

TEBM35C10-4 Miniature BMR® Driver

Features

- Full range: 100Hz – 20kHz
- Extremely wide directivity; 180°
- Nominal Impedance: 4 Ω
- Diameter: 52mm (54mm OD max)
- Depth: 25.1mm
- Mass: 51.3g

Applications

- Portable speakers
- Sound bars and stands
- Flat TV speakers
- Conference speaker phone

Description

The TEBM35C10-4 BMR® is an audio drive unit with an extended frequency response and extremely wide directivity. It combines the benefits of Tectonic bending-wave technology and pistonic modes of operation.

The small form-factor is ideally suited for compact products that require a full-range drive unit, room filling sound and a high performance acoustic solution.

Parameters

Parameter	Description	min	typ	max	Units
R_e	DC resistance	-10%	4.2	+10%	Ohms
L_e	Inductance (@ 10kHz)	-10%	0.06	+10%	mH
BL	Force factor	-10%	1.85	+10%	Tm
f_s	Resonant frequency	-20%	185	+20%	Hz
SPL	Sound Pressure Level @ 1W, 1m	78	80	81	dB
dDrv	Voice coil diameter	-	20.4	-	mm
M_{ms}	Moving mass	-10%	1.0	+10%	g
C_{ms}	Compliance	-12%	0.73	+12%	mmN ⁻¹
R_{ms}	Suspension Loss	-15%	0.26	-15%	Nsm ⁻¹
$X_{mech\ max}$	Maximum coil excursion (p-p)	-	8.0	-	mm
Sd	Effective piston area	-	11.04	-	cm ²
V_{AS}	Equivalent volume	-	0.12	-	L
Q_{ms}	Mechanical quality factor	-15%	4.47	+15%	
Q_{es}	Electrical quality factor	-15%	1.45	+15%	
Q_{ts}	Total quality factor	-20%	1.09	+20%	

Operating conditions

Condition	Value
Power handling (continuous, weighted pink noise)	10W
Operating temperature range	-20 to 55° C
Audio frequency range	100Hz to 20kHz

