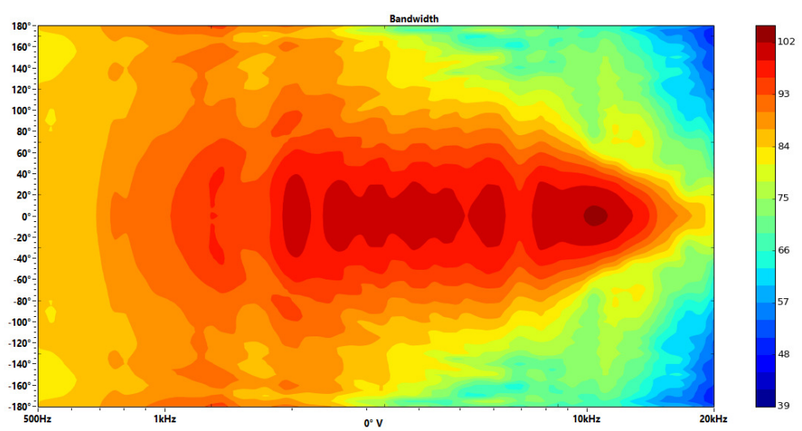
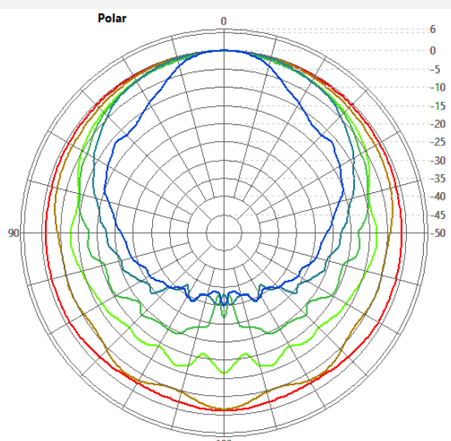


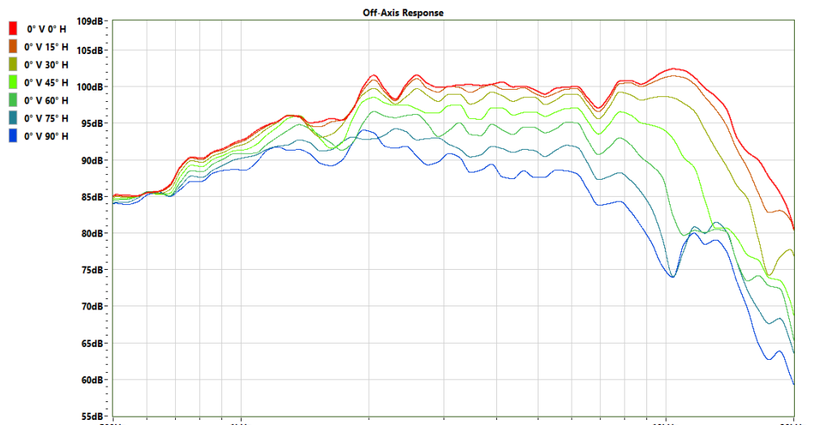



**Nota de Aplicação AN-0019.**
Analise de resposta fora do eixo, Driver Oversound DTi-4630, com guia de onda Ludovico LG-02.
https://www.ludovico.com.br/840/guia-de-ondas/guia-de-ondas-lg-02
http://oversound.com.br/novo/index.php?route=product/product&product_id=91
**Condições:**
Ruído Rosa, 2.83V rms, 1m, medição automatizada em câmara anecóica no laboratório da:
**OVERSOUND ALTO-FALANTES INDÚSTRIA E COMÉRCIO ELETRO ACÚSTICO.**
Horizontal: Quadrante 1 e 2, simetricamente espelhados para quadrantes 3 e 4.
Vertical: Quadrante 1, simetricamente espelhado para quadrantes 2, 3 e 4.
Todas as características dimensionais originais dos e entre componentes foram mantidas, nenhum tipo de modificação visando melhora de desempenho foi efetuada.
**Responsável:**
Eng. Francisco Monteiro, CREA: 260400014-8.
3/11/2020.

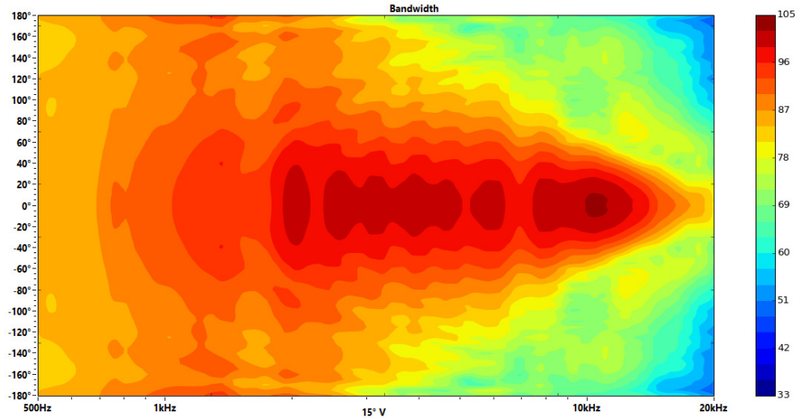



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 507Hz | 300° | 1,13 | 0,51dB |
| 0° V | 1023Hz | 250° | 1,37 | 1,37dB |
| 0° V | 2054Hz | 130° | 2,12 | 3,25dB |
| 0° V | 4120Hz | 114° | 2,62 | 4,19dB |
| 0° V | 8248Hz | 100° | 3,13 | 4,96dB |
| 0° V | 18527Hz | 44° | 4,78 | 6,80dB |

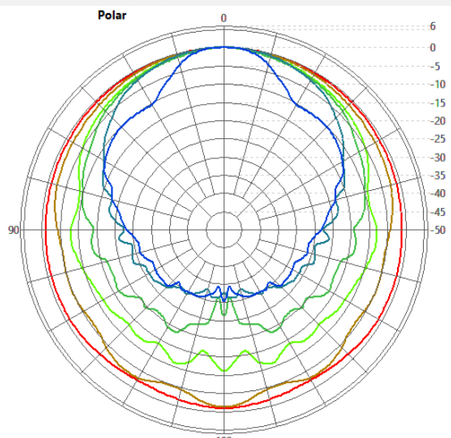


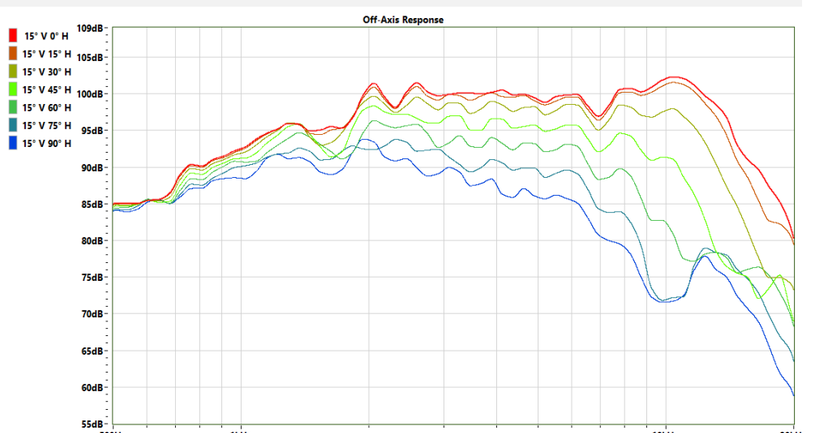




## 0° Vertical

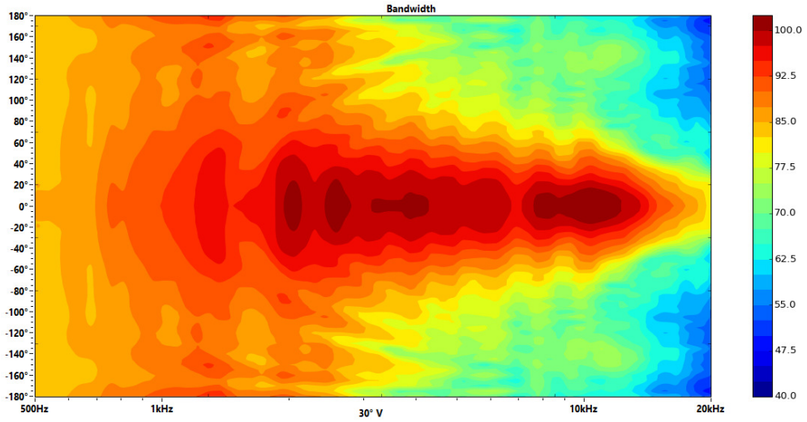



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 15° V | 507Hz | 310° | 1,12 | 0,48dB |
| 15° V | 1023Hz | 250° | 1,37 | 1,35dB |
| 15° V | 2054Hz | 128° | 2,13 | 3,28dB |
| 15° V | 4120Hz | 108° | 2,74 | 4,37dB |
| 15° V | 8248Hz | 88° | 3,54 | 5,49dB |
| 15° V | 18527Hz | 40° | 4,88 | 6,88dB |

