Informal document **GRB-53-26**
(53rd GRB, 15-17 February 2011,
Agenda item 3(c))

Effect of variants for an Lurban ASEP approach

As requested by the GRB Chairman

GRB feb 2011

Erik de Graaff

Basic assumptions in analysis as stated by the GRB chairman

- ASEP Methods
  - Chair-ASEP = slope method doc 2011-02 annex 10 par 3
  - KBA-ASEP = KBA method doc 2011-02 annex 10 par 4
  - Lurban-ASEP = accel method doc 2011-02 annex 10 par 6
  - NL ASEP = doc 2011-08

- KBA always applicable (independent of choice for Lurban/ASEP or Chair/ASEP)
- Acceleration boundaries
  - Annex 3: 3 m/s^2
  - ASEP: 5 m/s^2

Huge amount of data
How to clarify in a simple presentation?

If necessary: Formulas

$$L_{WOT,ASEP} \leq \frac{3 - k_{p,ASEP} \times L_{crs} + L_{urban} + 0.15 \times (v_{BB,ASEP} - 50)}{1 - k_{p,ASEP}}$$

- All factors influencing Lwot,ASEP are mutiplied by a factor 1/(1-kp,ASEP)
- For the example vehicle this factor has a value of 3

- this means
  - The margin of 3 dB on Lurban translates into a margin of 9 dB on Lwot

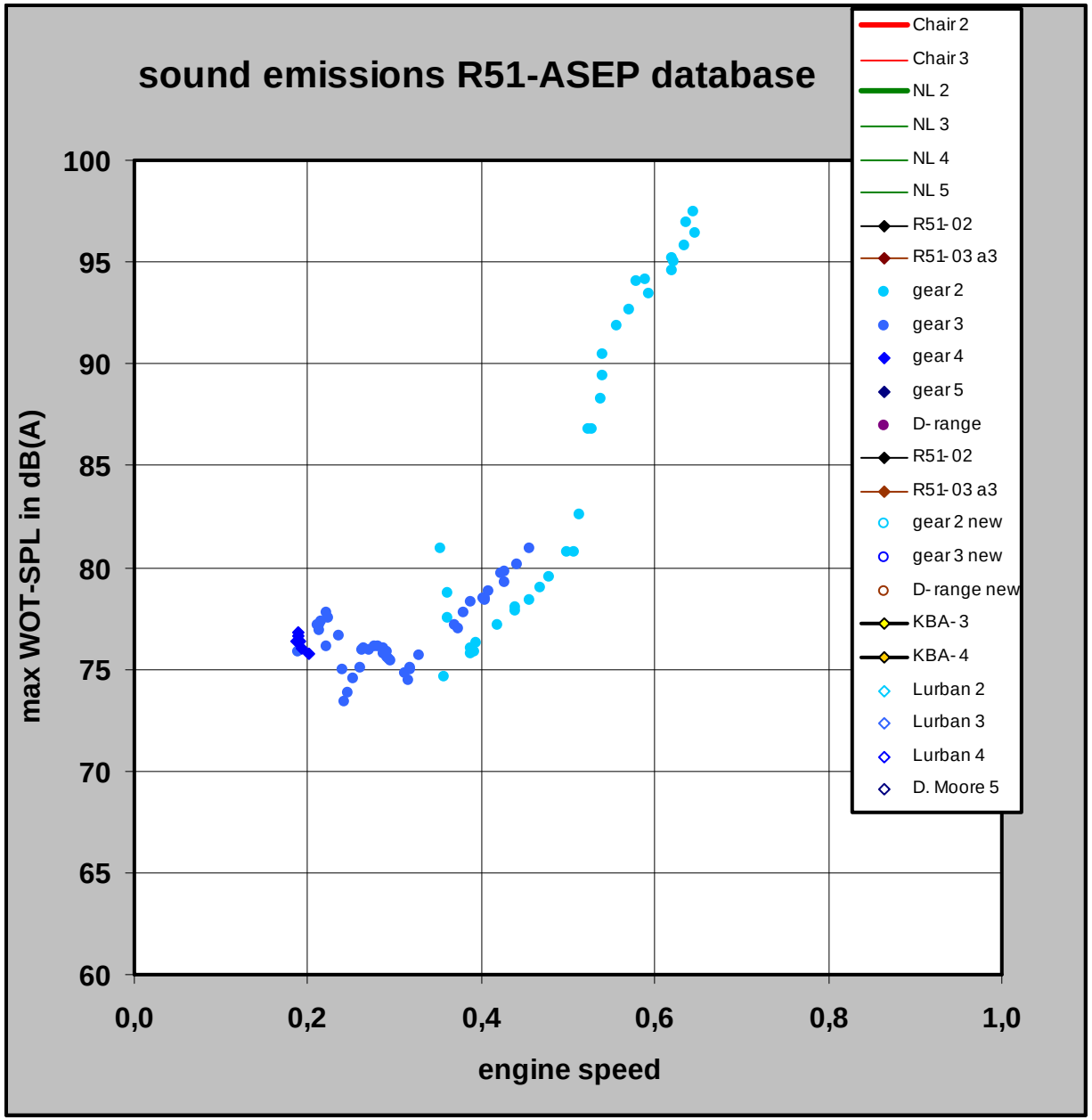
Huge amount of data
How to clarify in a simple presentation?

