



## **Sound Quality Judgebook 2022**



## Welcome to the European Mobile Media Association 2

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## Welcome to the European Mobile Media Association

### 4.0 Preface

This manual is designed to describe the exact procedure, used for judging a vehicles sound system, according to EMMA Rules and regulations and will be continuously updated.

**Introduce yourself in a polite way to the competitor.**

Follow the procedures and rules in chapter 4 as described in pages 33 & 41 in the Rulebook.

#### 4.1 Pre Judging Check

##### 4.1.1 Check Charger Y / N

Ask the competitor to disconnect the battery charger (if any) from his/her system and document it into the checkbox on the score sheet.

##### 4.1.2 Verification of Reasonable Driving Position Y / N

Check the competitor's ability to operate the gear-stick, the steering wheel & the pedals with the given driver's seat adjustment and document it into the checkbox.

##### 4.1.3 Channel Verification

The judge will use Tracks 2 & 3 of the CD to check left and right integrity. If they are reversed, the competitor is given up to 5 minutes to repair the fault.

##### Intro and Welcome Track 1:

This track is a first impression of the sound, which is fast, clean and full.  
The voice sounds clear, warm and direct, placed in the centre of the sound system.

##### 4.1.4 Calibration of Volume

The Competitor suggests the Volume to be listened at by the sound judges.  
**The Judges should use this Volume!**

**Only** in case that the suggested Volume is **too loud** (more than 80dB unweighted slow measurement with pink noise), the Judges have to take a measurement to correct the Volume.

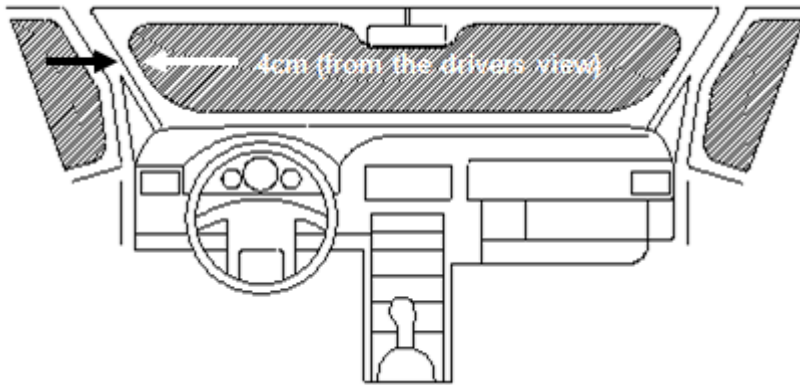
In case the suggested volume is too low, it's the competitor's decision to keep it or ask you to adjust the volume.

Furthermore the equipment used for reproducing the EMMA Sound Quality source will be noted on the score sheet.

##### 4.1.5 Limited view

The judge will sit in the designated listening position and check if anything from the Audio systems Installation is interfering with the view. This rule applies to the windscreen and the two front side

windows. Windows within the A-Pillar/ additional windows in the front of the front doors will not be considered as long as the height of the window is not more than half the height of the side window at the highest point (height is measured perpendicular to the road).



If the view is restricted, the Judges deduct 3 Points for each not OK Situation.



- the view to the side mirrors should not be blocked (if no passenger side mirror installed, the rear view mirror must allow a full view back)

### How to Judge

The measurement will be taken as follows:

- 4 cm perpendicular height taken 90 degrees to the road surface, when checking from the bottom of the screen or the side windows.
- When measuring on the windscreen the measurements are always taken from the edge of any opaque areas which are part of the screen. IE the LAST, smallest black dot
- 4 cm from the A-pillars at 90 degrees to the A-pillar.

### Hint:

- This does not include the actual screen used for media playback.
- If the audio build is greater than the 4 cm measurement but is still NOT obscuring the road, (e.g. it is obscuring only the car bonnet), then this is acceptable.

### How to score (deduction):

3 points will be deducted per build that obscures the view to a maximum of 6 points.

## 4.2 Imaging Characteristics

### 4.2.1 Imaging - Positions (0 to 25 points)

#### Track 2 to 6: Technical Tracks for Positions and Focus

The sound stage is divided to 4 equal distances by 5 positions in the following order:

**Left, Right, Center, Left center, Right center**

The **Left** and the **Right** positions of the sound stage are relatively easy to score.

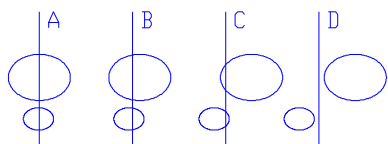
**Center, Left center and Right center** positions are more difficult to be in their exact place.

Use the human voice **for reference** of each position, **and judge the 5 following instruments**.

