

Speaker Placement Study

Prepared For



9000 Cox Rd,
West Chester Township, OH 45069

3-9-2020

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Sanctuary Loudspeaker Placement and Coverage Report

Scope of Work:

This document will present the results of a scientific research into the behavior of various speaker systems in this particular room. The results will be used to recommend the proper speakers and related equipment needed to provide a reasonable similar sound to every seat in the room. This study was undertaken as a part of a system design process and is not exhaustive but rather informative for budgetary and structural design purposes

Method of Study:

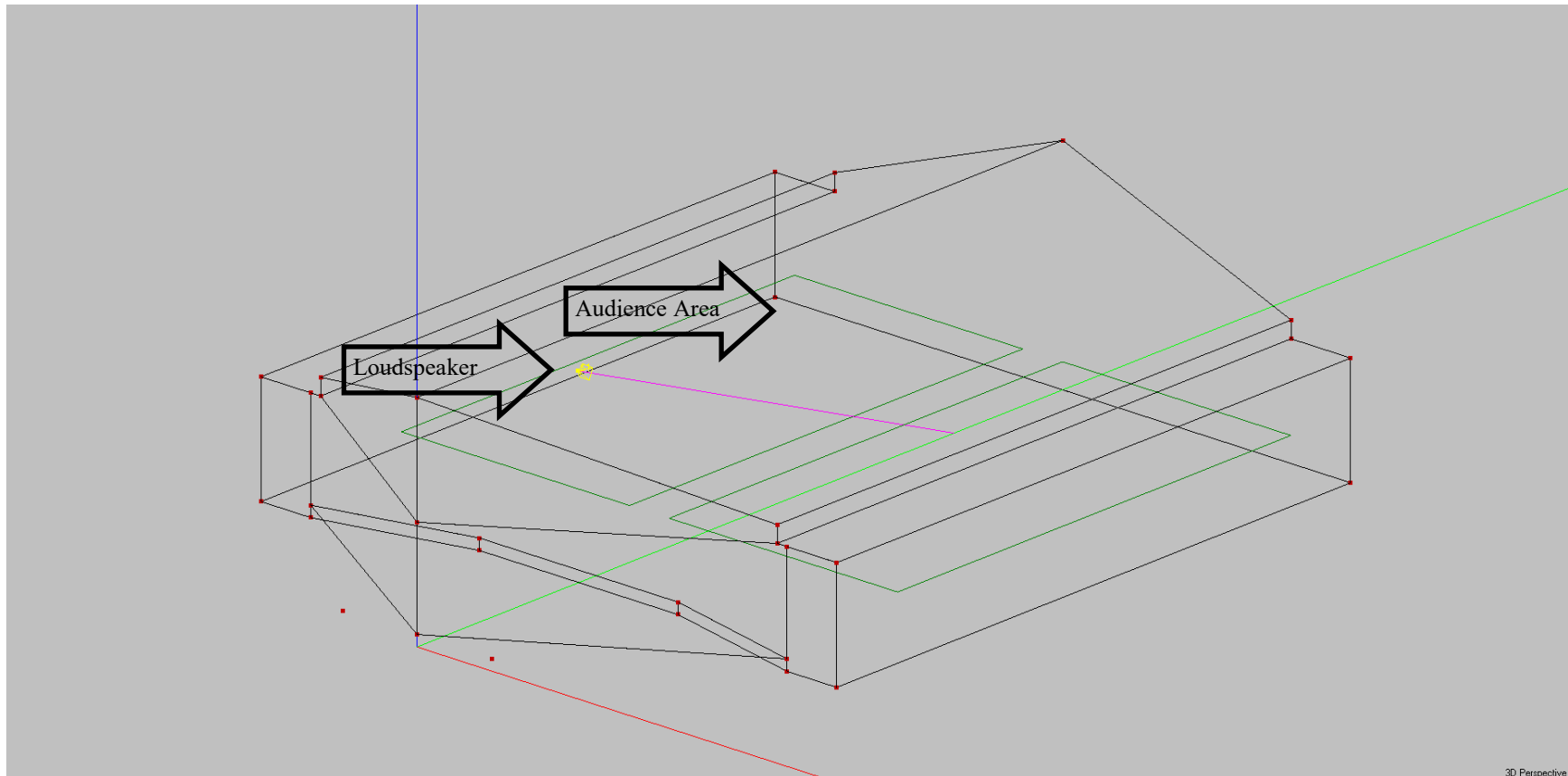
The primary resource for the statistics, chart and renderings in this study is the software program “Enhanced Acoustic Simulator for Engineers” (EASE). This software is the leading acoustic research and probing software developed by Dr. Wolfgang Ahnert of ADA (Acoustical Design Ahnert), Berlin. See Reference 1 to view a wireframe drawing of the room from which all calculations and renderings are made. Additional resource information was used and the references are included in the bibliography. The project started by creating a computerized model of the interior of the room including all surfaces. After completion of the design phase investigations began. The initial investigations determined the key statistics of the room in its present state. The next set of investigations included changing the surface materials at certain locations and retaking the statistics to determine the impact of the alteration to the listening environment. The last phase of the investigations included simulating the room being used with the sound system turned on and employing several variations of speaker placement.

The results are presented hereafter.

