**Informal Working Group on Real-Driving
Additional Sound Emission Provisions / Quiet Road Transport Vehicle**

Life Assessment 02/02 – Discussion

Aachen, June 4th 2024

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Agenda

- **Background noise (briefly)**
- Measurement results
- Subjective assessment

A critical aspect of the built scene is the background noise

- Realistic noise for realistic assessment

  - Not artificial noise

  - Various scenes to choose from

  - 7 scenes captured in Aachen

  - Important: Interaction of vehicles with pedestrians

- Note : Each sound file has its own characteristics in terms of:

  - Average sound level

  - Dynamic

  - Sound pattern

  → Sound files need to be level adjusted to the background noise taken as reference for the development of the regulation (Pederson model)

~55 dB(A) background noise
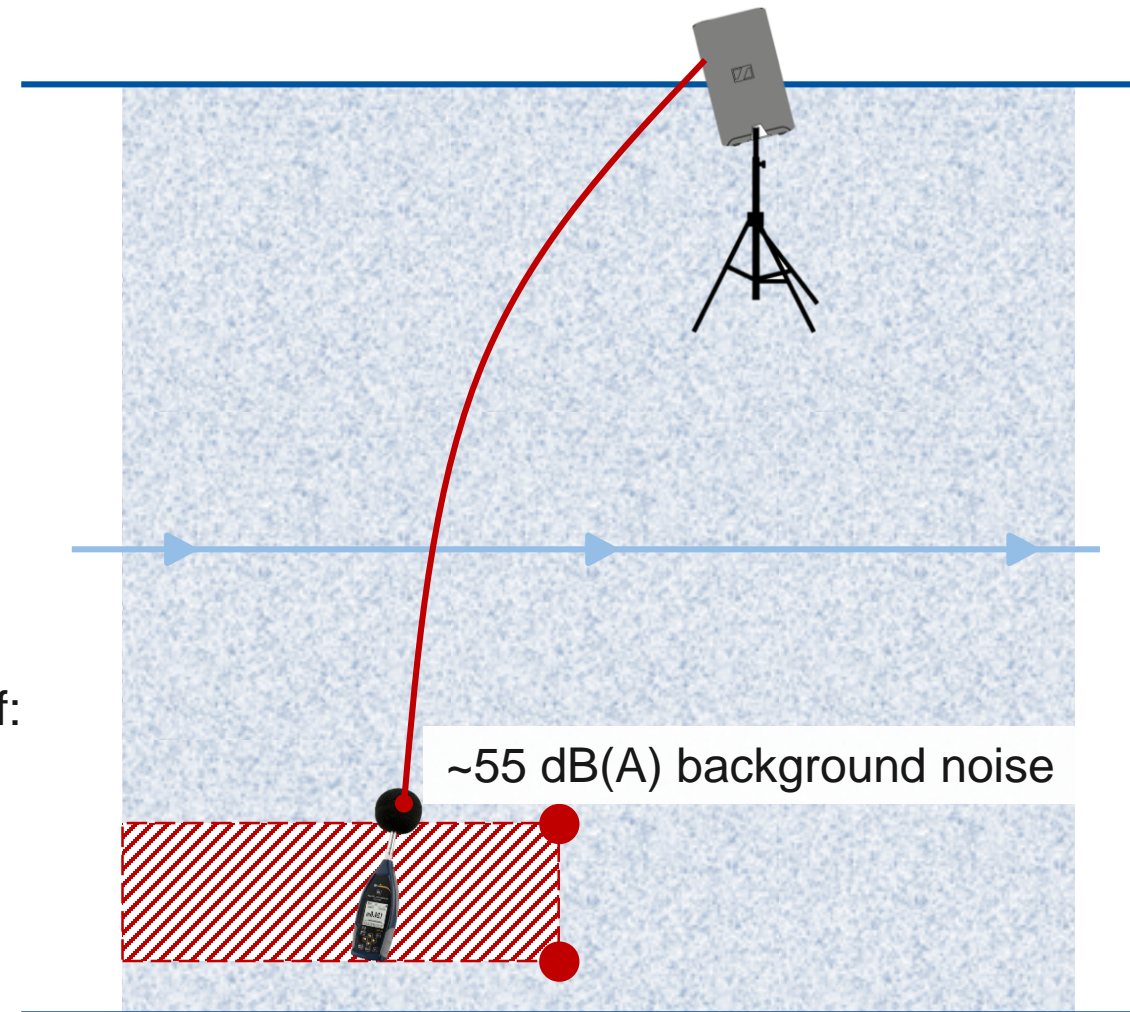
Additional background noise

