Alternatives methods

4th IWG ASEP

FRANCE

Terms of Reference
GRB-64-23

Context of presentation :

- ToR : For primary objective of IWG for ASEP shall propose simplified test procedure and/or alternative test (such as in-door testing) to reduce time expensive

Indoor alternatives methods Alternative 1

- **ECE/TRANS/WP.29/GRB/2017/8** introduce indoor testing as alternative

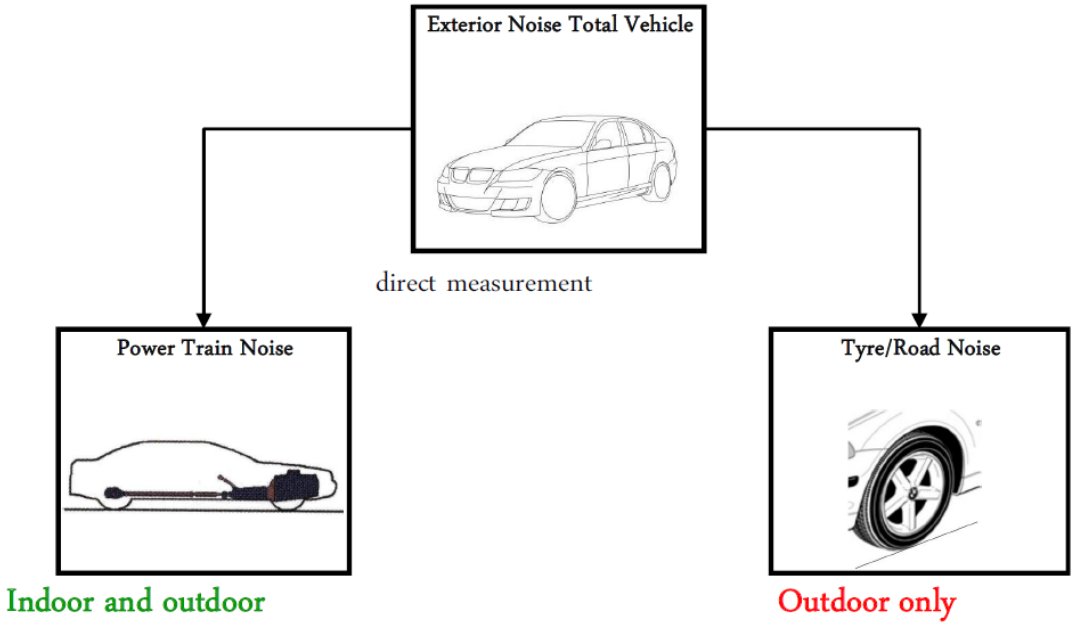
  → Annex 7 is also concern by this alternative :

> **Annex 7 § 1. (General) :** "The procedure set out in this annex requires the performance of a test in accordance with Annex 3."

Indoor is an alternative for testing on annex 3 and annex 7.

Indoor alternatives methods Alternative 1

- The indoor test for pass-by noise emission replicates real world outdoor tests under controlled environmental conditions and yields comparable results as shown by validation



Indoor alternatives methods
Alternative 1

Possible amendement (if necessary) of regulation UN 51.03 :

1. General

[…]

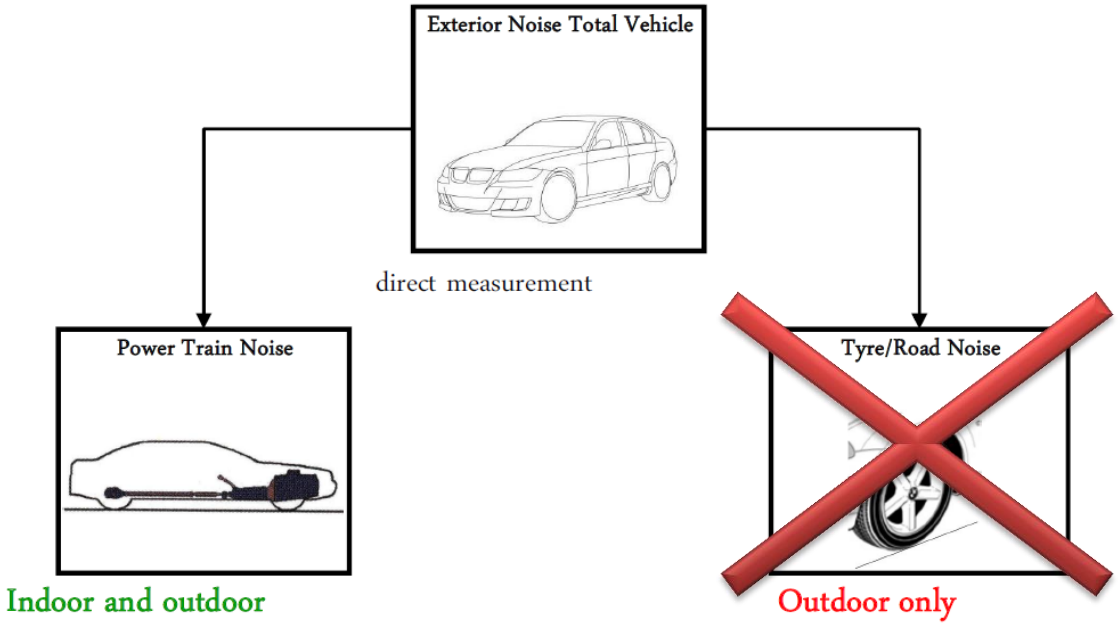
The procedure set out in this annex requires the performance of a test in accordance with Annex 3 **either outdoor or indoor**.

