and off-axis response of the T34A-4 high-frequency device. **Figure 4** shows the off-axis curves normalized to the on-axis response. **Figure 5** shows the CLIO 180° polar plot (measured in 10° increments). The two-sample SPL comparison is illustrated in **Figure 6**, indicating the two samples were closely matched to within 0.25 dB throughout most of its operating range, with some minor 1.5 dB variation at 4 kHz.

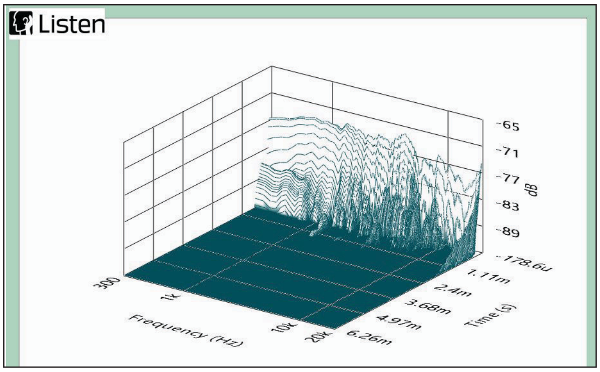

Figure 7: BlieSMA T34A-4 SoundCheck CSD waterfall plot

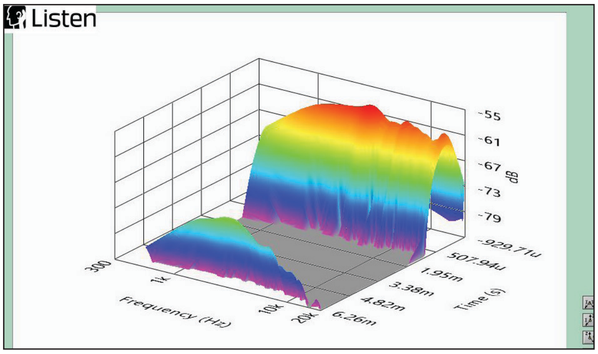

Figure 8: BlieSMA T34A-4 SoundCheck Short Time Fourier Transform (STFT) surface intensity plot

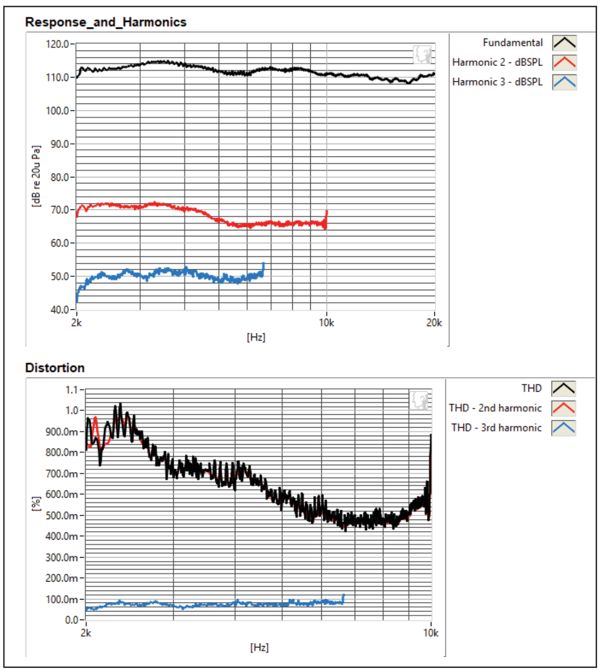

Figure 9: BlieSMA T34A-4 SoundCheck distortion plots

Next, I initiated the Listen, Inc. AudioConnect analyzer and the Listen, Inc. SCM ¼″ microphone (provided courtesy of Listen, Inc.) using SoundCheck 16 to measure the impulse response with the tweeter recess mounted on the test baffle. Importing the impulse response into the Listen SoundMap software resulted in the cumulative spectral decay (CSD) waterfall plot shown in **Figure 7**. The same data was used to produce the short-time Fourier transform (STFT) displayed as a surface plot in **Figure 8**.

For the last objective test, I used a pink noise stimulus (SoundCheck has a built-in generator and SLM utilities) to set the 1 m SPL to 94 dB (2.44 V) and measured the second (red curve) and third (blue curve) harmonic distortion at 10 cm (see **Figure 9**).