Strategy for this presentation

- No formulas
- One example vehicle
- Three variants of Lurban-ASEP
- For every variant
  - One graph with the principle
  - One graph with the data

The example vehicle

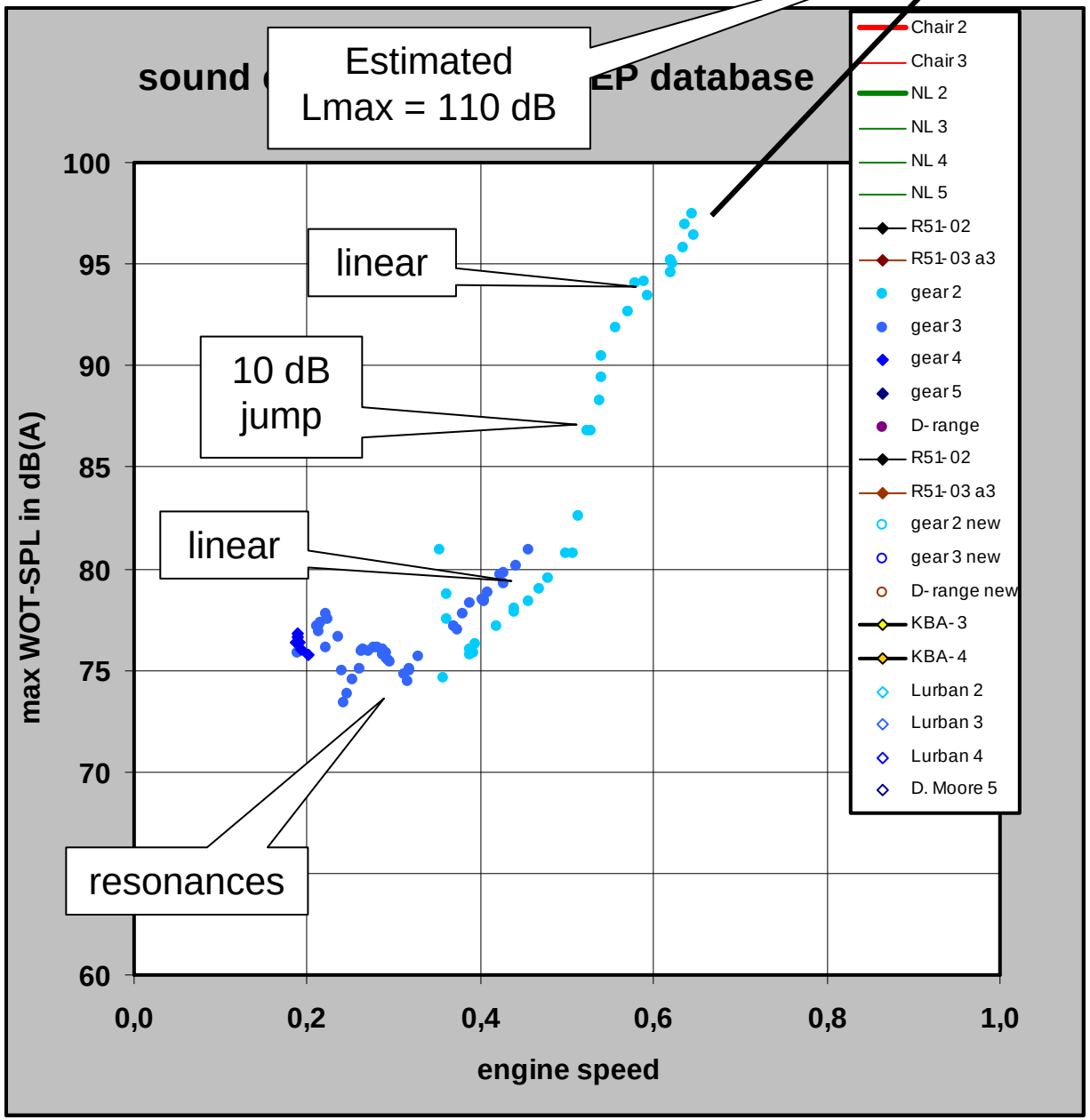
Blue dots are measured noise levels



The example vehicle

Why this example?
Reason 1: sound emission

- Not very linear
- Jump of 10 dB
- Estimated Lmax,nrated 110 dB



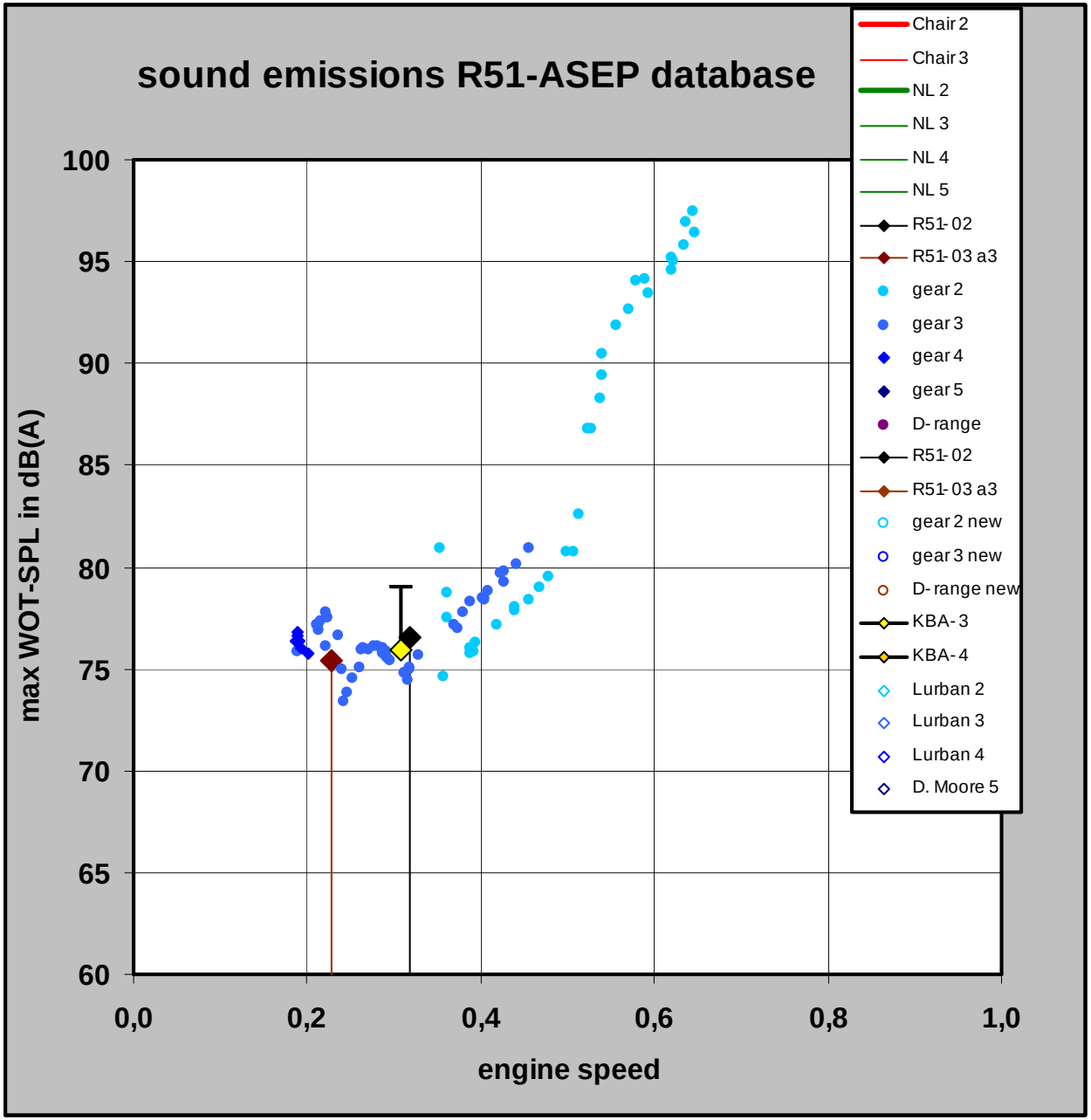
vehicle 200-49

PMR 159 kW/t
assumed limit A3: 73

Why this example?

- Sound emission
  - Not very linear
  - Jump of 10 dB
  - Lmax,nrated circa 110 dB
- Annex 3 on the edge
  - R51.02: -0.9 dB
  - R51.03 +0.7 dB
- Fulfills KBA
- Acceleration < 4 m/s^2