Scene	Lmin [dB(A)]	Lmax [dB(A)]	Leq [dB(A)]
1	57	73	62
2	54	79	63
3	55	80	63
4	58	76	63
5	49	84	70
6	41	70	53
7	31	61	45

#1 - Café

#2 – Shopping street

#3 – Traffic lights
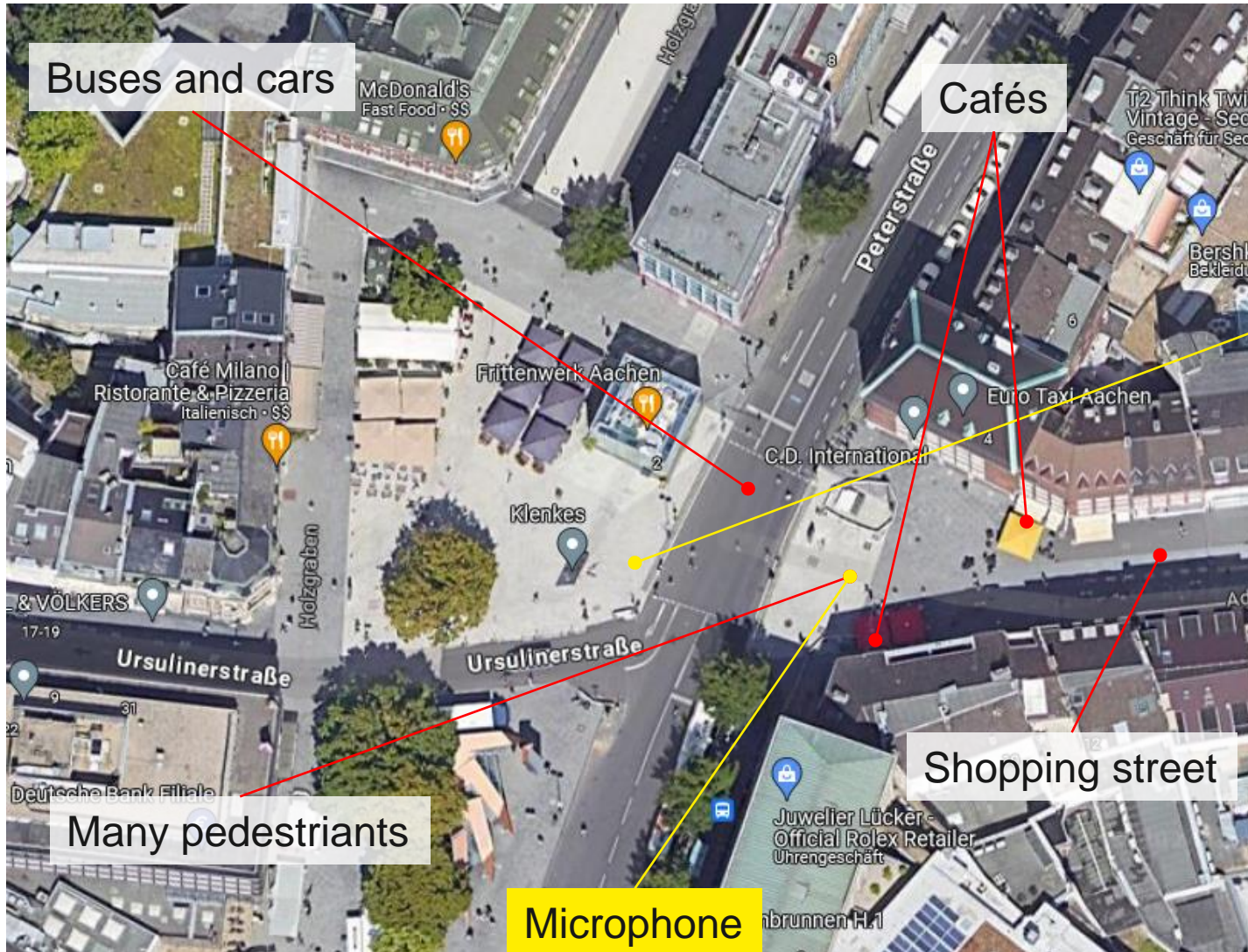
#4 - Fountain
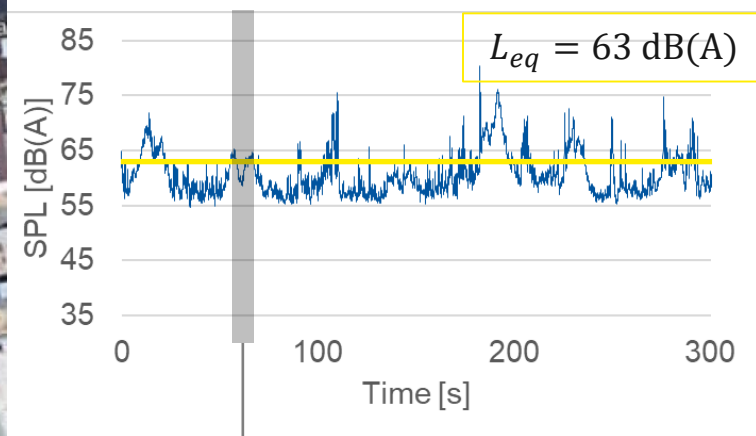
#5 – 30 km/h road