Wireframe Rendering

Serenity Baptist, West Chester

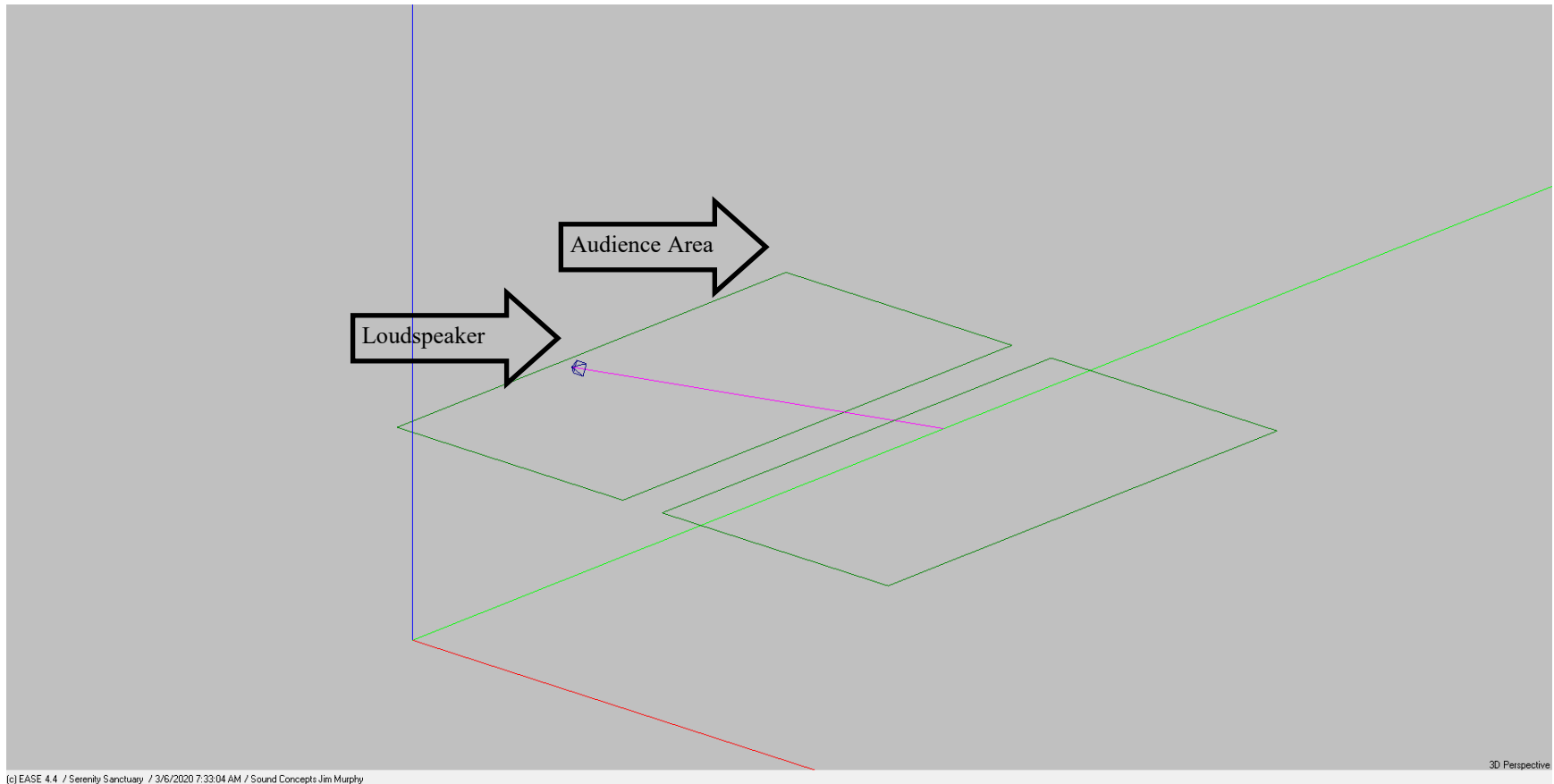
Shown here is the wireframe rendering of the interior of the room as required for the study of speaker placement and sound coverage patterns at the listener's seat. This rendering is not suitable for an accurate room acoustic study. The location of the loudspeaker is in the center of the room and located as high as possible and directly above the front edge of the stage. The audience areas are shown as planes at ear level and outlined in green.



Audience Area Rendering

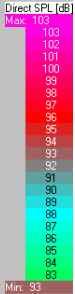
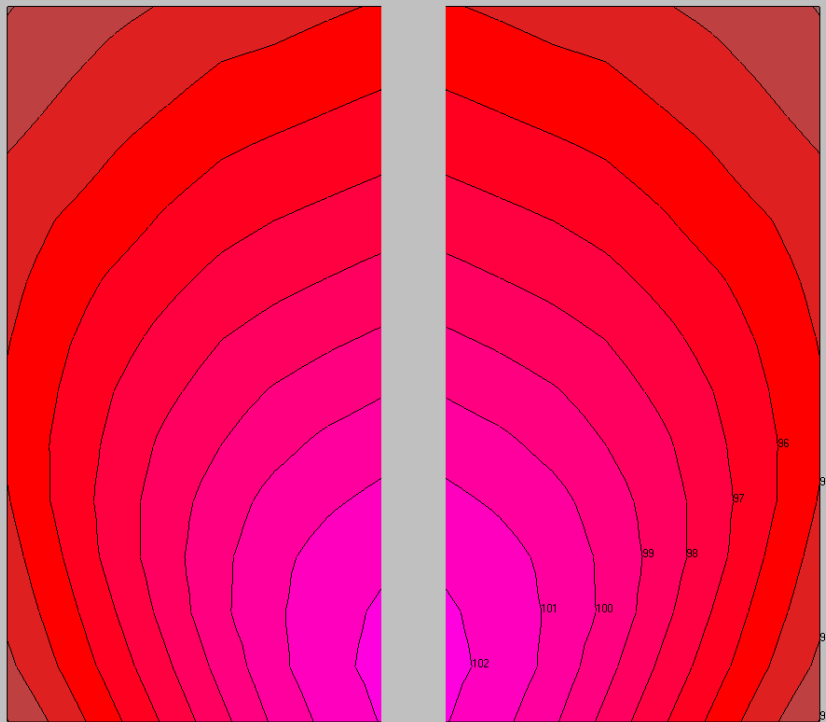
Serenity Baptist, West Chester

For the purpose of this study, the diagrams that follow show the coverage pattern of specific loudspeakers as the sound reaches the audience areas. The audience areas as indicated in the rendering below as rectangles outlined in green. The location of the loudspeaker(s) is also indicated. For this study the loudspeakers will all be located at the same point in the room using the “Point Source” theory of sound distribution.



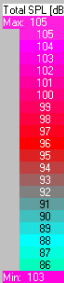
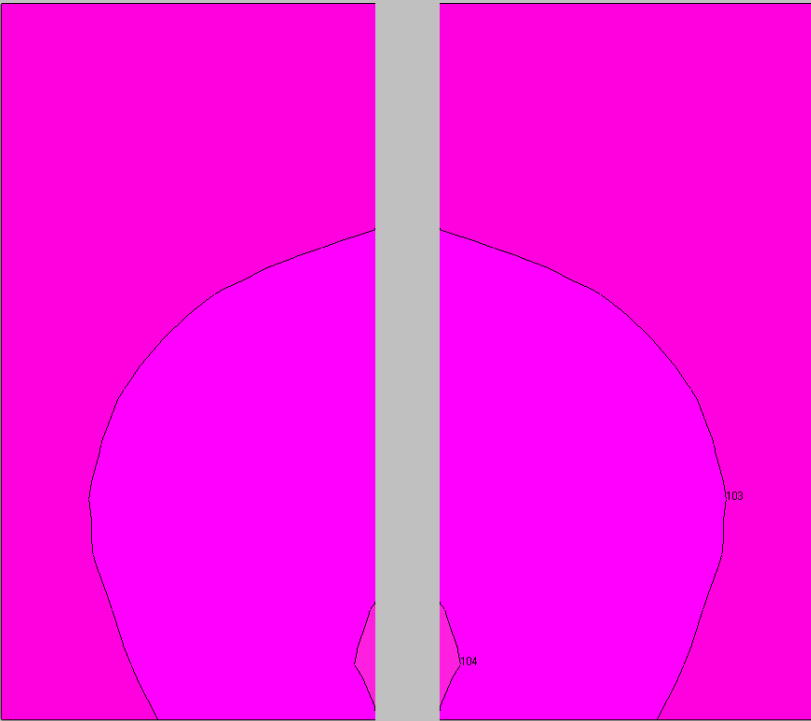
Direct Sound
Renkus-Heinz C12/9-2 9db variance 103db Max

