



Informal document GRB-58-10
(58th GRB, 2-4 September 2013,
agenda item 3(b))

How to set the sub-categories of M1 \ N1

China Automotive Technology and Research Center

Summary

- Chinese market is a global market, which is full of high-performance coupe, sports car, saloon car, SUV, MPV, Kei-car, Kei-truck, mini-bus, mini-truck and so on. It's much more difficult for us to set a proper sub-categories to cover all vehicles.
- We think it's better to find some common solution for mini-bus, light-bus, mini-truck, Kei-truck, heavy M1 category, pick-up and sports car, but actually speaking, it's difficult.

M1 category (GVW \leq 2.5t)

- Mini-bus (Micro-Van) of China



mini-bus

- Common characteristic: engine arranged on the front axle, rear axle drive, more seats (always more than 5 seats), and one box body.

M1 category (GVW \leq 2.5t)

- The mini-bus is not all the same to Kei-car of Japan. Like CH7140 manufactured by CHANGHE-SUZUKI, have front engine, front drive axle, and two bodies like the Kei-car of Japan, belongs to saloon car in our country.



M1 category (GVW≤2.5t)

- A new MPV Vehicle between mini-bus and saloon car, this kind of vehicle is derived from the mini-bus but now have some characteristic of saloon car, which has front engine, rear axle drive and two bodies. This kind of vehicle shows the developing trend of mini-bus in the future.



WULING SUNSHINE (Rear axle drive)

(The United States' magazine Forbes once called it "the most important vehicle on earth" in 2012)

M1 category (GVW≤2.5t)



- The WULING SUNSHINE, NISSAN NV200(front axle drive), CHANG'AN HONOR are all new products in Chinese market which use the front engine and two bodies arrangement;
- From the view-side of market and design, the mini-bus in the future may be replaced by such kind of vehicles.

Typical test data of mini-bus with method B

Seats No.	Test mass	GVW	Drive axle	Engine position	Pn	S	Test engine speed	PMR	Lurban
7	1060	1550	rear axle	middle	50	5600	97%	47.17	72.3
7	1125	1620	rear axle	middle	63	6000	62%	56	72.4
7	1125	1620	rear axle	middle	63	6000	60%	56	73.1
8	1225	1750	rear axle	middle	60.5	5300	65%	49.39	72.2
7	1135	1760	rear axle	middle	68	6000	74%	59.91	75.2
7	1135	1760	rear axle	middle	68	6000	75%	59.91	75.3
5、7	1255	1780	rear axle	middle	72	6000	----	57.37	70.9
7	1285	1810	rear axle	middle	60	6000	76%	46.69	72.4

- Average value of these vehicles: 73.1 dB(A), which is nearly 2 dB(A) higher than ordinary passenger car; and the 15% cut-off value is 74dB(A).

M1 category (GVW≤2.5t)

Limit value	Vehicles
72 dB(A)	
Suggest 74 dB(A) for 1st stage and 72 for 2nd stage.	