#6 – City pond

#7 – Forest

Additional background noise
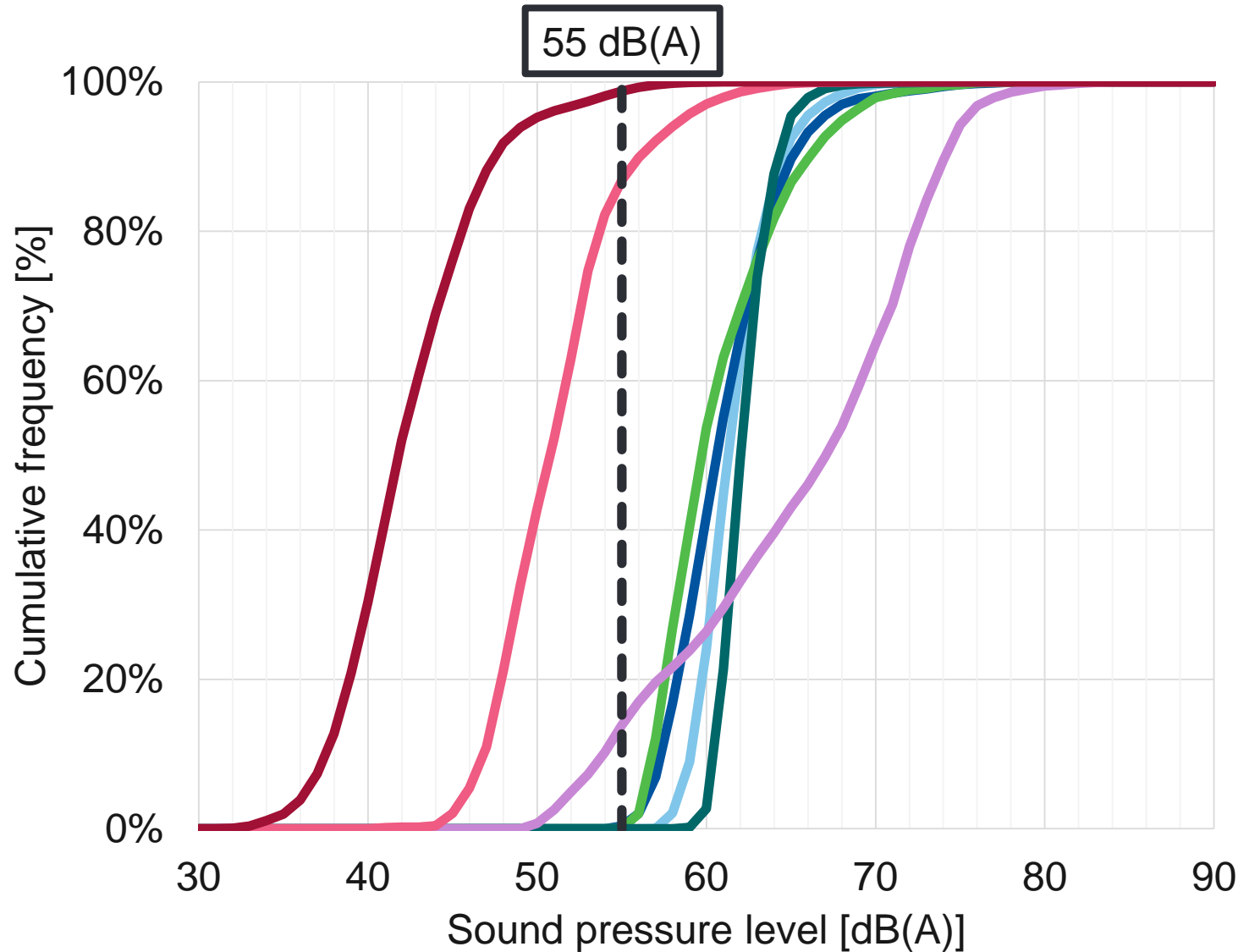## Scene #3 – Traffic lights

