User guide for speakers and screen placement software V3

This software allows you to study the placement of the main elements in a home theater room, checking compatibility with various recommendations.
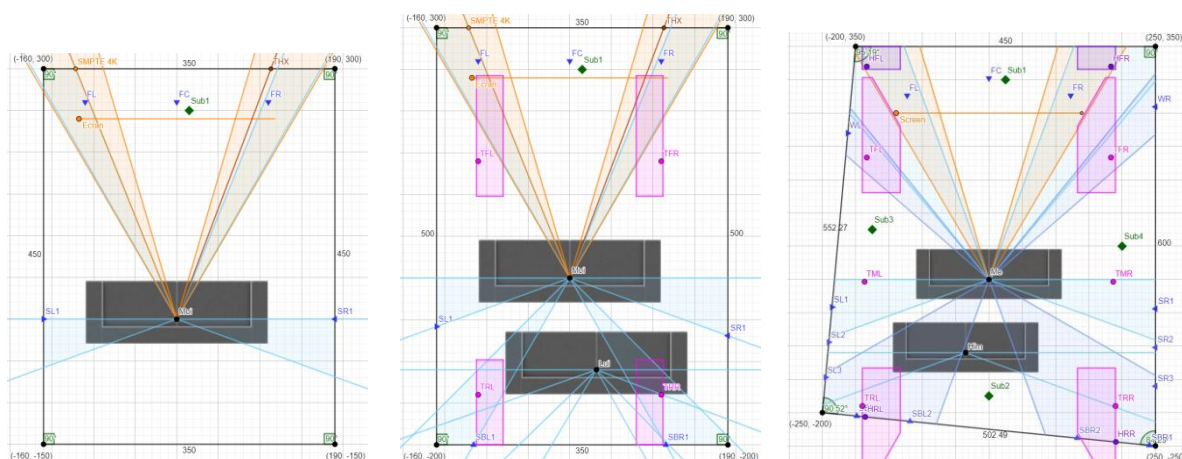
For speakers, you can choose between the recommendations of two guides : Dolby Atmos Home Theater Installation Guidelines or Dolby Atmos Home Entertainment Studio.

Note: While the "Home Theater" guide may seem by its title to be the most appropriate for our installations, the "Home Entertainment Studio" guide is more recent, significantly more precise and, by many accounts, gives better results.

For the screen, the recommendations are those of SMPTE. For subwoofers, the suggestions for placement come from various studies published on the Web.

These are well-known references. **However, it is clear that everyone does what he want and that a recommendation is not an obligation.** The software also gives you complete freedom of placement.

Numerous configurations are possible, from 4.0.0 to 9.1.10 channels, with up to 15.4.10 speakers and subwoofers. The room does not have to be a rectangle, but can be any quadrilateral (4 sides). Here are a few examples of possible configurations:

<u>Points to watch before use:</u>

This software does not take into account all the physical and acoustic constraints. Serious thought needs to be given to the layout of the entire front stage, considering these constraints.

In this software, the speakers are shown in the diagram by small triangles that represent the acoustic center of the speaker (the middle of the front). If they are flush-mounted, this triangle can remain stuck to the wall; otherwise, you need to take into account both the dimensions of the speakers and the space required around it.

The choice of type of screen (material) and type of front speakers is crucial.

With a standard screen, you will have maximum brightness (necessary for HDR) but you will be forced to place the center speaker below (or above) the screen and you will lose spatial coherence between the image and the sound.

With an acoustically transparent material, just like at the movies, you retain spatial coherence but lose luminosity. With a micro-perforated material, you lose a little less luminosity but the sound is "comb filtered". With a woven material, you lose even more luminosity but the sound transparency is better.

Behind an acoustically transparent screen, speakers with a horn tweeter can be placed closer to the material than speakers with a dome tweeter, for example.

Placement of the screen and front speakers must take into account:
- The type of screen material: standard, micro-perforated or woven
- Type of speaker tweeter: horned or not
- The physical dimensions of the speaker
- The space required by the connectors (for active speakers, the XLR connector and the power connector may require a certain depth)
- The space required around the speaker to:
> * As far as possible, avoid acoustic problems caused by the proximity of the speaker to walls
> * Allow any port tube to fulfill their function
> * Allow any built-in amplifiers (for active speakers) to cool properly
> * Etc.

Some other key points:

1°) To avoid problems linked to standing waves (Room Mode), symmetry and especially central positions should be avoided as much as possible.

To get the best viewing angle, we tend to take the "middle seat". However, for sound, right in the center - half the width (which is very common), half the length and half the height (which is also common) - in an untreated room, this is the worst position!

Note: With a ceiling height of 2m40 and an ear height usually around 1m20, you are right where you should not be.

2°) The ideal opening angle recommended by Dolby for main speakers is 60°. However, if this means sticking your main speakers to the walls, it will be much more harmful than reducing this angle slightly.

Still on the subject of standing waves, it is important for both main speakers and subwoofers not to place them at equal distances from the nearest walls. For example, if the acoustic center of a main speaker is 50 cm from the sidewall, it should not also be 50 cm from the front wall.

Note: The distance between the acoustic center (the middle of the front) and the wall should be taken into account, not the distance between the rear or side of the speaker and the wall.

3°) For side speakers, even if this is not indicated in the recommendations:
- With Monopolar speakers, it is best to avoid 90°: they could be too easy to locate. They should be placed to the rear, between 100° and 110°.
- With Bipolar speakers, you have complete freedom of placement.
- With Dipolar speakers, they must be placed at 90° (and you must not move): The sound will vary greatly depending on the angle. Dolby also does not recommend dipolar speakers for use in an Atmos configuration.

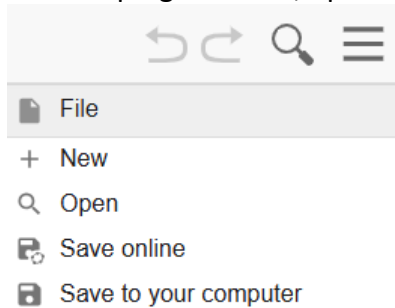4°) For Atmos speakers, Dolby indicates that with a ceiling height of less than 2m40, ceiling speakers should not be used. Atmos-specific main and surround speakers should be used, with a speaker directed towards the ceiling, which will give a more diffuse, less localized result.

Dolby indicates that ceiling speakers should be 2 to 3 times the height of the front speakers. Typically: 2 x 1m20 = 2m40.

