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The completion of a new loudspeaker series from bottom to top is normally not a difficult task, instead it is a hard job the reverse the path, because the more you go away from the *full design* the more will the compromises be to reduce both sizes & costs.

In detail, a standard 2-Way bookshelf system *allows* the designer only one acoustic transition region to play with, in order to shape a targeted energy spheroid.

But we don't have to forget the very fact that listening to music by means of small-sized speakers is still a widely accepted compromise by audiophile community, because of their undeniable advantages in terms of logistics within ordinary domestic environments. We feel it is the main reason for Chario Loudspeakers to constantly improve this kind of systems because they are a really electro-acoustic challenge benchmark.

Though the designer comes to many compromises that make the job *virtually* not feasible, it is reasonable exploiting all available elements to offer the audiophile a reasoned overview about all possible strategies to be implemented.

As a corollary to this rigorous scientific status, we at Chario Loudspeakers assert once again that it is always possible to work *miracles* in doing our job, but it is never possible working *miraculous* designs beyond physical laws boundaries. Sonnet proudly stands at the borderline of audio knowledge waiting for audiophiles to listen to their authoritative voice, because …

…we think differently!

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The Phase Curve

Human audio-perception system relies upon stimuli comparison to correctly localize acoustic sources, computing the wave-fronts reaching the two ears at the same time. At present time Duplex Theory is the best hypothesis researchers have to explain the ear-brain function.

Frequencies below about 700 Hz are processed by determining the arrival time to each ear-pinnae and this is referred to as ITD (inter-aural time delay). Frequencies above about 1,400 Hz are processed by determining the energy flow delivered to each era-pinnae and this is referred to as IAD (inter-aural amplitude difference)

We soon recognize Duplex Theory not to be exhaustive because it fails to correctly explain the localization process within the missing 700-1,400 Hz range. At these frequencies head& torso are enough obstructive to modify the incoming wavefront (diffraction) so that the crossover from ITD to IAD is not linear and localization cues are not flawless.

The proprietary WMT™ Chario Loudspeakers principle fully exploits this fault to *fool* the ears and dissimulating the presence of two or more radiators on the front baffle of the cabinet, giving the audiophile the sensation of listening to a large 1-Way full-range speaker in order to introduce an *intentional masking* of the discontinuity performance at crossover region.

The use of any analogical electrical filter to cut out the acoustic output of both woofer & tweeter beyond their own bandwidth, causes an acoustic signal delay within the crossover region, whose mirror image in the transformed domain is named *acoustic phase delay* measured in degrees.

Keeping under tight control the envelope of the acoustic phase delay curve for each transducer in a speaker system is a *sine qua non* condition to assure the quality of any electro-acoustic design. Sonnet design strategy is based on the concept of *slope* as it is commonly known in everyday life. The hypothesis is the following:

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If the slopes of the phase plot of woofer and tweeter are the same (i.e. parallel curves) as the radiation angle increases over the horizontal plane, then the auditory sensation is *invariant* both for direct & early-reflected wave-front (side wall).

From Pag.10 on are shown the Phase Plots for increasing horizontal angles from 0° (on axis) to 75°, woofer (red curve) and tweeter (black curve). Now, because drivers acoustic output is made uniform over a wide angle, the audiophile is given the chance to *modulate* the stereo-kinetic stage in width and/or depth. This geometrical representation exchange *could be* possible with other kind of loudspeaker systems, but only Sonnet keeps unchanged the perceived timbre. A clear-cut explanation of the layout is depicted on Pag.6

FIG.1 Sonnet are set parallel to the front wall. The standard stereophonic triangular layout provides the listener with two wave-fronts of *similar* energy content: direct path (blue) and reflected path (red). This layout exploits the early side-reflection (Haas effect) to enlarge the sonic stage beyond the physical distance of the two speakers.

FIG.2 Sonnet are tilted toward the listener. The standard stereophonic triangular layout provides the listener with two wave-fronts of *different* energy content: direct path (blue) and reflected path (red). This layout exploits the early side-reflection reduction to deepen the sonic stage beyond the front wall.

Any speaker rotation in between allows the audiophile to *mix* the two sensations.