[…]

Informal document on ECE/TRANS/WP.29/GRB/2017/8

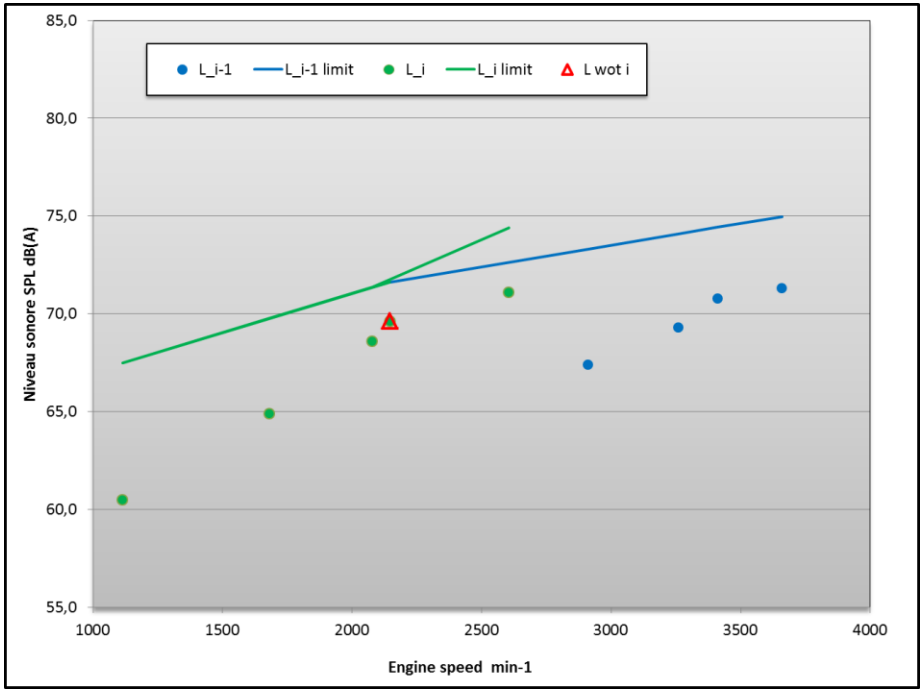
Indoor alternatives methods Alternative 2

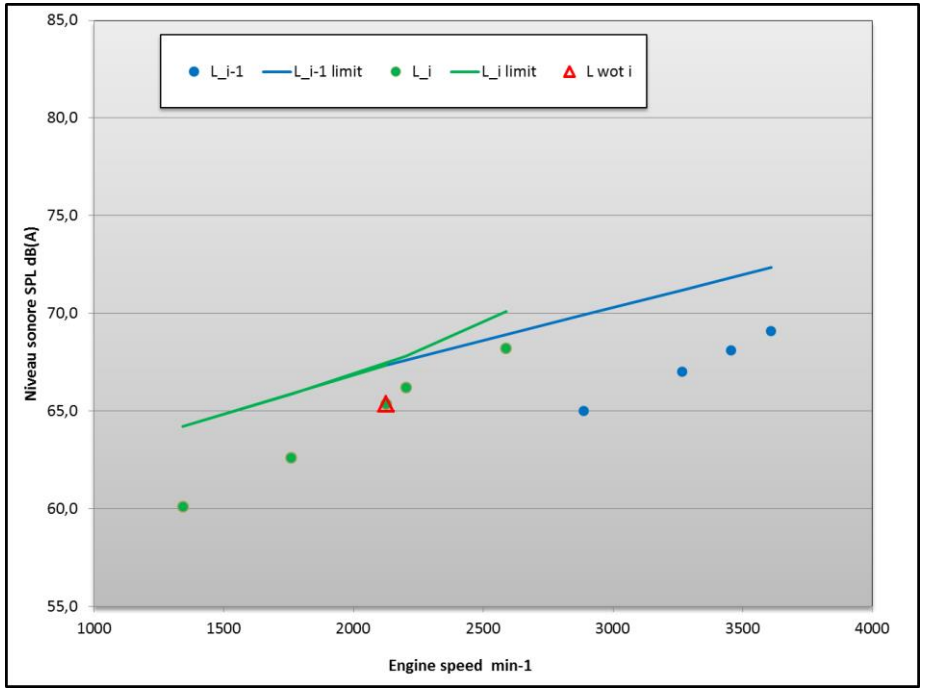
- As tyre is not subject to doubt regarding ASEP, it should be possible to test ASEP full indoor without tyre noise compensation.