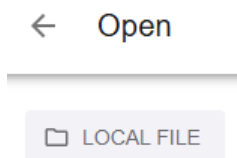**Getting started:**

To use the software, first download and unzip the file "Speaker Screen Placement V3.zip" into a folder. Then go to the GeoGebra website (classic version): GeoGebra

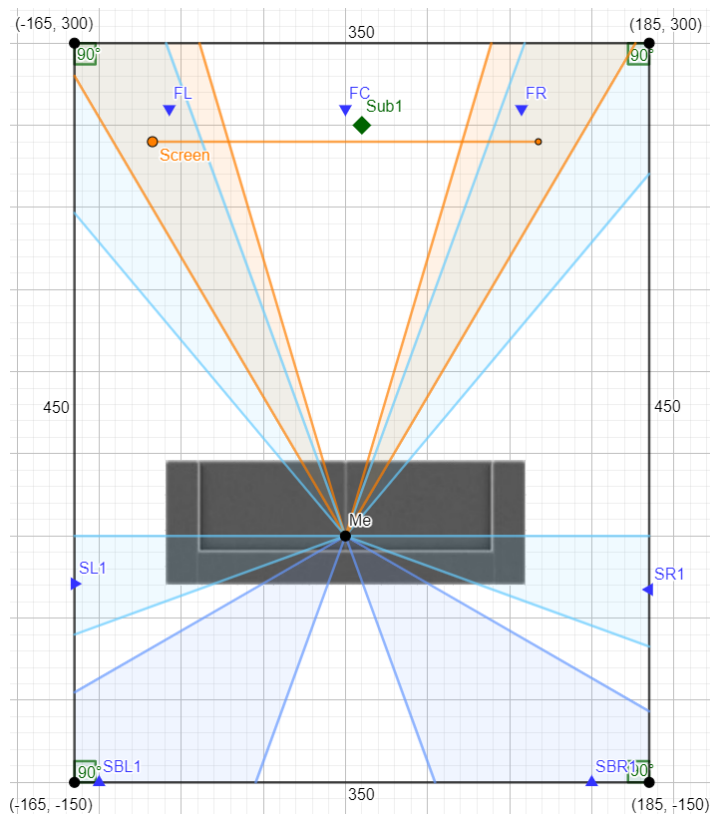In the top right corner, open the menu and select Open:

Then click on Local file, top left corner:

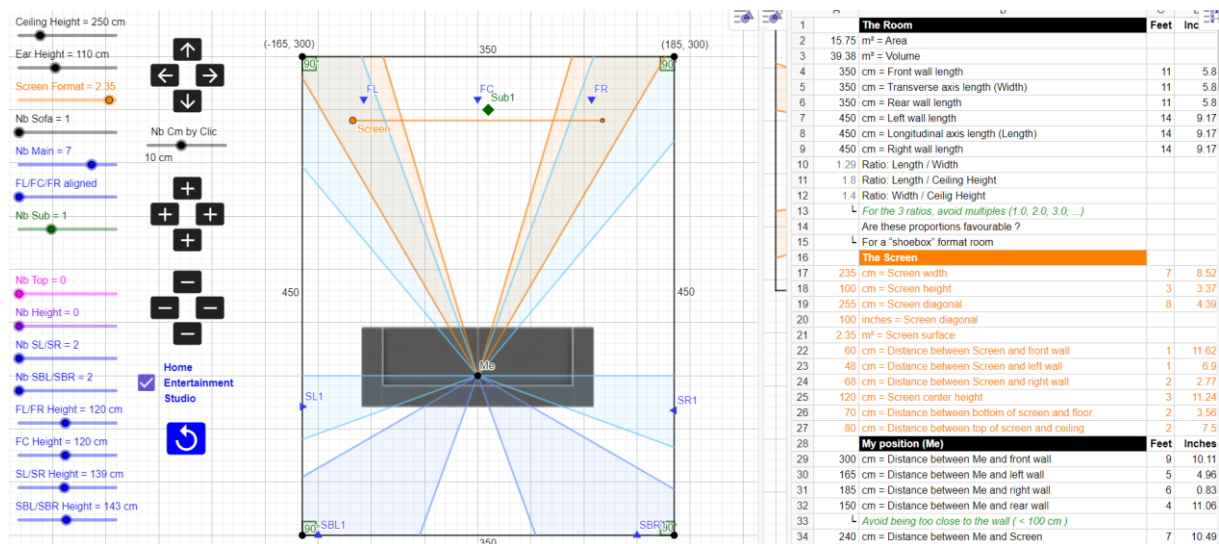
And fetch the downloaded file.

The result is a standard room with a 7.1 starting configuration:

Then proceed in stages:

1°) Draw the room around the reference point (Me).

2°) Position screen and front speakers.

3°) Define the complete speakers configuration.

4°) Adjust the position of side, rear and ceiling speakers.

5°) Adjust screen and side speakers height, and height speakers position.
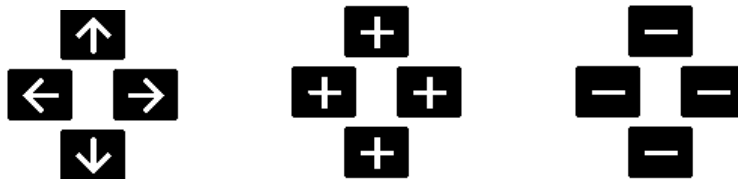
The software has 4 visible zones:

	The Room	Feet	Inc
1	The Room	Feet	Inc
2	15.75 m² = Area		
3	39.38 m³ = Volume		
4	350 cm = Front wall length	11	5.8
5	350 cm = Transverse axis length (Width)	11	5.8
6	350 cm = Rear wall length	11	5.8
7	450 cm = Left wall length	14	9.17
8	450 cm = Longitudinal axis length (Length)	14	9.17
9	450 cm = Right wall length	14	9.17
10	1.29 Ratio: Length / Width		
11	1.8 Ratio: Length / Ceiling Height		
12	1.4 Ratio: Width / Ceilig Height		
13	For the 3 ratios, avoid multiples (1.0, 2.0, 3.0, ...)		
14	Are these proportions favourable ?		
15	For a "shoebox" format room		
16	The Screen		
17	235 cm = Screen width	7	8.52
18	100 cm = Screen height	3	3.37
19	255 cm = Screen diagonal	8	4.39
20	100 inches = Screen diagonal		
21	2.35 m² = Screen surface		
22	60 cm = Distance between Screen and front wall	1	11.62
23	48 cm = Distance between Screen and left wall	1	6.9
24	68 cm = Distance between Screen and right wall	2	2.77
25	120 cm = Screen center height	3	11.24
26	70 cm = Distance between bottom of screen and floor	2	3.56
27	80 cm = Distance between top of screen and ceiling	2	7.5
28	My position (Me)	Feet	Inches
29	300 cm = Distance between Me and front wall	9	10.11
30	165 cm = Distance between Me and left wall	5	4.96
31	185 cm = Distance between Me and right wall	6	0.83
32	150 cm = Distance between Me and rear wall	4	11.06
33	Avoid being too close to the wall (< 100 cm)		
34	240 cm = Distance between Me and Screen	7	10.49

1°) In the center, the interactive diagram, the top view.

2°) On the far left, sliders to define configuration and certain heights.

3°) On the left, between the sliders and the diagram, buttons for shifting, enlarging and reducing room dimensions.

4°) On the right, a spreadsheet area giving all the necessary measurements and also few recommendations and points to watch out for.

5°) Hidden beneath the spreadsheet area, another window can be pulled to the left to see the other views and perform the final step.

1°) Room design:

There are several ways to define the shape, dimensions and angles of the room:

- You can select corners, one by one, and move them by drag and drop with the mouse or using the keyboard arrows.

- You can also use the button groups below to shift the room with the arrows; enlarge it with the **+** or reduce it with the **−**; top, left, right or bottom depending on the position of the button.

Note: At the same time, you define the position of the reference place.

The slider below lets you define the number of centimeters that will be applied each time you click one of the above buttons. Shifts, enlargements and reductions can therefore be made centimeter by centimeter; or in steps of 2.54cm (1 inch), 5cm, 10cm, 25cm, 30.48cm (1 foot), 50cm or 100cm (1 meter).

During this step, you can view dimensions, angles and other data in real time, both on the drawing and in the spreadsheet area on the right.

Note: This spreadsheet area is for data display only. Do not modify anything in this area.