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Data Sheet

Low Frequency Load	Back firing Vented
Vent Geometry	Half-Exponential Hourglass Type
Configuration	2 way Reversed Array
Drivers	1 Tweeter 32 mm SILVERSOFT™ dome NeFeB motor 1 Woofer 170 mm ROHACELL® Full-Apex™ Poly-Ring NeFeB motor
Sensitivity	90 dB SPL normalized to 1m with 2.83Vrms de-correlated L/R pink noise within IEC 268-13 compliant listening room
Low Frequency Cut Off	55 Hz @ -3dB referred to C_4 WETS
Xover Frequency	1,180 Hz
Alignment	LKR4 Derived ($\Delta\phi$=45deg)
Rated Impedance	Modulus 4Ω (min 3.0) Argument ±36°
Size	445 x 235 x 340 mm (H x W x D)
Weight	14kg
Suggested Amplifier	Rated for 120W/4 Ω Average Power Max
Cabinet Finishing	Solid walnut or solid cherry and HDF
Dedicated stand	13kg Size 750 x 540 x 460mm (H x W x D) Iron black anodized (Top Plate & Legs) Painted HDF (central body)

Notes
1. All quantities in SI Units
2. Average Power computed as V^2_{rms} / R
3. Speakers not shielded
4. Specs subject to change without notice

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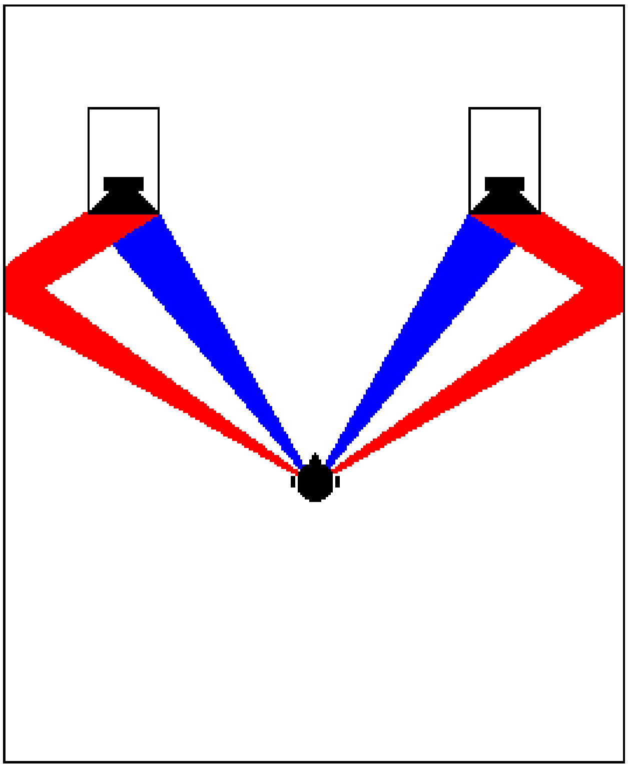