The 5 different sounds appear at each position in the following order:

Instrument	Attack Frequency
Fender Jazz Bass	80 Hz
Acoustic Guitar	200 Hz
Gong (20cm)	500 Hz
Cow Bell	800 Hz
Finger Cymbals	2,5 kHz

**Please note that these are the attack frequencies of the instruments and voices and of course they can be extended to lower and higher frequencies.**



#### How to score?

The 5 tones on tracks 2-6 should be heard on their positions.

The height is NOT scored here.

When a tone can be heard in multiple places score 0 points for that instrument.

If the initial sound of the same instrument is in the right place but the 2nd or 3rd sound is not in the same place then score 0.

On the diagram above, A is correct and gets full points.

B, C, and D get 0 points.

**Hint :**

Every sound starts at one small point which indicates its location, and then spreads equally round it.

Score the location that every sound starts.

**4.2.2 Imaging – Focus (0 - 25 points)****Tracks 2 to 6: Technical Tracks for Positions and Focus**

The technical tracks 2-6 for positioning and focus will be used to define the five positions. The centre position should be exactly in the middle between the ultimate left and ultimate right. Left centre should be exactly in the middle between ultimate left and centre. Right-centre should be exactly in the middle between centre and ultimate right. This means that all positions should be evenly spaced. When the sound is not coming from the position where it should appear, less points will be given for that position. For each correct position of each instrument the judges will score 1 Point.

Focus means correct size of each instrument, relatively to one another. The instruments should appear exactly on their designated position. If they are out of focus the judge will note 0 points.

Do not confuse size with volume. Louder does not mean bigger.

Each different sound in each position should be distinct with the correct focus-size.

The size of the focus is relative to the size of the stage. If the stage is very small also all focus should be smaller. If the stage is very wide the focus should be bigger in size. In any case all instruments should appear within the boundaries of the stage.

**Relative sizes are:**

**Fender Jazz Bass:** big size

**Acoustic guitar:** smaller than above

**Gong (20cm):** attack is smaller than Guitar

**Cow Bell:** quite smaller than the Gong

**Finger Cymbal:** small like a thump

Size of each tone should be considered, relatively to one another.

Please note that if the size is not fitting in, the position may be wrong too.

**4.3 Sound Stage and Imaging Characteristics Track 7****4.3.1 Sound Stage - Distance to the Soundstage (0 - 15 points)**

This is the distance between the listener and where the soundstage begins.

**Track 7: Technical Track for Width, Height, Distance and Room Information**

This is a track with moving instruments!

**Instruments used in center position:**

Bass Drum, Fretless Bass, Soprano Saxophone, Fender Jazz Bass, Snare/Hi-Hat (Hi-Hat very slightly to the left), High Cowbell (very slightly to the right)

**Instruments in stable position:**

Acoustic Guitar in far left and far right position playing chords from 00:54 - 01:16

Palm Muted Acoustic Guitar playing single notes from 00:55 – 01:16

### **Instruments moving:**

Rainmaker, Singing Bowl (ca.50 cm), Claves / Woodsticks, Cowbell (big), Palm Muted Electric Guitar

### **Description of moving instruments:**

00:00 – 00:19

Rainmaker starts in the center position and shifts fast to right position. Then to left center, right center and then fading out in far-left position. Binaural panning

00:00 -00:13

Singing Bowl starts in far left and shift to far-right.

00:23 – 00:40

Claves starts to shift from far left to far-right position.

00:33 – 00:44

Cowbell (big) shifts from far right to far left.

00:35 – 00:53

Rainmaker shifts from far left to far right.

00:42 – 00:54

Palm Muted Electric Guitar shifts from far right to far left.

00:49 – end

High Cowbell starts in (very slightly right) center position and stays there. Finger Cymbals are in different positions. Far left, far right and center position.

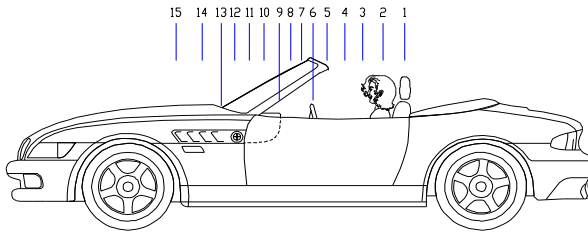
Listen to all Instruments.

The instrument that sounds the nearest/closest to you is the instrument that is judged in this section. It can be a moving instrument OR a stable instrument.

### **How to score?**

15 points	Is well out of the front windshield
14 points	Is just out of the bottom end of the front windshield
13 points	Is at the bottom end of the front windshield
10 to 12 points	Is between the beginning of the dashboard and the windshield
9 points	Is where the dashboard begins
7 to 8 points	Is between the top of the steering wheel & the beginning of the dashboard.
6 points	Is on top of the steering wheel
4 to 5 points	Is between the top of the steering wheel and the listener's body.
3 points	Is touching the face or chest of the listener.
2 points	Is on the head/body of the listener.
1 point	Is anywhere behind the listener.
0 point	No sound.

