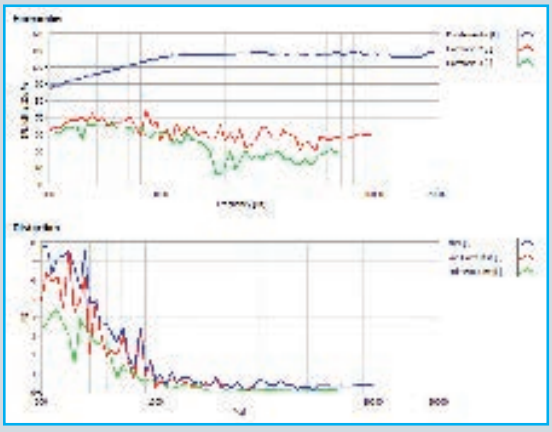

FIGURE 7: 28-537SH SoundCheck distortion plots.

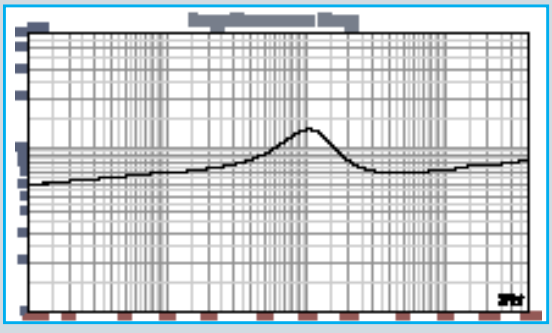

FIGURE 8: Tang Band 28-1582S free-air impedance plot.

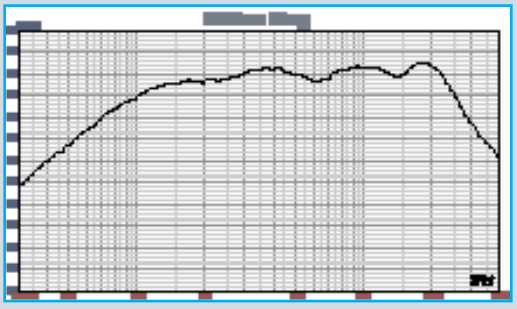

FIGURE 9: 28-1582S on-axis response.

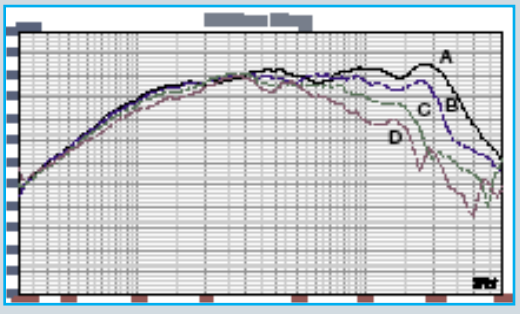

FIGURE 10: 28-1582S horizontal on- and off-axis frequency response (A = 0°; B = 15°; C = 30°; D = 45°).

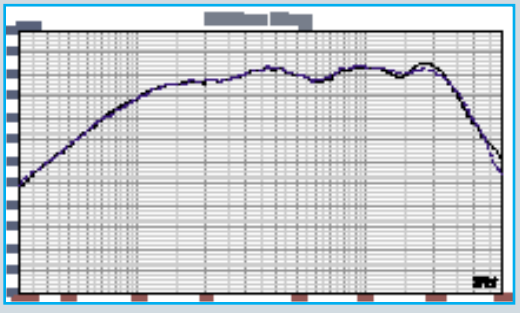

FIGURE 11: 28-1582S two-sample SPL comparison.

deep bullet-shaped rear cavity. The results of the LMS 300-point impedance sweep are given in ***Fig. 8***. Despite the larger cavity, the resonance occurs at 1.05kHz, which is somewhat higher than the 28-537SH. The magnetic fluid viscosity also appears to be lower. The minimum impedance for this tweeter is 7.04Ω at 4.5kHz.

I recess-mounted the TB tweeter in the same enclosure that had a baffle area of about 17″ × 8″ and measured the on- and off-axis frequency response. ***Figure 9*** depicts the on-axis response, which is about ±2.3dB from 2kHz-22-kHz. ***Figure 10*** depicts the off-axis response, which, like the 28-537SH, is typical for a 28mm soft dome. Off-axis the device is -6.6dB down at 10kHz from the on-axis response to 30° off-axis. The two-sample SPL comparison is illustrated in ***Fig. 11***, indicating the two samples are very nicely matched.