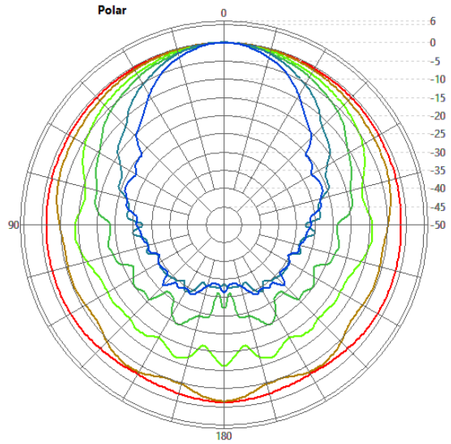



## 15° Vertical



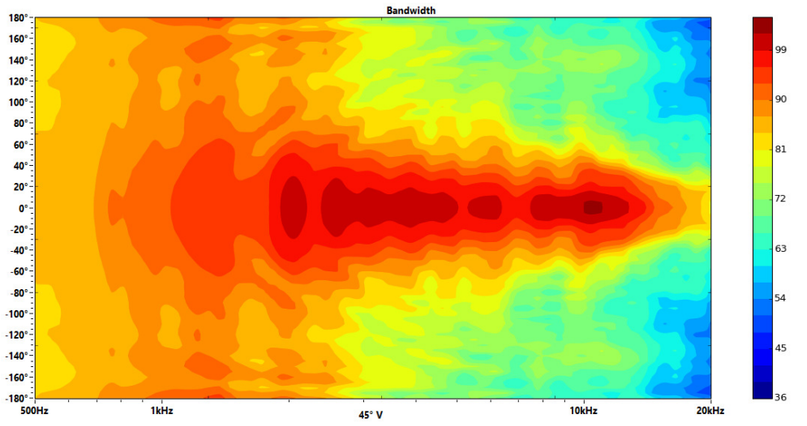

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 30° V | 507Hz | 300° | 1,14 | 0,56dB |
| 30° V | 1023Hz | 240° | 1,41 | 1,49dB |
| 30° V | 2054Hz | 120° | 2,27 | 3,55dB |
| 30° V | 4120Hz | 92° | 3,27 | 5,15dB |
| 30° V | 8248Hz | 64° | 4,59 | 6,62dB |
| 30° V | 18527Hz | 50° | 5,56 | 7,45dB |



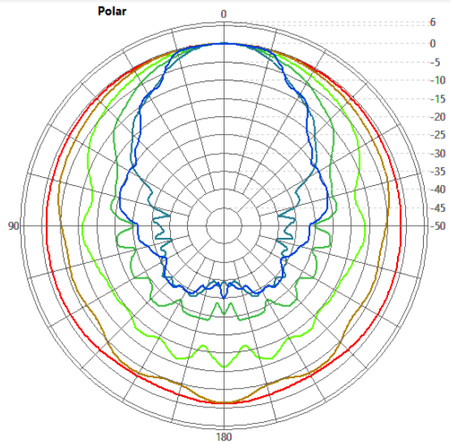


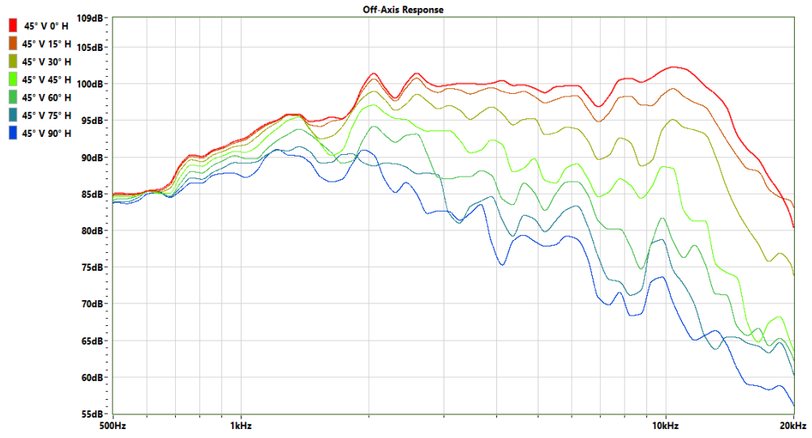


## 30° Vertical

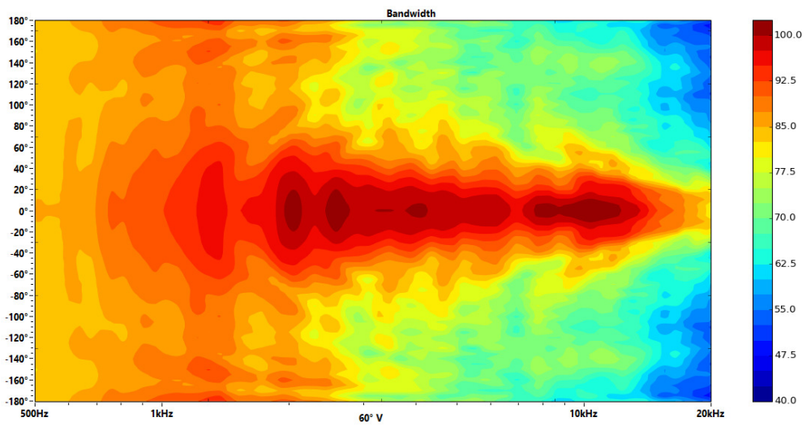



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 45° V | 507Hz | 310° | 1,13 | 0,55dB |
| 45° V | 1023Hz | 226° | 1,44 | 1,58dB |
| 45° V | 2054Hz | 110° | 2,46 | 3,90dB |
| 45° V | 4120Hz | 70° | 3,97 | 5,99dB |
| 45° V | 8248Hz | 46° | 5,70 | 7,56dB |
| 45° V | 18527Hz | 46° | 5,22 | 7,18dB |