You can also move the whole diagram around, and use the "magnifying glass" buttons at the bottom right of the diagram to zoom in and out of the overall view.
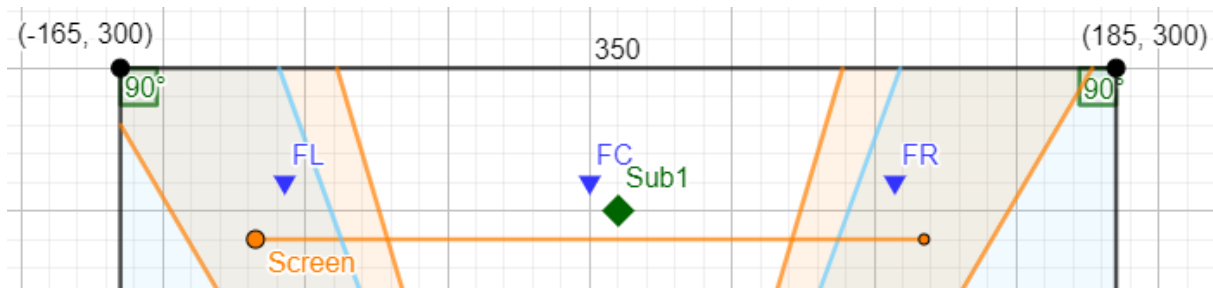
2°) Position screen and front speakers:

Once the room has taken on its final dimensions and shape, the second step is to position the entire front stage.

To begin, with the first four sliders in the top left corner, you need to indicate the height of the ceiling, the height of your ears (seated at the reference place), the screen format (from 1.66 to 2.40) and whether there are one or two sofas.

In the diagram, with the anchor point to the left of the screen, you can define its width and position in the room: advanced if it is acoustically transparent, or stuck to the front wall if it is a standard screen.

To stay within the SMPTE recommendations, the anchor point on the left of the screen must remain within the orange triangle.

If the first sofa and the reference place are fixed and serve as a reference for all other elements, the second sofa can be moved as you wish by simply drag and drop it.

As in step 1, you can of course continue to shift the room in relation to the reference place to increase or decrease the distance between the screen and the reference place.

The anchor point on the right of the screen, although not advisable, allows you to offset the screen.

After or at the same time as you position the screen, you can position the front speakers around it. By selecting the left front speaker (FL), you can move it as you wish. The center and right speakers are automatically moved symmetrically.

If however their positioning is not symmetrical, although not recommended, you can then move the right speaker independently. Moreover, as with the screen, to stay within the recommendations (Dolby for speakers), it is best to stay within the colored triangles (light blue for speakers).

In the spreadsheet area, you can visualize in real time the distances between elements, angles, ratios and compare them with recommendations; both for the reference position (Me on the fist sofa, My angle ...) and, if applicable, for the second position (Him on the second sofa, His angle ...).

Notes: Once you have selected an element in the drawing, you can move it very precisely with the mouse. However, millimeters may be more of a hindrance than a help. By moving elements with the keyboard arrows, you advance cm by cm, without decimal points.

        Remember to use the vertical scroll bar in the spreadsheet section to view simultaneously the data corresponding to the elements you move in the diagram.

The Room

	The Room	Feet	Inches
15.75	m² = Area		
39.38	m³ = Volume		
350	cm = Front wall length	11	5.8
350	cm = Transverse axis length (Width)	11	5.8
350	cm = Rear wall length	11	5.8
450	cm = Left wall length	14	9.17
450	cm = Longitudinal axis length (Length)	14	9.17
450	cm = Right wall length	14	9.17
1.29	Ratio: Length / Width		
1.8	Ratio: Length / Ceiling Height		
1.4	Ratio: Width / Ceilig Height		
└	*For the 3 ratios, avoid multiples (1.0, 2.0, 3.0, ...)*		
Yes	Are these proportions favourable ?		
└	*For a "shoebox" format room*		

The Screen

	The Screen	Feet	Inches
235	cm = Screen width	7	8.52
100	cm = Screen height	3	3.37
255	cm = Screen diagonal	8	4.39
100	inches = Screen diagonal		
2.35	m² = Screen surface		
60	cm = Distance between Screen and front wall	1	11.62
48	cm = Distance between Screen and left wall	1	6.9
68	cm = Distance between Screen and right wall	2	2.77
120	cm = Screen center height	3	11.24
70	cm = Distance between bottom of screen and floor	2	3.56
80	cm = Distance between top of screen and ceiling	2	7.5

My position (Me)

	My position (Me)	Feet	Inches
300	cm = Distance between Me and front wall	9	10.11
165	cm = Distance between Me and left wall	5	4.96
185	cm = Distance between Me and right wall	6	0.83
150	cm = Distance between Me and rear wall	4	11.06
└	*Avoid being too close to the wall (< 100 cm)*		
240	cm = Distance between Me and Screen	7	10.49
52.17°	degree = My horizontal viewing angle		
└	*SMPTE recommends an angle of 44° between 33° & 61°*		
23.5°	degree = My vertical viewing angle		
└	*SMPTE recommends an angle of 25° between 18° & 34°*		
2.27	Ratio: Ceiling height / Ear height		
└	*Avoid a ratio too close to 2.0*		
10	cm = Distance between Me and longitudinal axis	0	3.94
└	*Avoid a distance too close to 0*		
0.67	Ratio: Distance between Me and front wall / Length		
└	*Avoid a ratio too close to 0.5 or to 1.0*		

His position (Him on the 2nd sofa)

	His position (Him on the 2nd sofa)	Feet	Inches
404	cm = Distance between Him and front wall	13	3.06
185	cm = Distance between Him and left wall	6	0.83
165	cm = Distance between Him and right wall	5	4.96
46	cm = Distance between Him and rear wall	1	6.11
└	*Avoid being too close to the wall (< 100 cm)*		
344	cm = Distance between Him and Screen	11	3.43
37.61°	degree = His horizontal viewing angle		
└	*SMPTE recommends an angle of 44° between 33° & 61°*		
18.41°	degree = His vertical viewing angle		
└	*SMPTE recommends an angle of 25° between 18° & 34°*		
1.25	Ratio: Ceiling height / Height of his ears		
└	*Avoid a ratio too close to 2.0*		

Front Left Speaker

	Front Left Speaker	Feet	Inches
40	cm = Distance between FL and front wall	1	3.75
├	*Avoid identical or too close distances*		
58	cm = Distance between FL and left wall	1	10.83
└	*Avoid being too close to the wall*		
20	cm = Distance between FL and Screen	0	7.87
281	cm = Distance between FL and Me	9	2.63
22.42°	degree = My FL opening angle		
├	*Dolby recommends an angle of 30° between 20° & 40°*		
0°	degree = His FL opening angle		
2.2	degree = EF = My FL vertical longitudinal angle		
└	*Dolby recommends an angle of 0° between 0° & 20°*		
1	Ratio: FL height / Screen center height		
└	*Stay as close as possible to 1.0*		
┌	*Avoid a ratio too close to 0.50*		
0.48	Ratio: FL height / Ceiling height		
└	*Dolby recommends a ratio lower than 0.7*		

Front Center Speaker

	Front Center Speaker	Feet	Inches
40	cm = Distance between FC and front wall	1	3.75
165	cm = Distance between FC and left wall	5	4.96
185	cm = Distance between FC and right wall	6	0.83
20	cm = Distance between FC and Screen	0	7.87
└	Acoustically transparent screen : Avoid being too close		
260	cm = Distance between FC and Me	8	6.36
0°	degree = Reference axis between FC and Me		
2.2	degree = My FC vertical longitudinal angle		
1	Ratio: FC height / Screen center height		
0.48	Ratio: FC height / Ceiling height		