Next, I used the SoundCheck analyzer to measure the impulse response with the tweeter recess-mounted on a large 4′ × 2′ baffle. Importing this data in the SoundMap software produced the cumulative spectral decay plot (waterfall) in ***Fig. 12***. ***Figure 13*** depicts an STFT displayed as a surface plot. Last, I set the 1m SPL to 94dB, and the sweep range to 300Hz-20kHz, and measured the 2nd and 3rd harmonic distortion at 10cm (***Fig. 14***). For more information on these and other Tang Band drivers, visit www.tb-speakers.com.

The October issue of *Voice Coil* mentioned new OEM driver supplier SB Acoustics. The really hot news is that SB Acoustics has a technical partnership with

Scandinavian Audio Research (SCAR), which is made up of the former Vifa/Scan-speak development team including Lars Goller, Ulrik Schmidt, Frank Neilsen, Benny F. Pedersen, and Alan H. Jensen. You would expect any tweeter from this company to be rather interesting, and I was not disappointed. The SB Acoustics SB25STC-C000-4 (***Photo 3***) employs a 25mm cloth dome manufactured in Europe. Other features include a copper pole-shorting ring, solid plastic plug over the pole venting into the damped rear cavity, and gold-plated terminals.

Figure 15 illustrates the 300-point impedance sweep. The resonance occurs at 716.5Hz and is not damped by

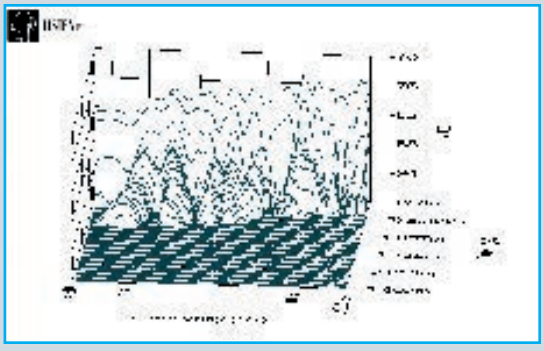

FIGURE 12: 28-1582S SoundCheck CSD waterfall plot.

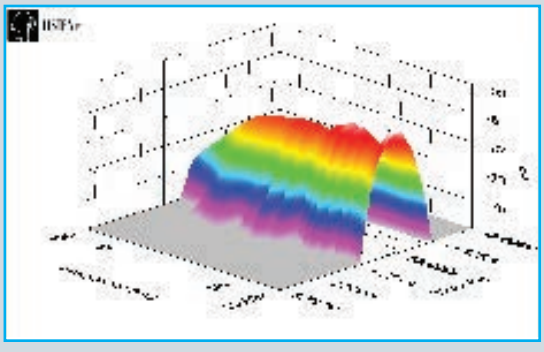

FIGURE 13: 28-1582S SoundCheck STFT surface intensity plot.

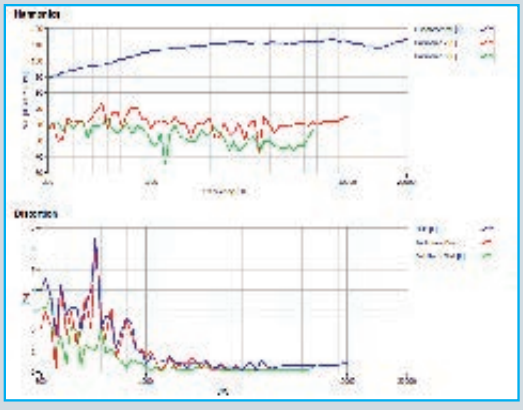

FIGURE 14: 28-1582S SoundCheck distortion plots.

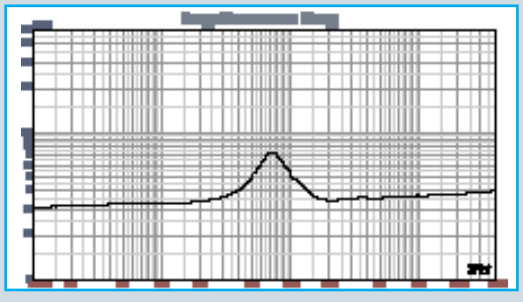

FIGURE 15: SB Acoustics SB-25STC free-air impedance plot.