Buses and cars

Cafés

Many pedestrians

Shopping street

Microphone

Necessary adjustment for 55dB(A): $\Delta L = -7.96$ dB

$L_{eq} = 63$ dB(A)

Additional background noise
Cumulative frequency

#1 - Café
#2 – Shopping street
#3 – Traffic lights
#4 - Fountain
#5 – 30 km/h road
#6 – City pond
#7 – Forest

55 dB(A)

Cumulative frequency [%]

Sound pressure level [dB(A)]

Measurement results
Subjective assessment

#1 - ICE

#2 - SES

#3 - AVAS

#4 - Van

#5 - Pure

Condition	Speed [km/h]	Accel. [m/s²]
1	20	0
2	0	3

Safety Condition 1

Safety Condition 2
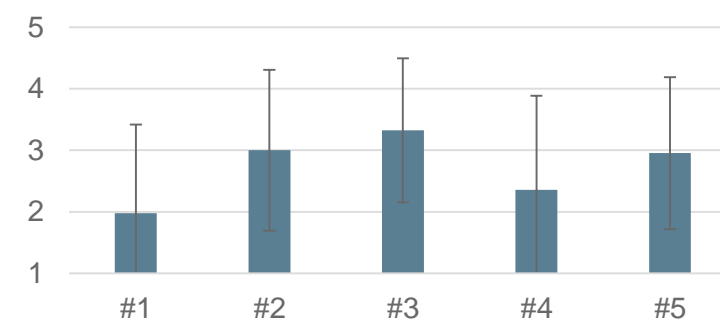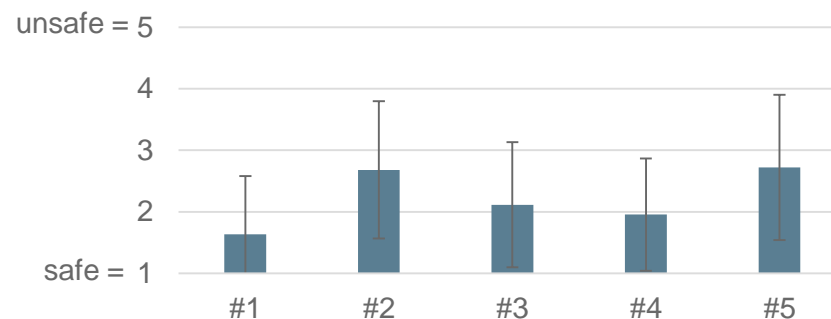
Sound Condition 1

Sound Condition 2
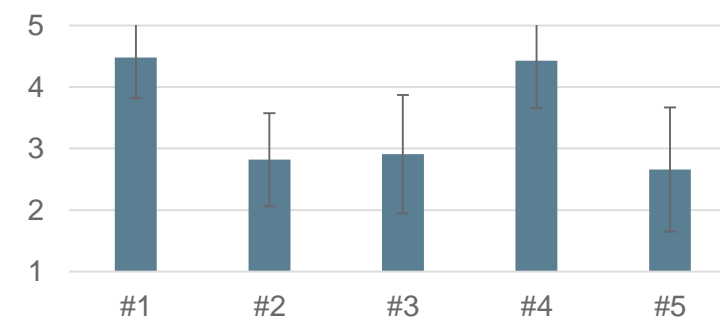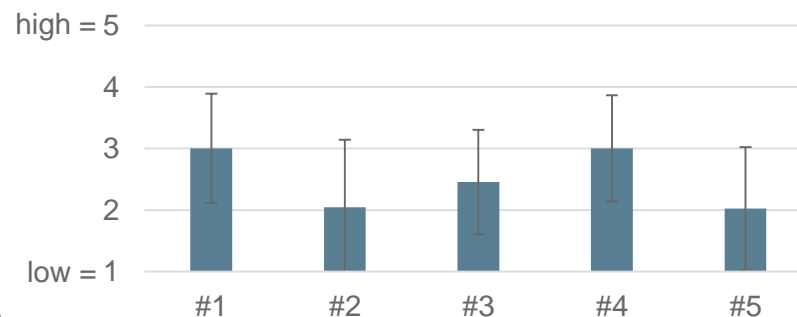
Note: The plots show the arithmetic mean and standard deviation