Front Right Speaker

	Front Right Speaker	Feet	Inches
40	cm = Distance between FR and front wall	1	3.75
78	cm = Distance between FR and right wall	2	6.71
20	cm = Distance between FR and Screen	0	7.87
281	cm = Distance between FR and Me	9	2.63
22.42°	degree = My FR opening angle		
0°	degree = His FR opening angle		
2.2	degree = EF = My FR vertical longitudinal angle		

Surround Left Speaker #1

	Surround Left Speaker #1	Feet	Inches
383	cm = Distance between SL1 and front wall	12	6.79
0	cm = Distance between SL1 and left wall	0	0
67	cm = Distance between SL1 and rear wall	2	2.38
187	cm = Distance between SL1 and Me	6	1.62
116.8°	degree = My SL1 opening angle		
└	*Dolby recommends an angle of 100° between 90° & 110°*		
9.97	degree = My SL1 vertical lateral angle		
└	*Dolby recommends an angle of 0° between 0° & 20°*		
0.56	Ratio: SL1 height / Ceiling height		
└	*Dolby recommends a ratio lower than 0.7*		

Surround Right Speaker #1

	Surround Right Speaker #1	Feet	Inches
383	cm = Distance between SR1 and front wall	12	6.79
0	cm = Distance between SR1 and right wall	0	0
67	cm = Distance between SR1 and rear wall	2	2.38
205	cm = Distance between SR1 and Me	6	8.71
114.26°	degree = My SR1 opening angle		
8.91	degree = My SR1 vertical lateral angle		

<u>Notes:</u>   For speakers, the recommendations given for the left speaker also apply to the right speaker of the same group, even if they are not mentioned again for the right one.

In Appendix A, you will find diagrams to explain the various angles indicated in the spreadsheet area.
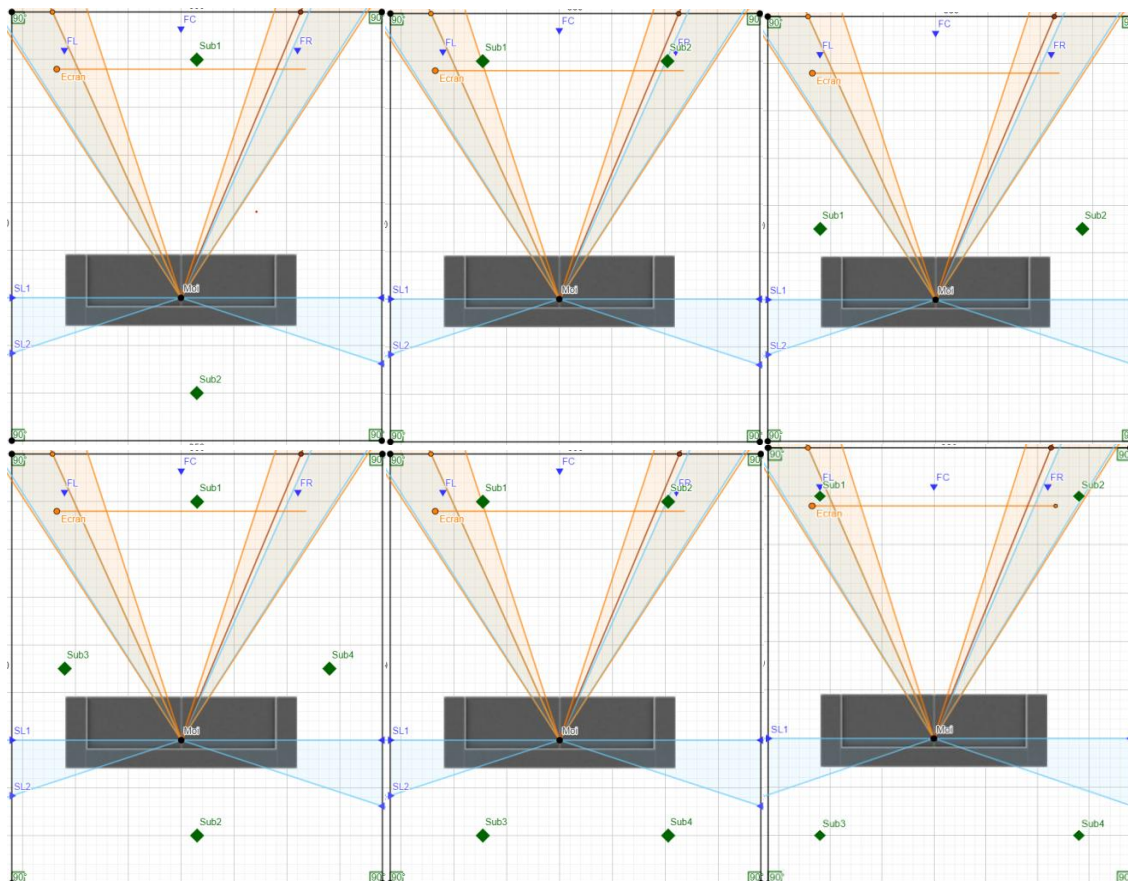
3°) Speakers configuration:

The sliders on the left let you precisely define the complete speaker configuration, except for the height speakers. From 4.0.0 to 9.1.10 channels with up to 4 subwoofers, 3 pairs of side speakers and 2 pairs of rear speakers:

Not all sliders are visible from the start. They are only visible if they are useful in the chosen configuration. Likewise, the proposed values vary with the configuration.

For the center speaker (FC), a slider lets you choose between a position aligned with the left and right front speakers (FL and FR) or in an arc (at equal distance from the reference place).

For multiple subwoofers, a slider allows you to choose between several recommended starting positions; although there are no official recommendations, nor any guarantee of results concerning the subwoofers.

You must also select the Dolby guide you wish to follow by checking or unchecking the box below. Unchecked, the software will follow the guide Dolby Atmos Home Theater Installation Guidelines ; checked, it will follow the guide Dolby Atmos Home Entertainment Studio (recommended).

While the software gives you a wide choice of configurations, the two guides do not take all of them into account. You may therefore get different recommendations depending on the guide you choose, or none at all, if the selected guide does not consider the chosen configuration.

The "Home Theater" guide does not allow for up to three pairs of side speakers, for example. The "Home Entertainment Studio" guide does not allow for a single pair of ceiling speakers.

Neither of the two guides provides indications for multiple viewers. For two sofas, the software suggests logical positions deduced from these guides but not official.

You must also indicate the height at which the different speaker groups will be positioned, using the sliders at the bottom.

With the "Home Theater" guide, these heights can only be used to refine distances shown in the spreadsheet area.

With the "Home Entertainment Studio" guide, many positions and heights are interdependent. For example, placement perimeters for ceiling speakers depend on the height of front, side and rear speakers.

Once you have set all these parameters, you can use the "Reset" button to (re)set all speakers to the ideal positions recommended by the chosen guide.