FIG.1 Sonnet parallel to the front wall

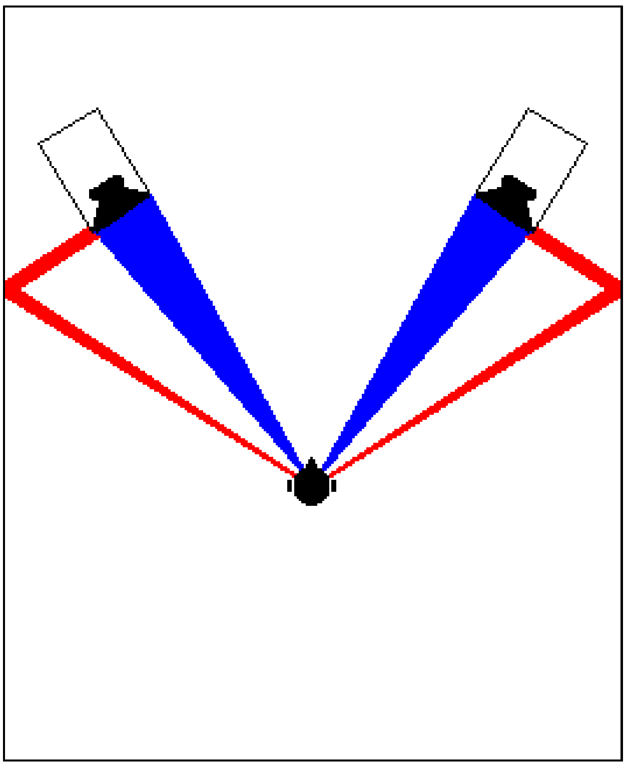
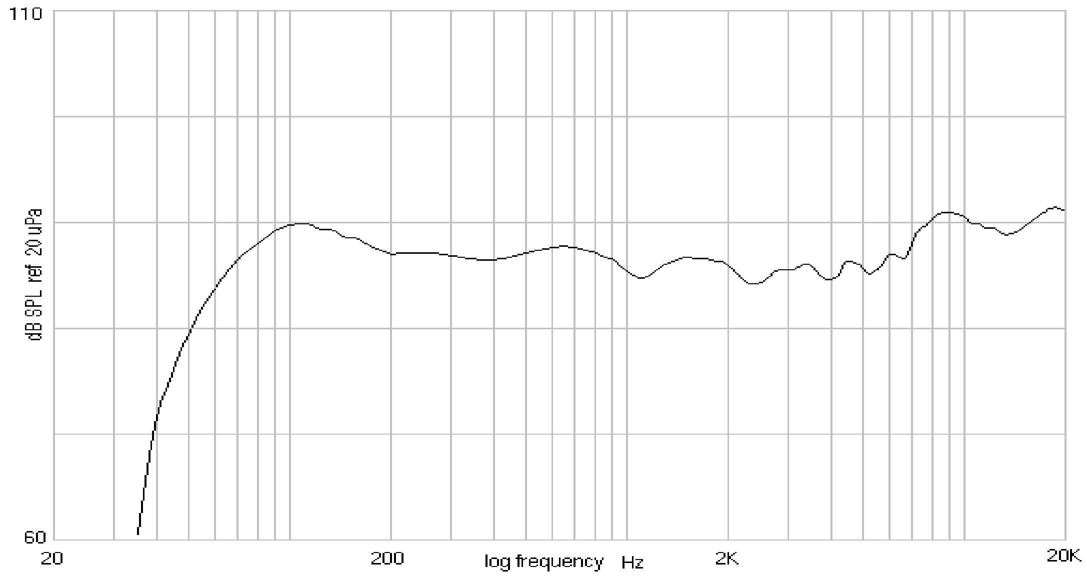
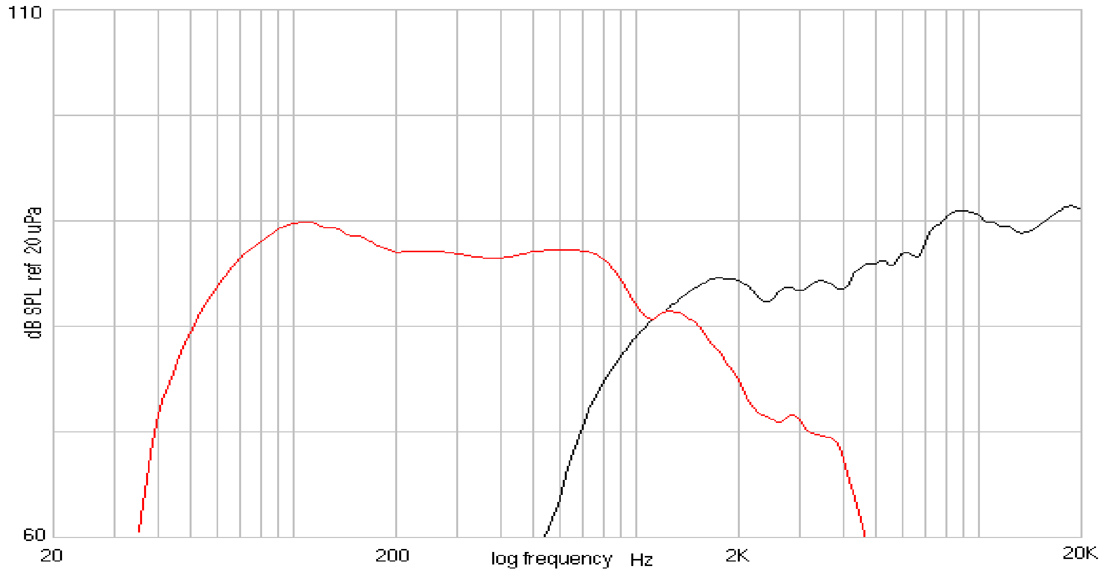