Measured Response – on axis SPL

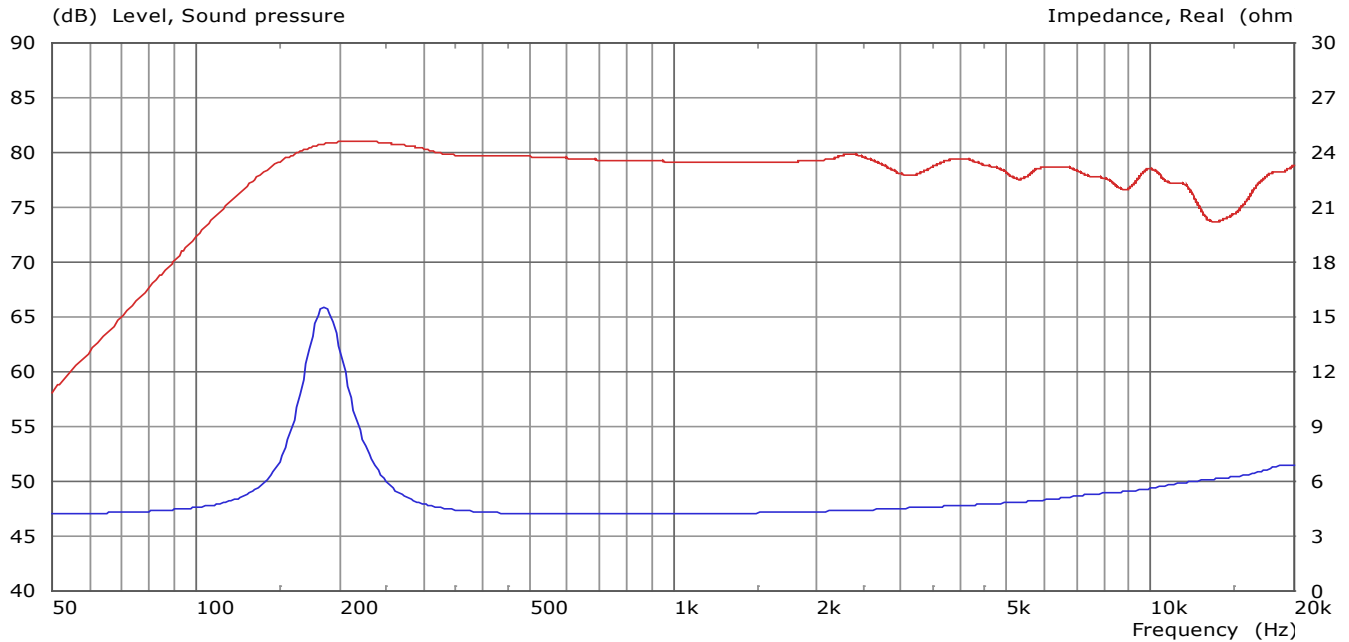


Figure 1: Red: on-axis SPL at 1W/1m (1/3-octave smoothed/spliced anechoic measurement) Blue: Impedance

Measured Response – adjusted power response over frontal hemisphere

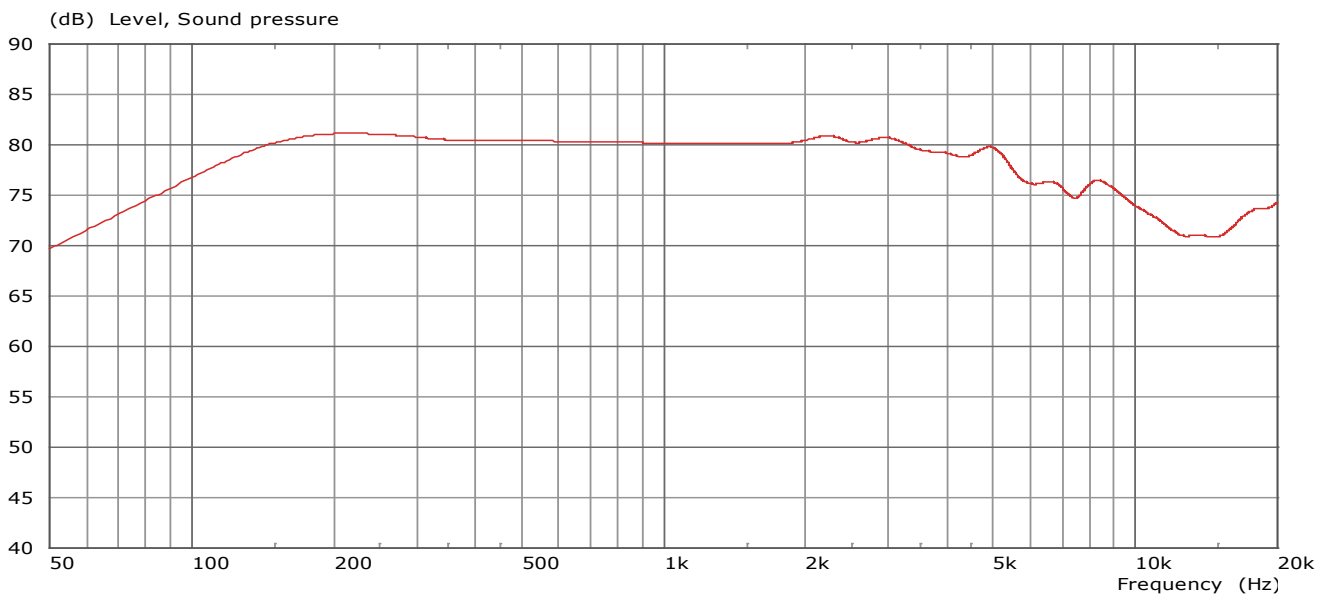


Figure 2: Power Response calculated across -90 -> +90 degrees, 1W/1m, (1/3-octave smoothed/spliced, -11 dB)