Indoor alternatives methods
Alternative 2

- Equivalent results outdoor and indoor





- Difference comes from tyre noise contribution

Indoor alternatives methods
Alternative 2

Possible amendement of regulation UN 51.03 :

1. General

[…]

The procedure set out in this annex requires the performance of a test in accordance with Annex 3 **either outdoor or indoor**.

When indoor testing, all results used for method 1 (L_{anchor}, L_j) could be evaluated only by measurement of power train noise on the dynamometer. No energetical addition of the tyre/road noise is needed.

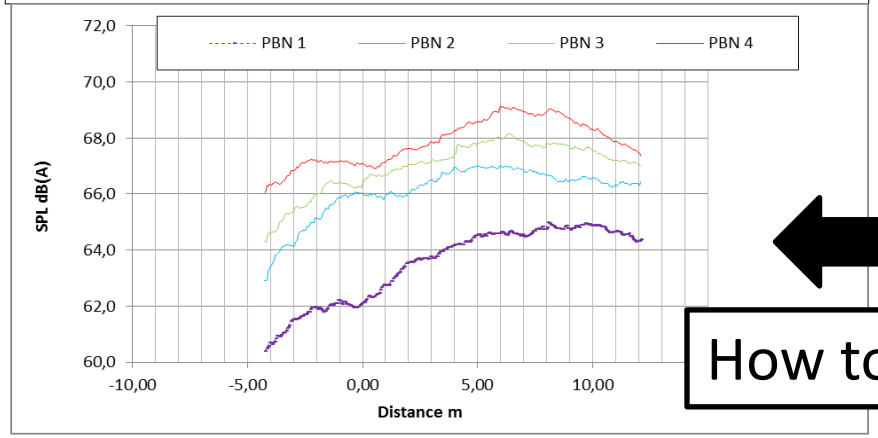
[…]

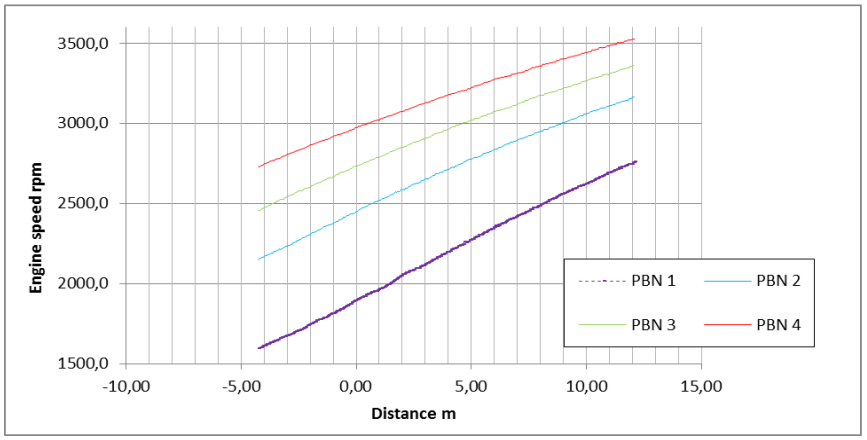
Informal document on ECE/TRANS/WP.29/GRB/2017/8

Indoor alternatives methods
Alternative 3

- Indoor offers possibilities to :