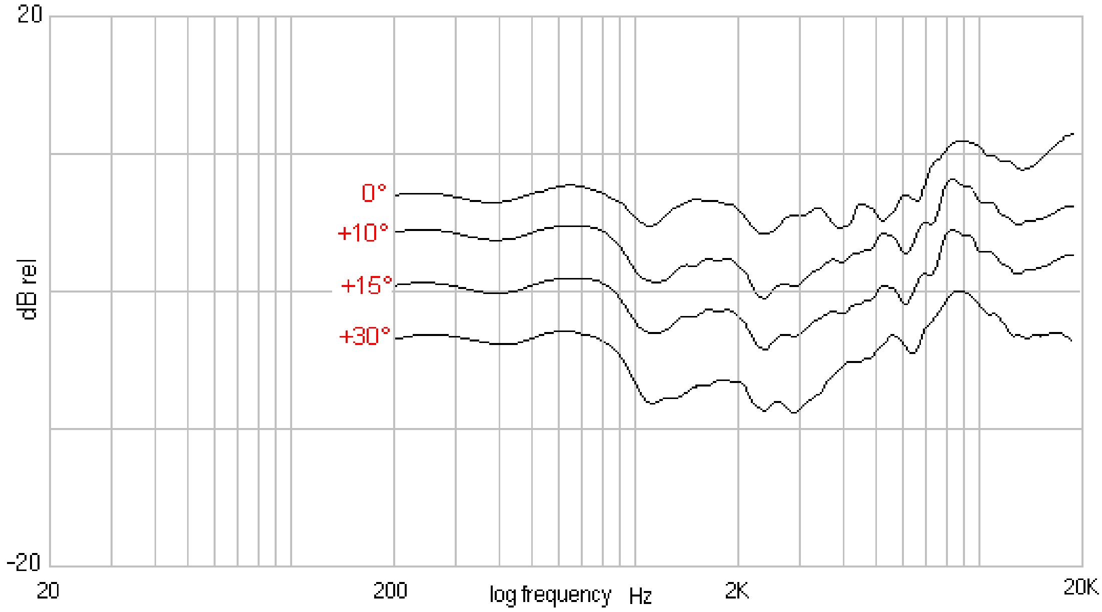
FIG.2 Sonnet tilted toward the listener



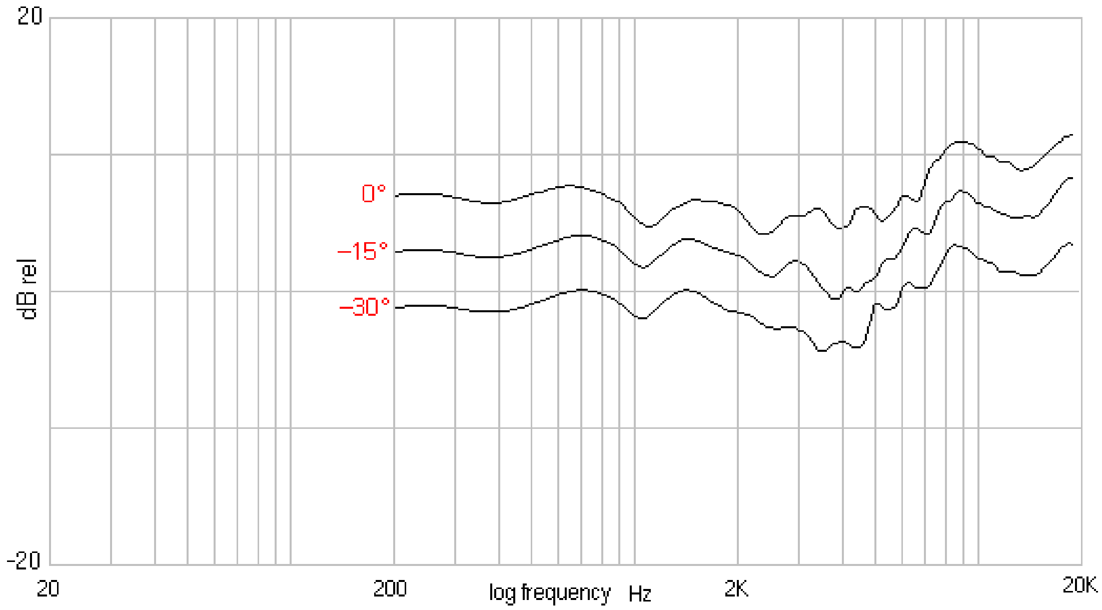
