Test Bench

TB Speaker's 75-1558SH High-End Home Audio 3" Dome Midrange

By Vance Dickason

The driver I characterized here came from Tang Band Speaker Co., Inc. (aka TB Speaker). It is a company I have known for many years and one that often produces unique and creative transducer designs, the month's sample being no exception.

For this explication, TB Speaker sent *Voice Coil* a new 75mm diameter soft dome midrange, the 75-1558SH (**Photo 1**). Features include a coated cloth 3" diameter diaphragm and surround, a 75.5mm diameter voice coil wound with round copper wire on a black anodized vented aluminum voice coil former with magnetic fluid in the gap area.

The motor system consists of large neodymium (neo) slug magnet with a low carbon content steel return cup with a black emissive coating (**Photo 2**) that also incorporates a distortion reducing shorting ring. The steel cup has a foam-damped vent that loads into a shaped and 100% polyester filled injection-molded back enclosure. Other features include 90dB 1W/1m sensitivity, an injection-molded faceplate, gold-plated terminals, and 25W rated power handing (200W on program material), 1.5mm Amax, and a nominal 8Ω impedance.

Photo 1: The 75-1558SH, TB Speaker's new 75mm diameter soft dome midrange

Photo 2: The 75-1558SH's motor system consists of large neodymium (neo) slug magnet with a low carbon content steel return cup with a black emissive coating.

Testing commenced using the Linear LMS analyzer to produce the 300-point impedance sweep illustrated in **Figure 1**. With nominal 8Ω impedance, the 75-1558SH had 6.65Ω DCR, with minimum impedance mounted of 7.24Ω and at 1.52kHz.

Following the impedance test, I recess-mounted the 75-1558SH in an enclosure with a baffle area of 15" × 6" and measured the on- and off-axis frequency response using the Loudsoft FINE R+D analyzer (provided to *Voice Coil* by Loudsoft) and the GRAS 46BE 1/4" microphone (courtesy of GRAS Sound & Vibration), which were set up to measure the 200Hz to 40kHz frequency response (using a 192kHz sampling rate) at 2V/0.5m, normalized to 2.83V/1m.

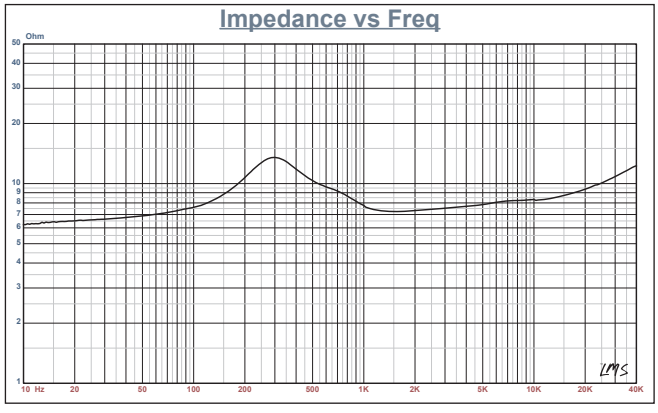

Figure 1: TB Speaker 75-1558SH impedance plot

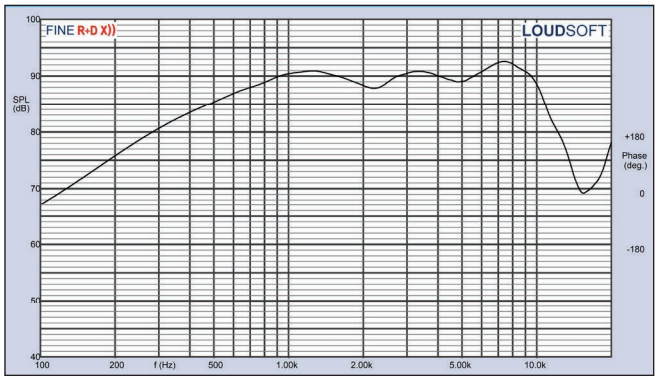

Figure 2: TB Speaker 75-1558SH on-axis frequency response

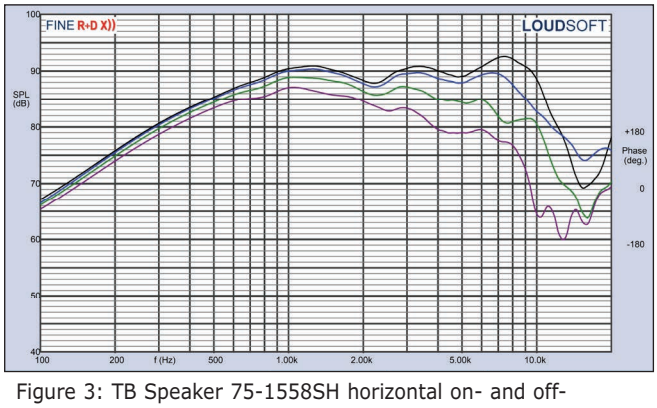

Figure 3: TB Speaker 75-1558SH horizontal on- and off-axis frequency response (0°=black; 15°=blue; 30°=green; 45°=purple)

Sweeps were performed at 0°, 15°, 30°, and 45°. **Figure 2** shows the on-axis response of the TB 75-1558SH midrange dome, which measured ±1.55dB from 0.7kHz to 6kHz, followed by a 2dB rise between 6kHz to 9.5kHz.