Note: When you use a slider, button or checkbox that can change the ideal position for one or more speakers, this button turns red to suggest that you activate it.
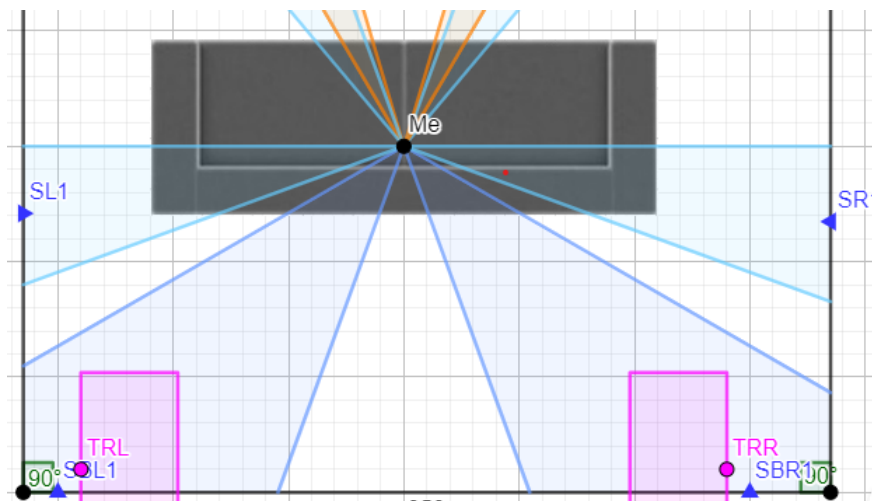
4°) Adjust the position of side, rear and ceiling speakers:

As with the front speakers, you can move the left speaker in a group as you wish. The right speaker will be moved symmetrically at the same time. You can then move the right speaker separately, if required.
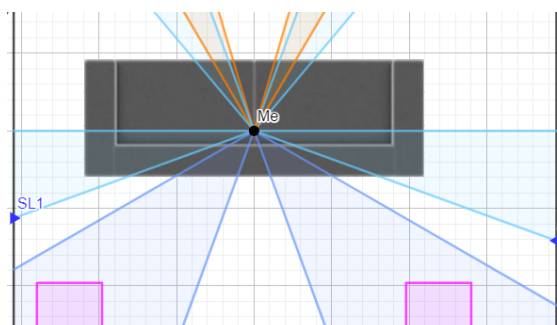
For wide and side speakers (WL and WR, SL1, SL2, SL3 and SR1, SR2, SR3), as for the rear speakers (SBL1, SBL2 and SBR1, SBR2) to stay within the Dolby recommendations, you need to stay within the light blue triangles where they were originally positioned.

For ceiling speakers (TL, TFL, TML, TRL and TR, TFR, TMR and TRR), you must stay within the purple perimeters.
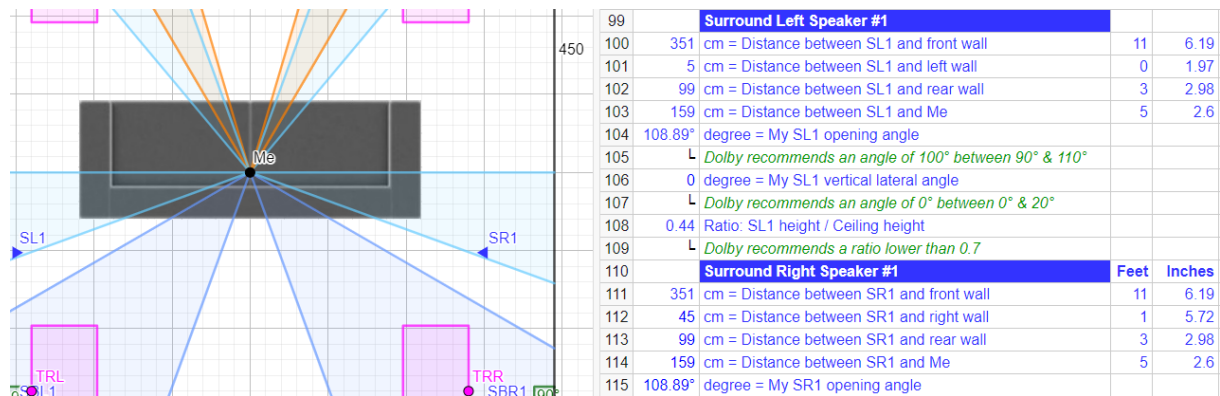
The perimeters shown on the diagram represent only part of the recommendations provided. Remember to check all data and recommendations (Dolby and others) in the spreadsheet section. However, all placements remain free (within the normal range of the speaker).

For side speakers, when you move the left speaker but keep it fixed to the wall, the right speaker will also remain fixed to the wall at the same angle to the listener. If the reference position is not in the middle of the room, the two speakers will not necessarily be at the same "level" on the walls, nor at the same distance from the listener.

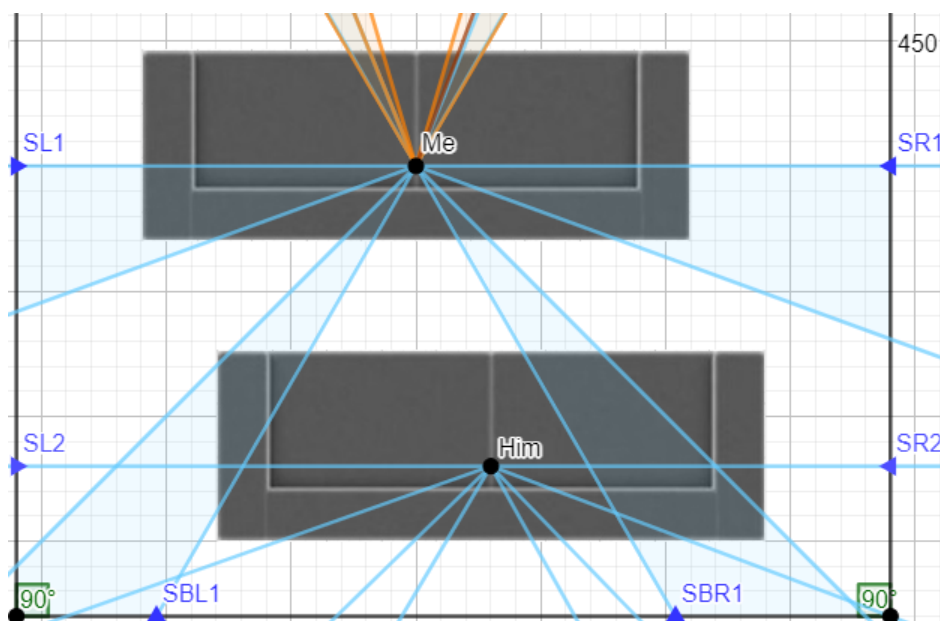|			Feet	Inches
102	94	cm = Distance between SL1 and rear wall	3	1.01
103	165	cm = Distance between SL1 and Me	5	4.96
104	109.97°	degree = My SL1 opening angle		
105	└	*Dolby recommends an angle of 100° between 90° & 110°*		
106	0	degree = My SL1 vertical lateral angle		
107	└	*Dolby recommends an angle of 0° between 0° & 20°*		
108	0.44	Ratio: SL1 height / Ceiling height		
109	└	*Dolby recommends a ratio lower than 0.7*		
110		**Surround Right Speaker #1**	**Feet**	**Inches**
111	371	cm = Distance between SR1 and front wall	12	2.06
112	0	cm = Distance between SR1 and right wall	0	0
113	79	cm = Distance between SR1 and rear wall	2	7.1
114	207	cm = Distance between SR1 and Me	6	9.5
115	109.97°	degree = My SR1 opening angle		

If you move the left speaker away from the wall (floor-standing speakers), when you move it, the right speaker also moves in the room in a completely symmetrical way (see below). The opening angle remains the same, as do the distances from the listener. However, distances between speakers and walls may differ between left and right.