Polar – off axis measurements in anechoic chamber at various angles

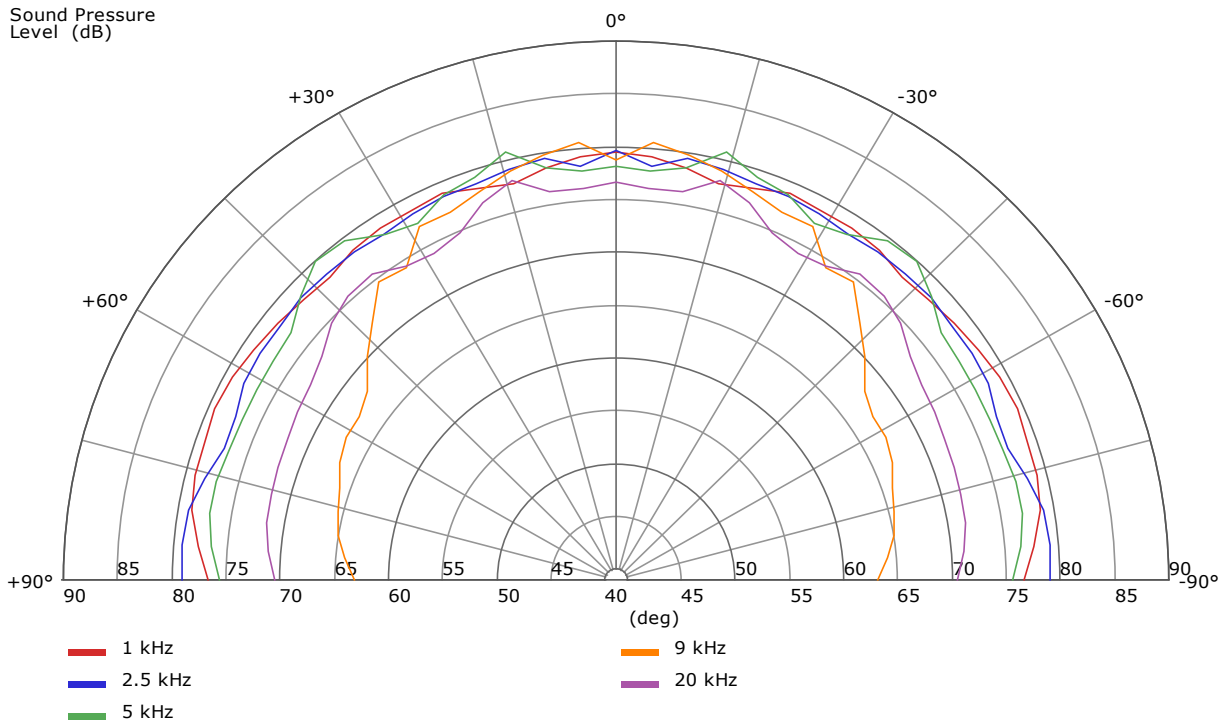


Figure 3: Polar response, angle/dB SPL, input level 1 Watt (1/3rd octave smoothing)