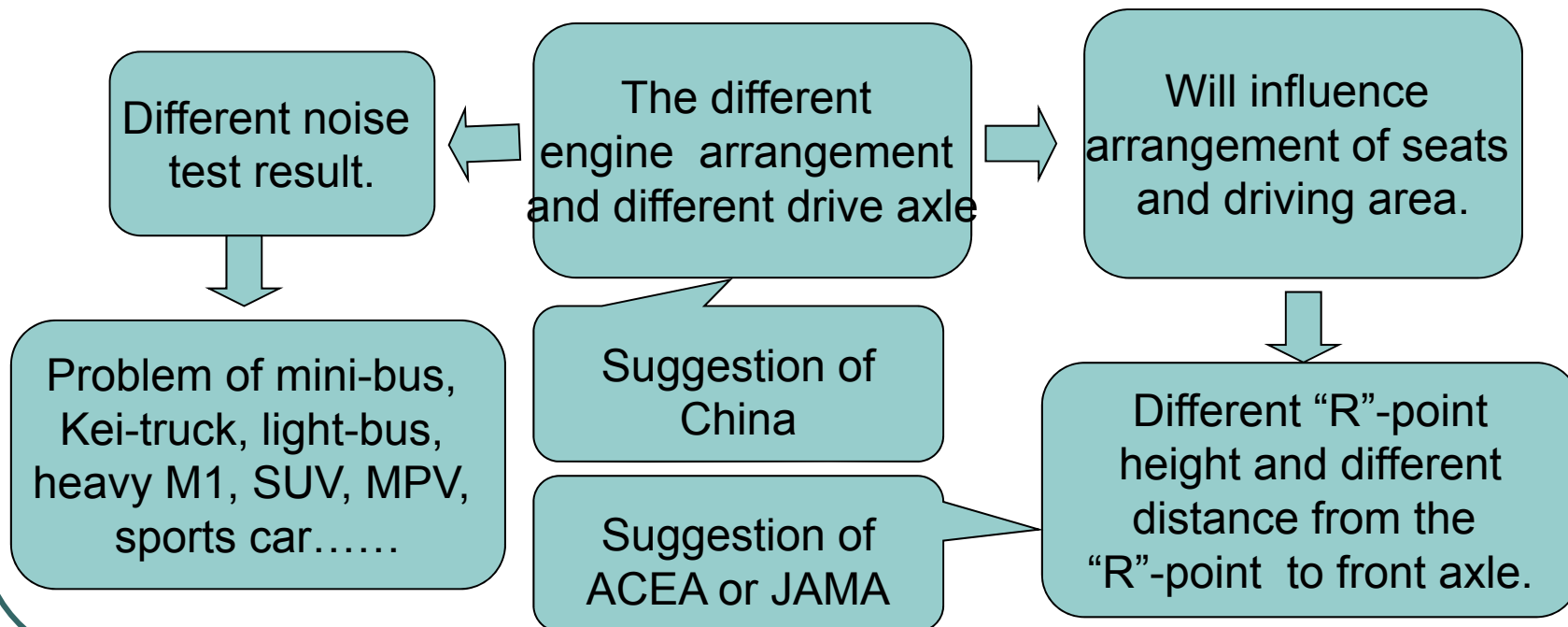
M1 category (GVW \leq 2.5t)

How to make the sub-category:

- Option 1: middle engine + rear axle drive + maximum seats No. of family > 5 ;
- Option 2: the distance from the front axle to the R-point of driver $\leq 1000\text{mm}$;
- Option 3 : the height of R-point from the ground $\geq 800\text{mm}$.

Other topic about M1

We are really considering about the same thing:





M1 category (GVW≤2.5t)

- In China, we use the option 1, cause it's much easier to carry out.
- But we found option 2 or option 3 can also be accepted during our data collecting.
- So we hope that the ECE regulation can make a proper decision not only consider the condition of China but also harmonize with the sub-category method of heavy M1 suggested by OICA or the suggestion submitted by Japan.

M1 category (GVW \leq 2.5t)

- If we consider the harmonization with the suggestion of JAMA of Kei-truck (the distance from the front axle to the R-point of driver \leq 1000mm)
- We will support option 2 (GVW \leq 2.5t and the distance from the front axle to the R-point of driver \leq 1000mm)

M1 category (GVW≤2.5t)

Distance from the R-point to the front axle	Vehicles
1150-1300mm	 <p>五菱宏光的车身长宽高分别为：4305\1680\1780mm，轴距达2720mm，除高度外，其他指标均比五菱荣光大出一圈。</p>
450-650mm	

M1 category (GVW \leq 2.5t)

- If we consider the harmonization with the suggestion of GRB and ACEA of heavy M1 (GVW above 2.5 tons and a R-point height greater than 850 mm from the ground)
- we will support option 3 (GVW \leq 2.5t and the height of R-point from the ground \geq 800mm)

M1 category (GVW≤2.5t)

Height of R-point	Vehicles
704-785mm	 A row of four vehicle images. From left to right: a white SUV with a woman standing next to it; a silver SUV; a silver minivan with 'GEMBAO' branding; and a dark blue minivan.
820-855mm	 Two images of minivans. The left image shows a silver minivan from a three-quarter front view. The right image shows a silver minivan with several people inside, viewed from a side-rear perspective.

M1 category (GVW \leq 2.5t)