As his first product to be released to the OEM driver market, it certainly appears that Malikov is a skilled practitioner. The fit, finish, and overall build quality look first-rate, befitting of a product intended for the high-end speaker market, not to mention that I am definitely a fan of large diameter tweeters that play well to 20 kHz, such as the T34A-4 and the Wavecor TW030WA13. For more information, visit the BlieSMA website at www.bliesma.de.

The 25-2234SD

The second transducer I characterized this month was from Tang Band (TB) Speaker, the 25-2234SD, a new 1″ high-resolution dome tweeter with response to 40 kHz (see **Photo 2**). Tang Band Speaker was established in Taipei, Taiwan in 1996. In 1999, the company moved its factory to Ningbo in China's Zhejiang Province, although the sales department remains in Taiwan. Over the past 20-plus years, TB Speaker has expanded its product portfolio from speaker parts, drivers, and ODM/OEM finished products to hi-fi home-theater speakers, and outdoor speakers to professional PA speakers.

Recently, the company has also developed a series of small speaker drivers incorporated into integrated

Photo 2: TB Speaker 25-2234SD is a new 1″ dome tweeter.

enclosures called "Sound Modules." TB Speaker has more than 100 patented products/technologies.

The 25-2234SD is a compact tweeter that features a 1" aluminum/magnesium inverted dome, a neodymium motor structure, an injection-molded faceplate (1.875" × 1.875"), a protective grill, and a rear cavity with magnetic fluid in the motor gap for cooling. The unit has an integrated circuit board with bare tinsel lead wires for connection (rather than the usual terminals), as it is assembled using a semi-automated production line, which results in excellent repeatable consistency.

I began analysis for the 25-2234SD by performing a 300-point LMS impedance curve shown in **Figure 10**. The impedance resonance for this tweeter occurs at

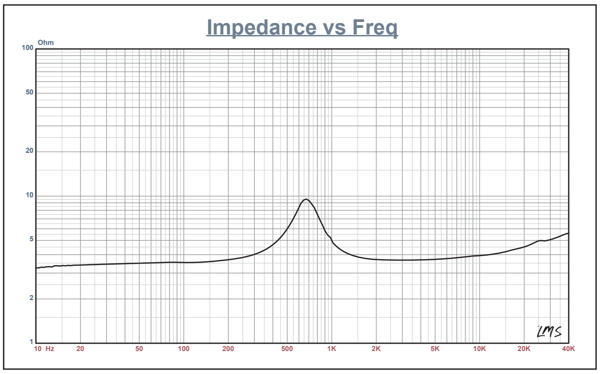

Figure 10: TB Speaker 25-2234SD impedance plot

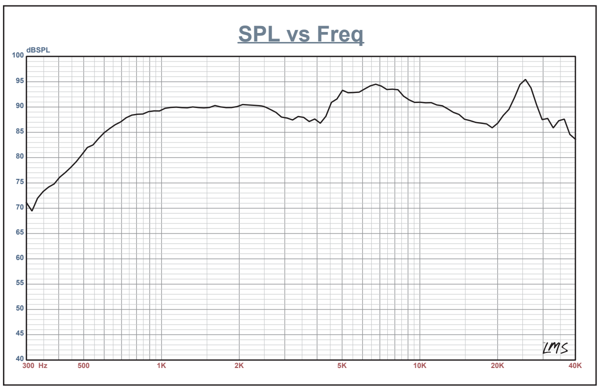

Figure 11: TB Speaker 25-2234SD on-axis response

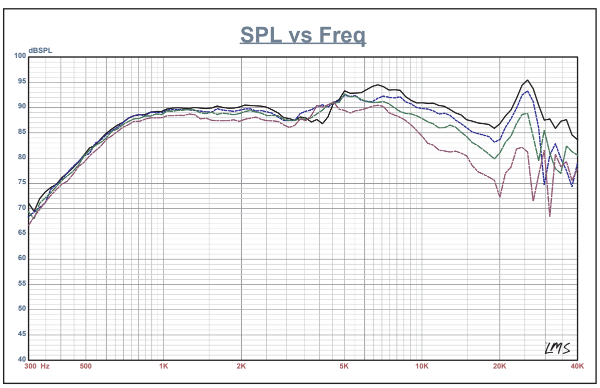

Figure 12: TB Speaker 25-2234SD horizontal on- and off-axis frequency response (0° = solid; 15° = dot; 30° = dash; 45° = dash/dot)

a moderately low 673 Hz (factory spec is 850 Hz). With a 3.55 Ω DCR (Re) (factory spec is 3.6 Ω), with the minimum impedance for this tweeter measuring 3.71 Ω at 2.90 kHz.

