Partial load for annex 3
France

7th session of the GRB Informal Working Group

Additional Sound Emission Provisions (ASEP), March 20-22, 2018

Changchun, Jilin province, China

Background

- From ECE-TRANS-WP.29-GRB-2018-02, GRB adopted the proposals, as contained in Annex III of ECE/TRANS/WP.29/GRB/65 (Report of the Working Party on Noise on its sixty-seventh session).

Original proposal

No.	Impact	Sub No.	Measure	Additional Requirements
3	Partial load driving	1	Acceleration is limited by a mechanical device	Acceleration** shall be between a_{urban} and $a_{wot,ref}$, not exceeding 2.0 m/s². For ASEP**, the anchor point parameter are calculated by: $L_{anchor} = (L_{test} - k_p * L_{crs}) / (1-k_p)$ with $k_P = 1 - a_{test}/a_{wot,ref}$ and $a_{wot,ref}$ according to 3.1.2.1.2.4. but not higher than 2.0 m/s² $n_{anchor} = n_{bb,test} * 3.6 / v_{bb,test} * (a_{test}*(20+2*l_{veh})+192.9)^{0.5}$
		2	External Programming for partial load acceleration$^{***)}$	

Adopted proposal
Applicable only to Pure Electric Vehicle (PEV)

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- IWG for ASEP proposes to work on OICA proposal to extend partial throttle to all vehicles

Objectives

1) Understanding of formulas.

2) Comparison of results from direct and indirect methods :

   i. L_{urban}

   ii. ASEP.

3) Additional descriptions to apply partial throttle testing.

ASEP anchor point parameter

Direct urban :

1) $L_{anchor} = (L_{test} - k_p * L_{crs}) / (1-k_p)$

2) $k_P = 1-a_{test}/a_{wot,ref}$

3) $n_{anchor} = n_{bb,test} * 3.6 / v_{bb,test} *(a_{test}*(20+2*l_{veh})+192,9)^{0,5}$

Formulas to be clarify for anchor point

Combined wot and crs :

1) $L_{urban} = L_{wot\ rep} - k_p \times (L_{wot\ rep} - L_{crs\ rep}))$

2) $k_p = 1 - (a_{urban} / a_{wot\ test})$

3) $a_{wot\ test} = ((v_{BB'}/3.6)^2 - (v_{AA'}/3.6)^2)/(2*(20+l))$

Example vehicle 1 (EV)

PMR	49,9
S (min-1)	-
L urb direct	67,8
L urban	68,3

In this case, simular results between between
L urb direct and L urban
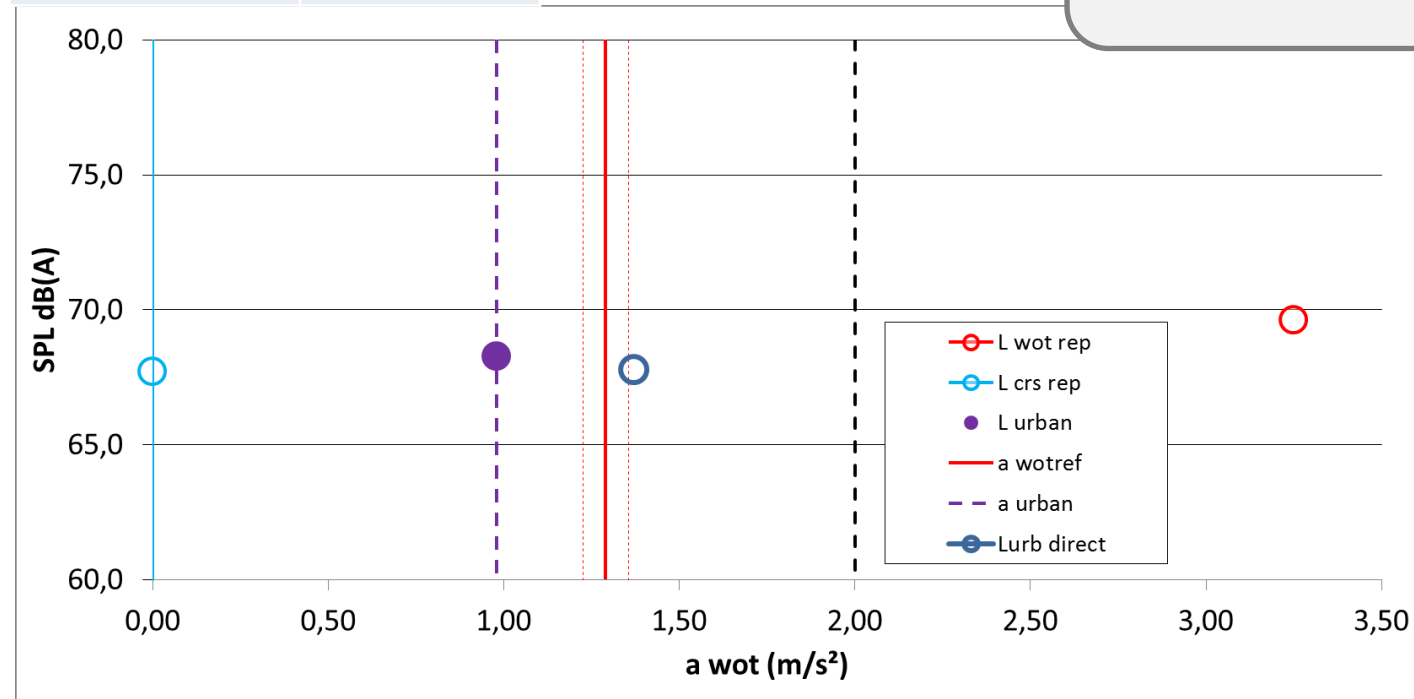
Example vehicle 2 (diesel)