Serenity Sanctuary
Used:
Lspk: S1, S2
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3rd Octave)



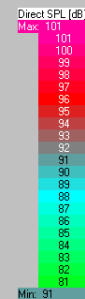
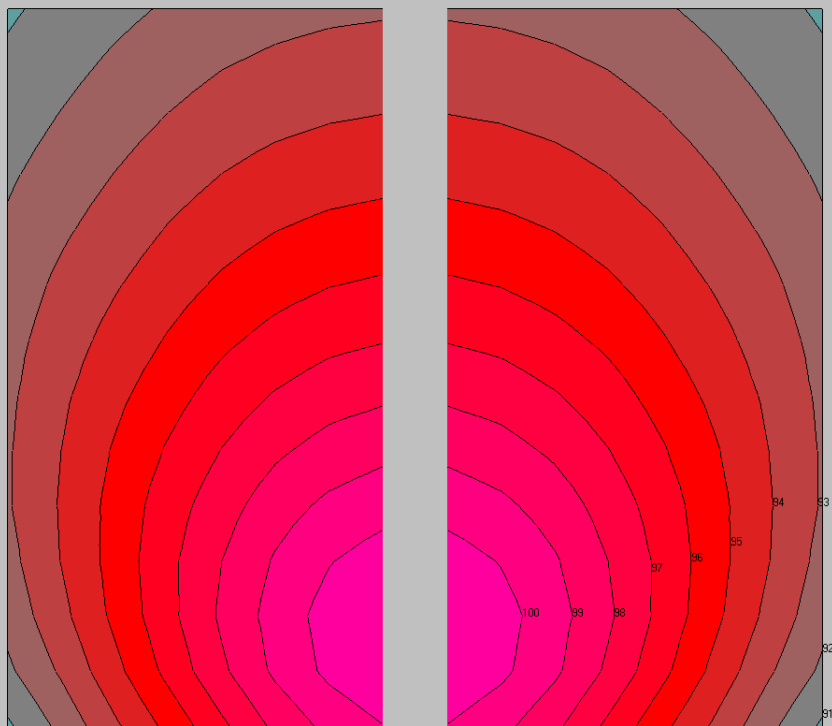
Total Sound
Renkus-Heinz C12/9-2 1db variance 105db Max

Serenity Sanctuary
Used:
Lspk: S1, S2
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2" Epot
(1/3rd Octave)



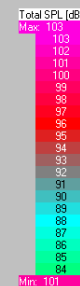
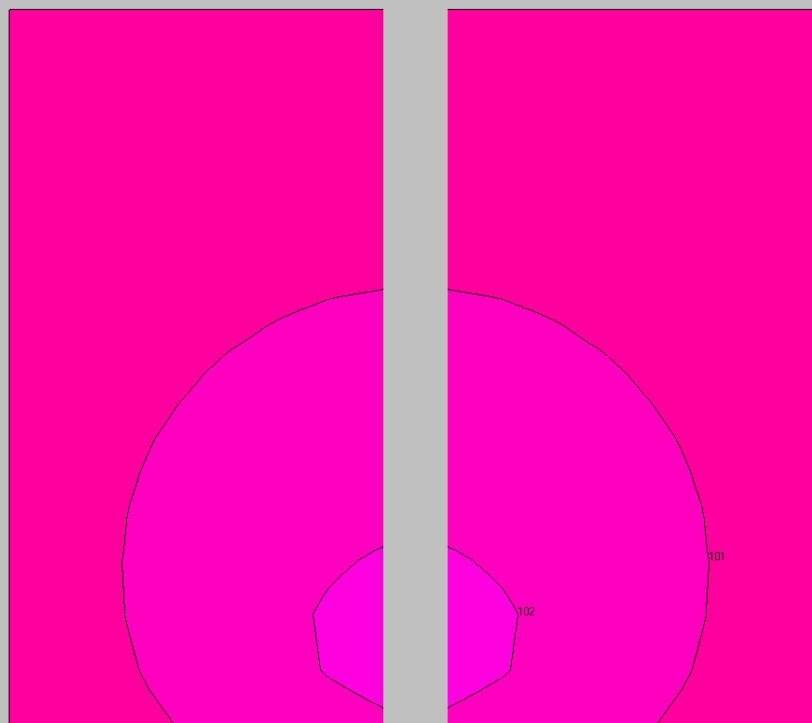
Direct Sound
JBL AM7212-64-2 9db variance 101db Max

Serenity Sanctuary
Used:
Lspk: S2, S3
Map: Direct SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 - Epot
(1/3rd Octave)



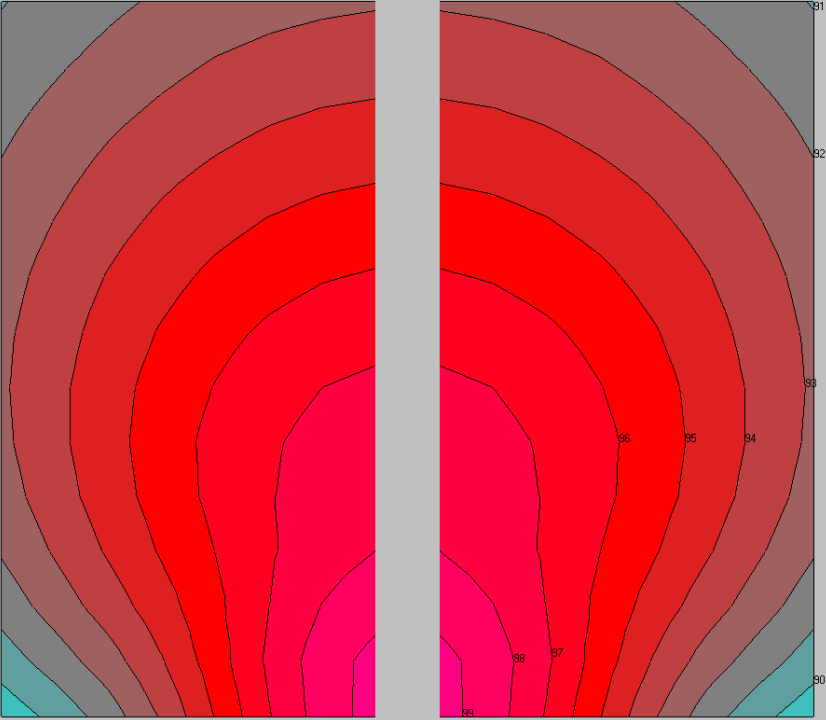
Total Sound
JBL AM7212-64-2 2db variance 103db Max

Serenity Sanctuary
Used:
Lspk: S2, S3
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energ: 2 * Epot
(1/3rd Octave)