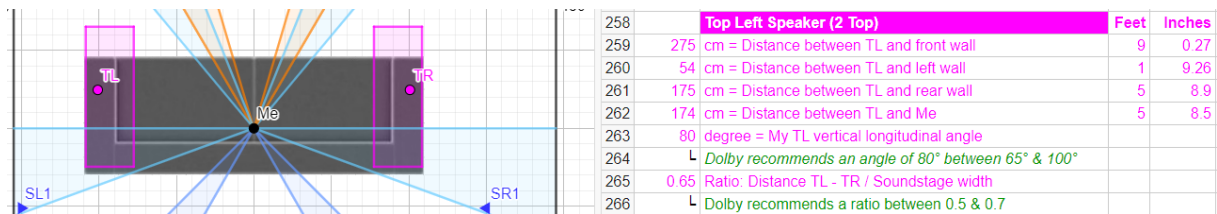| 99		Surround Left Speaker #1		
100	351	cm = Distance between SL1 and front wall	11	6.19
101	5	cm = Distance between SL1 and left wall	0	1.97
102	99	cm = Distance between SL1 and rear wall	3	2.98
103	159	cm = Distance between SL1 and Me	5	2.6
104	108.89°	degree = My SL1 opening angle		
105	∟	*Dolby recommends an angle of 100° between 90° & 110°*		
106	0	degree = My SL1 vertical lateral angle		
107	∟	*Dolby recommends an angle of 0° between 0° & 20°*		
108	0.44	Ratio: SL1 height / Ceiling height		
109	∟	*Dolby recommends a ratio lower than 0.7*		
110		Surround Right Speaker #1	Feet	Inches
111	351	cm = Distance between SR1 and front wall	11	6.19
112	45	cm = Distance between SR1 and right wall	1	5.72
113	99	cm = Distance between SR1 and rear wall	3	2.98
114	159	cm = Distance between SR1 and Me	5	2.6
115	108.89°	degree = My SR1 opening angle		

Notes: As priority is always given to respecting angles, a side speaker can be located on the rear wall (this proves that your sofa is too close to it); a rear speaker can be located on a side wall; and in the same pair of speakers (SBL1 and SBR1 for example) one of the speakers can be on a side wall and the other on the rear wall.

Before moving elements, remember to use the vertical scroll bar in the spreadsheet area to place the data corresponding to the elements you wish to move on the right side of the diagram, to have a complete view in real time.

If you have only one sofa, the reference listener will always be "Me" on the first sofa. If you have two sofas and two pairs of side speakers, SL1 and SR1 will be positioned according to "Me"; SL2 and SR2 according to "Him" on the second sofa.

You can also move the ceiling speakers (TL, TFL, TML, TRL and TR, TFR, TMR and TRR) as you wish. To judge their correct placement, you can use both the areas shown on the diagram and the data provided in the spreadsheet area.

258		Top Left Speaker (2 Top)	Feet	Inches
259	275	cm = Distance between TL and front wall	9	0.27
260	54	cm = Distance between TL and left wall	1	9.26
261	175	cm = Distance between TL and rear wall	5	8.9
262	174	cm = Distance between TL and Me	5	8.5
263	80	degree = My TL vertical longitudinal angle		
264	└	Dolby recommends an angle of 80° between 65° & 100°		
265	0.65	Ratio: Distance TL - TR / Soundstage width		
266	└	Dolby recommends a ratio between 0.5 & 0.7		

In addition to the spreadsheet area, you can make your own measurements: When you click successively on any two elements in the diagram, the distance between the 2 elements is displayed in the bottom left-hand corner:
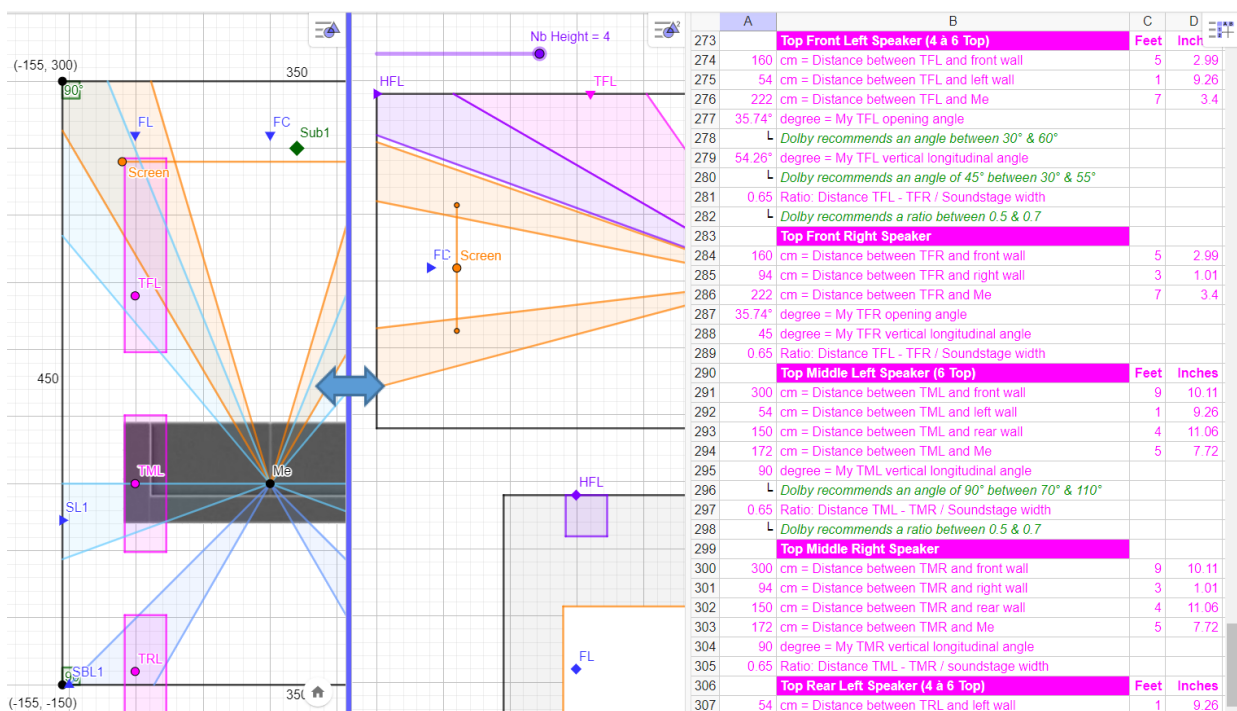
Real Distance (3D) between SL1 and TL = 161 cm = 5 ft 3.39 in

Plumb Distance (2D) between SL1 and TL = 79 cm = 2 ft 7.1 in

Real Distance (3D) between Left Screen Edge and Front Left Corner = 77 cm = 2 ft 6.31 in

Plumb Distance (2D) between Left Screen Edge and Front Left Corner = 77 cm = 2 ft 6.31 in

Note: When you have moved elements or modified the room just for testing and you want all the speakers to be repositioned as they were at the start, you can use the reset button:

5°) Adjust screen and side speakers height, and height speakers position.

On top of the basic diagram (top view), you can drag a second window to the left with three additional views: side view, front stage view and rear wall view.