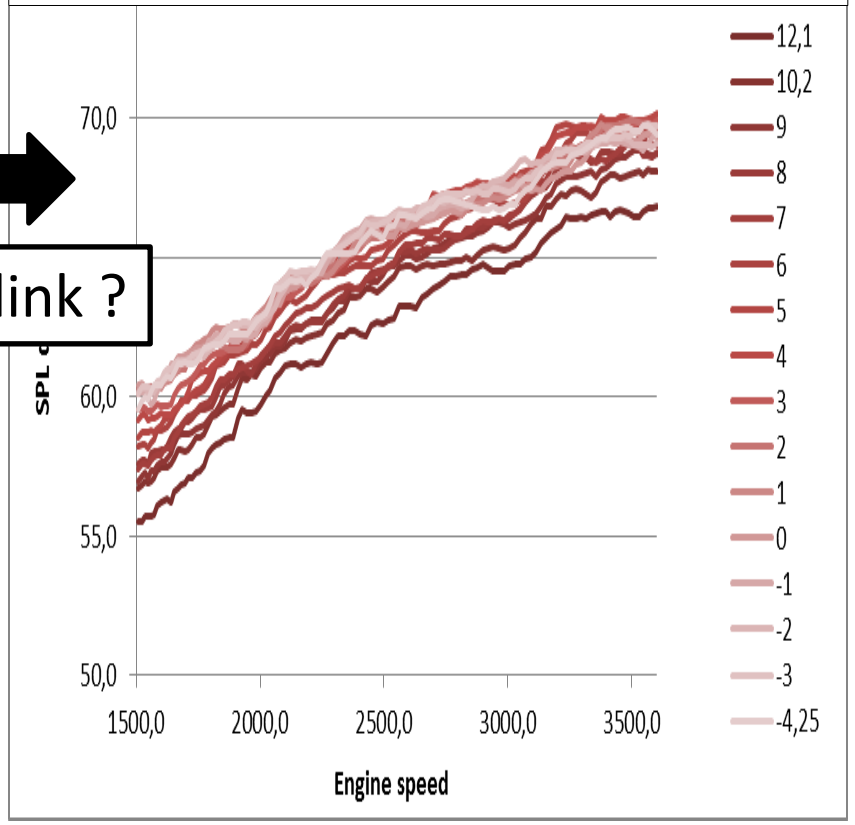
1) replicates outdoor PBN tests



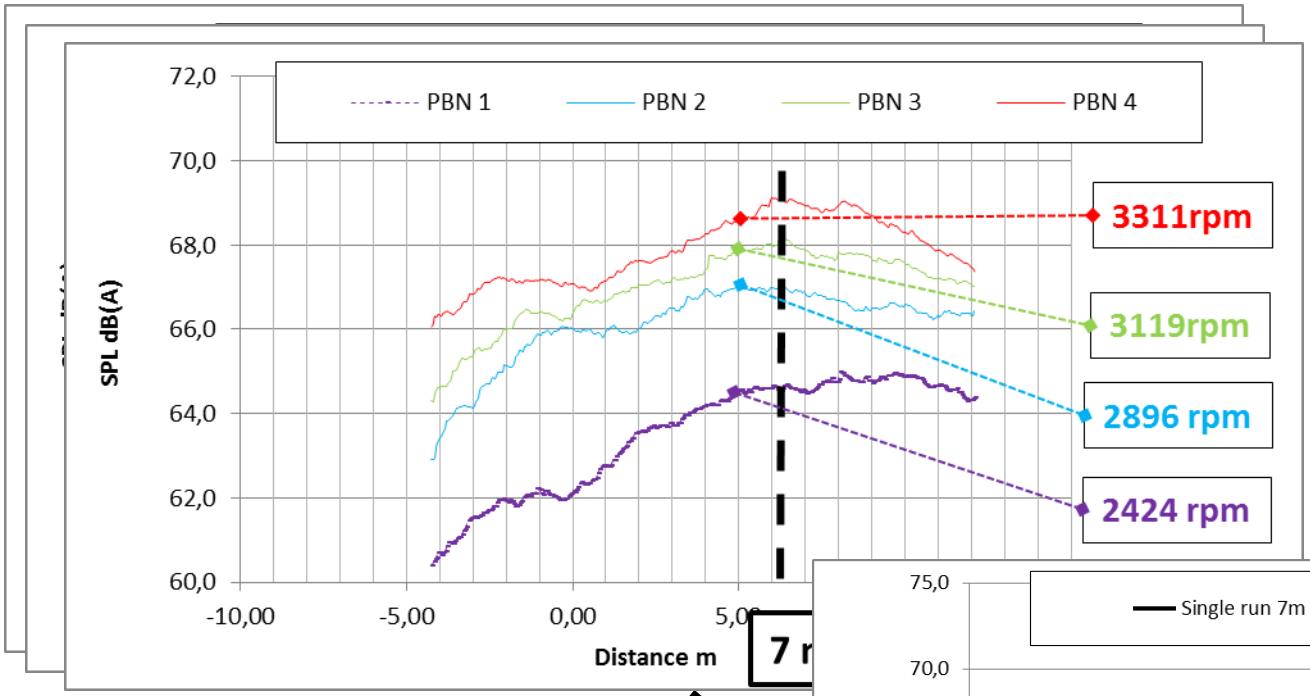


How to link ?