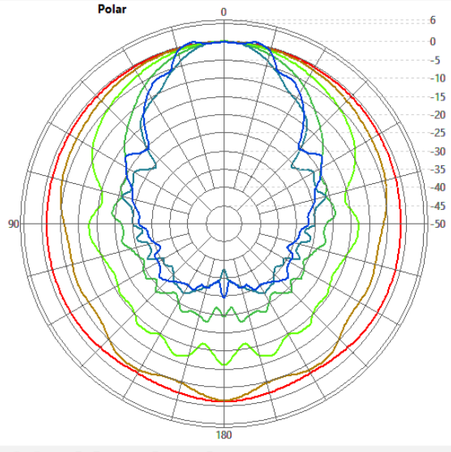


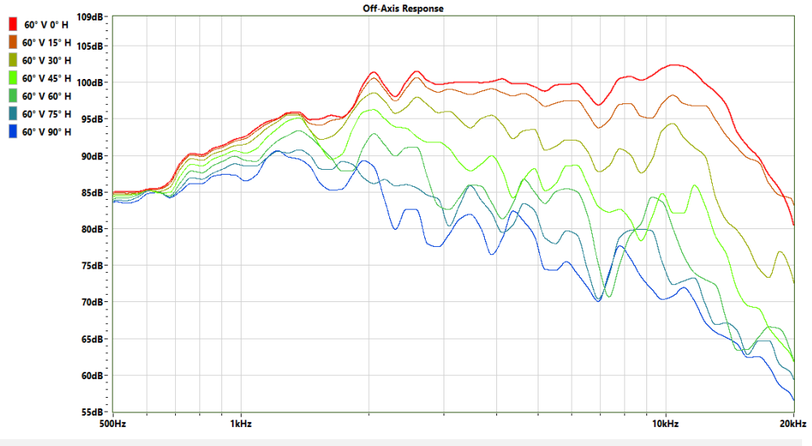




## 45° Vertical

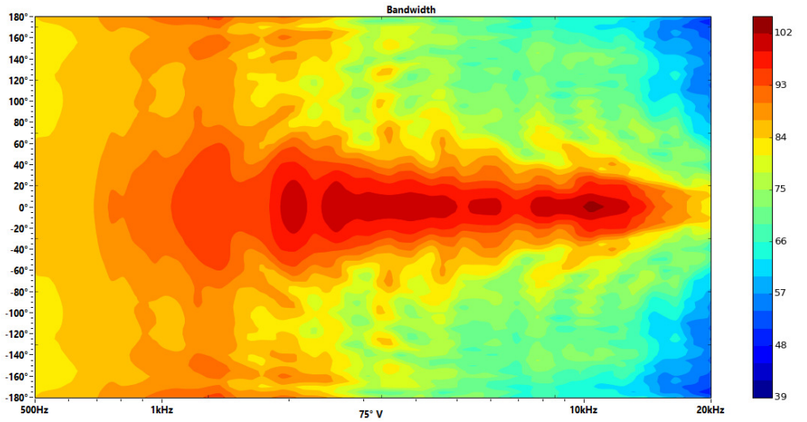



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 60° V | 507Hz | 300° | 1,14 | 0,57dB |
| 60° V | 1023Hz | 178° | 1,49 | 1,74dB |
| 60° V | 2054Hz | 100° | 2,68 | 4,27dB |
| 60° V | 4120Hz | 58° | 4,52 | 6,55dB |
| 60° V | 8248Hz | 38° | 6,22 | 7,94dB |
| 60° V | 18527Hz | 46° | 5,48 | 7,39dB |

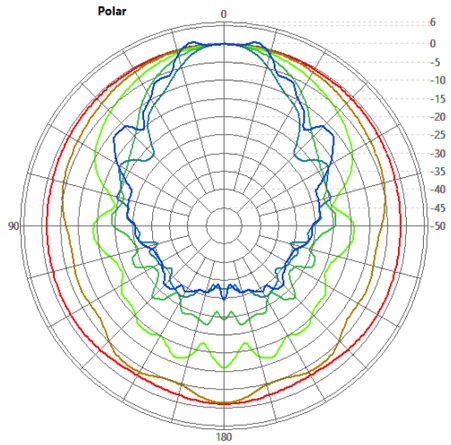


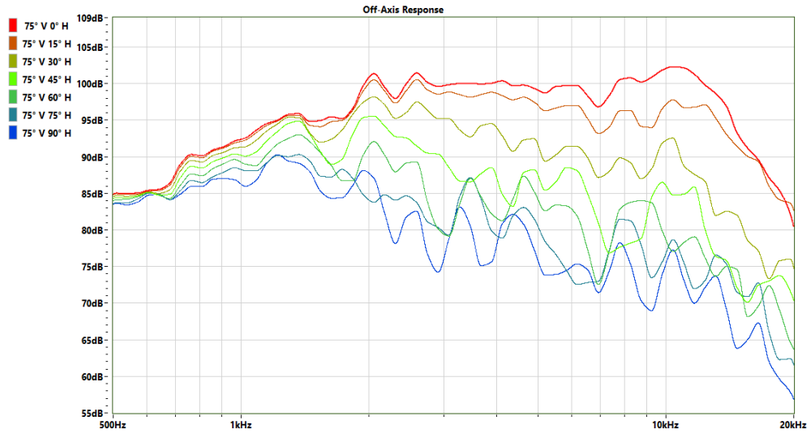




## 60° Vertical

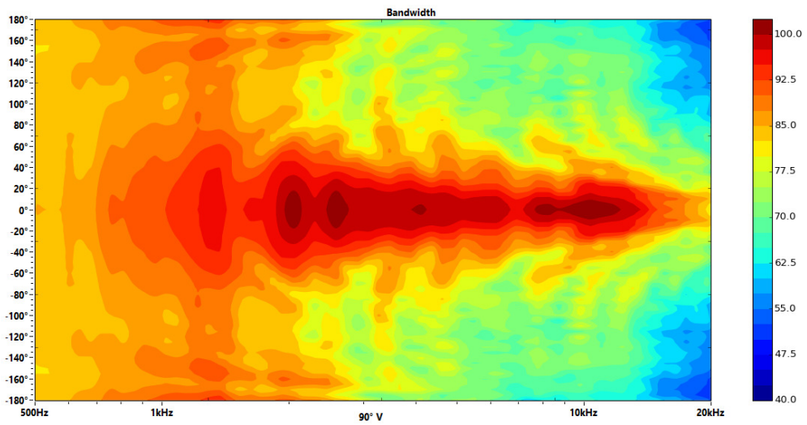



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 75° V | 507Hz | 300° | 1,14 | 0,57dB |
| 75° V | 1023Hz | 266° | 1,52 | 1,82dB |
| 75° V | 2054Hz | 92° | 2,83 | 4,52dB |
| 75° V | 4120Hz | 54° | 4,79 | 6,80dB |
| 75° V | 8248Hz | 36° | 6,32 | 8,01dB |
| 75° V | 18527Hz | 40° | 5,04 | 7,02dB |

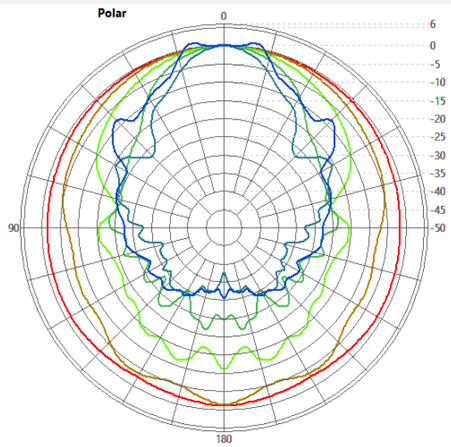


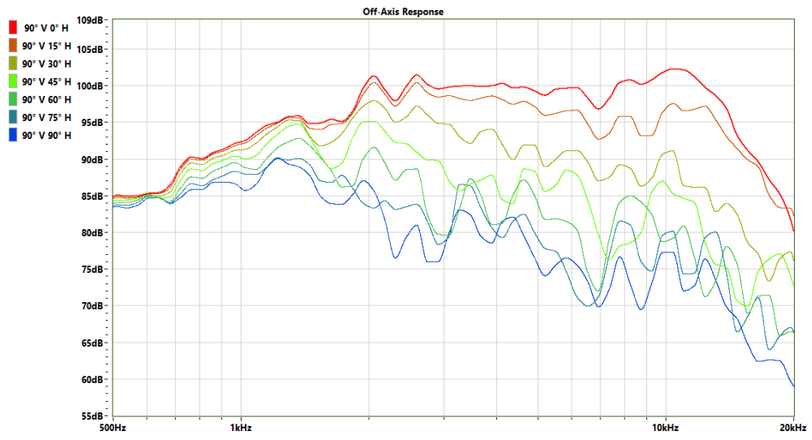




## 75° Vertical

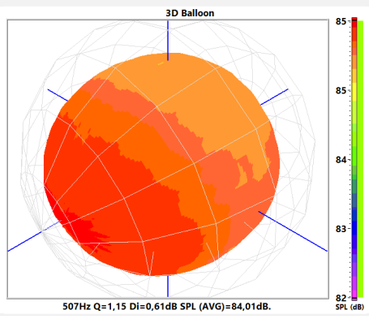



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 90° V | 507Hz | 300° | 1,15 | 0,61dB |
| 90° V | 1023Hz | 172° | 1,55 | 1,89dB |
| 90° V | 2054Hz | 88° | 2,93 | 4,68dB |
| 90° V | 4120Hz | 50° | 4,92 | 6,92dB |
| 90° V | 8248Hz | 34° | 6,59 | 8,19dB |
| 90° V | 18527Hz | 40° | 4,70 | 6,72dB |