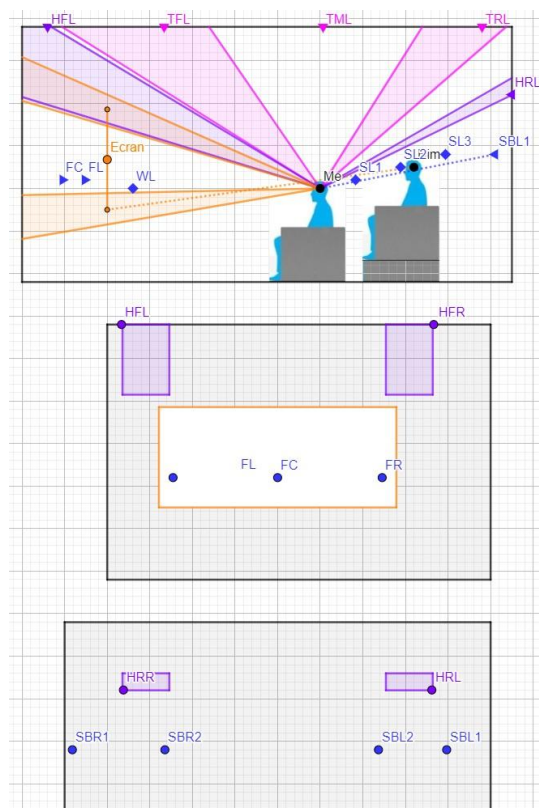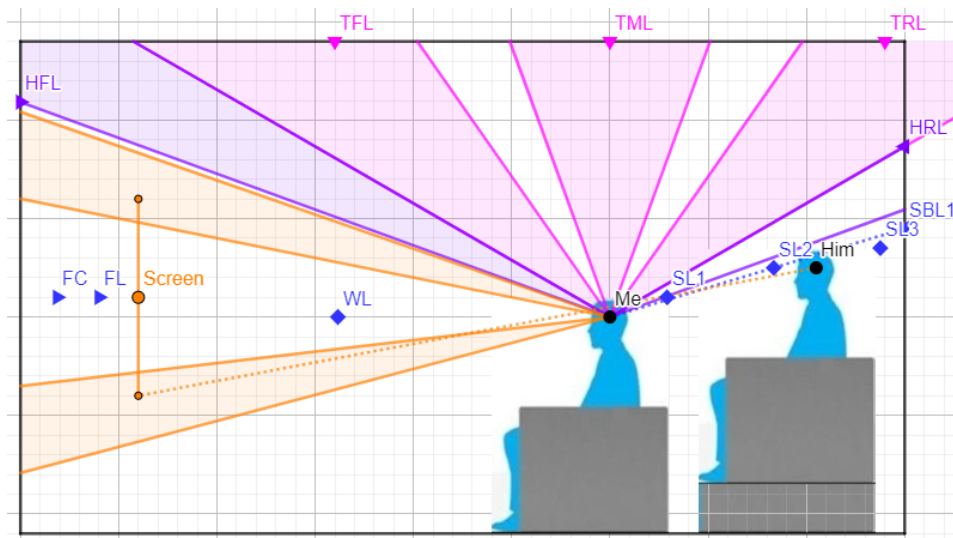|	A	B	C	D
273		Top Front Left Speaker (4 à 6 Top)	Feet	Inch
274	160	cm = Distance between TFL and front wall	5	2.99
275	54	cm = Distance between TFL and left wall	1	9.26
276	222	cm = Distance between TFL and Me	7	3.4
277	35.74°	degree = My TFL opening angle		
278	└	Dolby recommends an angle between 30° & 60°		
279	54.26°	degree = My TFL vertical longitudinal angle		
280	└	Dolby recommends an angle of 45° between 30° & 55°		
281	0.65	Ratio: Distance TFL - TFR / Soundstage width		
282	└	Dolby recommends a ratio between 0.5 & 0.7		
283		Top Front Right Speaker		
284	160	cm = Distance between TFR and front wall	5	2.99
285	94	cm = Distance between TFR and right wall	3	1.01
286	222	cm = Distance between TFR and Me	7	3.4
287	35.74°	degree = My TFR opening angle		
288	45	degree = My TFR vertical longitudinal angle		
289	0.65	Ratio: Distance TFL - TFR / Soundstage width		
290		Top Middle Left Speaker (6 Top)	Feet	Inches
291	300	cm = Distance between TML and front wall	9	10.11
292	54	cm = Distance between TML and left wall	1	9.26
293	150	cm = Distance between TML and rear wall	4	11.06
294	172	cm = Distance between TML and Me	5	7.72
295	90	degree = My TML vertical longitudinal angle		
296	└	Dolby recommends an angle of 90° between 70° & 110°		
297	0.65	Ratio: Distance TML - TMR / Soundstage width		
298	└	Dolby recommends a ratio between 0.5 & 0.7		
299		Top Middle Right Speaker		
300	300	cm = Distance between TMR and front wall	9	10.11
301	94	cm = Distance between TMR and right wall	3	1.01
302	150	cm = Distance between TMR and rear wall	4	11.06
303	172	cm = Distance between TMR and Me	5	7.72
304	90	degree = My TMR vertical longitudinal angle		
305	0.65	Ratio: Distance TML - TMR / soundstage width		
306		Top Rear Left Speaker (4 à 6 Top)	Feet	Inches
307	54	cm = Distance between TRL and left wall	1	9.26

In these three new views, you can adjust the height of the screen and all side speakers independently of each other, and manage up to two pairs of height speakers, front and rear (HFL, HFR and HRL, HRR).
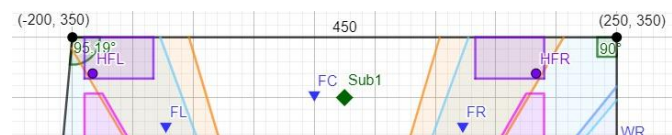
In the side view, you can adjust:
- The screen height
- The height of side speakers SL2 and SL3 independently of SL1
- The height of wide speakers WL independently of front speaker FL

When you have two sofas / rows of seats, side view is essential to avoid problems of speakers or screen being masked by other spectators.

For height speakers, if they are located on walls, you can position them directly on the front stage view (in the middle) for HFL and HFR, and on the rear wall view (at the bottom) for HRL and HRR.

If they are located on the ceiling, like HFL and HFR in the example on the left, you need to go back and position them on the top view:
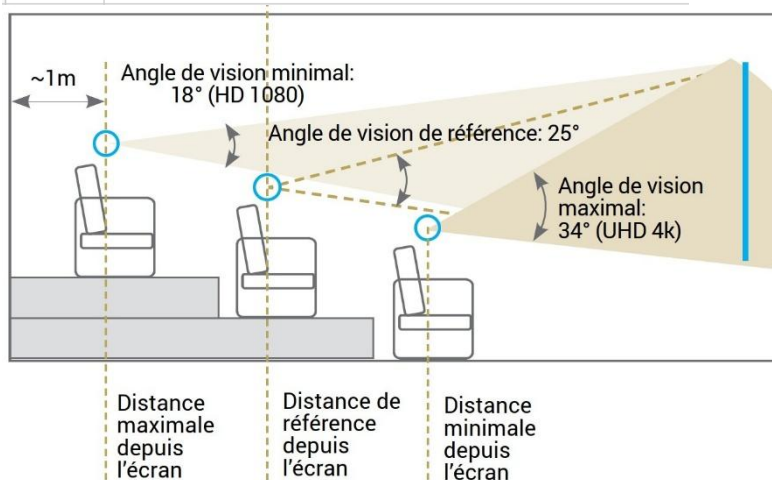

Note: On the rear wall view, facing the wall, the left speaker (HRL) is on the right. Ditto for the right speaker, which is on the left.