2) explores wider range with single run



Indoor alternatives methods
Alternative 3



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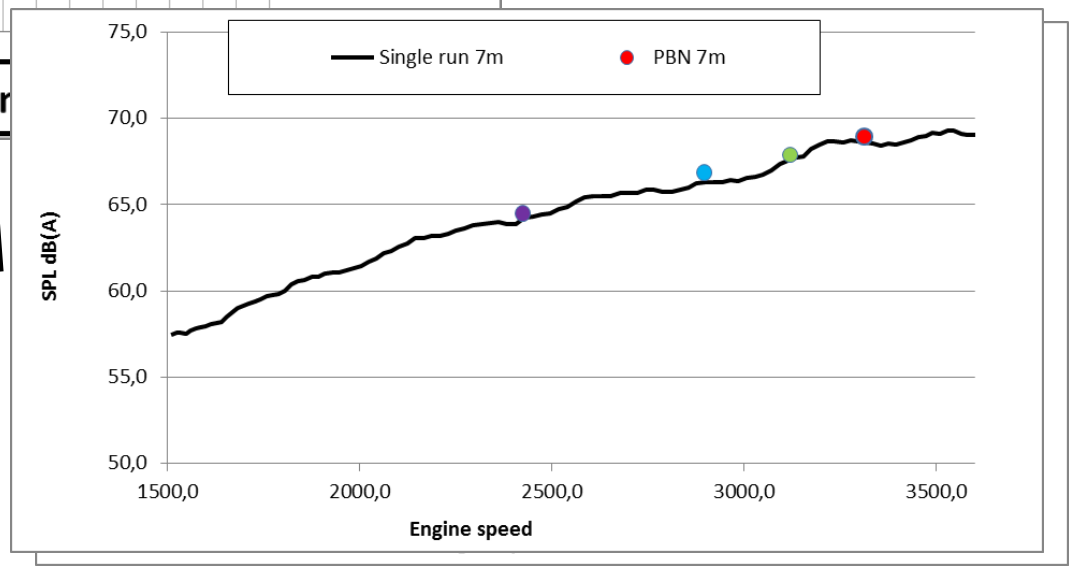
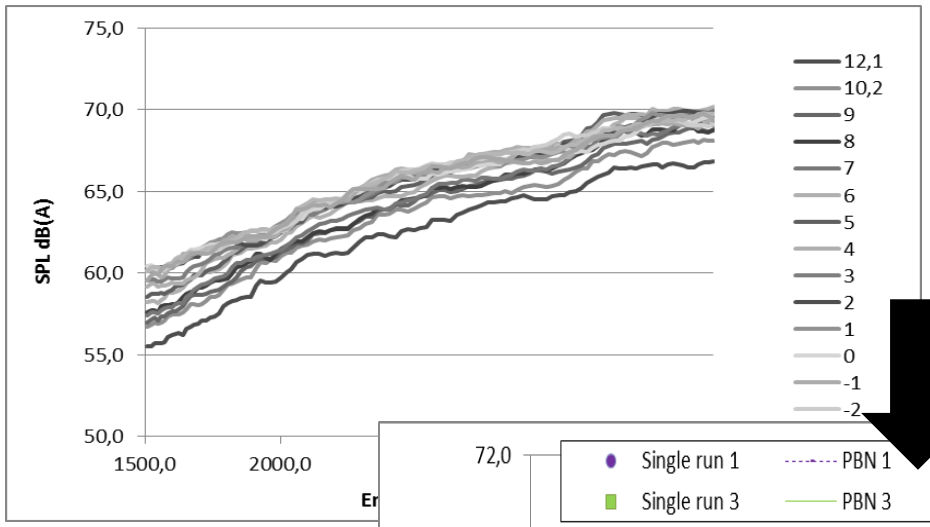
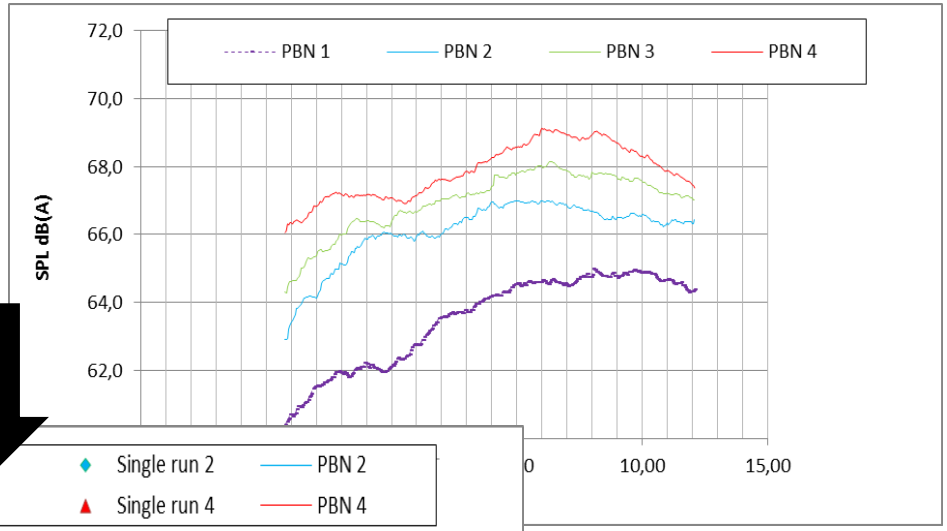
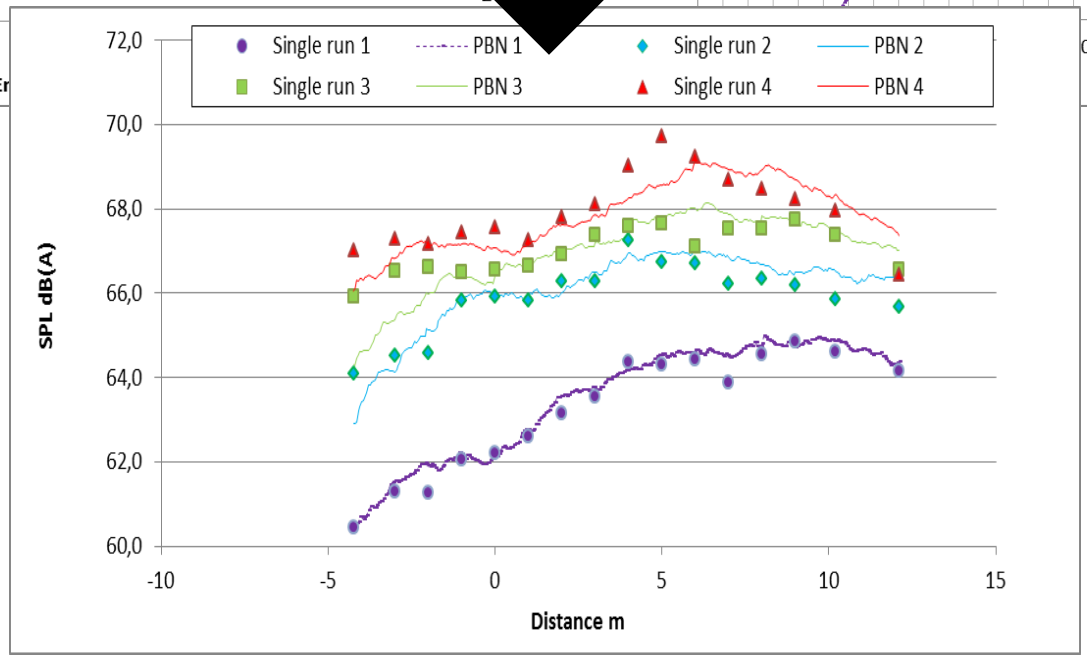