Outline Drawing

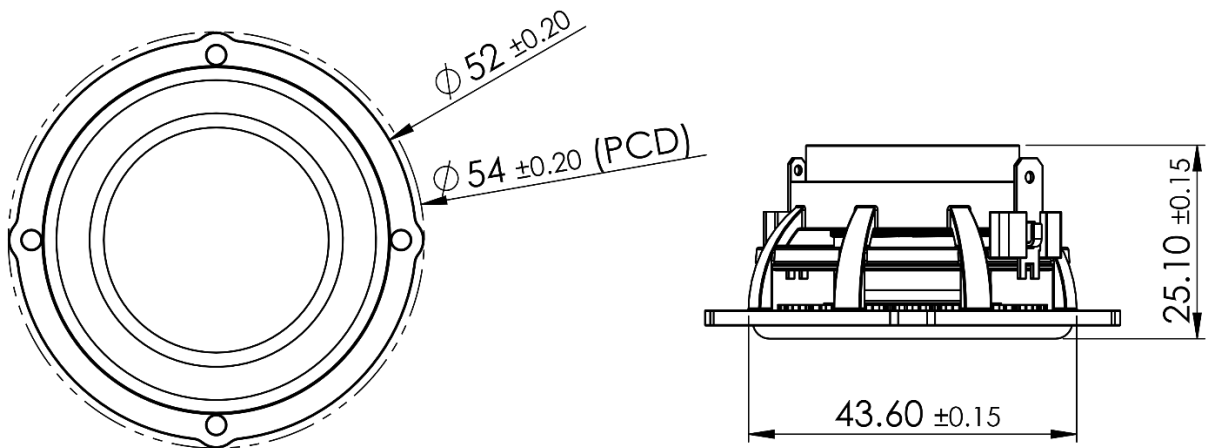


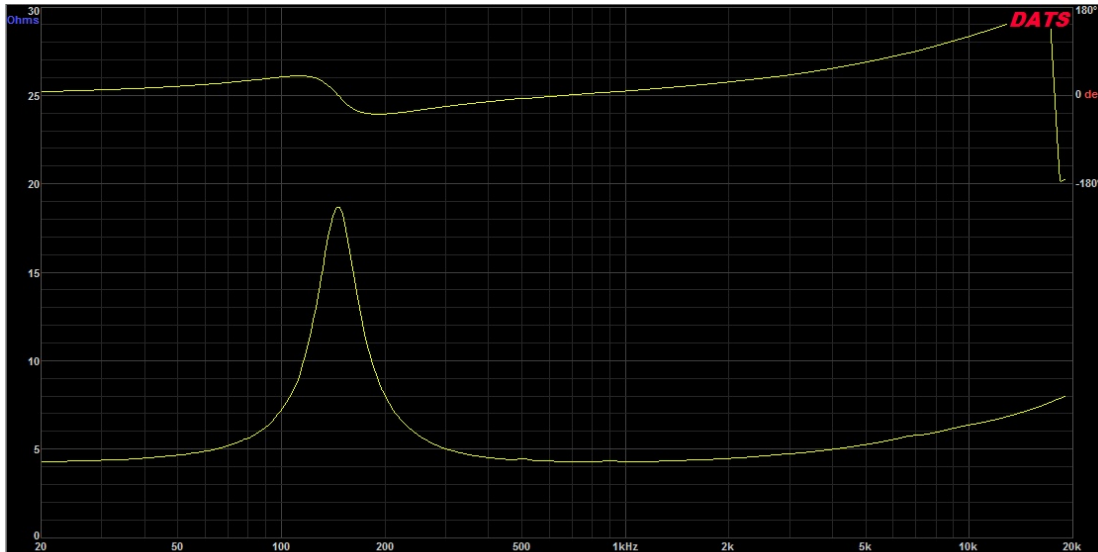
Figure 4: Nominal dimensions

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Impedance and Thiele-Small Testing:

Results were obtained via Dayton's DATS v2 using the added mass method.

- Effective Diameter = 37.08 [mm]
- $R_e = 4.181$ [Ohms]
- $F_s = 146$ [Hz]
- $Z_m = 18.69$ [Ohms]
- $BL = 2.134$ [N/A]
- $Q_{ms} = 3.848$
- $Q_{es} = 1.109$
- $Q_{ts} = 0.8608$
- $V_{as} = 0.148$ [liters]
- $L_e(10k) = 0.07819$ [mH]
- $dBSPL = 78.08$ [1W/1m]
- $M_s = 1.316$ [grams]
- $C_{ms} = 0.903$ [mm/N]