**Avoid scoring 0 or 1 unless it's absolutely necessary.**



#### 4.3.2 Sound Stage - Width of sound stage (0 – 15 points)

This is the distance between the left and the right side of the soundstage.

#### Track 7: Technical Track for Width, Height, Distance and Room Information

##### How to score?

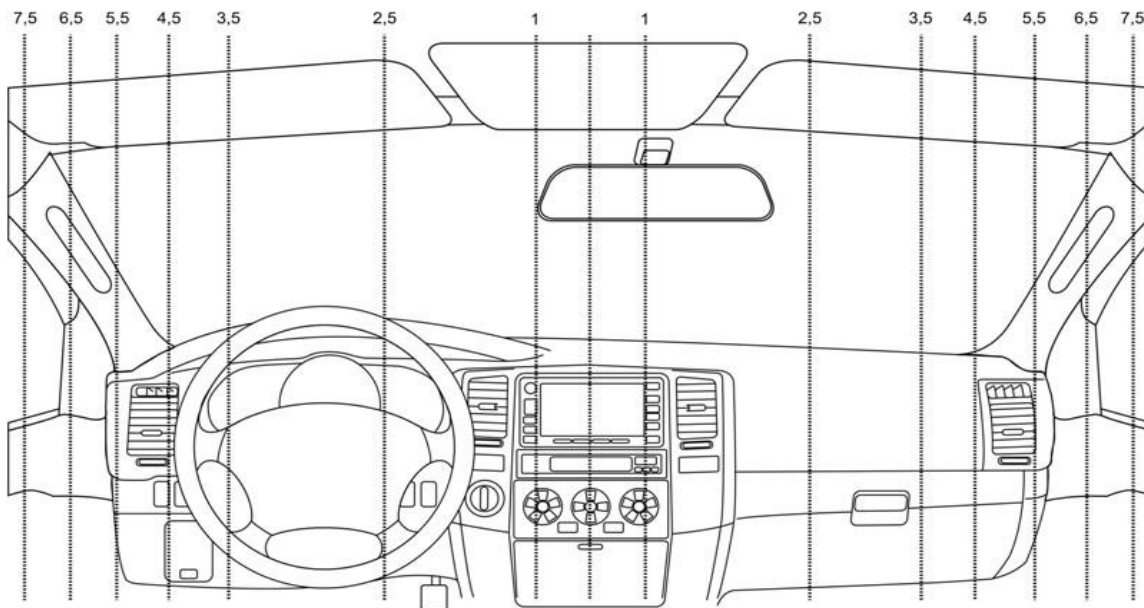
Left: One of the instruments that is furthest to the center is your point to judge.

Right: One of the instruments that is furthest to the center is your point to judge

For scoring follow the vertical lines on the diagram.

Add left and right points.

**Never score 0 and avoid scoring 1 unless it's absolutely necessary.**





### 4.3.3 Sound Stage - Height of the sound stage (0- 15 points)

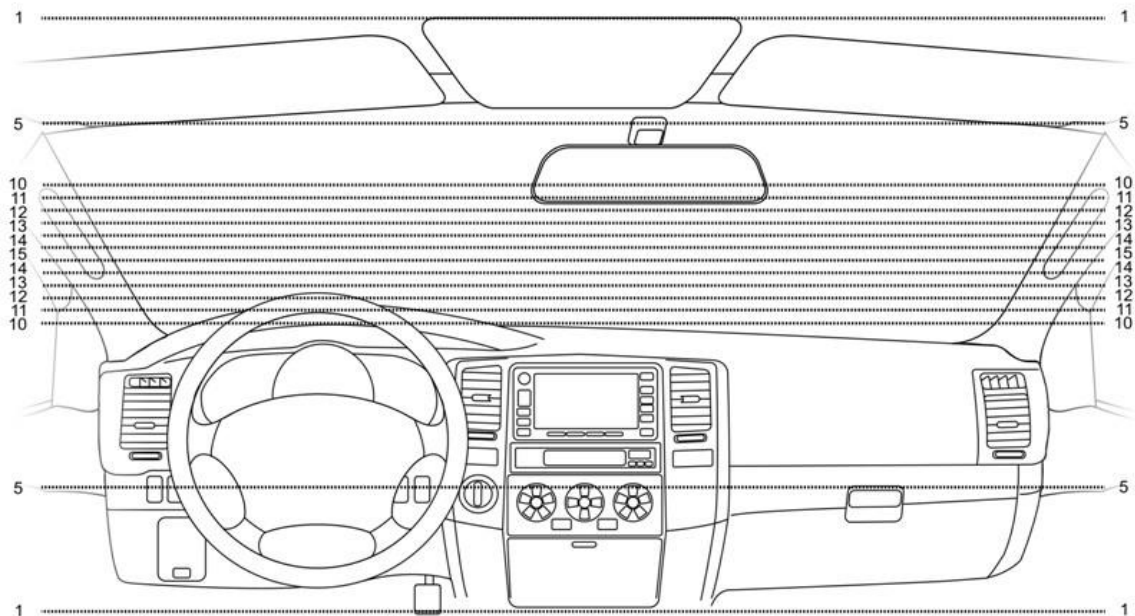
Ideally the stage height should be stable at horizon level from left to right, with some vertical spread below and above that level. It means, that some instruments may appear a little lower or a little higher than most of the others who appear at horizon level.