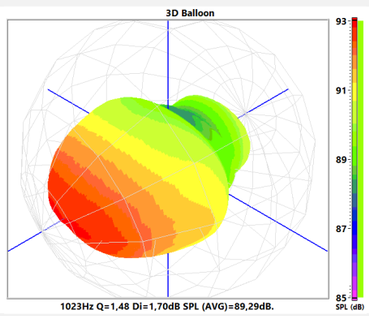


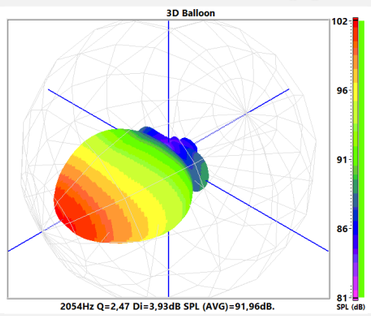

## 90° Vertical



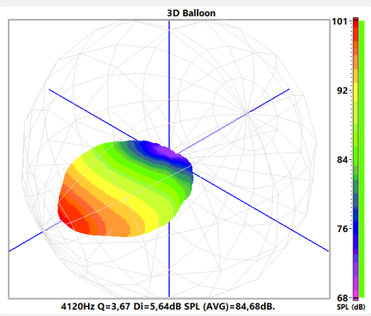

507Hz Q=1,15 Di=0,61dB SPL (AVG)=84,01dB.



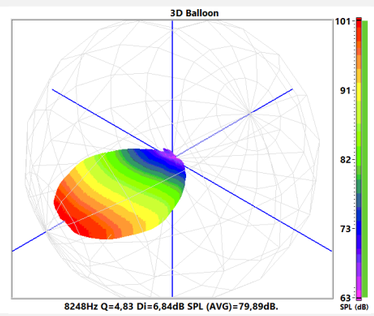

1023Hz Q=1,48 Di=1,70dB SPL (AVG)=89,29dB.



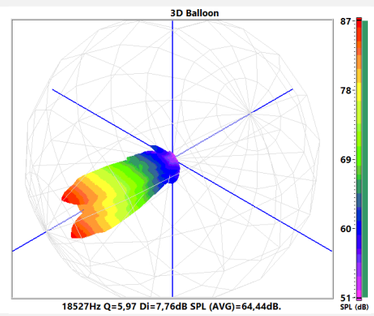

2054Hz Q=2,47 Di=3,93dB SPL (AVG)=91,96dB.




4120Hz Q=3,67 Di=5,64dB SPL (AVG)=84,68dB.



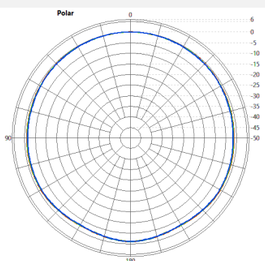

8248Hz Q=4,83 Di=6,84dB SPL (AVG)=79,89dB.



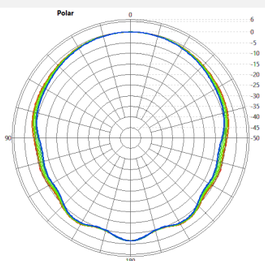

18527Hz Q=5,97 Di=7,76dB SPL (AVG)=64,44dB.

## 3D Balloon

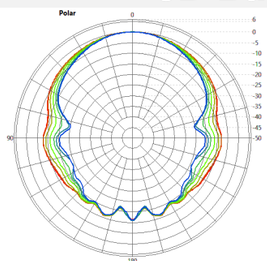
| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 507Hz | 300° | 1,13 | 0,51dB |
| 15° V | 507Hz | 310° | 1,12 | 0,48dB |
| 30° V | 507Hz | 300° | 1,14 | 0,56dB |
| 45° V | 507Hz | 310° | 1,13 | 0,55dB |
| 60° V | 507Hz | 300° | 1,14 | 0,57dB |
| 75° V | 507Hz | 300° | 1,14 | 0,57dB |
| 90° V | 507Hz | 300° | 1,15 | 0,61dB |



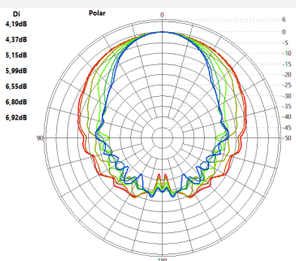

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 1023Hz | 250° | 1,37 | 1,37dB |
| 15° V | 1023Hz | 250° | 1,37 | 1,35dB |
| 30° V | 1023Hz | 240° | 1,41 | 1,49dB |
| 45° V | 1023Hz | 226° | 1,44 | 1,58dB |
| 60° V | 1023Hz | 178° | 1,49 | 1,74dB |
| 75° V | 1023Hz | 266° | 1,52 | 1,82dB |
| 90° V | 1023Hz | 172° | 1,55 | 1,89dB |



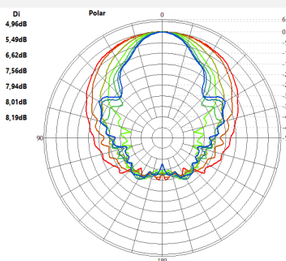

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 2054Hz | 130° | 2,12 | 3,25dB |
| 15° V | 2054Hz | 128° | 2,13 | 3,28dB |
| 30° V | 2054Hz | 120° | 2,27 | 3,55dB |
| 45° V | 2054Hz | 110° | 2,46 | 3,90dB |
| 60° V | 2054Hz | 100° | 2,68 | 4,27dB |
| 75° V | 2054Hz | 92° | 2,83 | 4,52dB |
| 90° V | 2054Hz | 88° | 2,93 | 4,68dB |



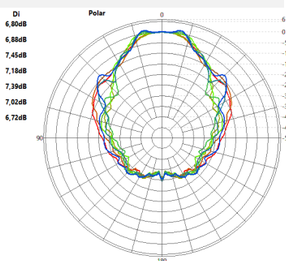

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 4120Hz | 114° | 2,62 | 4,19dB |
| 15° V | 4120Hz | 108° | 2,74 | 4,37dB |
| 30° V | 4120Hz | 92° | 3,27 | 5,15dB |
| 45° V | 4120Hz | 70° | 3,97 | 5,99dB |
| 60° V | 4120Hz | 58° | 4,52 | 6,55dB |
| 75° V | 4120Hz | 54° | 4,79 | 6,80dB |
| 90° V | 4120Hz | 50° | 4,92 | 6,92dB |




| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 8248Hz | 100° | 3,13 | 4,96dB |
| 15° V | 8248Hz | 88° | 3,54 | 5,49dB |
| 30° V | 8248Hz | 64° | 4,59 | 6,62dB |
| 45° V | 8248Hz | 46° | 5,70 | 7,56dB |
| 60° V | 8248Hz | 38° | 6,22 | 7,94dB |
| 75° V | 8248Hz | 36° | 6,32 | 8,01dB |
| 90° V | 8248Hz | 34° | 6,59 | 8,19dB |




| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 18527Hz | 44° | 4,78 | 6,80dB |
| 15° V | 18527Hz | 40° | 4,88 | 6,88dB |
| 30° V | 18527Hz | 50° | 5,56 | 7,45dB |
| 45° V | 18527Hz | 46° | 5,22 | 7,18dB |
| 60° V | 18527Hz | 46° | 5,48 | 7,39dB |
| 75° V | 18527Hz | 40° | 5,04 | 7,02dB |
| 90° V | 18527Hz | 40° | 4,70 | 6,72dB |