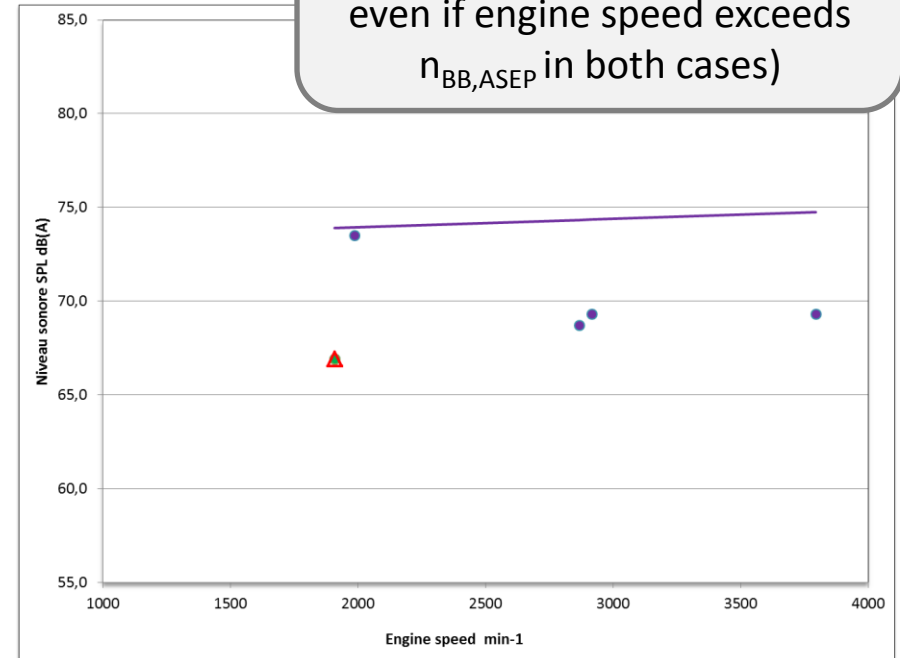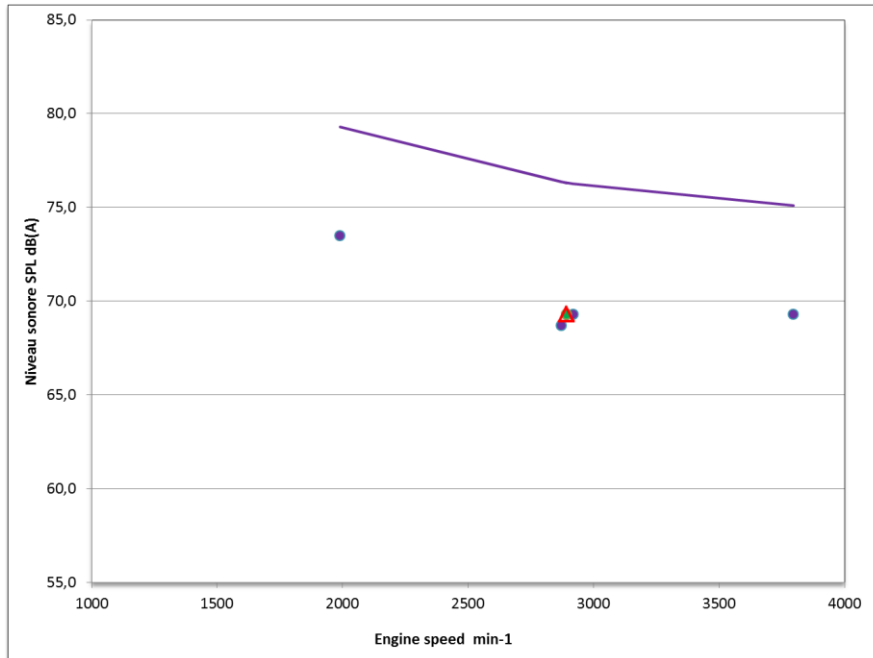|	
PMR	55,2
S (min-1)	4000
L urb direct non-locked	66,8
L urban non-locked	67,7
L urban locked	66,0