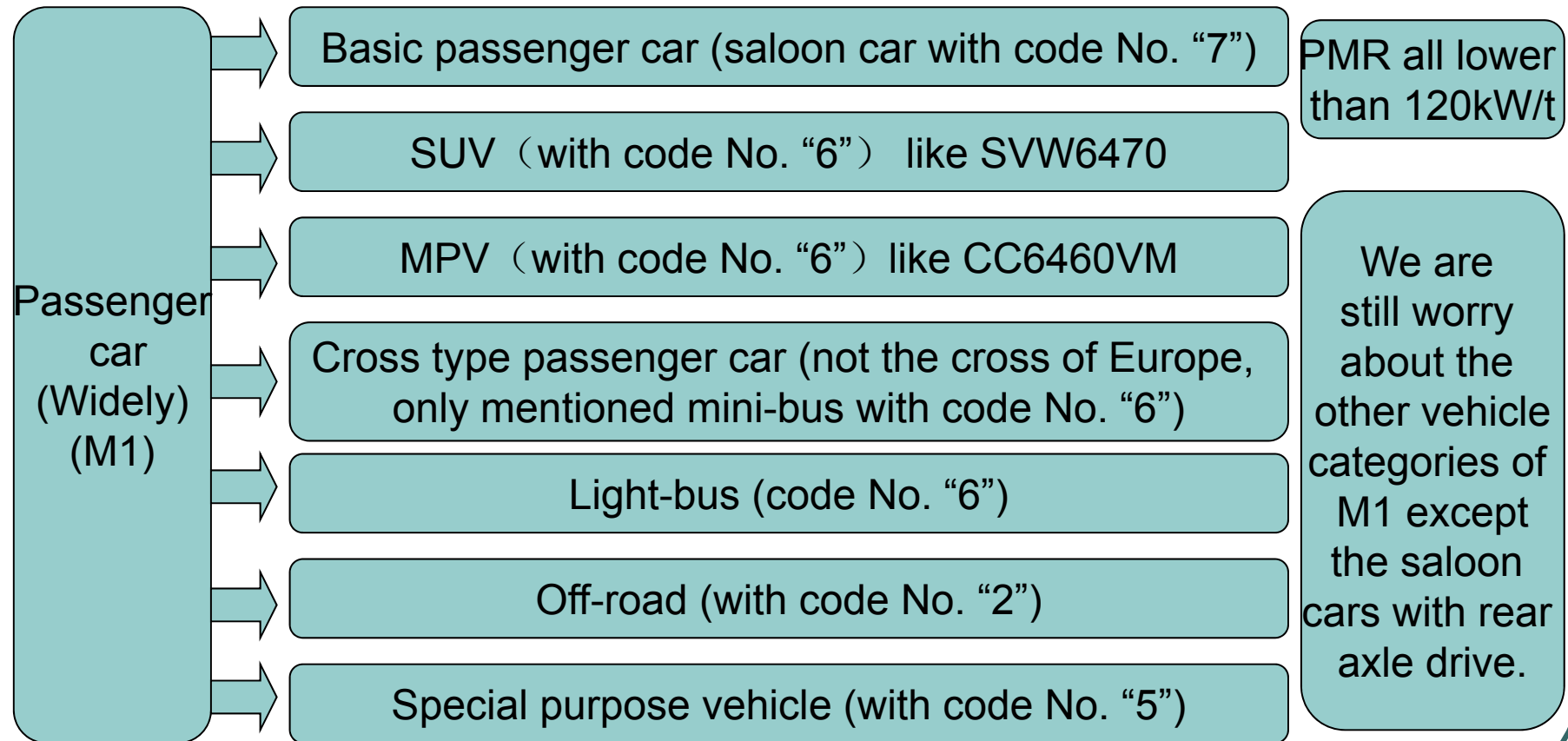
Conclusion for mini-bus

- Not matter we choose option 1, option 2, or option 3, they can all solve the question of mini-bus of China basically. So we strongly suggest that GRB can consider such kind of option.
- But no matter option 1, option 2 or option3 can not solve all the question of Chinese M1 category. The reason is as follows:

M1 category (GVW≤2.5t)

- In China, we have a very special classification method for vehicle carry persons, with the number “7” means saloon car, “6” means bus. The Mini-bus, light bus, SUV, MPV always named with number “6”.
- Like “SGW6390” means mini-bus with length 3.9 meters, “CA7160” means saloon car with 1.6 liter engine displacement.

The main sub-category of M1 in China



Typical test data of MPV and SUV with rear axle drive (method B)



Seats No.	Energy	Test mass	GVW	Drive axle	Engine position	Pn	S	PMR	Lurban
5、 7、 8	gasoline	1400	1925	rear axle	front	78	5500	55.71	73.2
7	gasoline	1280	1850	rear axle	front	79	5400	61.72	73.4
7	gasoline	1165	1750	rear axle	front	50	6000	42.9	74.0
5、 7	gasoline / diesel	1995	2490	rear axle	front	100	3800	50.13	72.8

These products may meet some problem (GVW≤2.5t)



Drive axle	Front	Rear		4-Wheel Drive
Engine position	Front	Middle	Front	Front
Average noise (dB (A)) Method B	71.0	73.1	73.0	72.3

M1 category (GVW≤2.5t)

Limit value	Vehicles
72 dB(A)	
Suggest 74 dB(A) for 1st stage and 72 for 2nd stage.	 <p data-bbox="1032 1281 1384 1315">五菱宏光的车身长宽高分别为：4305\1680\1780mm，轴距达2720mm。除高度外，其他指标均比五菱荣光大出一圈。</p>

Why we are different?