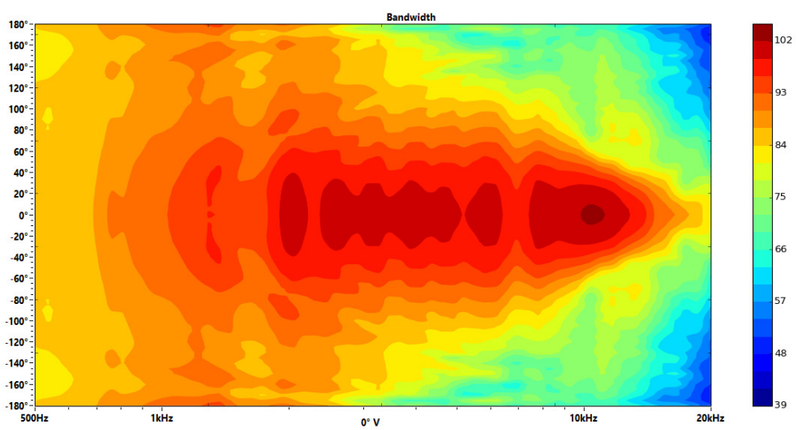



## Polar Comparativa Vertical






**Application Note AN-0019.**
Off-axis response analysis, Driver Oversound DTi-4630, with Ludovico LG-02 waveguide.
https://www.ludovico.com.br/840/guia-de-ondas/guia-de-ondas-lg-02
http://oversound.com.br/novo/index.php?route=product/product&product_id=91
**Conditions:**
Pink noise, 2.83V rms, 1m, automated measurement in an anechoic chamber at:
**OVERSOUND SPEAKERS AND ELECTRO-ACOUSTIC INDUSTRY.**
Horizontal: Quadrant 1 and 2, symmetrically mirrored for quadrants 3 and 4.
Vertical: Quadrant 1, symmetrically mirrored for quadrants 2, 3 and 4.
All original dimensional characteristics of and between components were maintained, no modifications were made to improve performance.
**Developer:**
Eng. Francisco Monteiro, CREA: 260400014-8.
3/11/2020.

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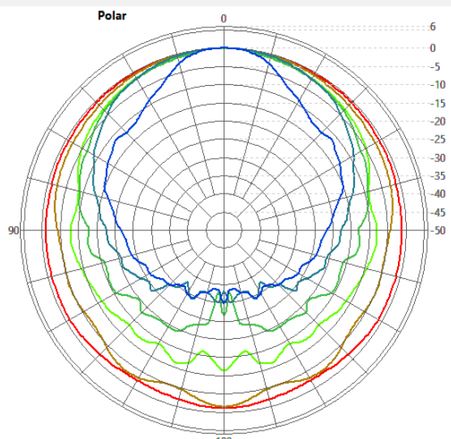
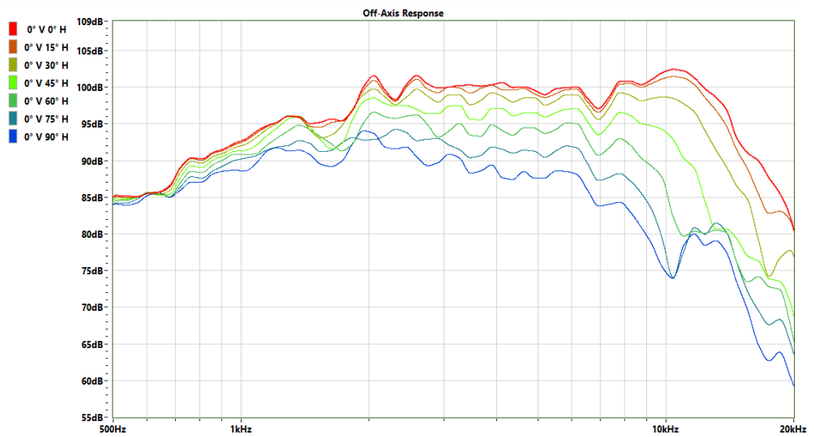
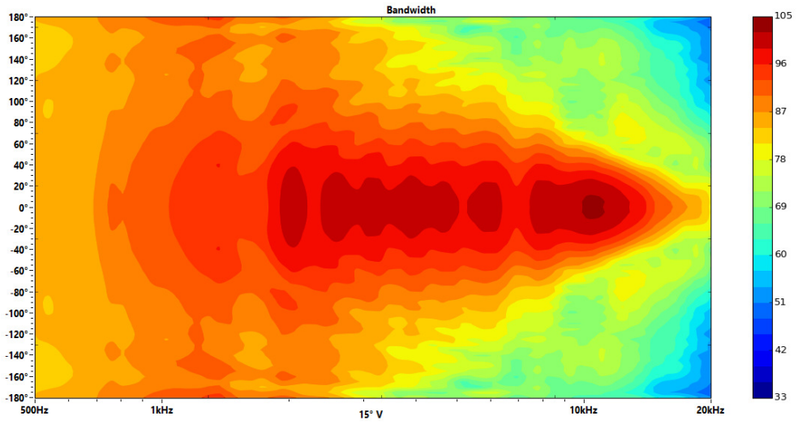
| 0° V | 4120Hz | 114° | 2,62 | 4,19dB |
| 0° V | 8248Hz | 100° | 3,13 | 4,96dB |
| 0° V | 18527Hz | 44° | 4,78 | 6,80dB |

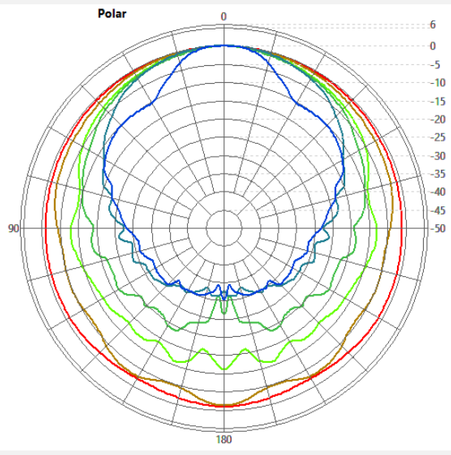


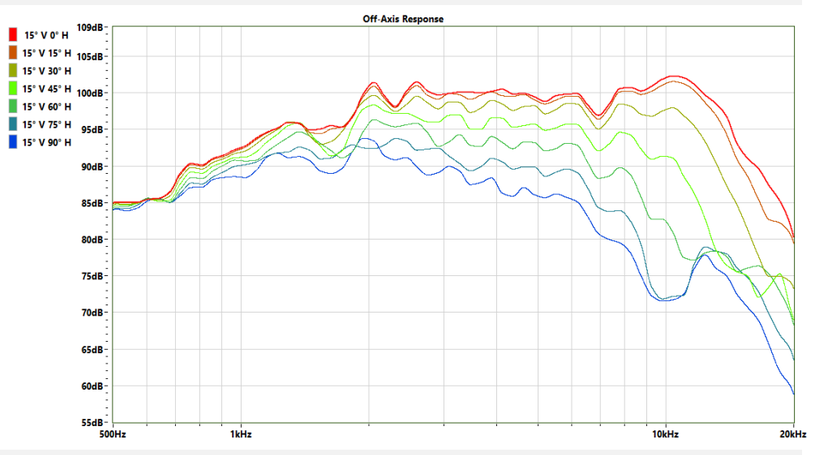




## 0° Vertical

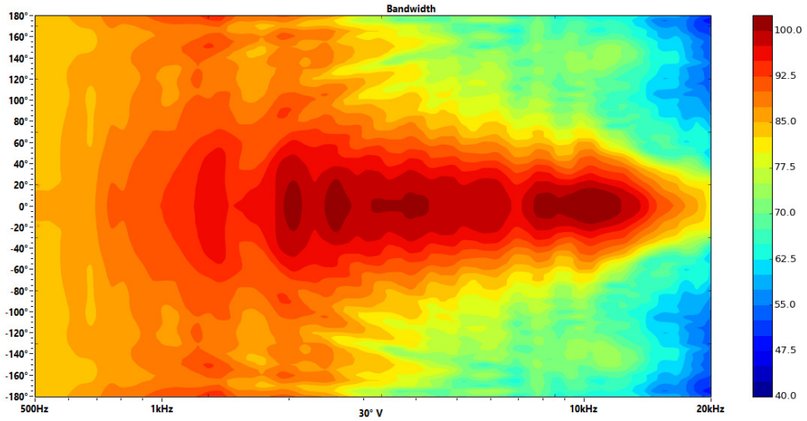



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 15° V | 507Hz | 310° | 1,12 | 0,48dB |
| 15° V | 1023Hz | 250° | 1,37 | 1,35dB |
| 15° V | 2054Hz | 128° | 2,13 | 3,28dB |
| 15° V | 4120Hz | 108° | 2,74 | 4,37dB |
| 15° V | 8248Hz | 88° | 3,54 | 5,49dB |
| 15° V | 18527Hz | 40° | 4,88 | 6,88dB |