#### Track 7: Technical Track for Width, Height, Distance and Room Information

All instruments should be on the same height. All stable AND moving instruments. Ideally on eye level.

##### How to score:

Follow all moving instruments and use the stable instruments too. Some moving instruments can fall a little bit down on some positions. Deduct 1 point for every instrument that is NOT on eye level at any position.



**Be careful: Score only the height – NOT the positions.**

### 4.3.4 Sound Stage – Room Information (1 to 5 points)

#### Track 7: Technical Track for Width, Height, Distance and Room Information

This is the sense of space around the music created by room reverberations (aka echoes), in which the recording took place or created by the engineer.

Either way you should close your eyes and imagine the room size you are listening in. Imagine the size of the room.

You should sense the size of the room and the reflections of the sound on the side walls, (left-right & front-rear) and the floor - ceiling. Within Track 7 the impression should be created that the rainmaker is far behind the Instruments in the center position and also many of the moving instruments are closer or more far away. This feeling of a room size the source for the scoring.

##### How to score:

Start with 1 point and add on the following points

2 Points	there is some room audible but not big
3 Points	a room is to feel
4 Points	a big room is audible
5 Points	the impression of an extraordinary big room is audible

## A FEW THINGS ABOUT TONAL ACCURACY

### PHASE

In the car we can detect phase differences, mostly from the passenger side.

**Small phase problems:** Most people cannot detect them as they are too small and you have to concentrate on details to spot them.

We can describe these problems in the same way as we do in **Medium**, but the effects described are a lot less hearable.

**Medium phase problems:** most people detect that something is wrong about the music, but cannot describe or explain what.

The music sounds like as it is coming from further away, creating an ambience as if we were in a small or big church.

Or you feel that an instrument is moving forward or backward depending on the frequency. Some instruments sound natural, but some others sound unnatural, depending on the frequency.

Small or big emptiness in low frequencies are easier to detect.

A phase difference on only one frequency makes instruments sound unnatural on this frequency only.

It can also be that the same sound e.g. Floor Tom comes from Subwoofer with a time difference than from Midbass.

**Big phase problems:** are easier to detect as they make music sound completely unnatural and annoying.

We can describe these problems as in Medium, but on a superlative degree.

### EMPTINESS IN SOUND

For the low frequency instruments, the Subwoofer and Mid-Woofer, Frequencies are responsible.

For human voices and mid frequencies instruments, the Mid-Woofer and the Midrange Frequencies are responsible.

For human voices and High Frequency Instruments, the Midrange and High Frequencies are responsible.

### BASS & BASS DRUM

Most of the time, Bass Drum and Bass, hit at the same time in same or similar tones.

On well-adjusted systems you will be able to distinguish & separate them from one another.

They affect the SUB & MIDBASS area.

### ATTACK

Describes the feeling that the reproduction speed playing on the soundstage is according to the instrument playing. This means how fast the attack is coming and how fast it disappears and is no longer audible.

Some sounds come in very fast (snare, cymbal), while others come in, slower (piano, bass).

A good system is able to reproduce all of them very realistically.

### DECAY

All sounds, even the most sharp ones after the initial attack/strike have a continuation of sound (decay - ambience) after they finish called Decay.

The slower sounds have bigger decay while the fast ones have smaller decay.

## SUGGESTION FOR THE SOUND JUDGES

## Judge Tonal Accuracy by using tracks 8, 9, 10 and 11

Every instrument & voice should sound very natural & distinct, without affecting the sound of another.

### GENERAL THINGS ABOUT RECORDINGS

The Bass Drum, the Bass and the Lead Vocals of all tracks are mostly at center position. The Bass Drum is always behind the Bass.

Bass Drum has a quite big focus; Double Bass has bigger focus in lower tones, but smaller size & more precise focus on higher tones.

Electric Bass is about the same size with bass drum on low tones, & has more focus on higher tones.

When Bass Drum sounds, Bass sounds at the same time. You should be able to distinguish these 2 different sounds very clearly & easily.

Train your ears: Focus on the Bass Drum alone. Focus on the Double Bass alone.

Now focus on both of them.

The Lead Vocals are in front

### Track 8: Igor's Cello

This is good for scoring Midbass and Midrange.