In this case, simular results between L urb direct and L urban
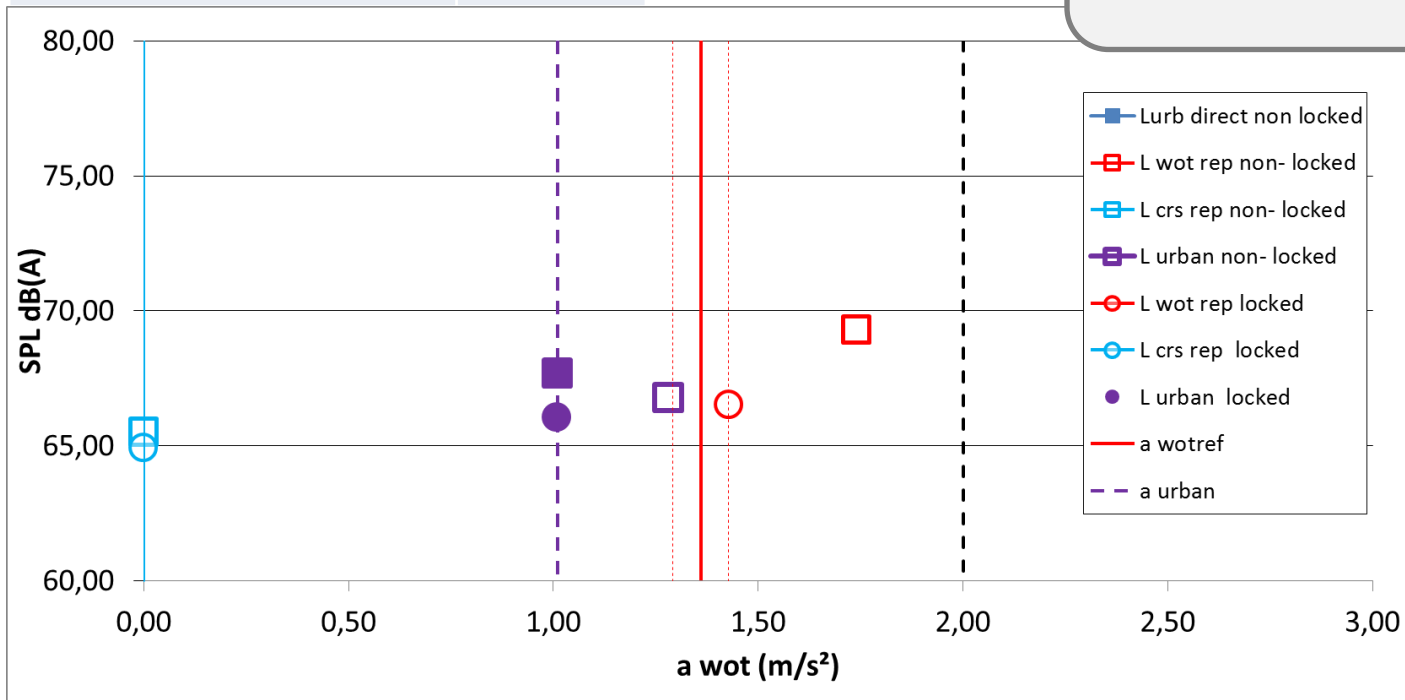
Example vehicle 2 (diesel)