Appendix A: Angles / Titles and Illustrations

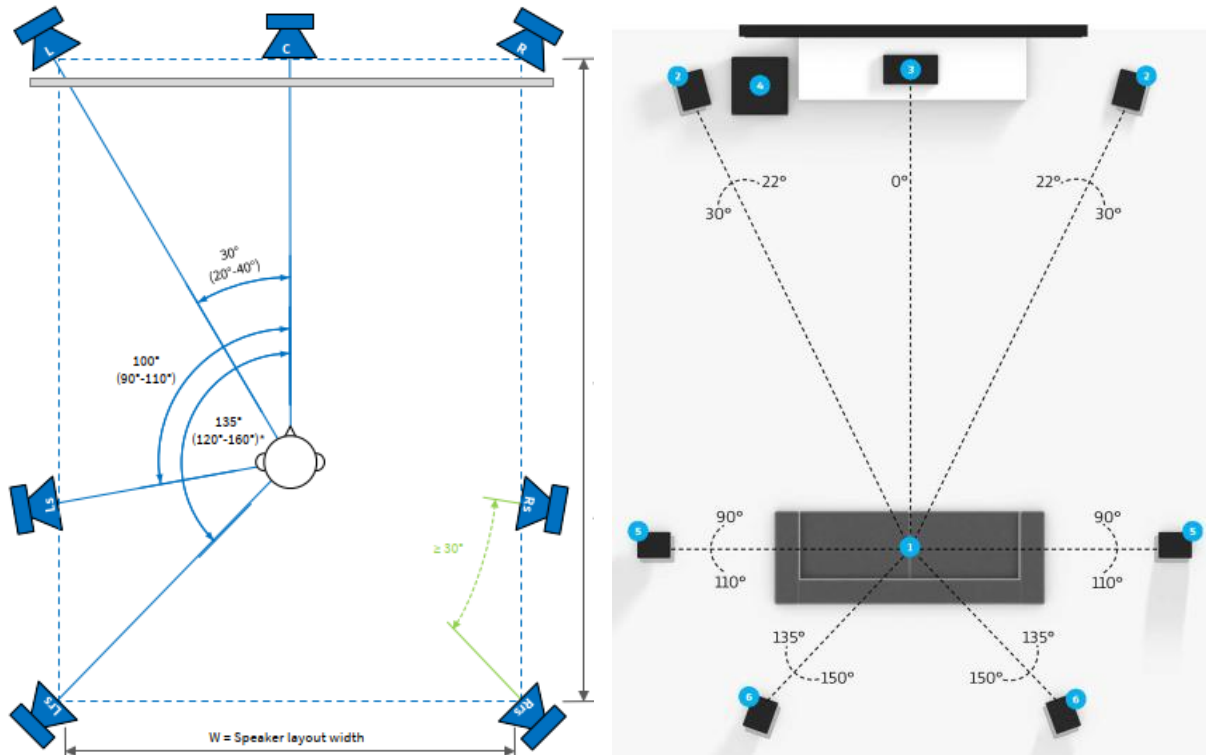| 52.17° | degree = My horizontal viewing angle |
| | SMPTE recommends an angle of 44° between 33° & 61° |

~30cm ~30cm

Angle de vision maximal:
61° (UHD 4k)

Distance minimale
depuis l'écran
(0,84x la base écran)

Angle de vision de référence: 44°
(HD 1080)

Distance de référence
depuis l'écran

Angle de vision minimal:
33° (HD 1080)

Distance maximale
depuis l'écran
(1,8x la base écran)

~1m

| 23.5° | degree = My vertical viewing angle |
| | SMPTE recommends an angle of 25° between 18° & 34° |

~1m

Angle de vision minimal:
18° (HD 1080)

Angle de vision de référence: 25°

Angle de vision
maximal:
34° (UHD 4k)

Distance
maximale
depuis
l'écran

Distance de
référence
depuis
l'écran

Distance
minimale
depuis
l'écran

22.42°	degree = My FL opening angle
	├ *Dolby recommends an angle of 30° between 20° & 40°*

The "opening" angles correspond to the angles shown on the top view diagrams in the Dolby guides:

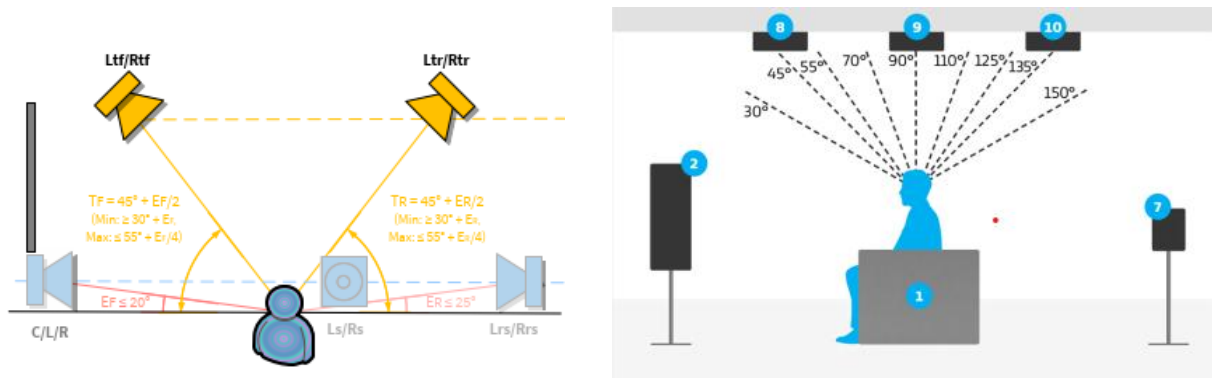|	
9.97	degree = My SL1 vertical lateral angle
	└ *Dolby recommends an angle of 0° between 0° & 20°*

The "vertical lateral" angles correspond to the angles shown in the diagrams below, only in the Dolby Atmos Home Entertainment Studio guide :
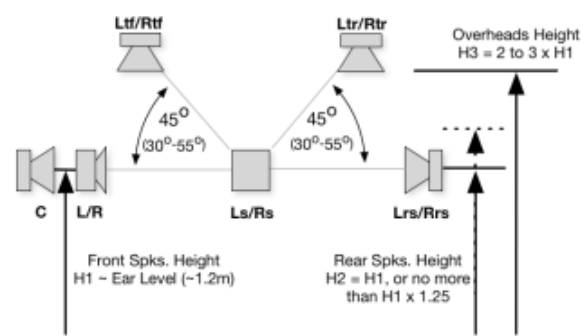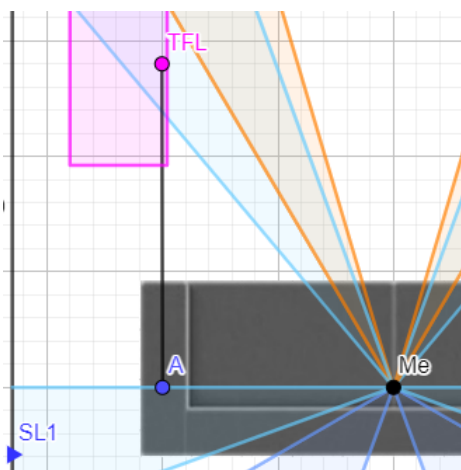

Note: The reference "ES" indicates that this value is used to calculate other angles.

45°	degree = My TFL vertical longitudinal angle
∟	*Dolby recommends 45°+EF/2 between 30°+EF & 55°+EF/4*

The "vertical longitudinal" angles correspond to the angles shown on the side view diagrams in the Dolby guides:

Note: These angles are not "absolute" but indicated in "2D" and therefore valid for any spectator placed on the same row of seats:

Appendix B : Bibliography:

Dolby Atmos Home Theater Installation Guidelines

Dolby Atmos Home Entertainment Studio - Technical Guidelines

CEDIA/CTA RP22 (Version 1.2 september 2023)

Trinnov Loudspeaker Position Guide