Figure 3 gives the on- and off-axis response of the TB 75-1558SH midrange dome. **Figure 4** shows the off-axis curves normalized to the on-axis response. **Figure 5** gives the CLIO 180° polar plot (measured in 10° increments with 1/3 octave smoothing). **Figure 6** shows the two-sample SPL comparison of the TB 75-1558SH midrange dome, indicating the two samples were closely matched to within 0.5dB to 1dB throughout its operating range from 2kHz to 20kHz.

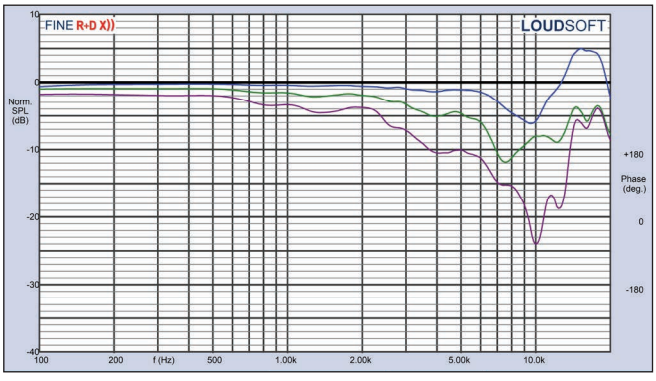

Figure 4: TB Speaker 75-1558SH normalized on- and off-axis frequency response (0°=black; 15°=blue; 30°=green; 45°=purple)

For the final group of tests I fired up the Listen, Inc. SoundCheck AudioConnect analyzer along with the Listen SCM 2 1/4" microphone (provided courtesy of Listen, Inc.) and measured the impulse response with the tweeter recess-mounted on the same 15" × 6" test baffle. Importing

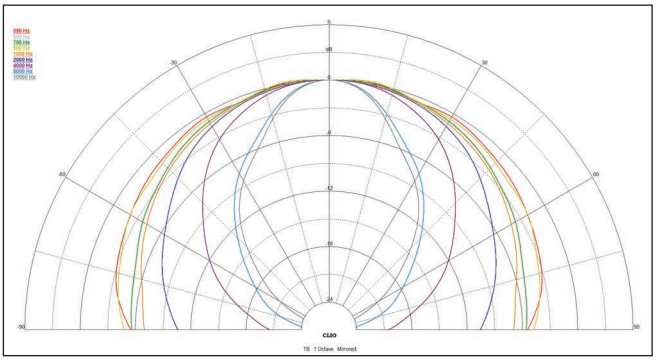

Figure 5: TB Speaker 75-1558SH 180° horizontal plane CLIO polar plot (in 10° increments)