- Sound emission not everywhere as could be expected from the Annex 3 result

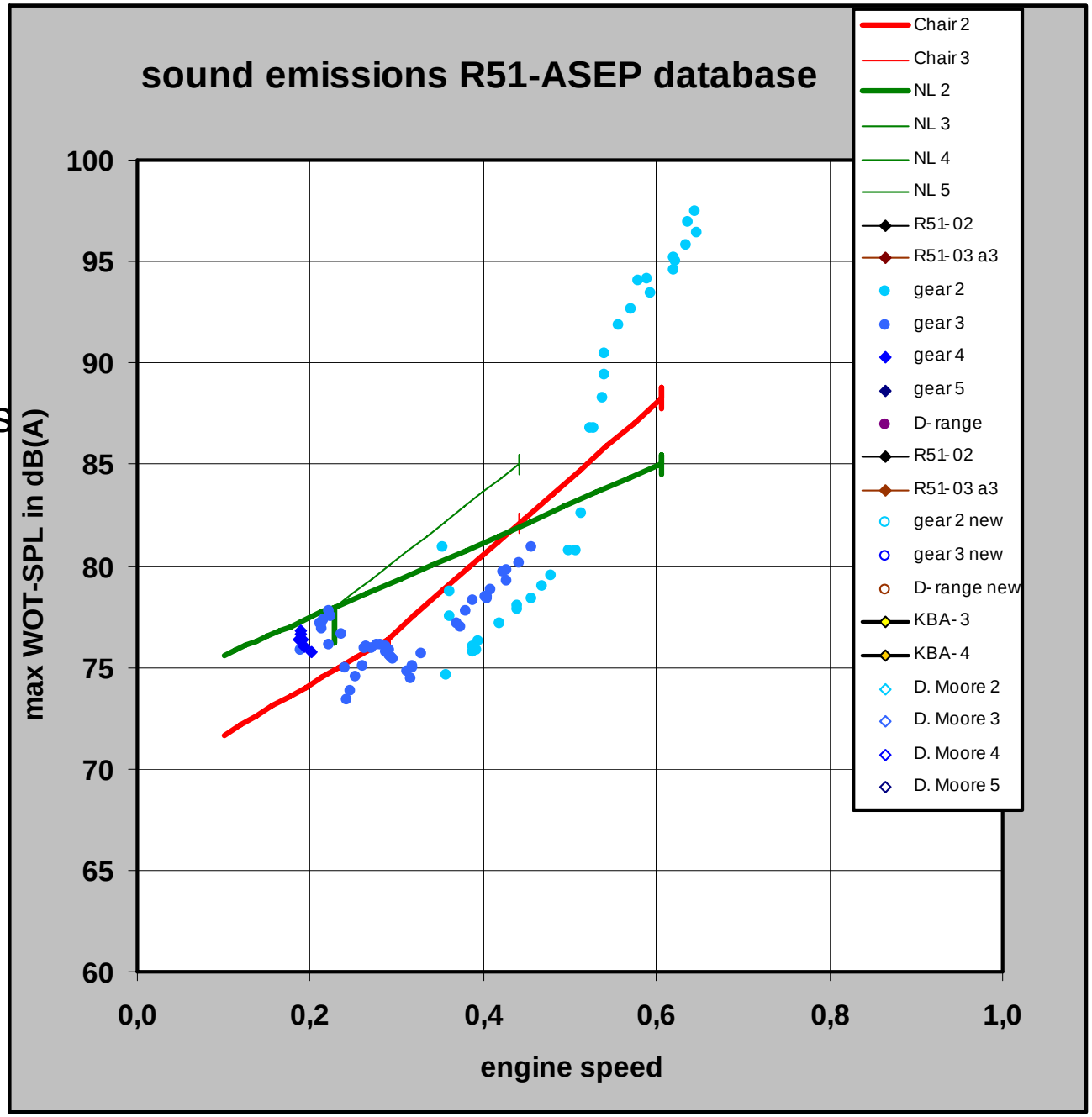


vehicle 200-49

PMR 159 kW/t

The vehicle fails both NL ASEP and Chair ASEP at various engine speeds

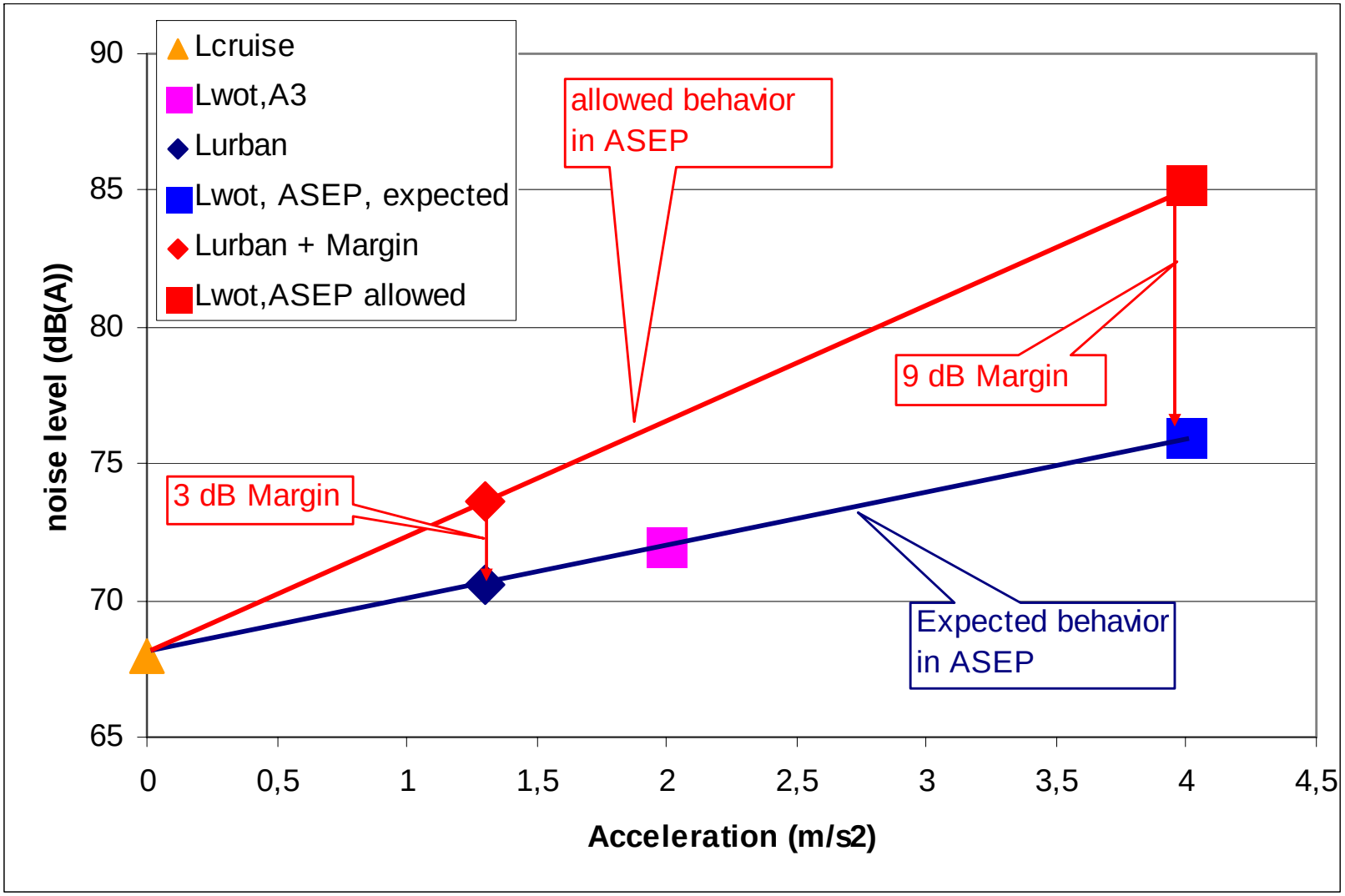
NL ASEP and Chair ASEP differ less than 3 dB



How do the Lurban-ASEP variants perform?