- Typical develop procedure of Chinese manufacturer, for example “Great Wall” :
- 1984: vehicle refit, (only some light duty truck and special purpose vehicle);
- 1996: manufacture the Pick-up with rear axle drive;
- 2003: manufacture the SUV, CUV with rear axle drive;
- 2007: manufacture the SUV, MPV with front axle drive, 4WD and passenger car.
- Now: the best seller in Chinese SUV and Pick-up branch market and the highest profit margin auto company global.

Conclusion: many of Chinese M1 category MPV and SUV comes from N1 light duty truck platform, and the rear axle drive are more fit for the road condition of China.

M1 category (GVW \leq 2.5t)

Our final target is :

- Option only 1: rear axle drive + maximum seats
No. of family > 5 ;

Suggestions for GRB:

- We hope other countries of GRB can also check that do you also have this kind of SUV or MPV with rear axle drive which is more loudly than Front engine Front axle drive vehicles.

M1 category (GVW≤2.5t)

Suggestions for GRB (three condition may happen):

- Condition 1: they do not have this kind of vehicle (hope GRB can consider the noise of these vehicles and give 1 or 2 dB loosen for limit value);
- Condition 2: they also have this kind of vehicle and they're much more loudly than saloon car (hope GRB or OICA can organize an investigation and set a proper limit value);
- Condition 3: they also have this kind of vehicle but they are the same quiet to the saloon car (China will promote the technology of ourselves and try to make these products fulfill the requirement of ECE regulation).

Other topic about M1 (GVW≤2.5t)

- China suggest reconsidering the influence of power train system including the engine arrangement and the drive axle to the noise test result but not only the PMR value for example:
- Why the mini-bus are much more loudly than the low power saloon car?
- Why the rear axle drive SUV are much more loudly than front axle drive SUV?
- Why the mid (rear) engine + rear axle drive sports cars are much more loudly than the coupes which nearly have the same PMR value, especially the cruise noise?
- Do we need to have some division for the really sports car with mid (rear) engine + rear axle drive and the powerful coupe?

Other topic about M1

The light bus (heavy M1 category)

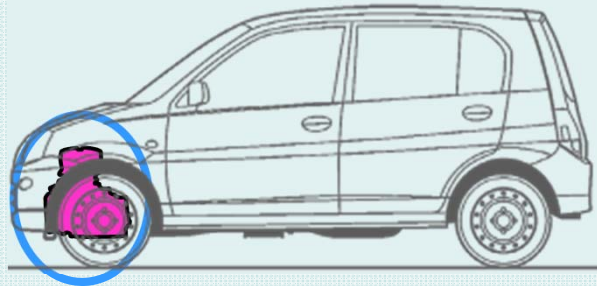
- We can fully support the suggestion of GRB, ACEA, VDA and JAMA use the M1 with GVW above 2.5 tons and a R-point height greater than 850 mm from the ground.
- We can support the suggestion from GRB expert group that have some special treatment with the sports cars (mid or rear engine) .

N1 category (GVW≤2.5t)

- The mini-truck of China always has the same chassis structure to mini-bus;
- And the vehicle has the same structure to the Kei-truck of Japan, but the only difference is Chinese mini-truck is more powerful and with larger size;
- There is no evidence shows that this kind of vehicle will develop into the style of Van in Europe, or some structure between the mini-bus and saloon car like the new products of mini-bus;
- This kind of vehicle need to be treated separately, with the limit value 74 dB(A).

ECE-TRANS-WP29-GRB-54-inf15e (Japan)

Light N1 (GVM \leq 2.0t)