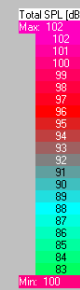
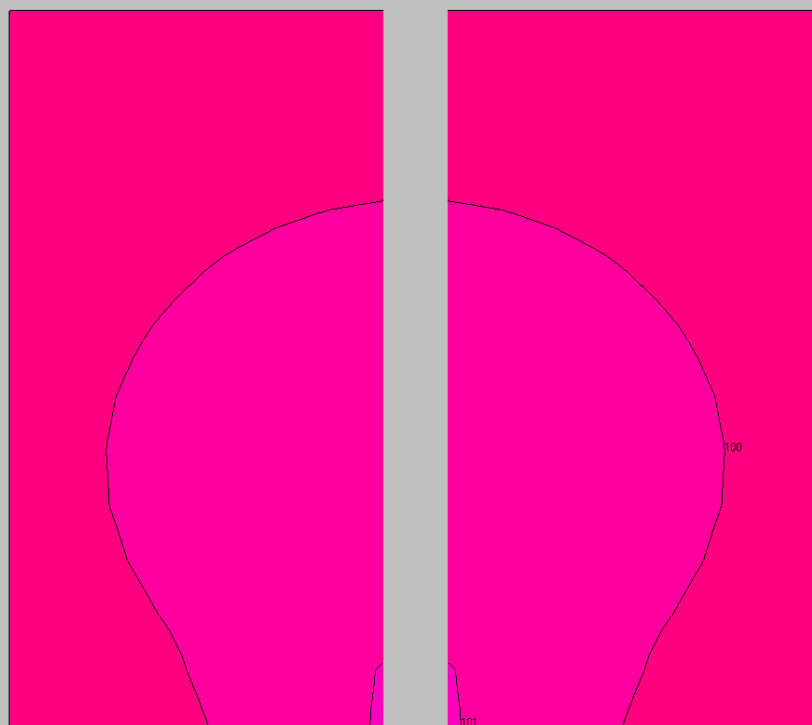
Direct Sound
JBL AM7212-95-2 9db variance 100db Max

Serenity Sanctuary
Used:
Lspk: S1, S2
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3rd Octave)



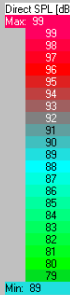
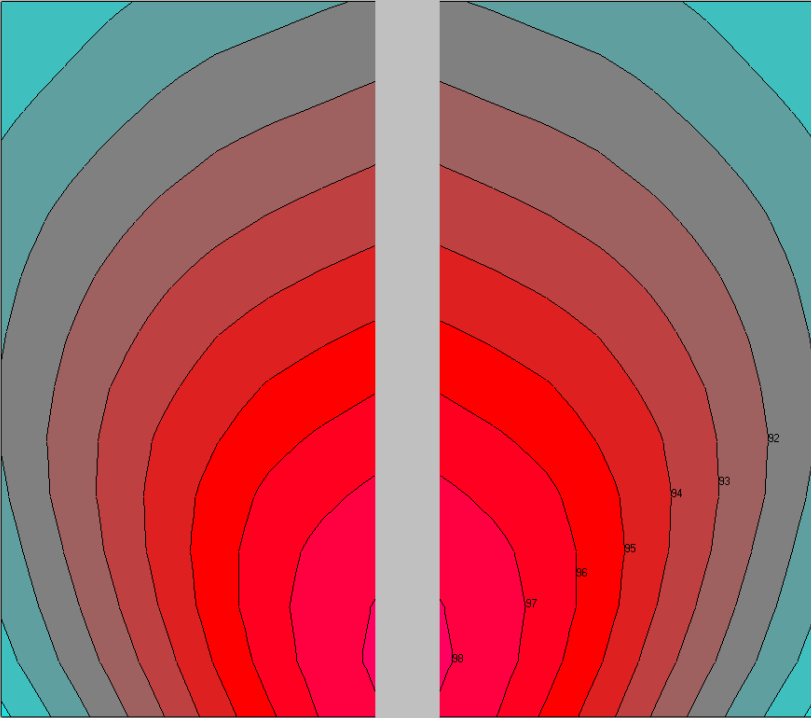
Total Sound
JBL AM7212-95-2 1db variance 102db Max

Serenity Sanctuary
Used:
Lspk: S1, S2
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3rd Octave)



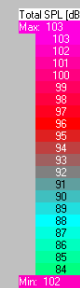
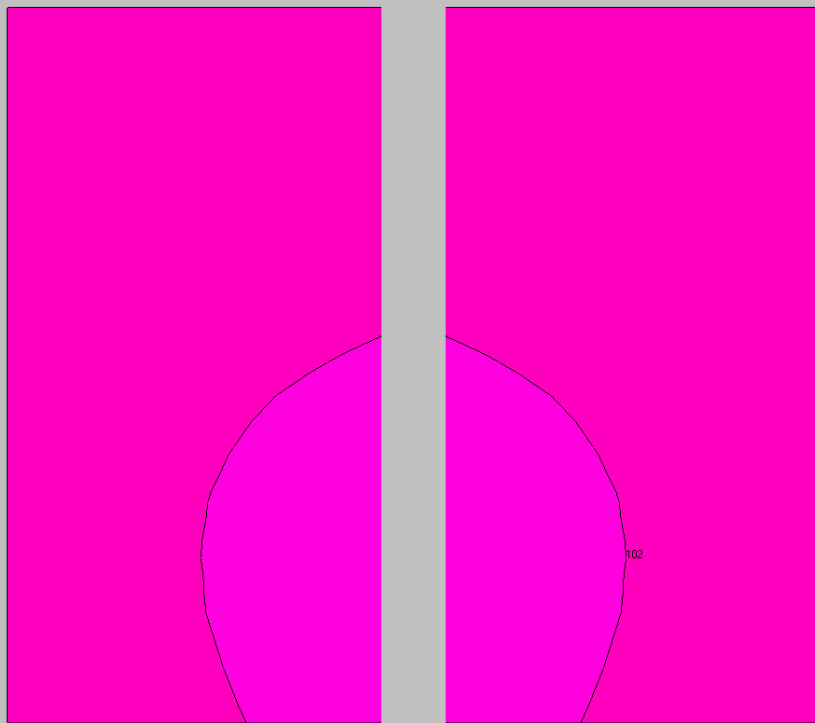
Direct Sound
Renkus-Heinz T12/6-2 9db variance 99db Max

Serenity Sanctuary
Used:
Lspk: S5
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3d Octave)