On axis frequency response



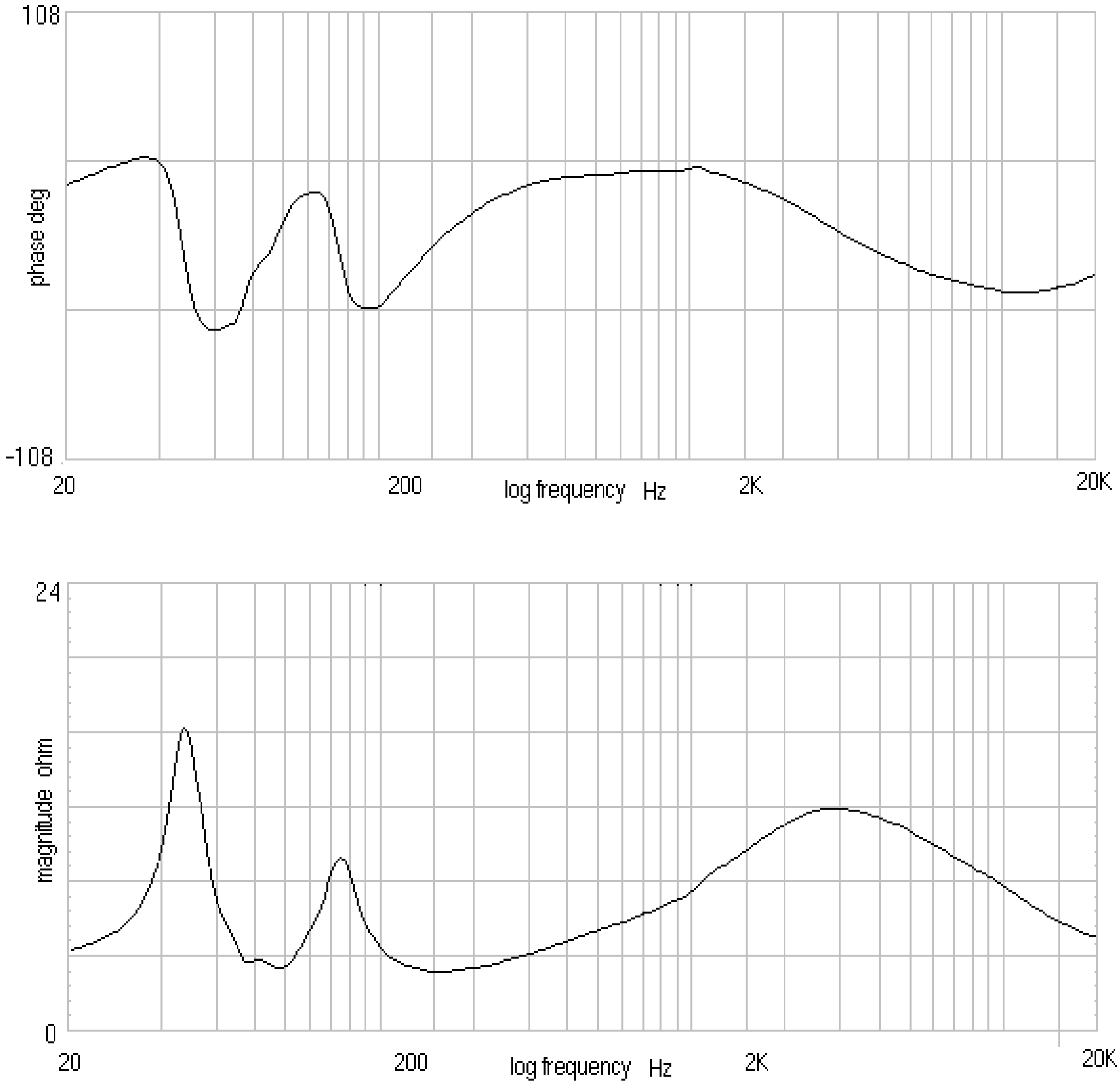
On axis frequency response for single drivers