	From L urban	From L urb direct
NBB	2892	1910
L anchor	69,3	66,9

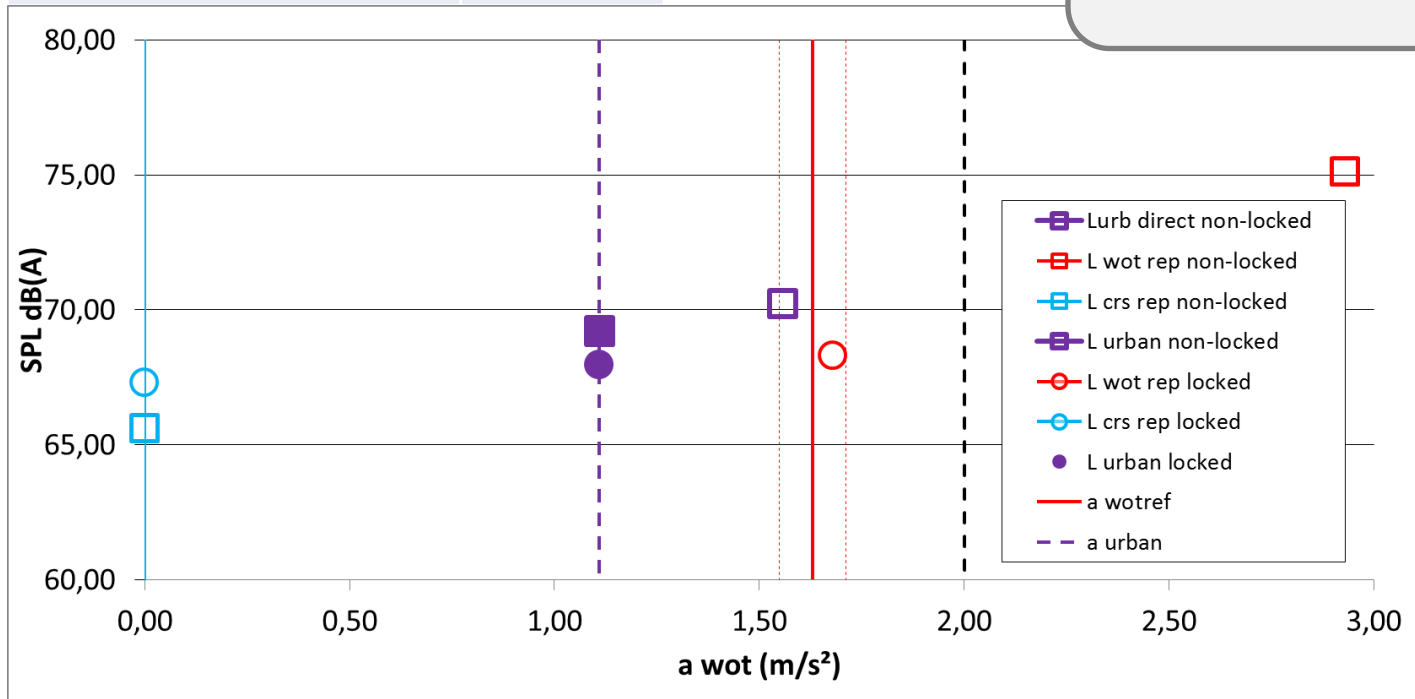In this case, different slope and "distance" to limit
even if engine speed exceeds $n_{BB,ASEP}$ in both cases)

Example vehicle 3 (Gasoline)