Variant 1 of Lurban-ASEP

Variant 1 for Lurban ASEP
3 dB margin on Lurban



Margin on Lwot in 2nd gear = Margin on Lurban multiplied by a factor 3

vehicle 200-49

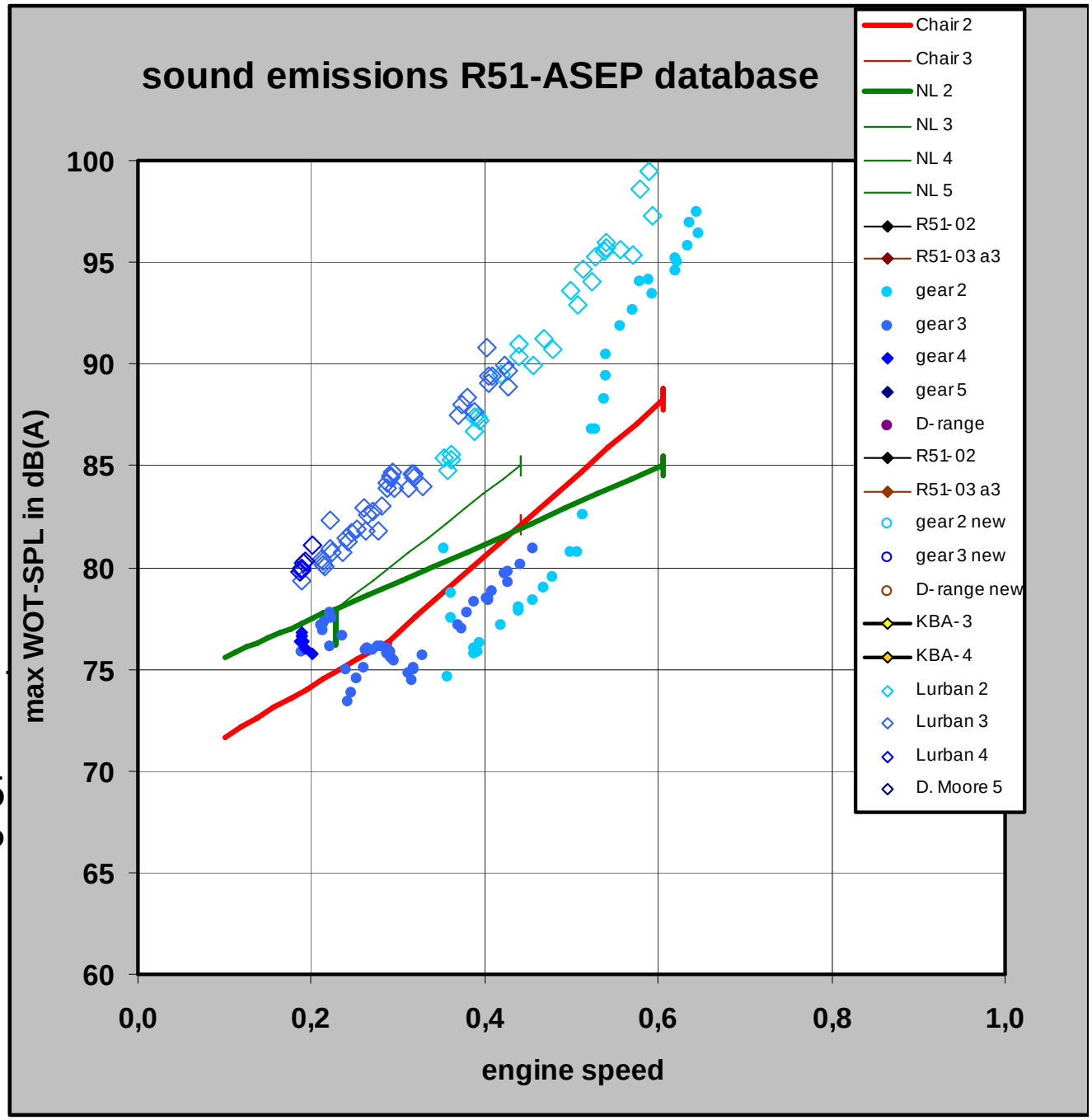
PMR 159 kW/t

Variant 1 Lurban ASEP:

3 dB margin on Lurban

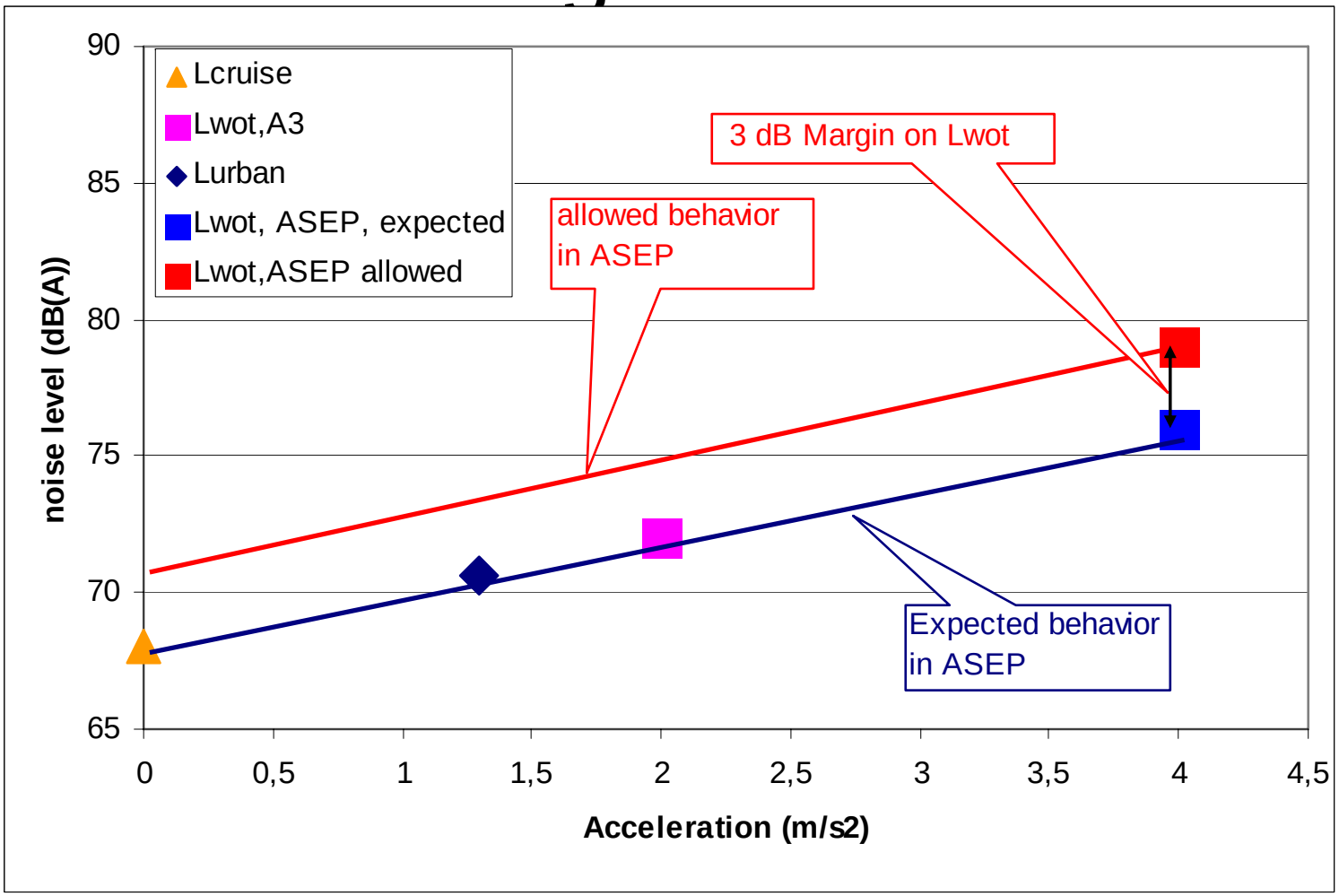
The vehicle never fails Lurban-ASEP

Limit of Lurban-ASEP is to 10 dB higher than chair-ASEP and up to 15 dB higher than NL ASEP



Variant 2 of Lurban-ASEP

Variant 2 for Lurban ASEP
3 dB margin on Lwot



- margin independent of acceleration

vehicle 200-49

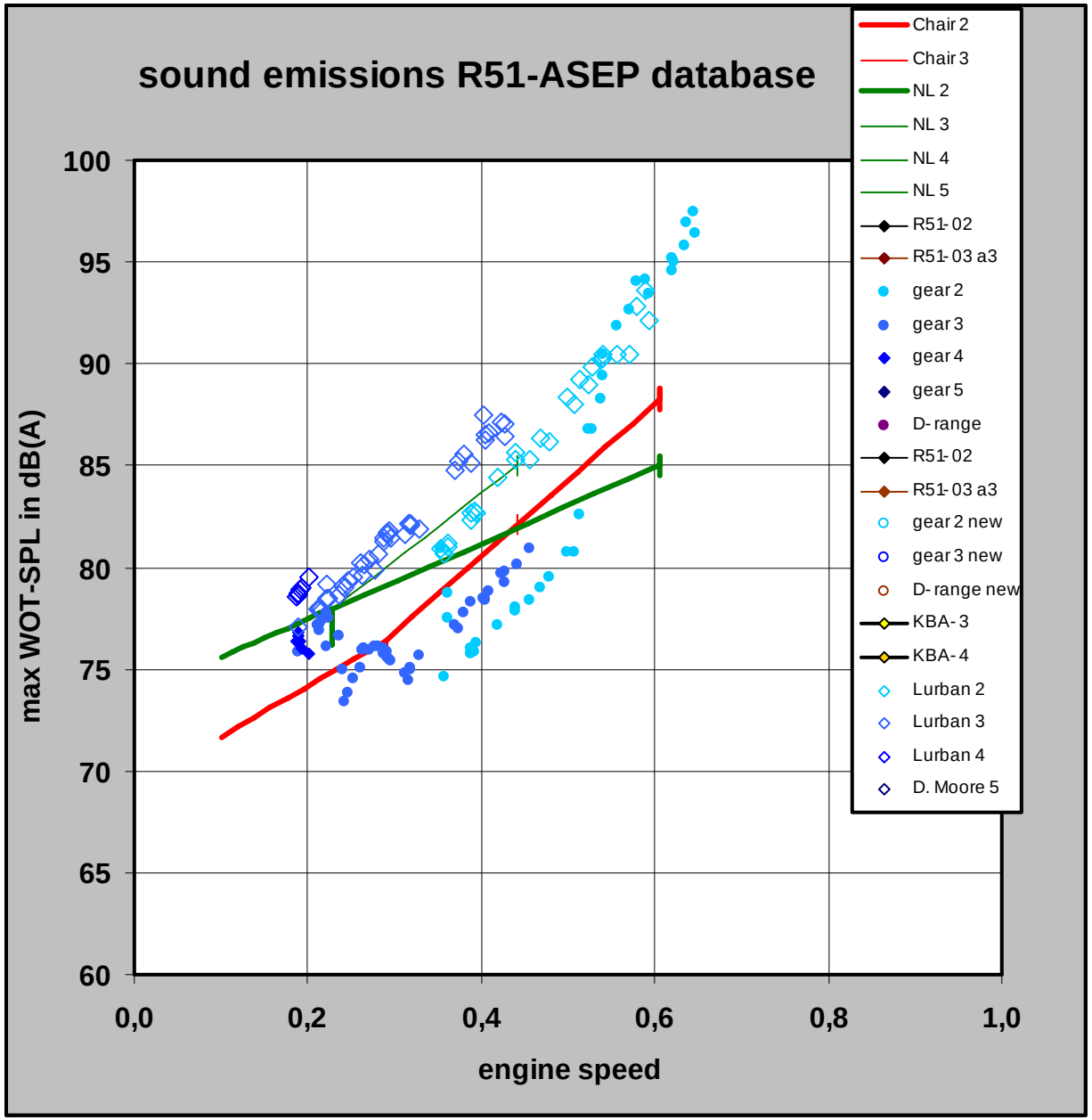
PMR 159 kW/t

Variant 2 Lurban ASEP:

3 dB margin on Lwot instead of Lurban

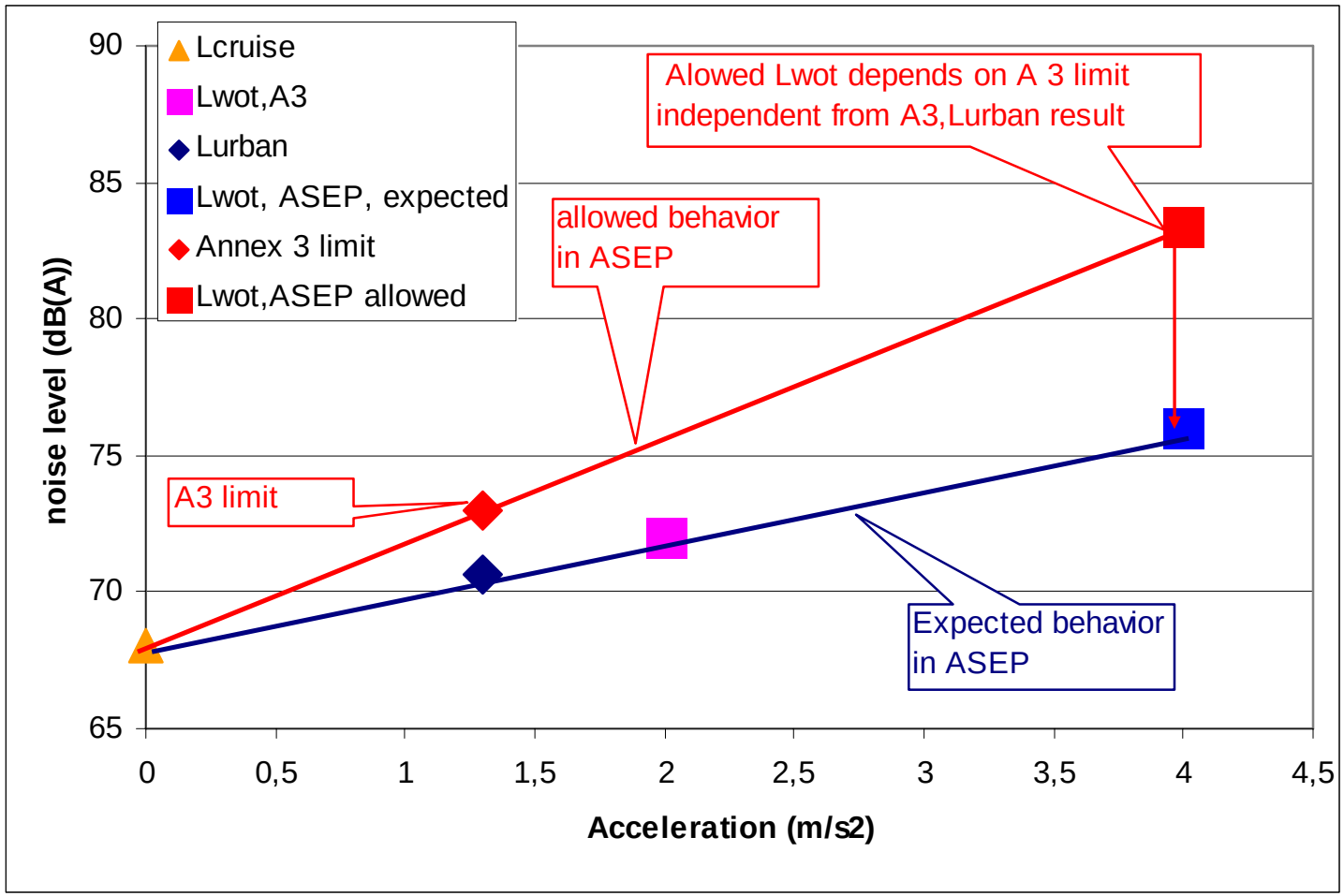
The vehicle is a boarder case for Lurban-ASEP