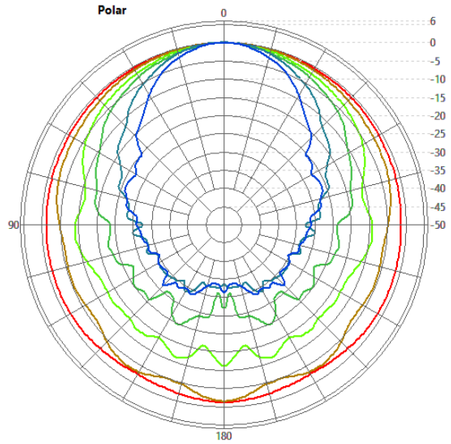



## 15° Vertical



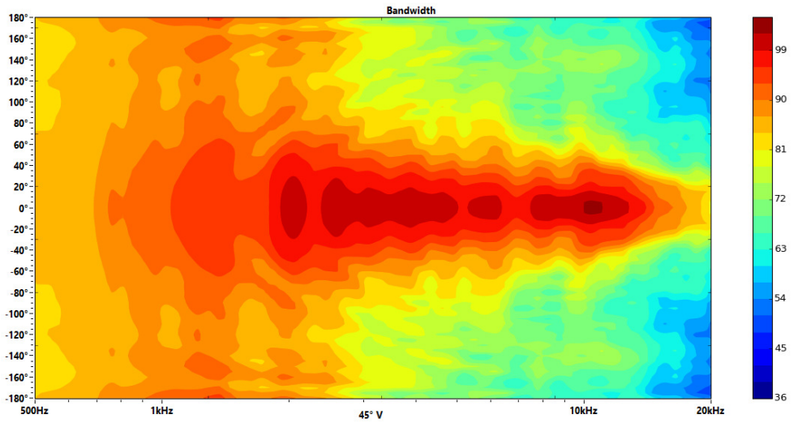

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 30° V | 507Hz | 300° | 1,14 | 0,56dB |
| 30° V | 1023Hz | 240° | 1,41 | 1,49dB |
| 30° V | 2054Hz | 120° | 2,27 | 3,55dB |
| 30° V | 4120Hz | 92° | 3,27 | 5,15dB |
| 30° V | 8248Hz | 64° | 4,59 | 6,62dB |
| 30° V | 18527Hz | 50° | 5,56 | 7,45dB |



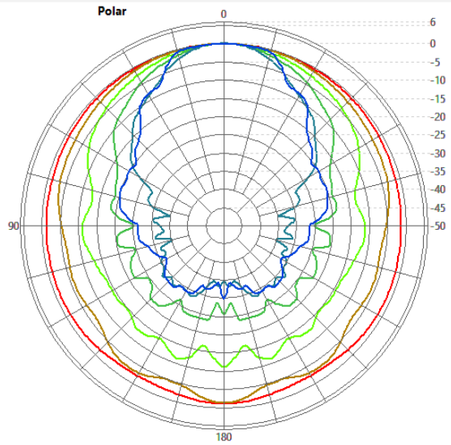


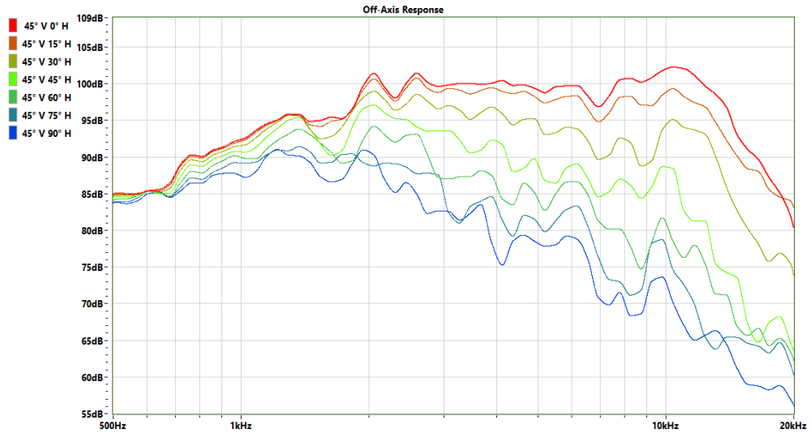


## 30° Vertical

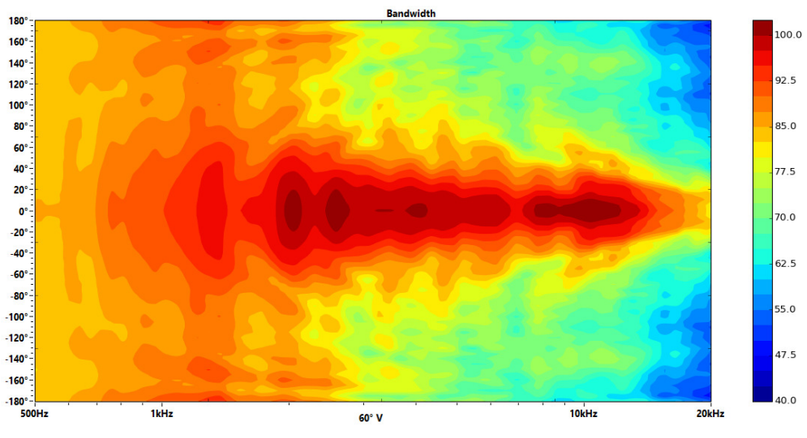



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 45° V | 507Hz | 310° | 1,13 | 0,55dB |
| 45° V | 1023Hz | 226° | 1,44 | 1,58dB |
| 45° V | 2054Hz | 110° | 2,46 | 3,90dB |
| 45° V | 4120Hz | 70° | 3,97 | 5,99dB |
| 45° V | 8248Hz | 46° | 5,70 | 7,56dB |
| 45° V | 18527Hz | 46° | 5,22 | 7,18dB |