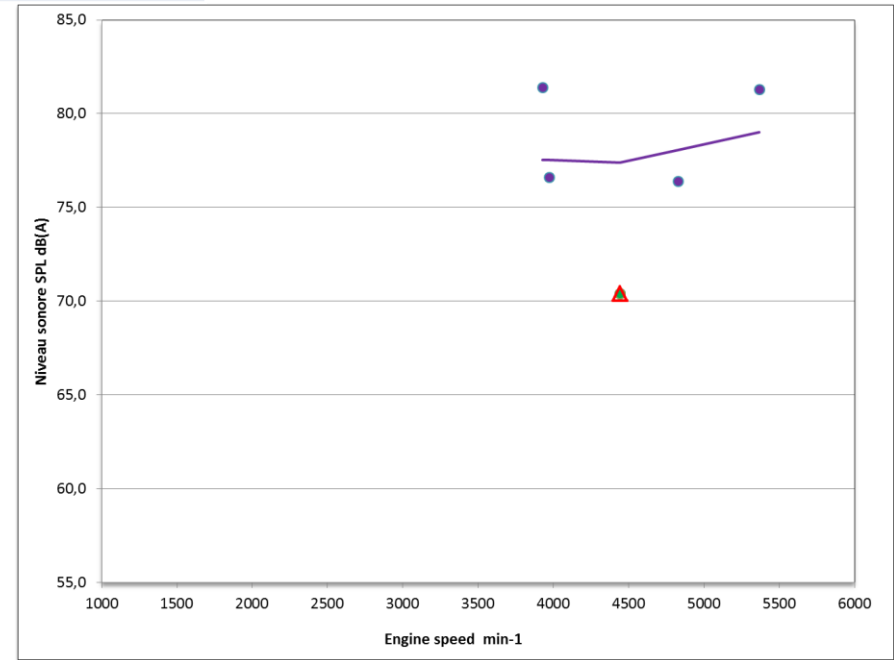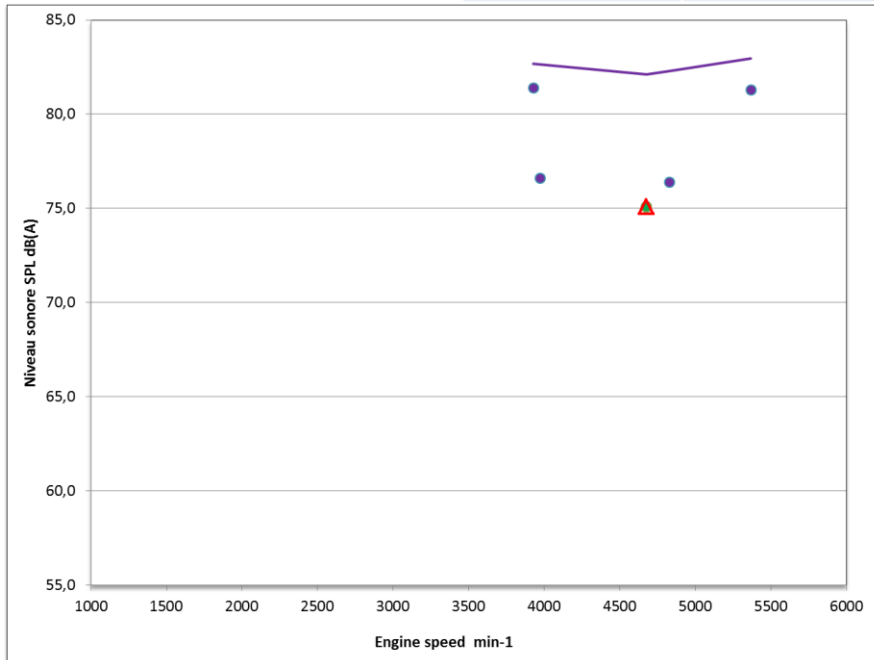|	
PMR	81,6
S (min-1)	6000
L urb direct non-locked	70,2
L urban non-locked	69,2
L urban locked	68,0

In this case, simular results between L urb direct and L urban

Example vehicle 3 (Gasoline)

	From L urban	From L urb direct
NBB i	4677	4441
L anchor	75,1	70,4

In this case, different compliance
(even if engine speed exceeds $n_{BB,ASEP}$ in both cases)

Proposal for amendement

3.1.2.1.4.3. Vehicles tested on partial throttle

The gear selector position for full automatic operation shall be used.

The acceleration value $a_{direct\ urb}$ shall be calculated as defined in paragraph 3.1.2.1.2.2.

The test may then include a gear change to a lower range and a higher acceleration. A gear change to a higher range and a lower acceleration is not allowed.

A gear shifting to a gear ratio which is not used in urban traffic shall be avoided.

The achieved acceleration $a_{direct\ urb}$ test shall be greater or equal to a_{urban} and lower or equal than $a_{wot\ ref.}$

The intermediate results according to 3.1.3, L_{direct_urb} is then used as the final result instead of the calculation using partial power factor k_p (see paragraph 3.1.3.1.).

3.1.3.1. Vehicles of categories M1, N1 and M2 ≤ 3,500 kg technically permissible maximum laden mass

[...]

For vehicles tested on partial throttle, $L_{urban} = L_{direct\ urb}$

AA-BB or PP-BB ?
Pre-acceleration ?

Others ?

Conclusions

- L urban measured directly on partial throttle provides similar result than L urban

- Anchor point deduced from direct measurement of L urban provides deviation compared to current procedure.

- Additional work would be necessary for application of L urban measured directly on partial throttle