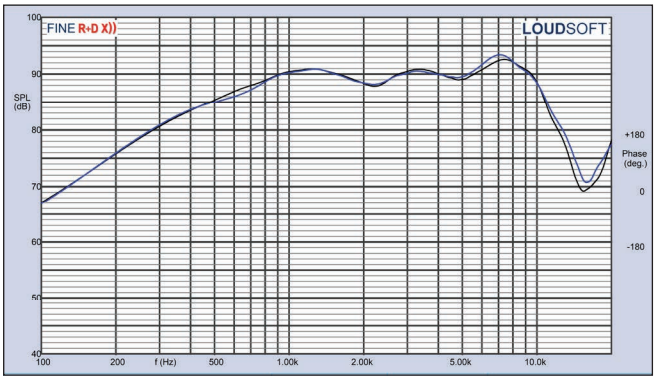

Figure 6: TB Speaker 75-1558SH two-sample SPL comparison

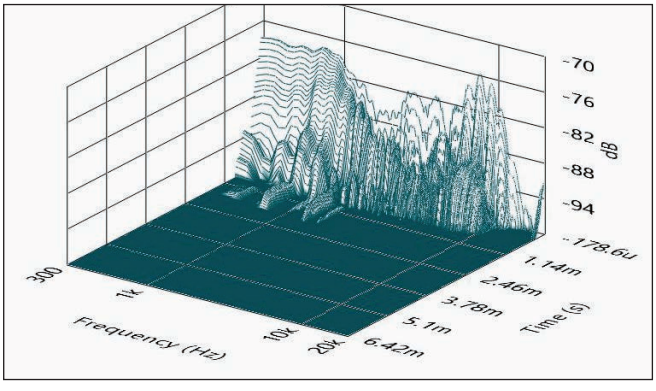

Figure 7: TB Speaker 75-1558SH SoundCheck CSD waterfall plot

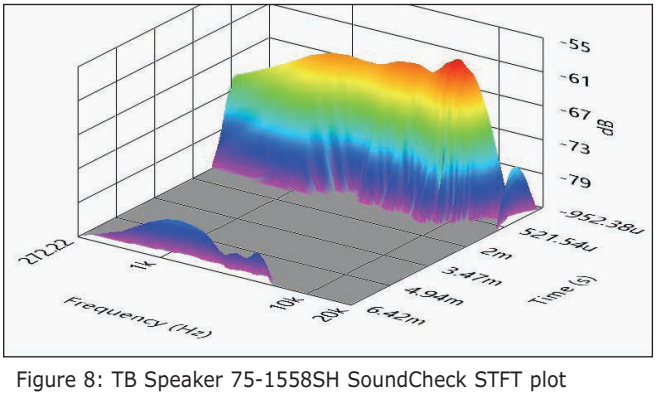

Figure 8: TB Speaker 75-1558SH SoundCheck STFT plot

this data into the Listen SoundMap software produced the cumulative spectral decay plot (CSD) "waterfall" plot shown in **Figure 7**. **Figure 8** depicts the Short Time Fourier Transform (STFT) displayed as a surface plot.

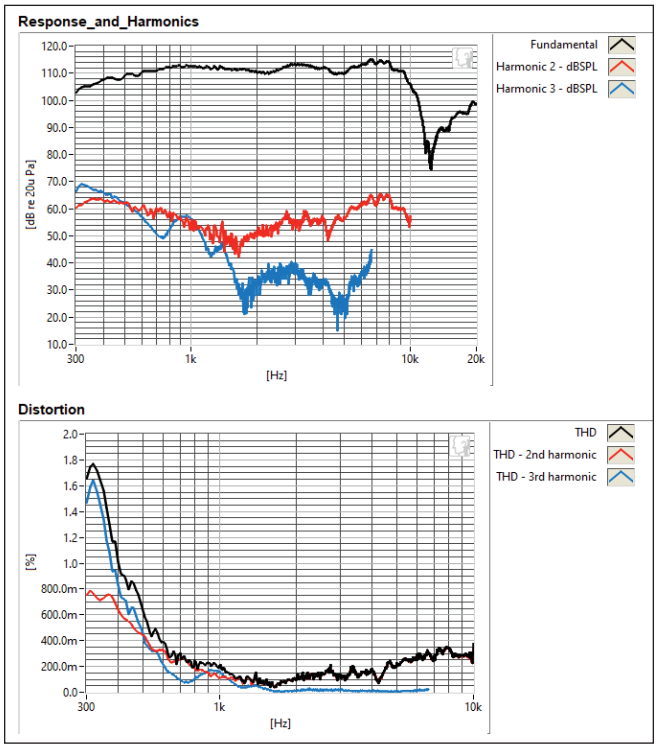

Figure 9: TB Speaker 75-1558SH SoundCheck distortion plots

For the final test procedure, I set the 1m SPL to 94dB (4.81V) using a pink noise stimulus, and measured the second and third harmonic distortion at 10cm, illustrated in **Figure 9**. Distortion is dominated by the second harmonic with a very low third harmonic distortion, however even the second harmonic content is well below 1% above 400Hz.

The build quality of the 75-1558SH is definitely appropriate to the high-end two-channel and studio monitor market for which it is intended. With the TB 75-1558SH midrange dome, I would have say that TB Speaker has created another modern classic. For more information about the TB 75-1558SH and other home hi-fi drivers and amplifiers, visit the TB Speaker website at www.tb-speaker.com. ***VC***

Submit Samples to Test Bench

Test Bench is an open forum for OEM driver manufacturers in the loudspeaker industry and all OEMs are invited to submit samples to *Voice Coil* for inclusion in the monthly Test Bench column.

Send samples in pairs and addressed to:

Vance Dickason Consulting
4330 Imperial Drive
West Linn, OR 97068
(503-557-0427) | vdconsult@comcast.net

All samples must include any published data on the product, patent information, or any special information necessary to explain the functioning of the transducer. This should include details regarding the various materials used to construct the transducer. For woofers and midrange drivers, please include the voice coil height, gap height, RMS power handling, and physically measured Mmd (complete cone assembly including the cone, surround, spider, and voice coil with 50% of the spider, surround and lead wires removed).