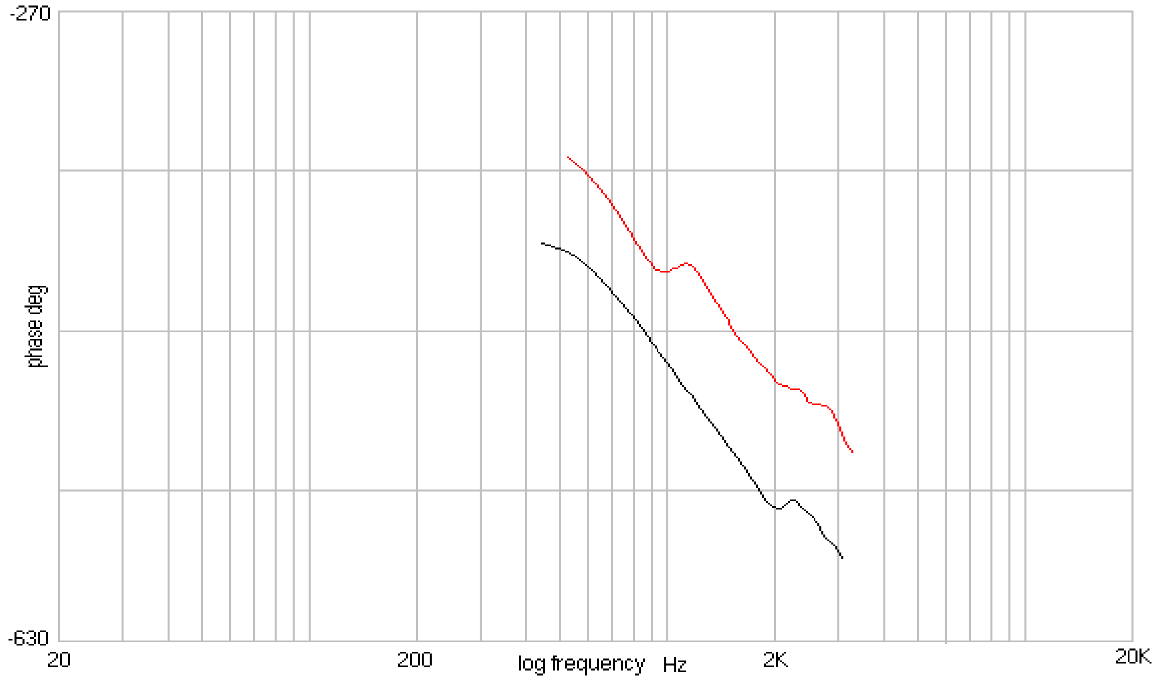
On axis upward vertical radiation



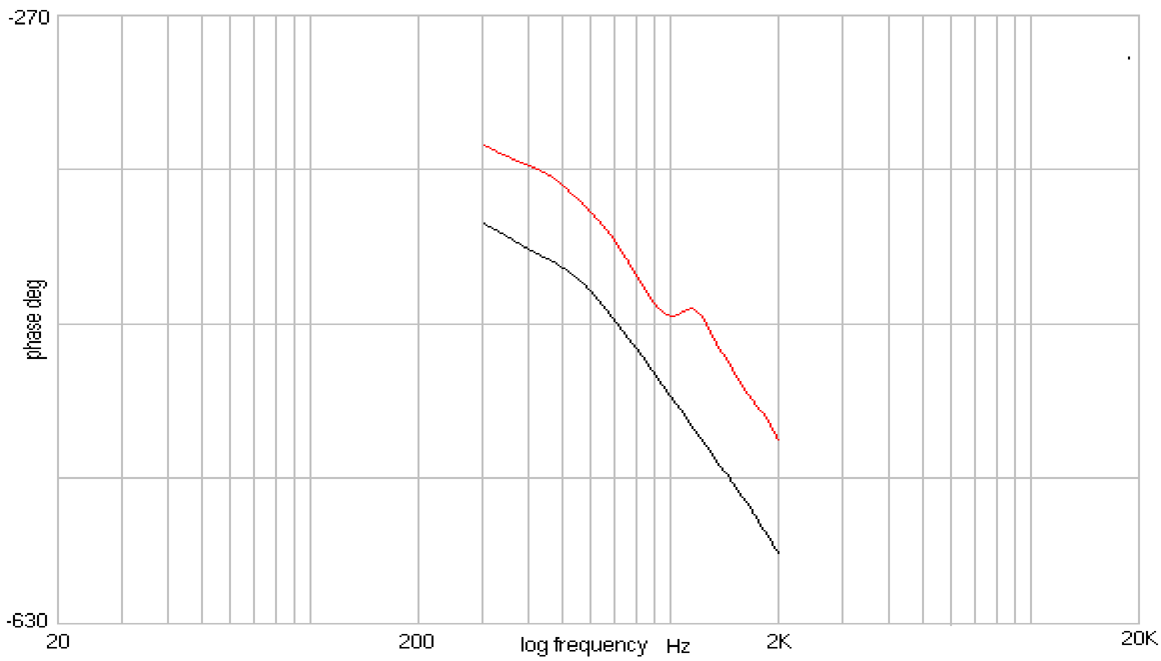
On axis downward vertical radiation