Celli with various playing techniques, stacked upon each other, sometimes looped, accompanied by Grand Piano, 5 Celli playing, 4 of them positioned from left to right, the Cello playing the effect sound is positioned in the center.

### Track 9: Garcon

This is good for scoring Sub-Bass, Mid-Bass, Midrange and Highs.

In the beginning you hear a crowd in a Jazz Club environment as sound effect. Instruments used: Vocals, Electric Guitars, Electric Piano, Fender Jazz Bass, Drums, Piano, Fingersnaps, pop Brass Section synthesized, String Section.

### Track 10: Rainfall

This is good for scoring Sub-Bass, Mid-Bass, Midrange, Highs and Overall Spectral Balance.

Bassdrum is completely undamped! Instruments used: Vocals, various Electric Guitars, Electric Bases, Drums played with Mallets, Organ, Tenor Alto Saxes, Synthesizer, Trumpet, Tambourine, Grand Piano processed backward at the end.

### Track 11: Alone

This is good for scoring Sub-Bass, Mid-Bass, Midrange and Highs.

Lead Vocals doubled for a "natural" chorus effect. Instruments used: Vocals, Electric Bases, Acoustic Guitar, Electric Guitar, Piano, Marimba, Cello, String Section, Egg Shaker, Tambourine.

## 4.4 Tonal accuracy (0 - 120 points) Tracks 8, 9, 10 and 11

### Sub-bass - 10 to 60 Hz (0 - 30 points)

Instruments: Double Brass, Tuba, Trombone, French Horn, Woodwinds, Electric Bass, Bass Clarinet, Contrabass, , Bass Violin, Cello, Harp, Big Drums, Piano, Organ, Viola, Harp

### Mid bass - 60 to 200 Hz (0 - 30 points)

Instruments: Voices, Bass, Brass, Tuba, Trombone, French Horn, Trumpet, Woodwinds, Clarinet, Oboe, English Horn, Alto Sax, Bass, Bass Clarinet, Contrabass, Tympani, Bass Violin, Cello, Guitar, Viola, Violin, Harp, Piano, Organ, Tambourine, Drums, Floor Tom, Harp

**Midrange** - 200 to 3000 Hz (0 - 30 points)

Instruments : Voices, Bass, Brass, Tuba, Trombone, French Horn, Trumpet, Woodwinds, Flute, Clarinet, Oboe, English Horn, Alto Saxophone, Bass, Strings, Cello, Guitar, Viola, Violin, Harp, Piano, Organ, Piccolo, Bells, Drums, Tambourine, Cymbals, High Hat, Ride, Shaker, Rattle Snake, Tom Tom, Floor Tom, Harp

**High Frequencies** - 3000 Hz to inaudibility (0 - 30 points)

Instruments: Voices, Woodwinds, Piccolo, Flute, Clarinet, Strings, Violin, Triangle, Brushes, Harp, Piano, Organ, Bells, Tom Tom, Cymbals, High Hat, Ride, Shaker, Rattle Snake, Harp

**Use the following scoring guide to score Sub-Bass, Mid-Bass, Midrange, Highs, & Overall Spectral Balance.**

- A 29 to 30 points. 98% to 99%** Joyful, amazing, wonderful, shuddering, unbelievable tuneful, substantial, sexy, full of emotion  
 Life Like - Completely Natural & Clear, Generate full feelings, emotions, shuddering, warm, inviting, relaxing sound, Voices/instruments breath, with space around them, 99% Harmonically & Musical,  
 All details are there, All Instrument tones are 100% Distinct & Separate, The s,x,f,c sound perfect,  
 The hardware disappears; nothing comes between you & the music, completely effortless sound  
 Full of endless Energy & Dynamics, All tones start & stop with great precision & energy.  
 Perfect Instrument Size, Real Vocals in full body with flesh and blood
- B 27 to 28 points. 95% to 97%** it feels extremely close to, but just a little bit less than the above  
 Very Close to Completely Natural & Clear, Generate almost full feeling, shuddering, Extremely close to the above, Almost 99% Harmony & Musicality  
 Almost all details are there, All Instrument tones are almost 100% Distinct & Separate, The s,x,f,c sound almost perfect  
 The hardware almost disappears, Almost Effortless,  
 Almost full of Energy & Dynamics, Almost all tones start & stop with great precision & energy.  
 Very close to Perfect Instrument size, Real vocals with almost full body
- C 24 to 26 points. 90% to 94%** Everything is there in very good proportion, but just not good enough  
 A great deal of Naturalness & Clarity, generate a lot of feelings, no shuddering, a lot of space & atmosphere, but not enough, a great deal of Harmony & Musicality.  
 Most of the details are there, Most tones are very Distinct & Separate, The s,x,f,c sounds a little bit thicker or thinner than normal,  
 Wide open window to the sound, the hardware adds tiny coloration, little effort in a few tones,  
 A great deal of Energy & Dynamics, Most tones starts & stop with great precision & energy,  
 A little smaller or bigger Instrument size, Close to real vocals with close to full body
- D 21 to 23 points. 85% to 89%.** Almost everything is there in good proportion, but something is obviously missing, or is too much.  
 Fair Naturalness & Clarity, Generate fair feelings, Space is medium or little larger than normal, Fair Harmony & / or Musicality