Next, I mounted the 25-2234SD in an enclosure with a 4″ × 9″ baffle area and proceeded to measure the on- and off-axis SPL. I used the LMS analyzer to produce a 100-point 300-Hz-to-40-kHz frequency response curve. Data was then taken with sweeps at 0°, 15°, 30°, and 45°. **Figure 11** shows the 25-2234SD's on-axis response. The 25-2234SD' frequency response was ±3.85 dB from 700 Hz to 17.27 kHz, with the primary breakup mode centered on 35 kHz.

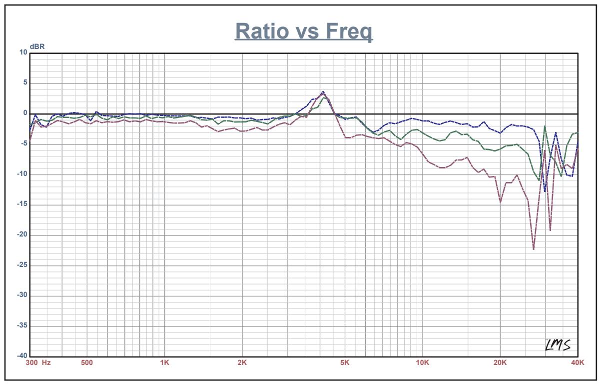

Figure 13: TB Speaker 25-2234SD normalized on- and off-axis frequency response (0° = solid; 15° = dot; 30° = dash; 45° = dash/dot)

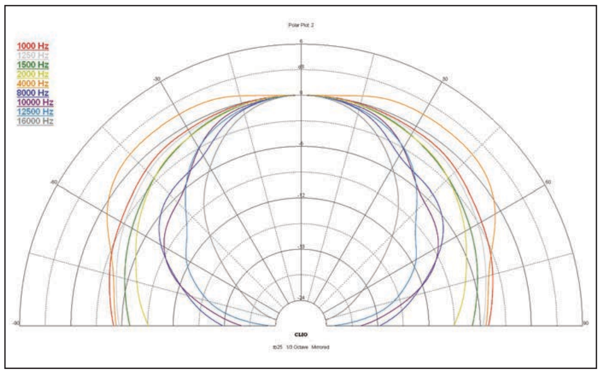

Figure 14: TB Speaker 25-2234SD 180° horizontal plane CLIO polar plot (in 10° increments)

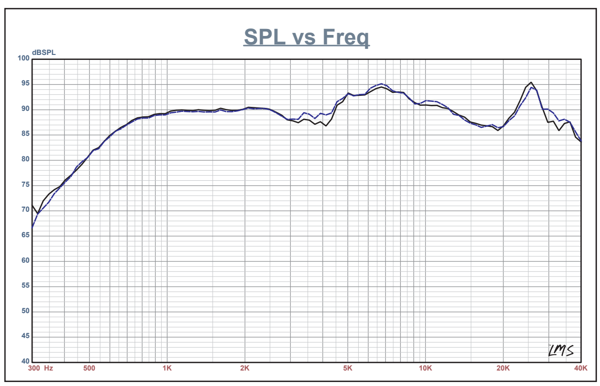

Figure 15: TB Speaker 25-2234SD two-sample SPL comparison

Figure 12 depicts the on- and off-axis frequency response in the horizontal plane. **Figure 13** shows the off-axis curves normalized to the on-axis response. **Figure 14** shows the CLIO 180° polar plot (measured in 10° increments). The two-sample SPL comparison is illustrated in **Figure 15**, indicating the two samples were closely matched to within 0.75 dB throughout most of its operating range, with some minor 1.5 dB variation between 4 to 4.5 kHz.

For the last group of measurements, I again set up the Listen SoundCheck analyzer with the SCM microphone and AudioConnect preamp/power supply. I used the built-in pink noise generator with SLM utilities to set the SPL to 94 dB/1 m (4.46 V) and placed the ¼" SCM microphone to 10 cm from the faceplate of the 25-2234SD. Next, I ran the distortion curves depicted in **Figure 16** (red curve = second harmonic, blue curve = third harmonic).