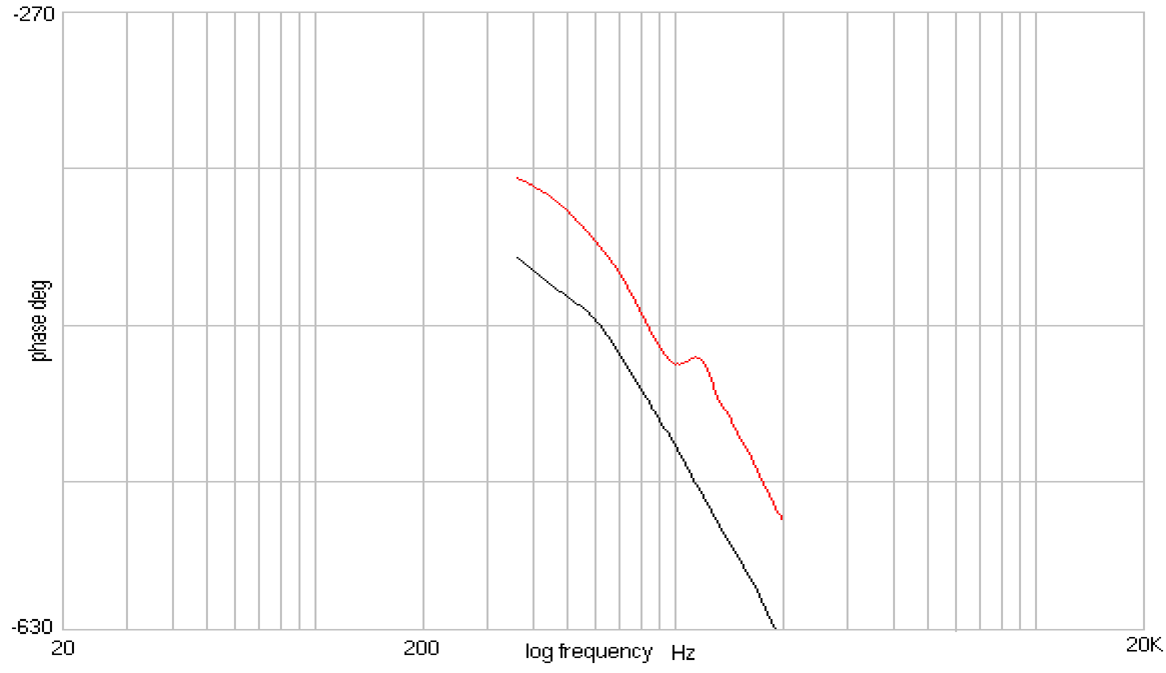
Impedance modulus & argument



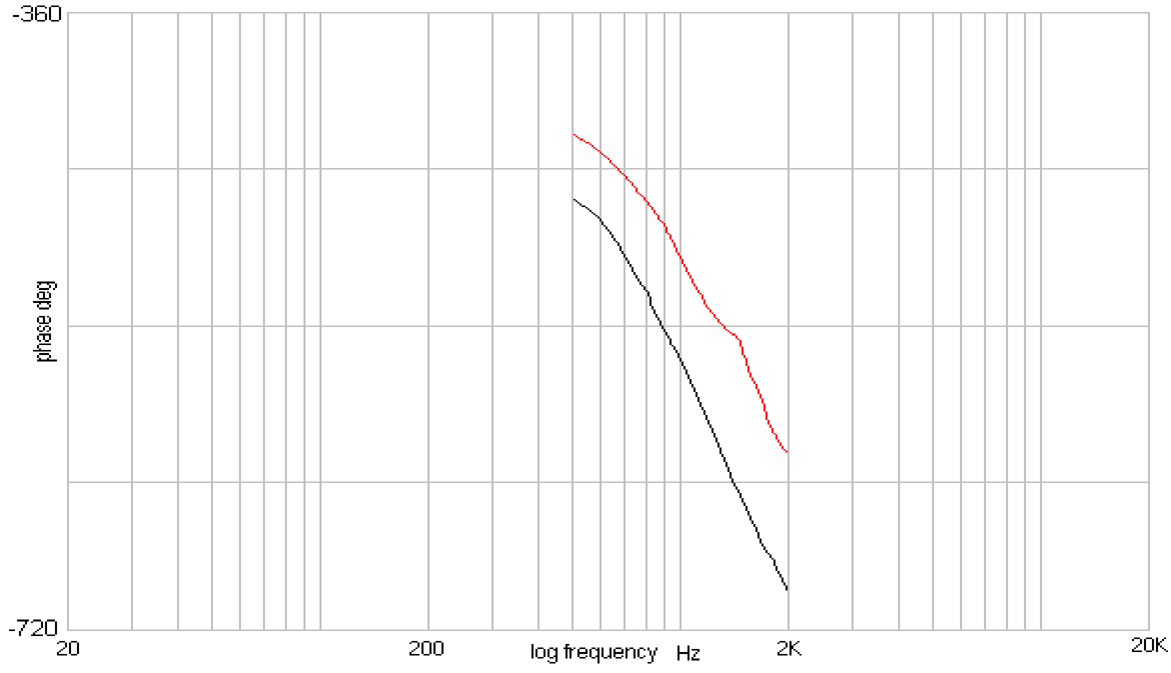
Phase difference @ constant slope - 0° horizontal