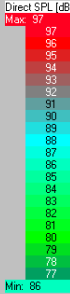
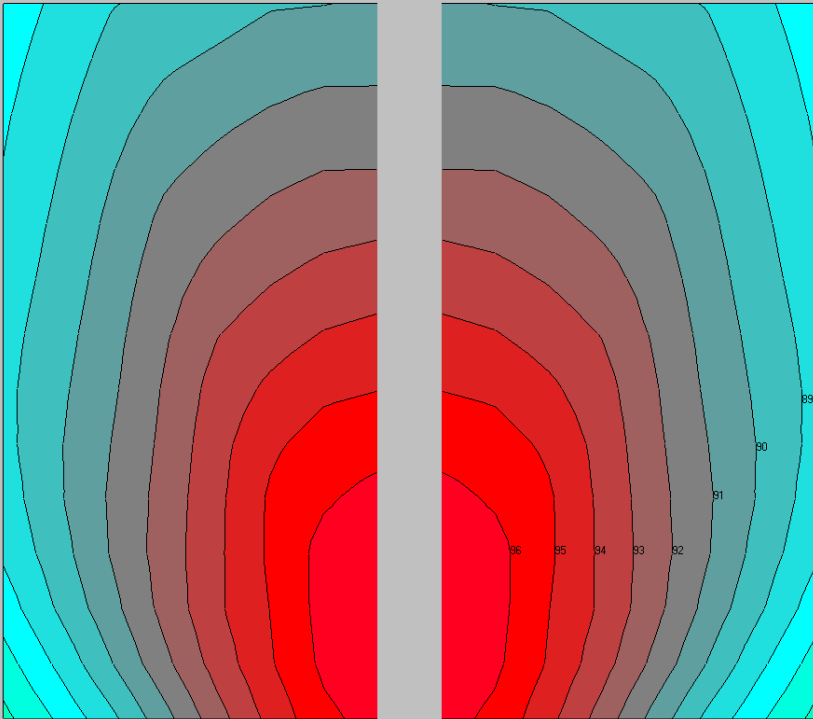
Total Sound
Renkus-Heinz T12/6-3 1db variance 103db Max

Serenity Sanctuary
Used:
Lspk: S5
Map: Total SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3rd Octave)



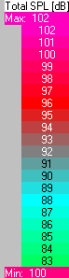
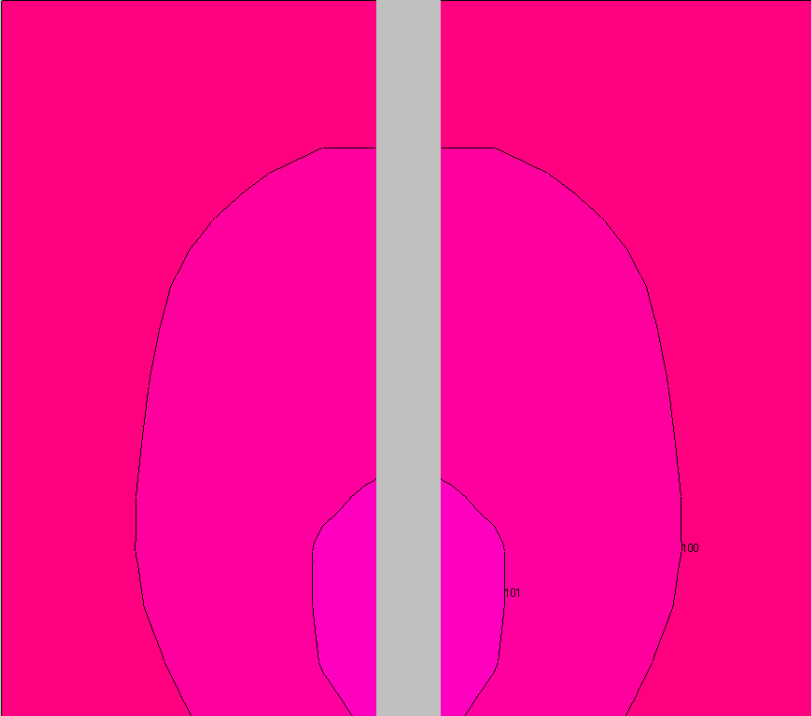
Direct Sound
Renkus-Heinz C12/9-1 10db variance 97db Max

Serenity Sanctuary
Used:
Lspk: S2
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 - Epot
(1/3d Octave)



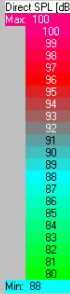
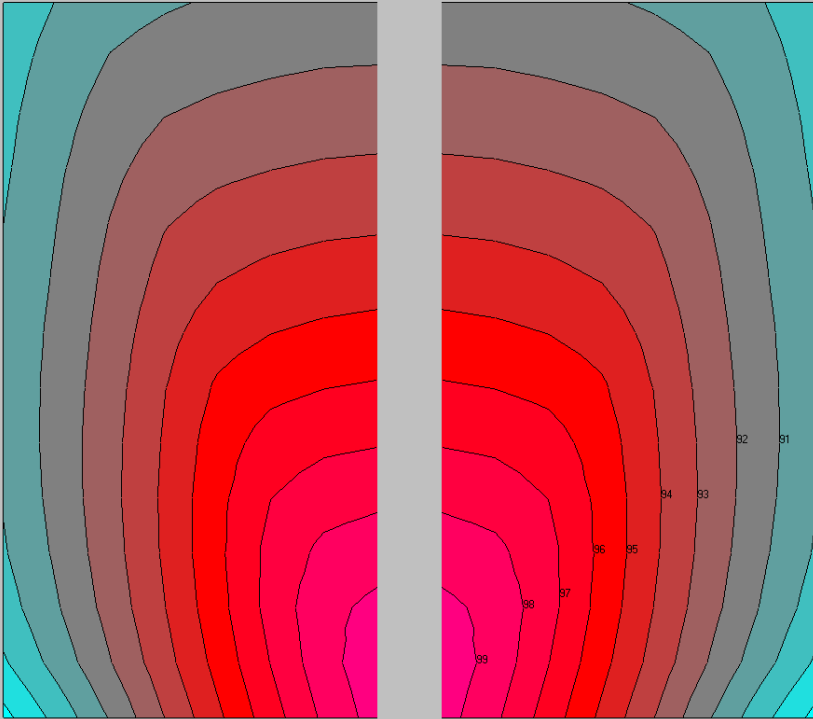
Total Sound
Renkus-Heinz C12/9-1 2db variance 102db Max

Serenity Sanctuary
Used:
Lspk: S2
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energr: 2 * Epot
(1/3rd Octave)