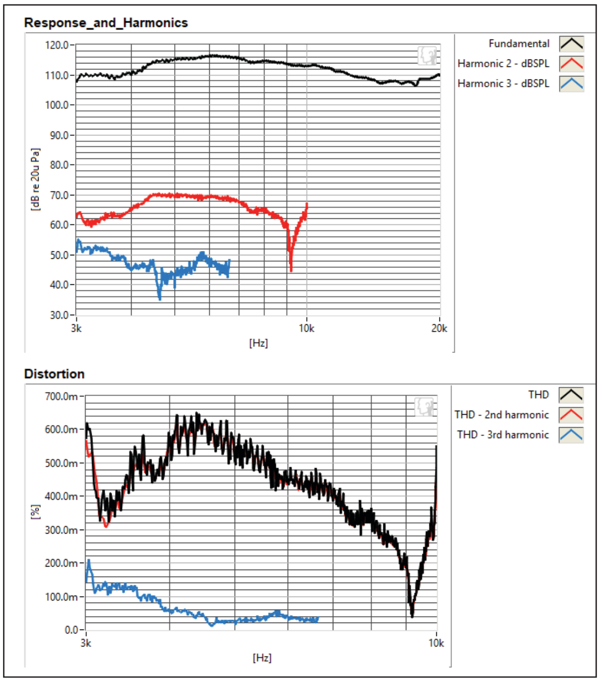

Figure 16: TB Speaker 25-2234SD SoundCheck distortion plots

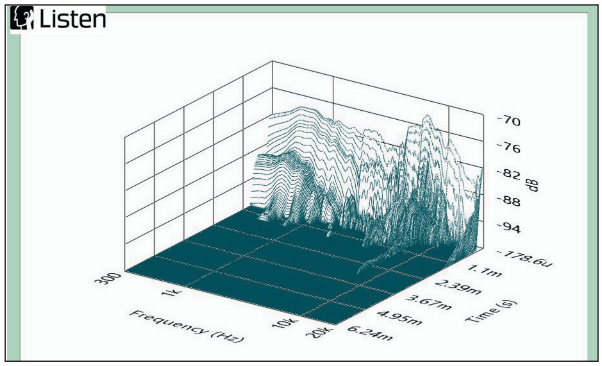

Figure 17: TB Speaker 25-2234SD SoundCheck CSD waterfall plot

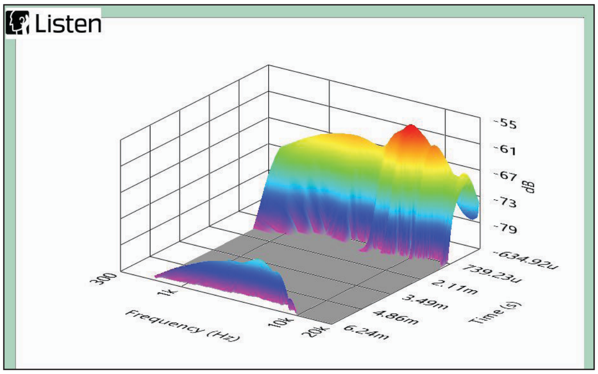

Figure 18: TB Speaker 25-2234SD SoundCheck STFT surface intensity plot

For the final measurement, I performed an impulse measurement, and then imported the results into the Listen SoundMap software, winnowed out the room reflections, and created the CSD plot shown in **Figure 17** and the STFT shown in **Figure 18**. For more infromation, visit www.tb-speaker.com.

The DE680TN-8

The last transducer I examined this month came from Italian OEM manufacturer B&C Speakers, The DE680TN-8 compression driver is the latest addition to B&C Speakers' extensive 17 model ferrite and neodymium motor 1.4" exit compression drivers. In terms of features, the DE680TN-8 is designed for use with 1.4" throat horns, which means it has a 36 mm

Photo 3: The B&C Speakers DE680TN-8 titanium diaphragm

(1.4") throat diameter and a field replaceable titanium diaphragm driven by a 65 mm (2.5") diameter voice coil wound with copper-clad aluminum wire (CCAW) on a high Qm non-conducting former. The titanium diaphragm has been redesigned and incorporates a new bent-edge former along with a new dome and surrounds geometry (see **Photo 3**). Other features include a neodymium ring magnet motor, a nominal 80 W-rated power handling (160 W continuous), a 1.2 kHz recommended crossover frequency (second-order or higher high-pass filter), and 2.83 V/1 m 108 dB sensitivity. B&C Speakers supplied the ME90 horn for