Indoor alternatives methods
Alternative 3

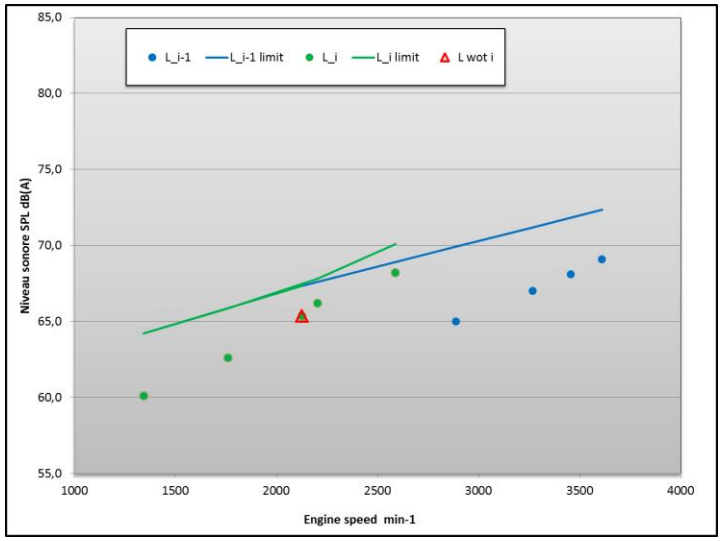


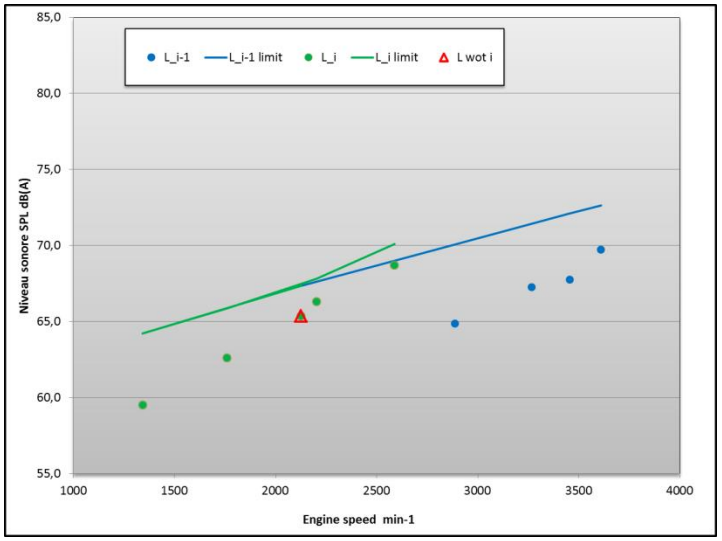




Indoor alternatives methods Alternative 3

- Equivalent results PBN and single run

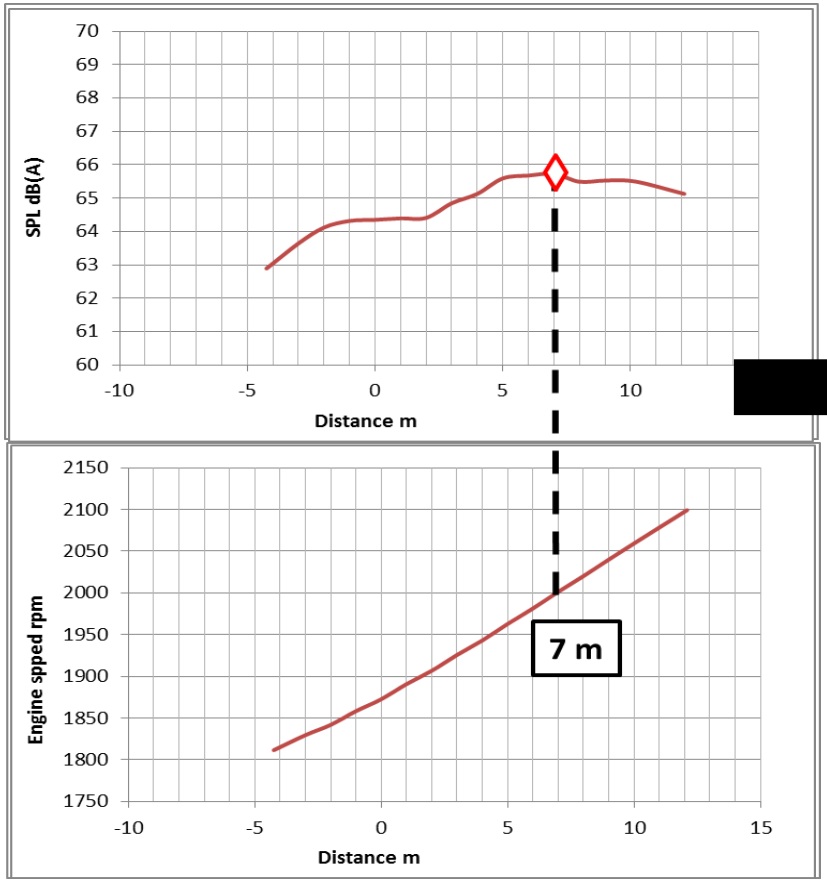


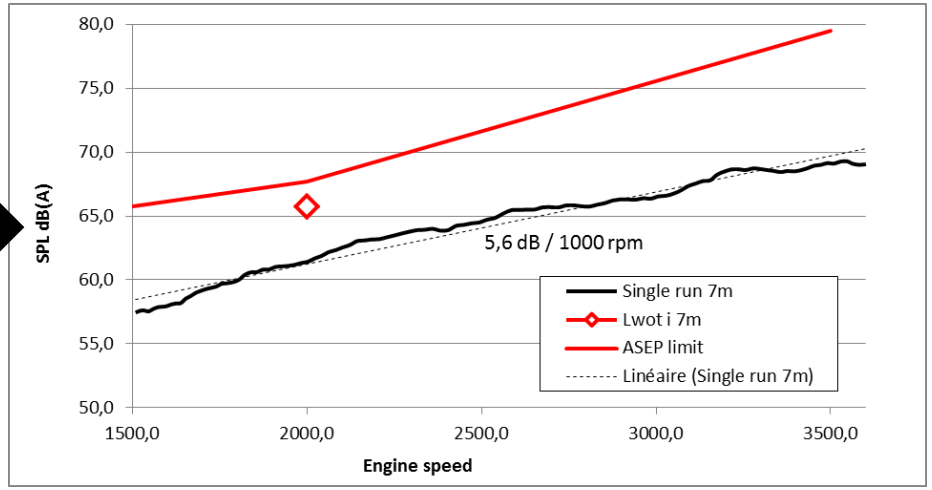


- $N_{BB'}$ calculation shall be defined from single run

Indoor alternatives methods Alternative 3

- When tested indoor, « $L_{wot\ i}$ » and « $N_{wot\ i}$ » could be defined for each position

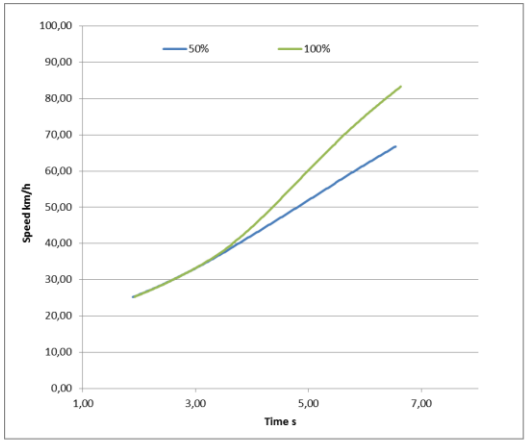


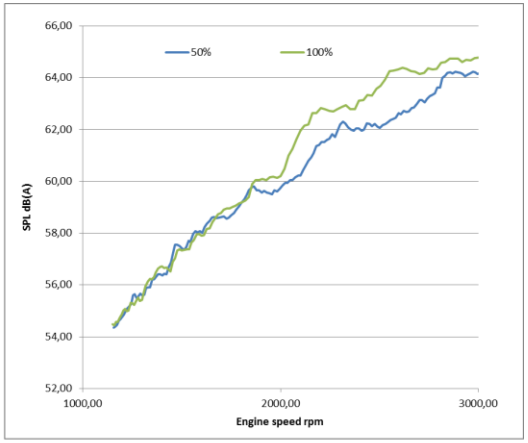


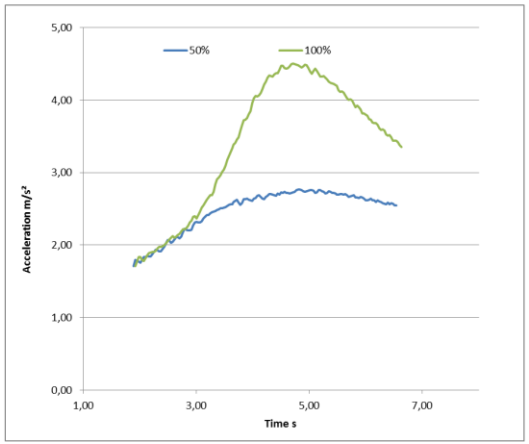
L_{anchor} can't be included for the regression

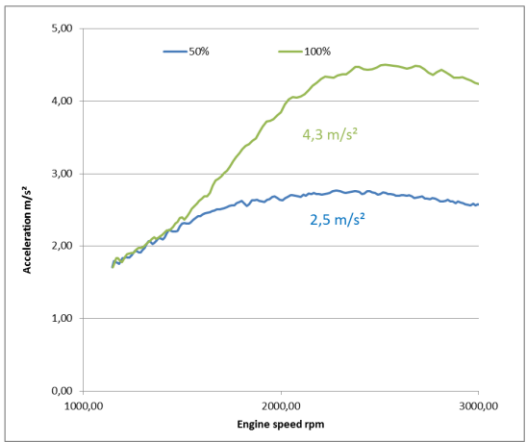
Indoor alternatives methods Alternative 3

- Alternative 3 is interesting to explore partial throttle more easily.









Acceleration shall defined for model evaluation

Conclusions

- Indoor is an alternative test to increase accuracy
  - Repeatability of measurement conditions: Controlled approach speed, kick-down, centre deviation
  - Independent of weather conditions (temperature)
- Indoor is an alternative test to reduce time expensive specially when several modes and set-up shall be tested : When vehicle is on the bench, all tests can be performed indoor 2 or 3 times quicker than outdoor

Conclusions

- Alternative 1 and 2 could be easily implemented using informal document during discussions ECE/TRANS/WP.29/GRB/2017/8
- Alternative 3 is interesting to explore wider range for engine speed without additional workload.