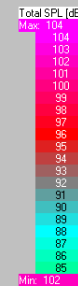
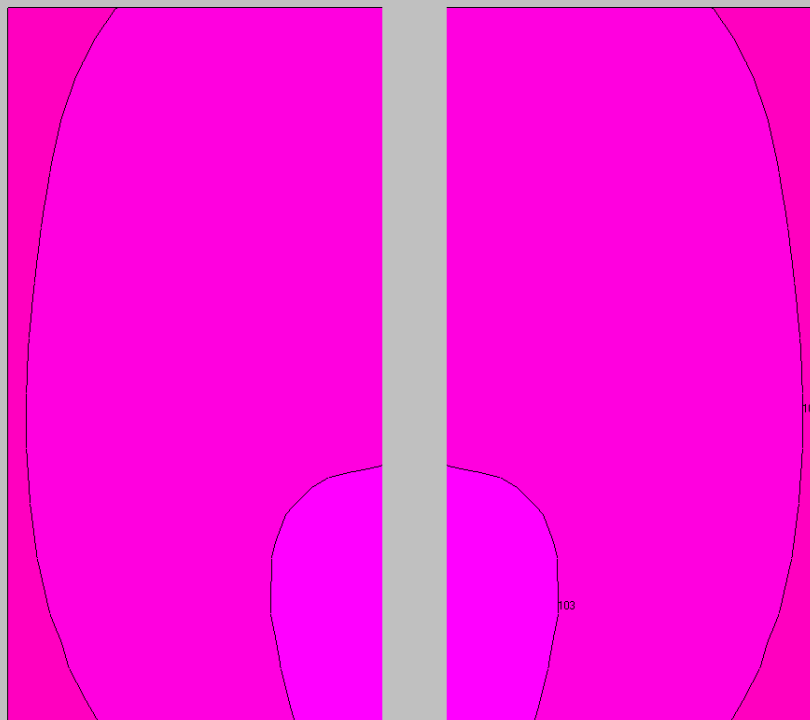
Direct Sound
Renkus-Heinz T15/4-2 11db variance 100db Max

Serenity Sanctuary
Used:
Lspk: S5
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2" Epot
(1/3rd Octave)



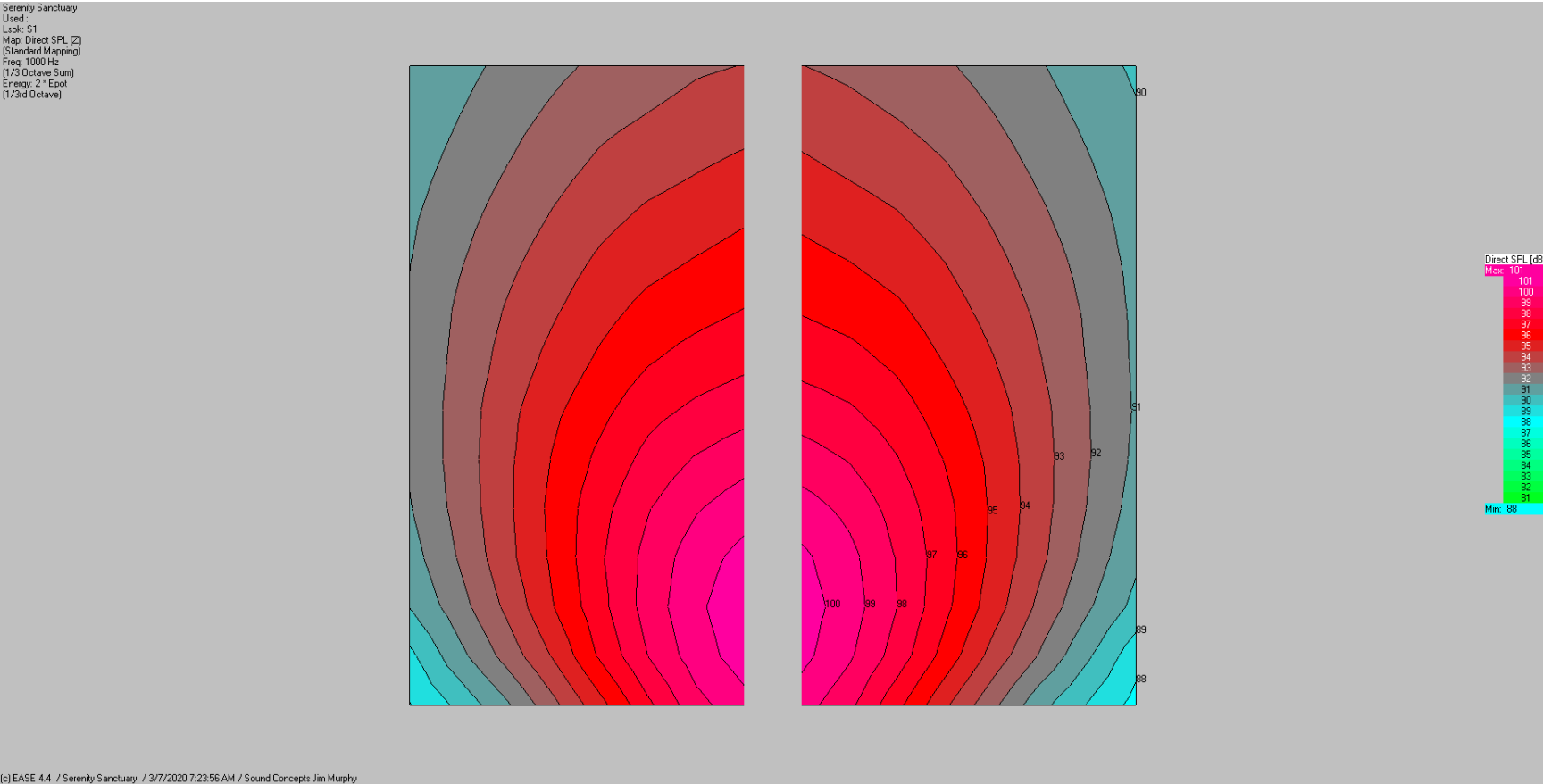
Total Sound
Renkus-Heinz T15/4-2 2db variance 104db Max

Serenity Sanctuary
Used:
Lspk: S5
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energ: 2 * Epot
(1/3rd Octave)



Direct Sound

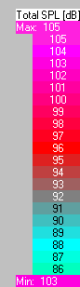
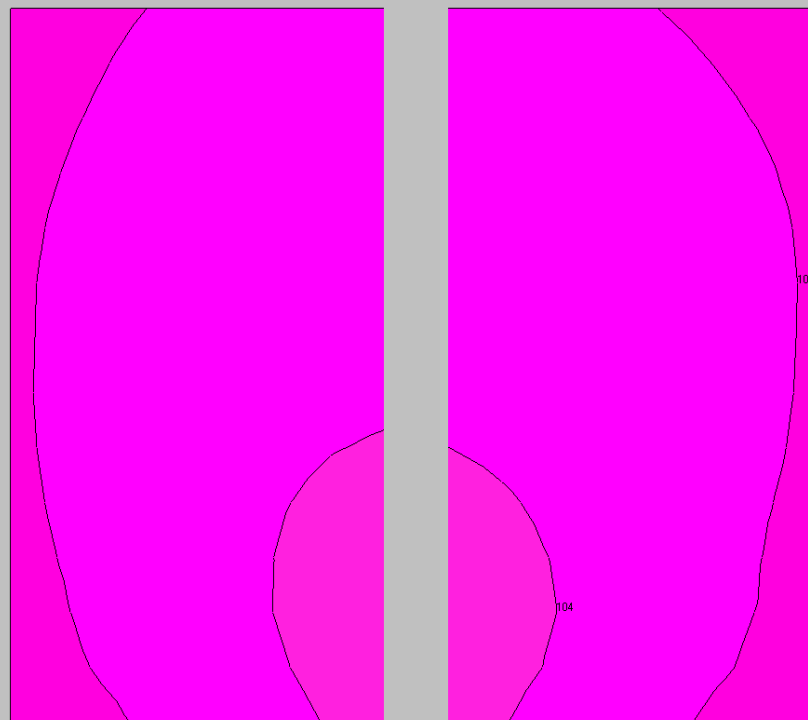
Renkus-Heinz Varia 1 cabinet 22° X 120° 12db variance 101db Max