A few details are missing, Most tones are almost very Distinct & Separate, The s,x,f,c sound thicker or thinner than normal  
 Almost open window to the sound, the hardware adds little color, Little Effort in a lot of tones.  
 Fair Energy & Dynamics, Some tones start & stop with great precision & energy  
 Fairly smaller or bigger instrument size, Close to real vocals with little less body.

- E 18 to 20 points. 80% to 84%** Sounds correct, but there are missing things or does not give much music feeling  
 Little Naturalness & Clarity, Generate little feelings, little space & atmosphere, little Harmony & / or Musicality,  
 A few details are there, a lot of tones are very Distinct & Separate, the s, x,f,c sound a lot thicker or thinner than normal.  
 A couple of tones behind a curtain, colorations more obvious, Fair Effort in a few tones, Little Energy & / or Dynamics, only a couple of tones start & stop with great precision & energy.  
 A few Instruments smaller or bigger size, Good vocals with half size body.
- F 15 to 17 points. 75% to 79%** Sounds nice but some tracks sound nicer than others.  
 Only some tones Natural & / or Clear, Generate feeling only in a few tones, Space & atmosphere only in some notes & / or instruments, Harmony & / or M in a few tones  
 Details only in few tones, a lot of tones are almost very Distinct & Separate, the s,x,f,c sound a little blur or whistling.  
 Some tones behind a curtain, colorations quite obvious, Fair Effort in a lot of tones  
 Energy & / or Dynamics in only a few tones, Acceptable transients.  
 A lot of Instruments smaller or bigger size, good vocals with very small or very big body.
- G 12 to 14 points. 70% to 74%** Sounds acceptable, nothing annoying but not so clear.  
 Not Natural but clean, generate feeling only in little tones, too much space, Harmony & / or M musicality in little tones,  
 Very little details, A few tones are Distinct & / or Separate, the s,x,f,c sound blur or whistling.  
 A lot of tones behind a curtain, many colorations, a lot of effort in a few tones  
 Energy & / or Dynamics only in a couple of tones, acceptable transients only in a specific range.  
 Quite smaller or bigger Instrument size, Acceptable vocals with no body.
- H 9 to 11 points. 50% to 69%** Sounds acceptable, almost nothing annoying  
 Not Natural but almost clean, no Feelings, no Space, or enormous Space, Almost No Harmony & / or Musicality  
 Almost no details, Little tones are Distinct & / or Separate, The s,x,f,c sound blur or whistling a lot.  
 The curtain is quite obvious, A lot of effort in a lot of tones,  
 Almost no Energy & / or Dynamics, Poor transients.  
 Half or Double size Instruments, almost acceptable vocals with no body.
- I 5 to 8 points. 30% to 49%** Sounds annoying in only some tones or tunes  
 Not Natural, some tones clean, some opposite feelings, Space & Atmosphere not easy to detect, No Harmony & / or Musicality  
 Hard to detect details, Almost no Distinction & / or Separation, the s,x,f,c sound harsh,  
 The curtain is heavy, Big effort in a few tones,  
 No Energy or Dynamics, Very poor transients,  
 Very big differences in instrument size, poor vocals with no or enormous body
- K 1 to 4 points. 1% to 29%** Sounds annoying in almost all tunes and tracks  
 Not Natural, bad feelings, Space not detectable, No Harmony & / or Musicality

No details, no distinction & separation, Hard to listen to,  
The curtain is very thick & heavy, Big effort in a lot of tones,  
No Energy & Dynamics, No transients,  
Cannot detect instrument size, cannot detect vocal size.

**L      0 points. No Sound      0%**

**Additional hints:**

Mistakes or miss-adjustments in the crossover area should result to lower score on both e.g. Midrange and High Frequency sections  
Never score 0 if there is a sound, and avoid going lower than (5 to 8) unless it is absolutely necessary.

#### **4.5      Overall Spectral Balance (0 - 30 points)**

Here we judge all the above (Sub, Mid-Bass, Midrange, & Highs) as a whole - as one thing. How all the frequencies - the entire bandwidth - are blended/combined together. How is the sound as a total? Are they well linked together, or not?

**Track 10: Rainfall**

Well balanced track with some effects. All instruments should sound clear and rich. The position of every single instrument is spot on.

**Overall Spectral Balance at higher volume (0 - 30 points)**

The same as the above, but at 6db louder volume level.