Lurban-ASEP is 0-6 dB more liberal than chair-ASEP and NL ASEP



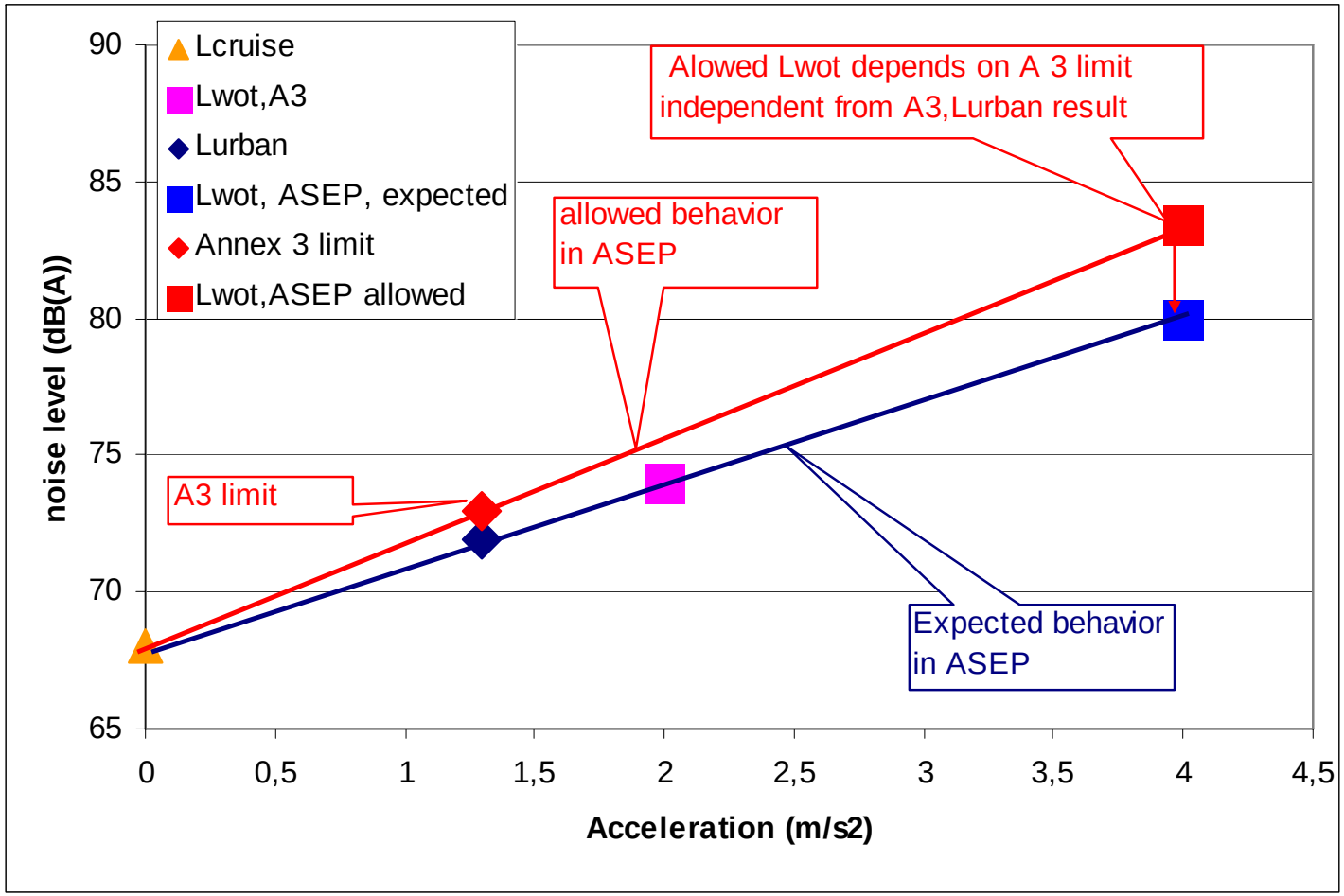
Variant 3 of Lurban-ASEP

Variant 3 for Lurban ASEP



- Check Lurban-ASEP against Annex3 limit
- with 0 dB margin on Limit

Variant 3 for Lurban ASEP
Example: different Annex 3 result



No effect on ASEP limit

ASEP limit only depends on Annex 3 limit, not the Annex 3 result