Total Sound

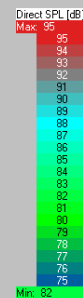
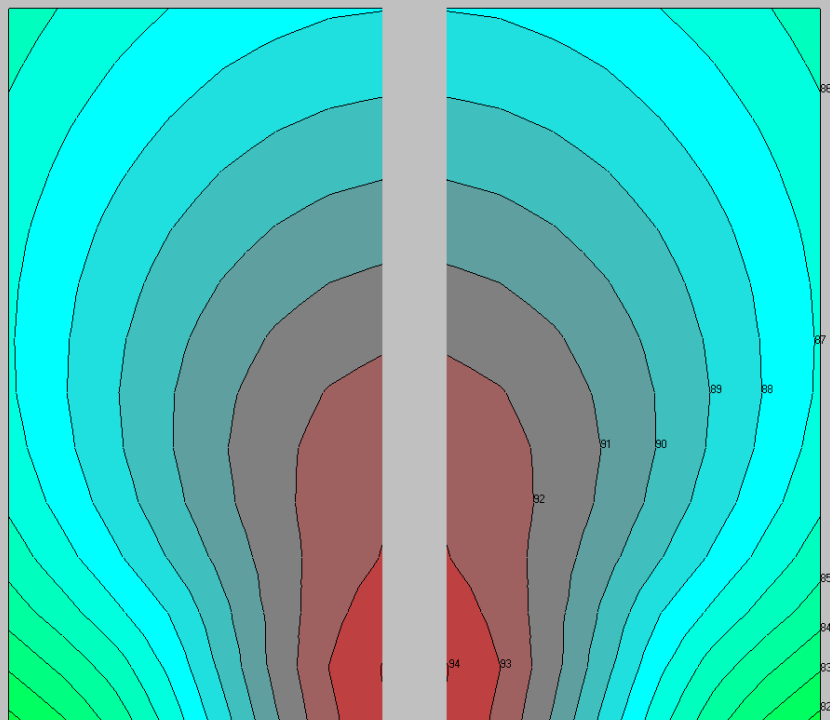
Renkus-Heinz Varia 1 cabinets 22° X 120° 2db variance 105db Max

Serenity Sanctuary
Used:
Lspk: S1
Map: Total SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2° Espot
(1/3rd Octave)



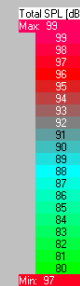
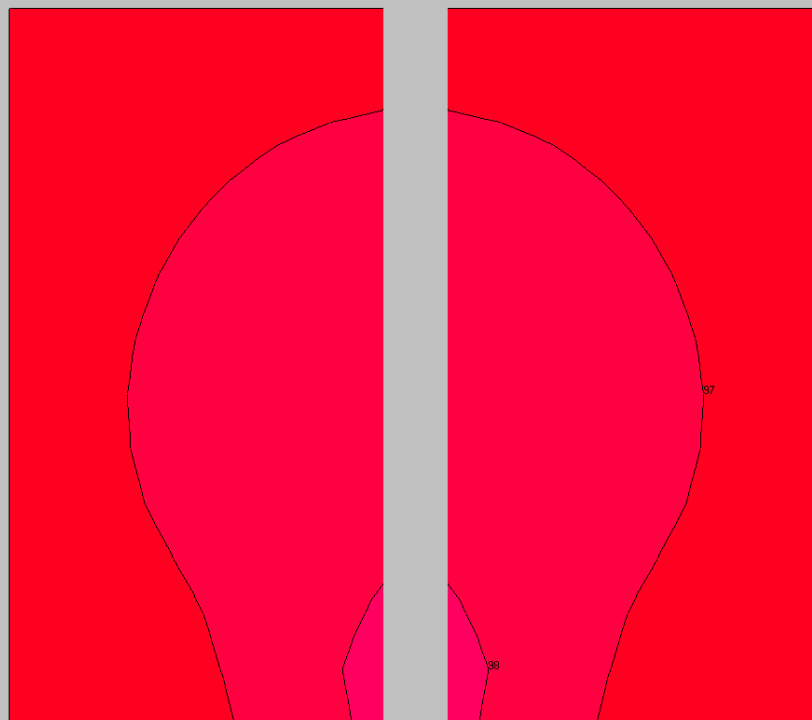
Direct Sound
JBL AM7212-95 12db variance 95db Max

Serenity Sanctuary
Used:
Lspk: S1
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2" Epot
(1/3rd Octave)



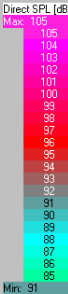
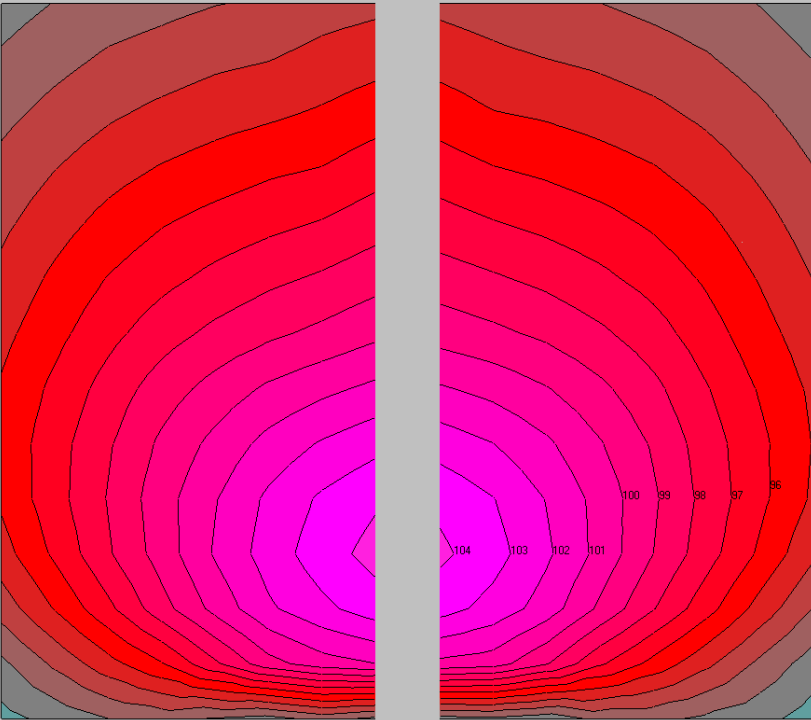
Total Sound
JBL AM7212-95 2db variance 99db Max