**If the sound is better than SB in normal volume, add 1 to 3 points, if not deduct 1 to 3 points. In case of bigger difference contact the head judge.**

The suggestion to the judges is to step up the volume by at least 2 to 3 steps.  
This may vary from head unit to head unit.

**Additional hints:**

Although it appears so, Overall Spectral Balance is not a point average, given to Sub-bass, Mid-Bass, Midrange & High frequencies  
Small point differences between Sub-bass, Mid-Bass, Midrange & Highs, gives a point result in Overall SB that looks like a point average of the above.  
Big point differences between Sub-bass, Mid-Bass, Midrange & High frequencies can give a lot lower points in Overall Spectral Balance  
Overall Spectral Balance scoring can never be higher than the highest point in Tonal Accuracy  
Overall Spectral Balance scoring can be lower than the lowest point in Tonal Accuracy

Never score 0 if there is a sound, and avoid going lower than (5 to 8) unless it is absolutely necessary.

#### **4.6      Listening pleasure (0 - 30 points)**

It's the pleasure and joy that music can generate to the listeners.

Considering all musical tracks, score the following:

Naturalness	0 to 3 points
Harmony & Musicality	0 to 3 points
Atmosphere & Emotions	0 to 3 points
Clarity	0 to 3 points
Effortless sound	0 to 3 points
Dynamics & Energy	0 to 3 points
Distinction & Separation	0 to 3 points
Body of Voice & Instruments	0 to 3 points
Transparency	0 to 3 points
Details	0 to 3 points

**How to score:**

- 0 points for no Naturalness at all
- 1 points for little Naturalness
- 2 points for fair Naturalness
- 3 points for perfect Naturalness

**Hints:**

The scoring here seems to have a connection with the Overall Spectral Balance scoring. These 2 scorings are not directly connected, but the actual scorings cannot be far away from OSB under normal circumstances.

You must score listening pleasure from a different point of view.

Do you get pleasure from the music you are listening to? Or you do not?

Under most cases listening pleasure will score proportional to Overall Spectral Balance points at higher level. E.g. SB=20 points LP=18 to 20 points

It can be that a system not so good in SB gives some listening pleasure & can score proportionally a little higher. E.g. SB=18 points, LP=20 to 22 points

It is not realistic to score 18 on the Overall Spectral Balance and score 25 on listening pleasure.

It is not realistic to score 28 on the Overall Spectral Balance, and score 12 on listening pleasure.

A sound system that sounds very good or excellent, should be able to show it throughout the whole score sheet.

On a sound system that does not sound so good, you have to point this out in detail throughout the score sheet.

**Never score 0 and avoid scoring below 5, unless it is absolutely necessary.**

Even a bad (not a very bad) sounding car should score around 10 points.

**4.7 Adjustments****Track 12: Zero Bit Track****Engine-off Testing - Switching Noise (-6 - 0 points)**

Potential noises can be:

Turn-on / turn-off noise, switching pops -- a popping, thumping or clicking noise, that is heard through the system's speakers when the system is powered up by the source unit's on/off switch or

switching pops - a clicking or popping noise that comes through the speakers when adjustments are made to the audio system's volume or track selection controls. Zipper, digital search, or stepper noises, which are inherent in some digital volume control designs, are beyond the scope of being corrected by proper installation techniques, but are not considered acceptable and will result in point deduction.

A noise that is emulated from or by the audio system, the vehicle or the vehicle environment and that is not recorded on the EMMA Sound Quality CD.

Potential noises can be:

Rush, hum, hiss, cracks, floor noise, rattling panels, loud fans, mechanical noise etc.

Points are not to be deducted for mechanical noises such as relay clicks or automatic motorized covers being activated.

#### How to score:

0 points	No audible noise
1 to -2 points	Barely audible noise
3 to -4 points	Audible noise
5 to -6 points	Disturbingly audible noise

#### Engine-on Testing (-6 - 0 points)

Turn off system. Turn on engine. Turn on system.

Noise that is generated by the mechanical/electrical system of the vehicle that is reproduced through the speakers with the audio system turned on / off.

Track 14 is used. The judges will adjust the volume level from medium to maximum. If the noise increases the judges may deduct maximum 6 points.

Possible noises are:

Alternator whine, ignition noise, PWM-noise created by control boxes, etc.

#### How to judge:

1. Turn off the system
2. Turn on the engine
3. Turn on the system
4. Turn on and off the lights, alarm lights, air condition, brakes, electric windows, etc.
5. Accelerate the engine

#### How to score:

0 points	No audible noise
1 to -2 points	Barely audible noise
3 to -4 points	Audible noise
5 to -6 points	Disturbingly audible noise

If noises are audible in some listening tracks (such as Track 7) but not in the zero-bit-track (noise gate), these other tracks can be considered for judging.