vehicle 200-49

PMR 159 kW/t

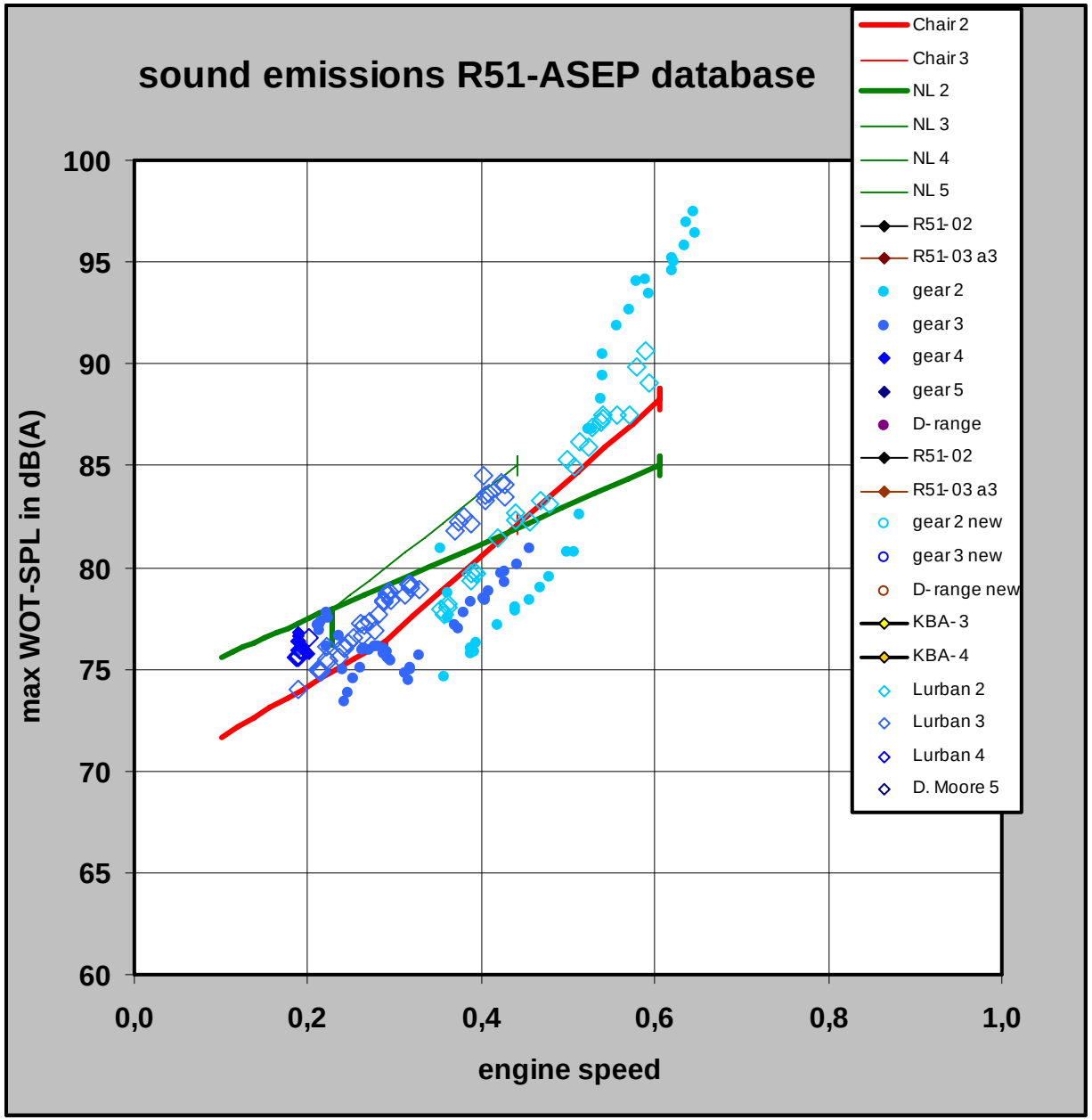
Variant 3 Lurban ASEP:

Check with A3 limit

0 dB margin on A 3 limit

The vehicle fails Lurban-ASEP

Lurban-ASEP limit is comparable to chair-ASEP and NL ASEP



Discussion

- Chair-ASEP rejects this vehicle
- Lurban ASEP
  - Variant 1 vehicle passes
  - Variant 2 boarder case
  - Variant 3 rejected