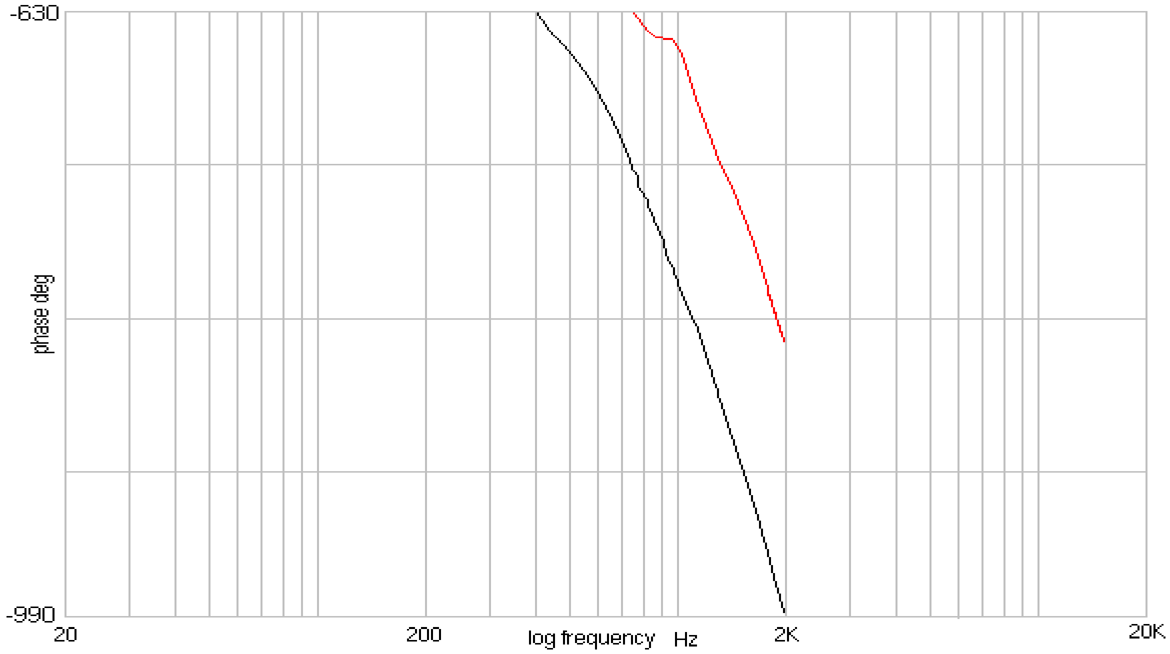
Phase difference @ constant slope - 15° horizontal



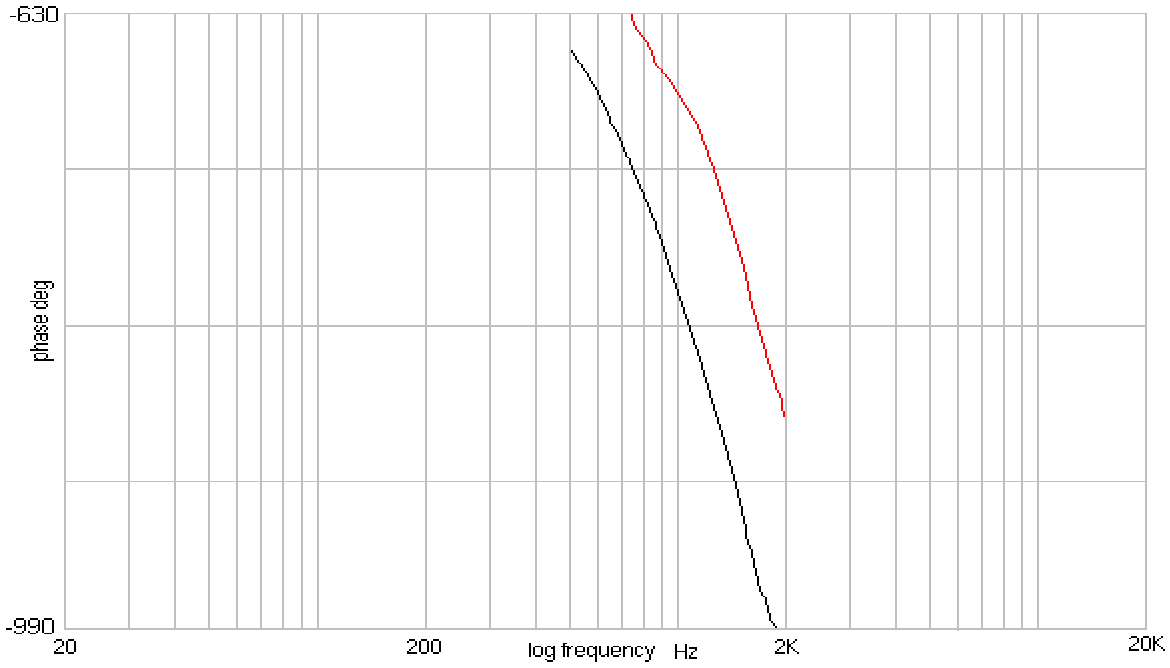
Phase difference @ constant slope - 30° horizontal



Phase difference @ constant slope - 45° horizontal



Phase difference @ constant slope - 60° horizontal



Phase difference @ constant slope - 75° horizontal

Full Apex™ Rohacell© diaphragm

Magnete Poly-Ring Neodymium

T32 SILVERSOFT™ Dome Tweeter

SOUNDCAP™ High Grade & Resistors MIL – IRON POWDER Cores & HIGH Q Inductors