## 4.8 Ergonomics

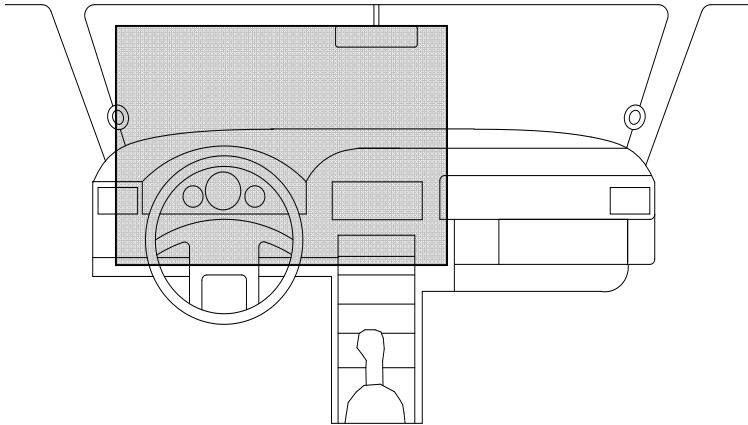
### System Handling (0 - 6 points)

### System Handling – Visibility (0 - 3 points)

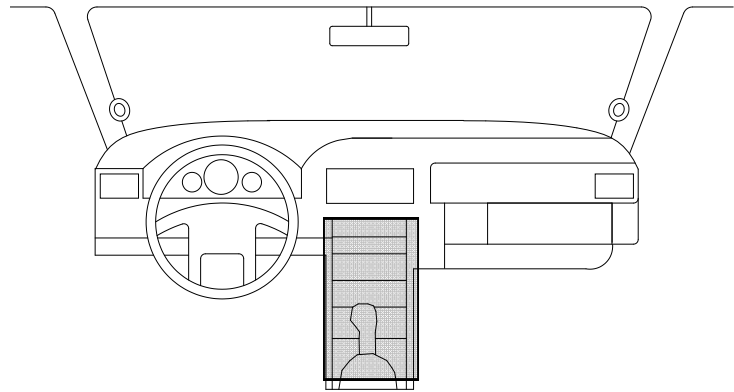


All relevant information about the music track must be in the same area. Even if it is more then one display all Informations like, Track Title, Volume etc. have to be clearly visible for the judge.

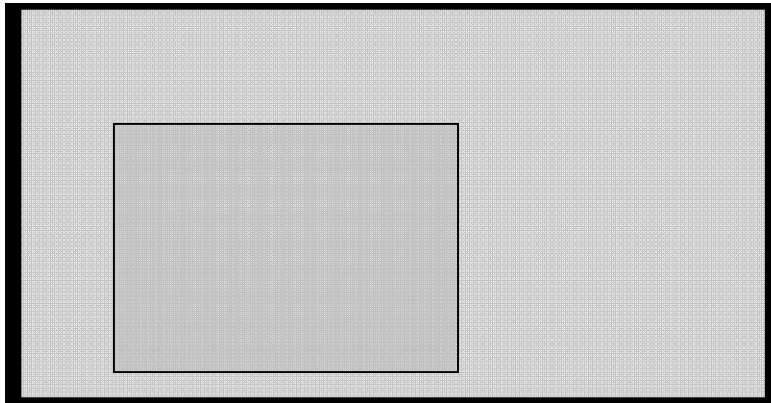
**3 points** when in this grey area



**2 points** when in this grey area



**1 point** when outside of this grey area



**0 point** for very bad visibility or NO display

**System Handling - Control (0 - 3 points)**

**3 Points** - Very easy to access and operate the system. (Extra Remote) Controls can be adjusted with hands on the steering wheel. (Extra Remote) control unit should be proper mounted (should not move when adjusting).

**2 Points** - Easy to access and operate the system. (Extra remote) control is installed and properly mounted (should not move when adjusting). A loose handheld remote control is not accepted.

**1 Point** - Easy to access and operate the system. No remote control

**0 Points** - Hard to access and operate the system. Source unit out of reach

## LAST BUT NOT LEAST EXPLANATIONS TO THE COMPETITORS

The competitor will always receive a realistic description of the quality of his/her sound by the judges

Your conversation with the competitor should be done in a very kind & polite way.

Please choose your words in such a way that are not offensive for the competitor or his equipment.

The Judges should explain in a simple & fast way, the points that you gave for his system.

Your explanations should be done in a way that the competitor is able to understand the meaning.

The competitor may not know what a phase difference is and how many points deductions that causes. Never use brand names or installer's names while explaining.

But you can recommend them to listen to another car - **NOT FROM HIS CLASS** - that sounds good in order to hear the difference. Never tell the competitor that the system sounds very good by scoring only 15 points in Tonal Accuracy. Sounds very good = for the competitor means close to the top.

**So please choose your words very carefully!**

Notes:

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Picture of the used Instruments:







Addendums and updates to the rules will be published at [www.emmanet.com](http://www.emmanet.com)

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