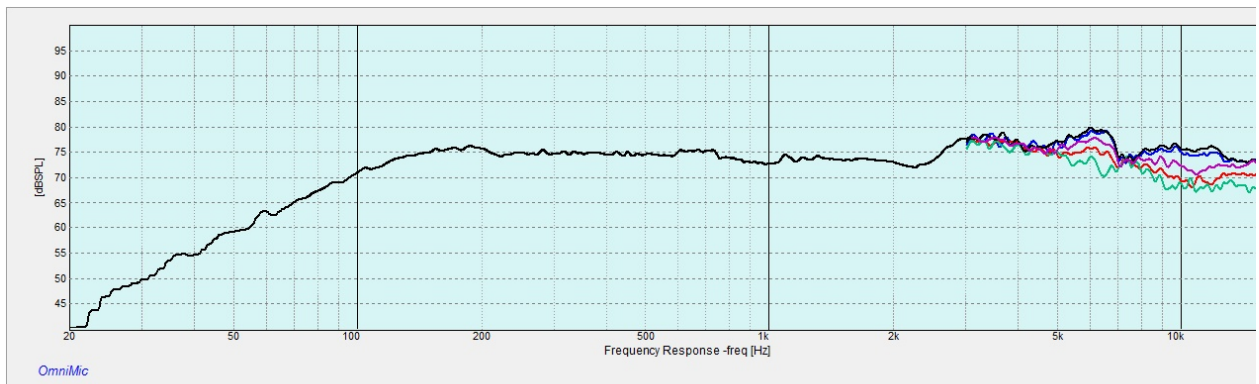
ErinsAudioCorner.com

Frequency Response:

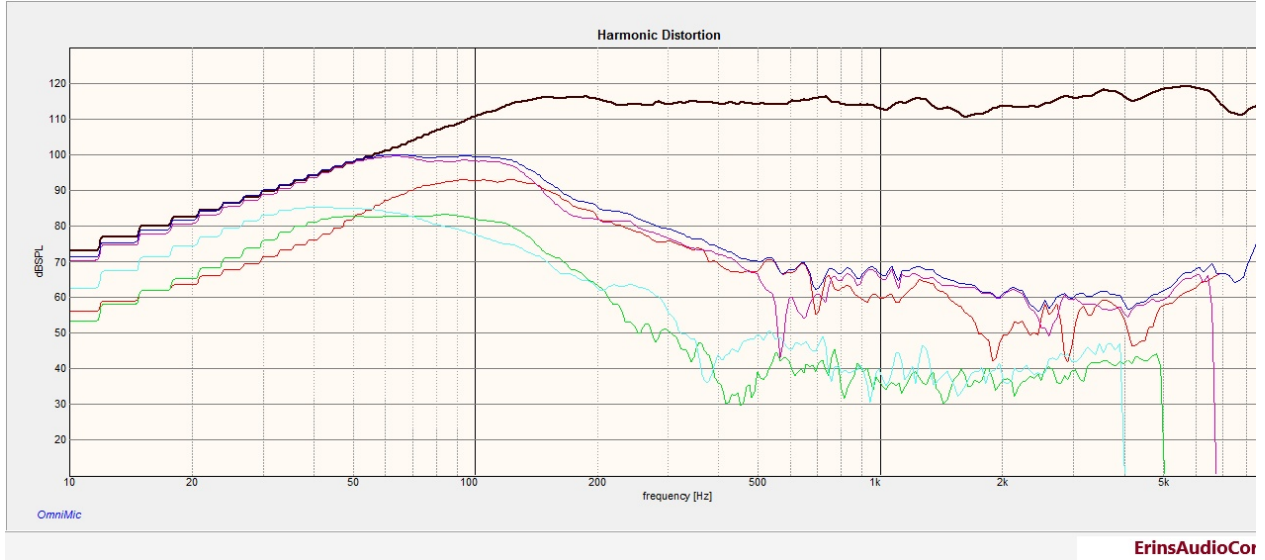
The following response measurements were taken at 2.83v at 1 meter. Nearfield response was merged with far-field at approximately 3khz.

The measurements were performed at 0, 15, 30, 45, and 60 degrees.