Serenity Sanctuary
Used:
Lpplc: S1
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3d Octave)



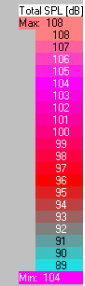
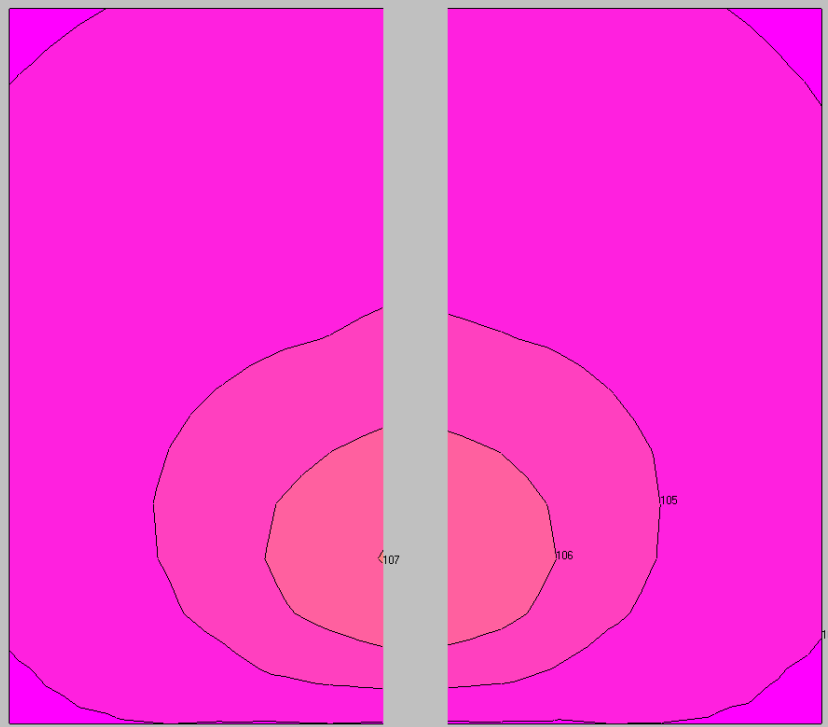
Direct Sound
Renkus-Heinz CFX101LA 2 Cabinets (6db) 13db variance 105db Max

Serenity Sanctuary
Used:
Lspk: 51
Map: Direct SPL (Z)
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2" Epot
(1/3rd Octave)



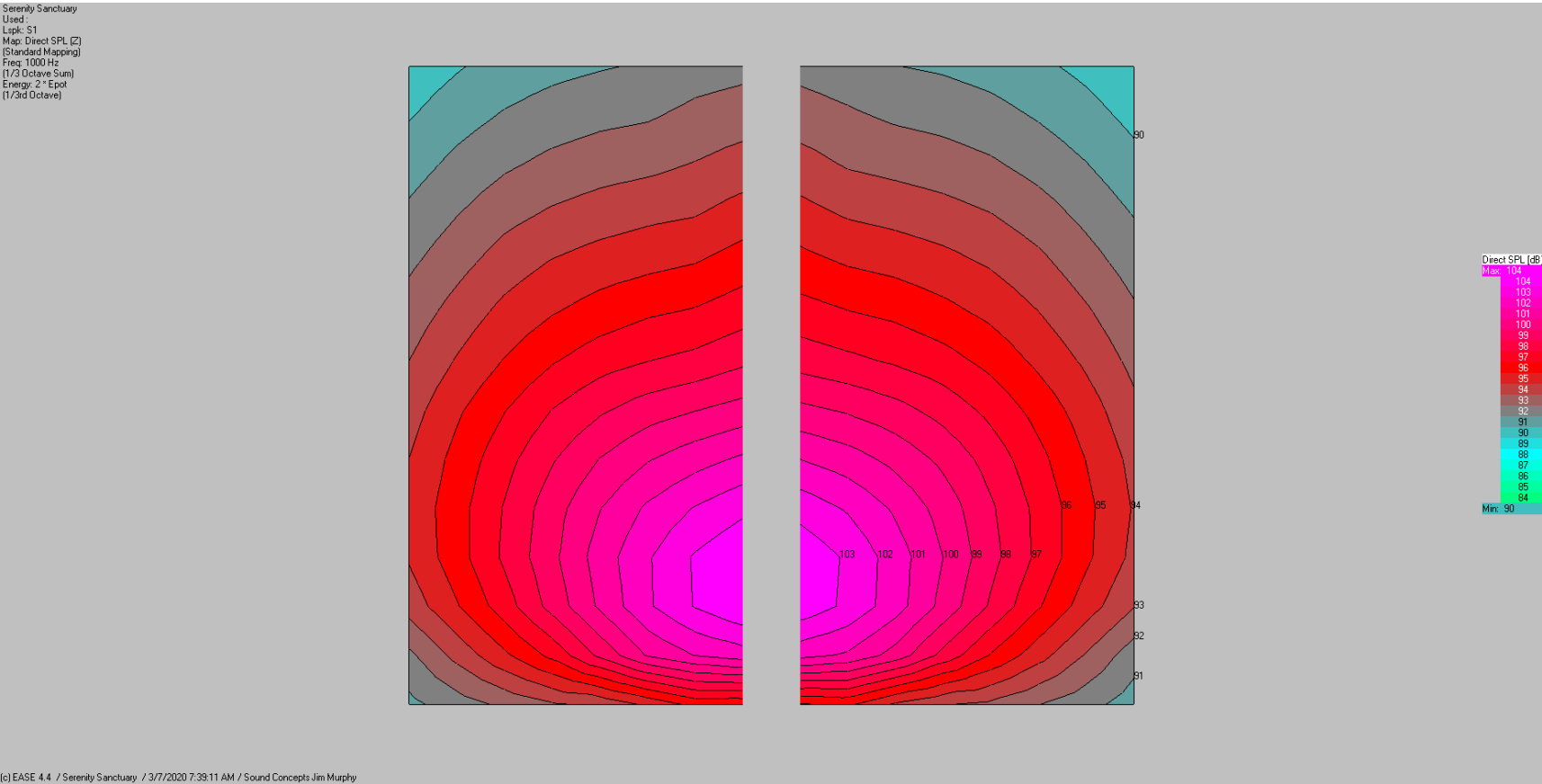
Total Sound
Renkus-Heinz CFX101LA 2 Cabinets (-6) 3db variance 108db Max

Serenity Sanctuary
Used:
Lspk: S1
Map: Total SPL [Z]
(Standard Mapping)
Freq: 1000 Hz
(1/3 Octave Sum)
Energy: 2 * Epot
(1/3rd Octave)



Direct Sound

Renkus-Heinz Varia 2 cabinets (-6db) 22° X 120° 13db variance 104db Max



Total Sound

Renkus-Heinz Varia 2 cabinets (-6db) 22° X 120° 3db variance 108db Max 3db Variance