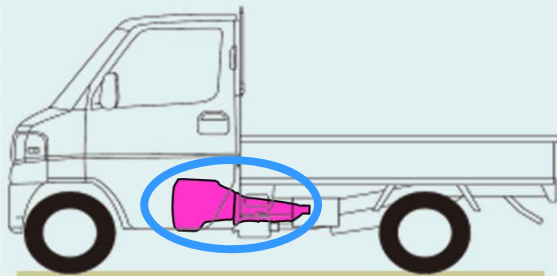


Van type

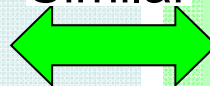
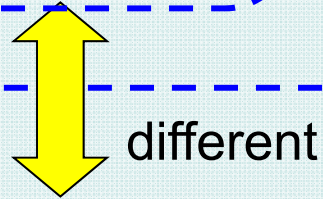
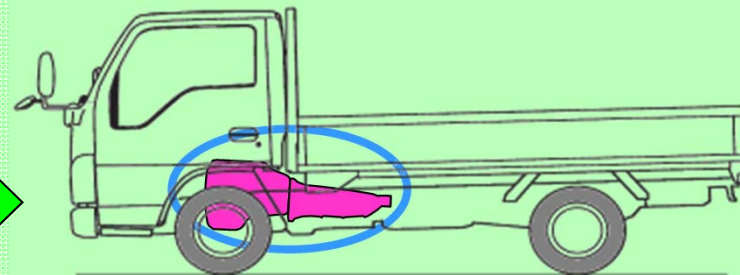
Heavy N1 (GVM $>$ 2.0t)

Same group
Truck type

Kei N1



Similar

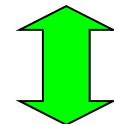


N1 category (Chinese style mini-truck)

(ECE-TRANS-WP29-GRB-57-inf05)



Chinese van and mini-truck: we are all the Kei-truck style but only a little bigger, and with different bodies.



Japanese Kei-truck

N1 category (GVW≤2.5t)

The mini-truck has the same structure to mini-bus, so it also has:

- engine arranged on the front axle, rear axle drive.
- We suggest for the limit value of 74 dB(A) for stage one for these vehicles.

N1 category (GVW≤2.5t)

How to make the sub-category:

- Option 1: middle engine + rear axle drive;
- Option 2: the distance from the front axle to the R-point of driver ≤1000mm;
- Option 3 : the height of R-point from the ground ≥800mm.

N1 category (GVW≤2.5t)

Conclusion for mini-Truck

- Not matter we choose option 1, option 2, or option 3, they can all solve the question of mini-truck of China basically. So we strongly suggest that GRB can consider such kind of option.
- But no matter option 1, option 2 or option3 can not solve all the question of Chinese small N1 category. The reason is as follows:

N1 category (GVW \leq 2.5t)



Other topic about small N1 category

- There are many small pick-up with the same structure of Heavy pick-up of America but with $2.0t < GVW \leq 2.5t$, this kind of vehicle seems very hard to fulfill the requirement of 72dB(A).
- We hope that GRB can consider about this kind of condition and make some additional dB, for these vehicles.

Typical test data of N1 with method B

Test mass	GVW	Drive axle	Engine position	energy type	Pn	S	PMR	Lurban
1225	1725	rear axle	middle	gasoline	64.5	----	52.65	75.2
1125	1970	rear axle	middle	gasoline	60.5	5300	53.78	71.9
1515	2240	rear axle	front	diesel	76	4500	50.17	75.9
1180	2350	rear axle	middle	gasoline	79	5400	66.95	74.6
1735	2485	rear axle	front	diesel	58	3600	33.43	77.6
1645	2495	4WD(front)	front	diesel	68	3600	41.34	72.4

N1 category (GVW≤2.5t)

Limit value	Vehicles
72 dB(A)	
Suggest 74 dB(A)	

N1 category (GVW \leq 2.5t)

Our final target is :

- Option only 1: rear axle drive;

Suggestions for GRB:

- We hope other countries of GRB can also check that do you also have this kind of pick-up or mini-truck with rear axle drive which is more loudly than front engine- front drive van style of Europe.

N1 category (GVW≤2.5t)

Suggestions for GRB (three condition may happen):

- Condition 1: they do not have this kind of vehicle (hope GRB can consider the noise of these vehicles and give 1 or 2 dB loosen for limit value);
- Condition 2: they also have this kind of vehicle and they're much more loudly than front axle drive car (hope GRB or OICA can organize an investigation and set a proper limit value);
- Condition 3: they also have this kind of vehicle but they are the same quiet to the front axle drive car (China will promote the technology of ourselves and try to make these products fulfill the requirement of ECE regulation).

Why we always choose rear axle drive?

1. Nice price!

- (only 5,000-6,000 USD per mini-truck, **tax-included**)

2. Carrying more goods and more economic!

- Kerb mass 1,000kg, bus can always carry more than 1,000kg goods.

3. Climb higher mountains!



Thanks for your attention

- The sub-category is a global problem, so it's very difficult to make every-sides satisfied, any kind of decision can not cover all vehicle types.
- We will respect the final decision of GRB no matter what kind of result we get.
- Thanks for the hard work of experts from GRB, ISO, OICA, other countries and organizations.
- Hope the GRB meeting can be a bridge that make China one part of the global market.