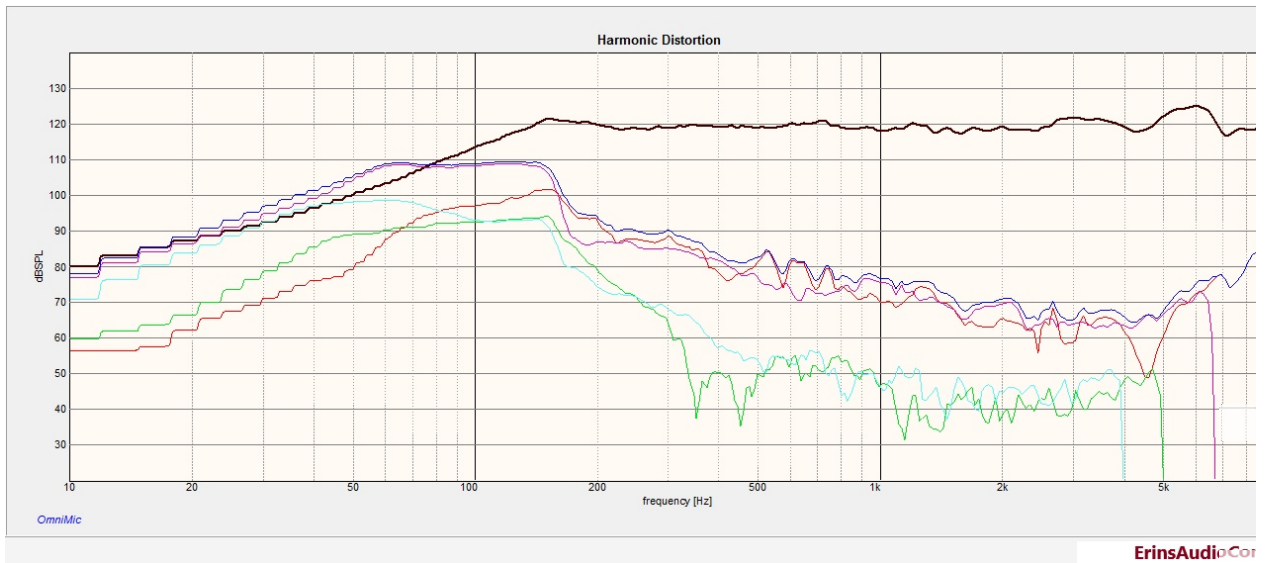
- 0 = Black
- 15 = Blue
- 30 = Purple
- 45 = Red
- 60 = Green



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HD @ 96dB



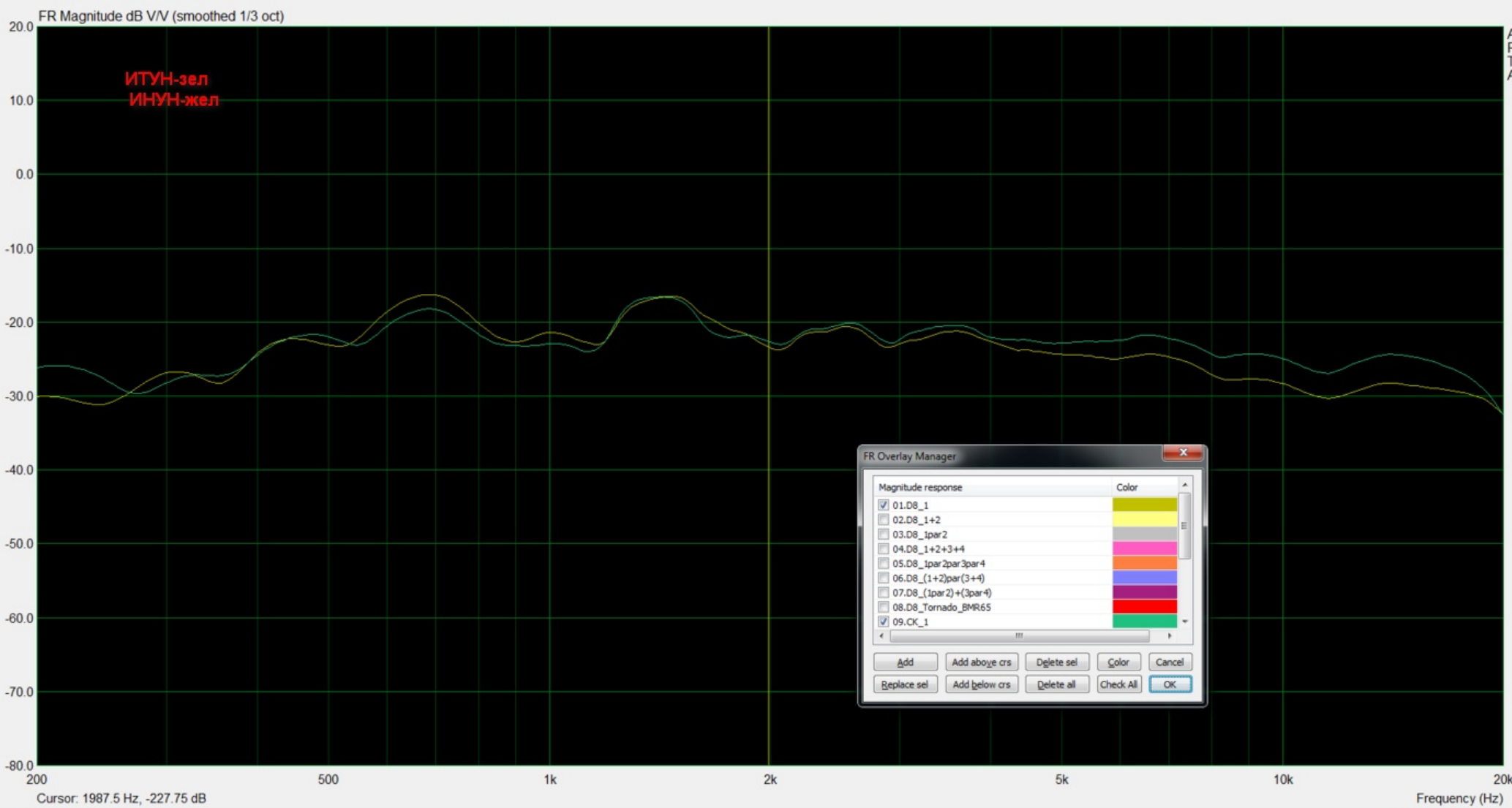
Conclusion:

This driver has an incredible bandwidth for its size. This driver literally fits in my palm yet should have no problems playing from 300-400hz (with a proper high-pass; listener dependent) all the way up to 20khz without issue. Cone breakup is practically non-existent with only a hint of breakup at 18khz. THD is very, very low given its size. At 96dB output the 3% THD mark is about 300hz; Above 500hz the THD is < 1%. Use this with a high-pass filter and most shouldn't have an issue crossing down to 400hz. At 30 degrees off axis the response is down 3dB and at 60deg off axis the response is 7dB down at 10khz. Those numbers are on par with some of my favorite 1 inch tweeters. I'm very impressed. Of course, all this comes at a cost and the cost here is: sensitivity. On average this driver runs about 77dB at 2.83v/1m. Bummer. Compression testing would benefit me here but since I have nothing to A/B it against, I'm gonna let it stand. Of course, a high-pass filter also remedies compression to a good degree and since I don't expect someone listening to this driver at high output near Fs, I suspect compression issues will be fairly inconsequential.

Naturally people will compare this to the AuraSound 2" driver (aka: the "whisper"). While the whisper has approximately 4dB higher sensitivity on average, this driver has a lower Fs, low THD, and an excellent polar response. I don't believe the whisper can cover the same bandwidth as well as this particular Tectonic Elements driver can.

At their current retail price of about \$9/each, they're worth trying out if are even remotely interested. My biggest hangup with them is the very low sensitivity but if that's not an issue for your specific needs, it's hard to not recommend them when used with a reasonable high-pass filter. They'd also make some neat "project" speakers (something like a personal bluetooth boombox or some other DIY-type project).

This also seems like a nice candidate for an array to gain some extra SPL.



ART A

FR Overlay Manager

Magnitude response	Color
<input checked="" type="checkbox"/> 01.D8_1	Yellow
<input type="checkbox"/> 02.D8_1+2	Light Yellow
<input type="checkbox"/> 03.D8_1par2	White
<input type="checkbox"/> 04.D8_1+2+3+4	Pink
<input type="checkbox"/> 05.D8_1par2par3par4	Orange
<input type="checkbox"/> 06.D8_(1+2)par(3+4)	Blue
<input type="checkbox"/> 07.D8_(1par2)+(3par4)	Purple
<input type="checkbox"/> 08.D8_Tornado_BMR65	Red
<input checked="" type="checkbox"/> 09.CK_1	Green

Buttons: Add, Add above crs, Delete sel, Color, Cancel, Replace sel, Add below crs, Delete all, Check All, OK

Top
Fit
Range
Set
Smoothing
1/3

High Fr
Low Fr