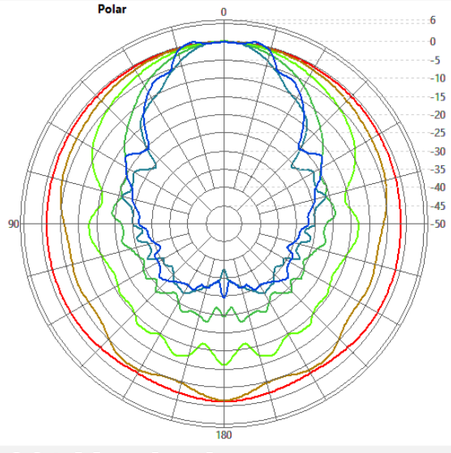


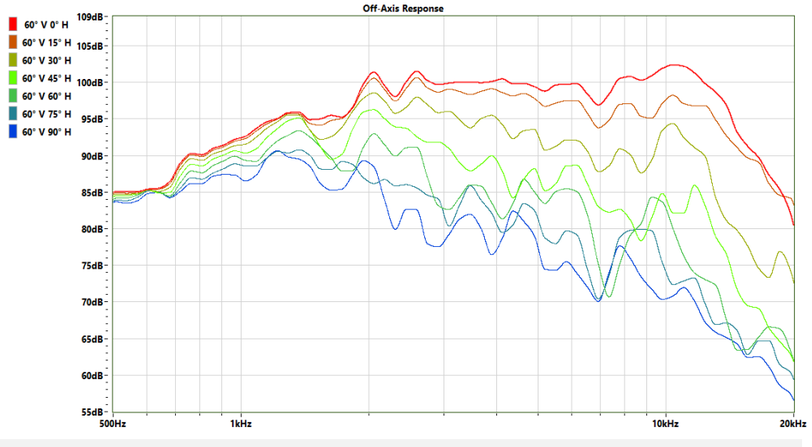




## 45° Vertical

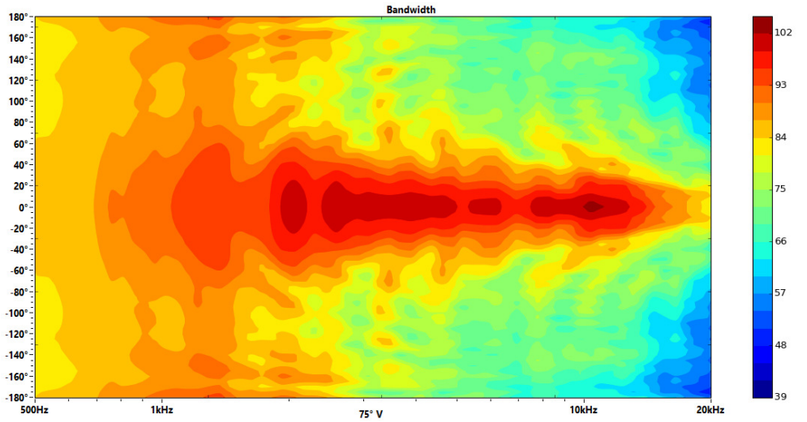



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 60° V | 507Hz | 300° | 1,14 | 0,57dB |
| 60° V | 1023Hz | 178° | 1,49 | 1,74dB |
| 60° V | 2054Hz | 100° | 2,68 | 4,27dB |
| 60° V | 4120Hz | 58° | 4,52 | 6,55dB |
| 60° V | 8248Hz | 38° | 6,22 | 7,94dB |
| 60° V | 18527Hz | 46° | 5,48 | 7,39dB |

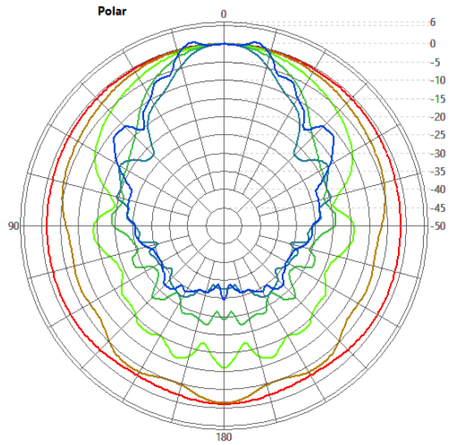


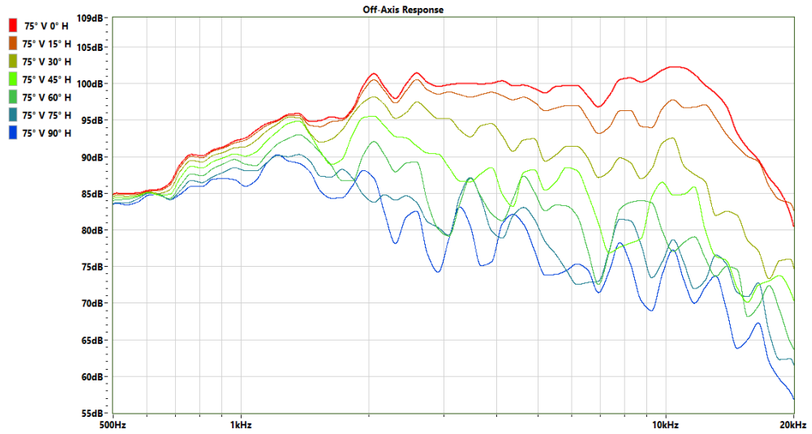




## 60° Vertical

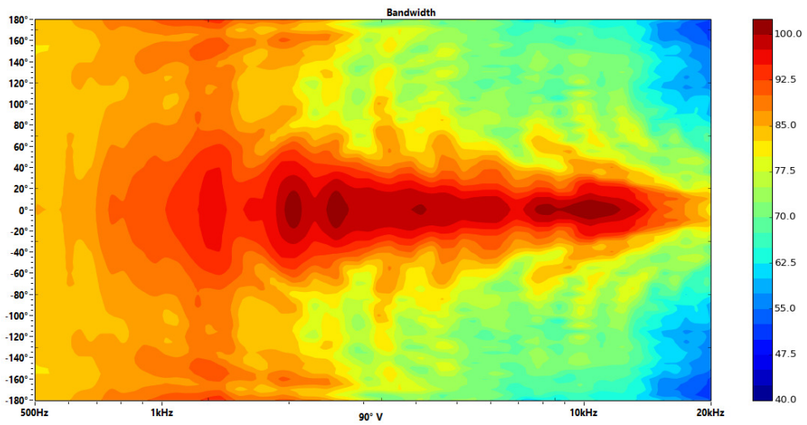



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 75° V | 507Hz | 300° | 1,14 | 0,57dB |
| 75° V | 1023Hz | 266° | 1,52 | 1,82dB |
| 75° V | 2054Hz | 92° | 2,83 | 4,52dB |
| 75° V | 4120Hz | 54° | 4,79 | 6,80dB |
| 75° V | 8248Hz | 36° | 6,32 | 8,01dB |
| 75° V | 18527Hz | 40° | 5,04 | 7,02dB |

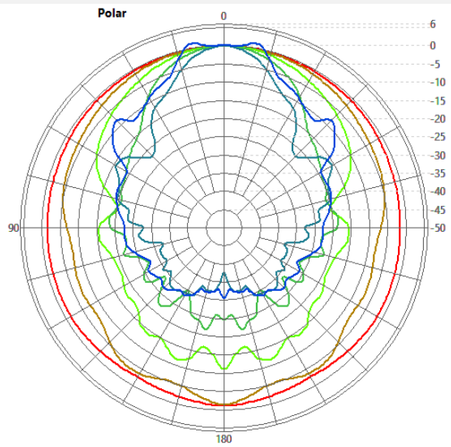


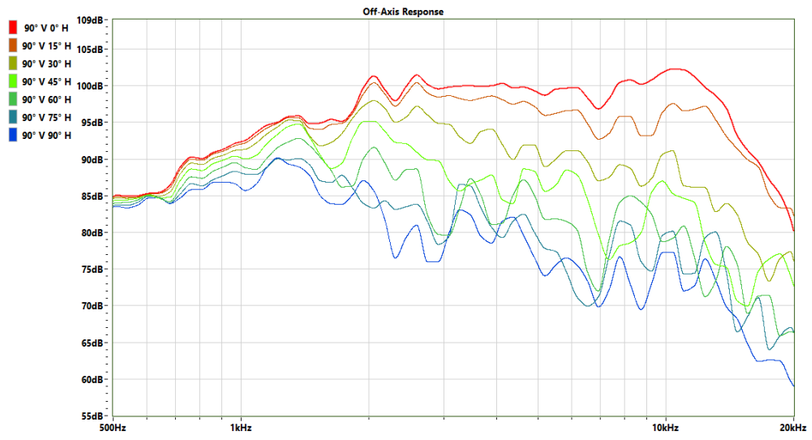




## 75° Vertical

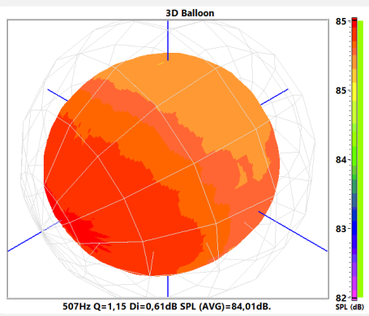



| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 90° V | 507Hz | 300° | 1,15 | 0,61dB |
| 90° V | 1023Hz | 172° | 1,55 | 1,89dB |
| 90° V | 2054Hz | 88° | 2,93 | 4,68dB |
| 90° V | 4120Hz | 50° | 4,92 | 6,92dB |
| 90° V | 8248Hz | 34° | 6,59 | 8,19dB |
| 90° V | 18527Hz | 40° | 4,70 | 6,72dB |

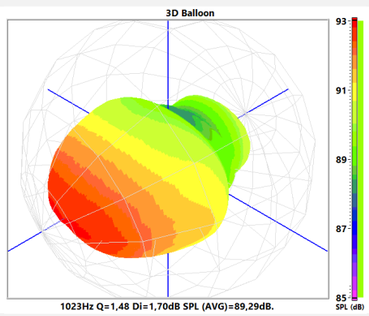


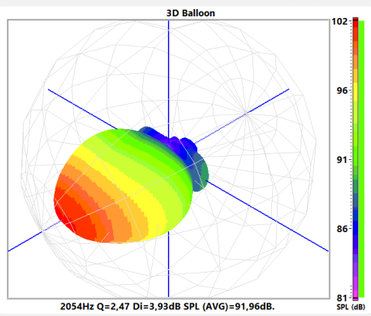

## 90° Vertical



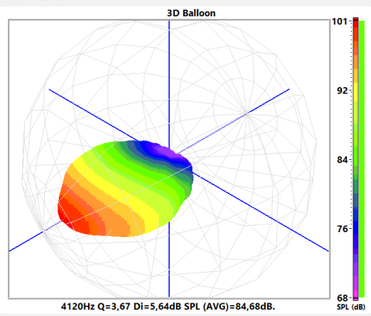

507Hz Q=1,15 Di=0,61dB SPL (AVG)=84,01dB.



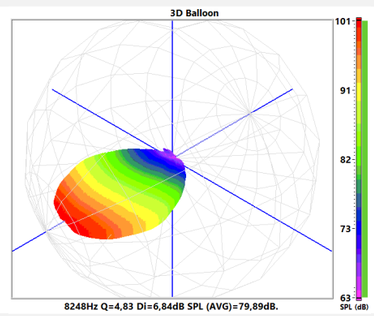

1023Hz Q=1,48 Di=1,70dB SPL (AVG)=89,29dB.



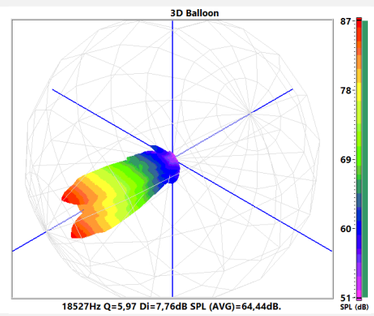

2054Hz Q=2,47 Di=3,93dB SPL (AVG)=91,96dB.




4120Hz Q=3,67 Di=5,64dB SPL (AVG)=84,68dB.



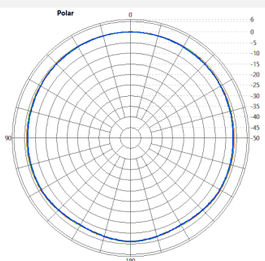

8248Hz Q=4,83 Di=6,84dB SPL (AVG)=79,89dB.



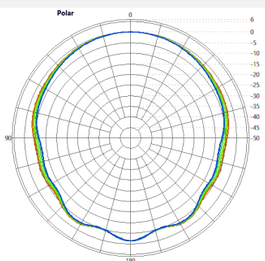

18527Hz Q=5,97 Di=7,76dB SPL (AVG)=64,44dB.

## 3D Balloon

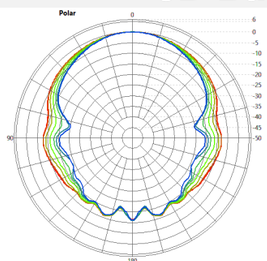
| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 507Hz | 300° | 1,13 | 0,51dB |
| 15° V | 507Hz | 310° | 1,12 | 0,48dB |
| 30° V | 507Hz | 300° | 1,14 | 0,56dB |
| 45° V | 507Hz | 310° | 1,13 | 0,55dB |
| 60° V | 507Hz | 300° | 1,14 | 0,57dB |
| 75° V | 507Hz | 300° | 1,14 | 0,57dB |
| 90° V | 507Hz | 300° | 1,15 | 0,61dB |



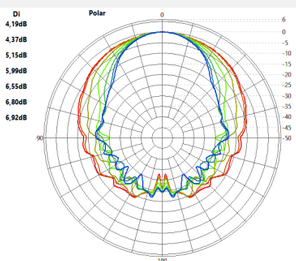

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 1023Hz | 250° | 1,37 | 1,37dB |
| 15° V | 1023Hz | 250° | 1,37 | 1,35dB |
| 30° V | 1023Hz | 240° | 1,41 | 1,49dB |
| 45° V | 1023Hz | 226° | 1,44 | 1,58dB |
| 60° V | 1023Hz | 178° | 1,49 | 1,74dB |
| 75° V | 1023Hz | 266° | 1,52 | 1,82dB |
| 90° V | 1023Hz | 172° | 1,55 | 1,89dB |



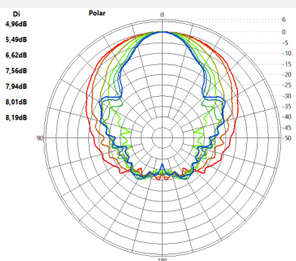

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 2054Hz | 130° | 2,12 | 3,25dB |
| 15° V | 2054Hz | 128° | 2,13 | 3,28dB |
| 30° V | 2054Hz | 120° | 2,27 | 3,55dB |
| 45° V | 2054Hz | 110° | 2,46 | 3,90dB |
| 60° V | 2054Hz | 100° | 2,68 | 4,27dB |
| 75° V | 2054Hz | 92° | 2,83 | 4,52dB |
| 90° V | 2054Hz | 88° | 2,93 | 4,68dB |



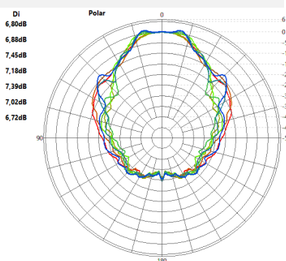

| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 4120Hz | 114° | 2,62 | 4,19dB |
| 15° V | 4120Hz | 108° | 2,74 | 4,37dB |
| 30° V | 4120Hz | 92° | 3,27 | 5,15dB |
| 45° V | 4120Hz | 70° | 3,97 | 5,99dB |
| 60° V | 4120Hz | 58° | 4,52 | 6,55dB |
| 75° V | 4120Hz | 54° | 4,79 | 6,80dB |
| 90° V | 4120Hz | 50° | 4,92 | 6,92dB |




| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 8248Hz | 100° | 3,13 | 4,96dB |
| 15° V | 8248Hz | 88° | 3,54 | 5,49dB |
| 30° V | 8248Hz | 64° | 4,59 | 6,62dB |
| 45° V | 8248Hz | 46° | 5,70 | 7,56dB |
| 60° V | 8248Hz | 38° | 6,22 | 7,94dB |
| 75° V | 8248Hz | 36° | 6,32 | 8,01dB |
| 90° V | 8248Hz | 34° | 6,59 | 8,19dB |




| Ang | Freq | Cov | Q | Di |
|---|---|---|---|---|
| 0° V | 18527Hz | 44° | 4,78 | 6,80dB |
| 15° V | 18527Hz | 40° | 4,88 | 6,88dB |
| 30° V | 18527Hz | 50° | 5,56 | 7,45dB |
| 45° V | 18527Hz | 46° | 5,22 | 7,18dB |
| 60° V | 18527Hz | 46° | 5,48 | 7,39dB |
| 75° V | 18527Hz | 40° | 5,04 | 7,02dB |
| 90° V | 18527Hz | 40° | 4,70 | 6,72dB |




## Polar Vertical Comparative