Measurement results
Sound level meter

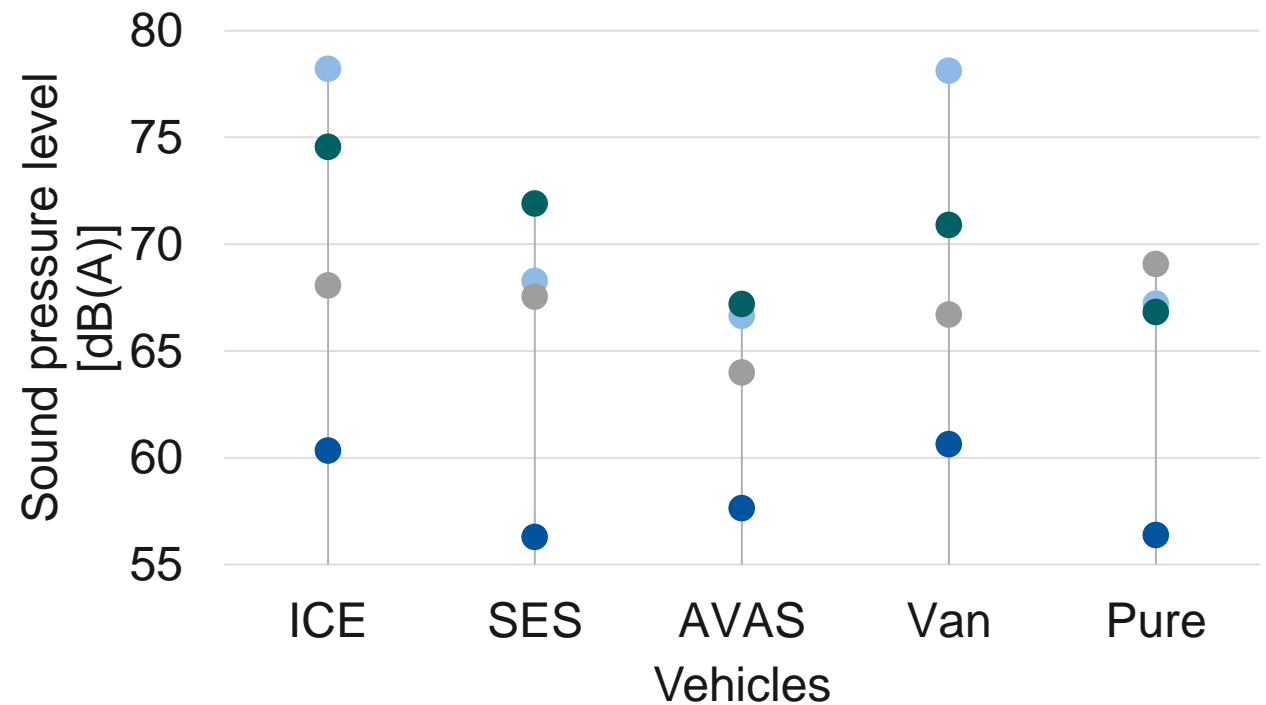| #1 - ICE | #2 - SES | #3 - AVAS | #4 - Van | #5 - Pure |

Condition	Speed [km/h]	Accel. [m/s²]
1	20	0
2	0	3
3	40	0
4	20	3

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Measurement results
Correlation

| #1 - ICE | #2 - SES | #3 - AVAS | #4 - Van | #5 - Pure |

Condition	Speed [km/h]	Accel. [m/s²]
1	20	0
2	0	3

Vehicle	Min	Max
#1 – ICE	1	4
#2 – SES	1	5
#3 – AVAS	1	4
#4 – Van	1	4
#5 – Pure	1	5

Note: The plots show the arithmetic mean and minimum/maximum

How do you feel in crossing the road?
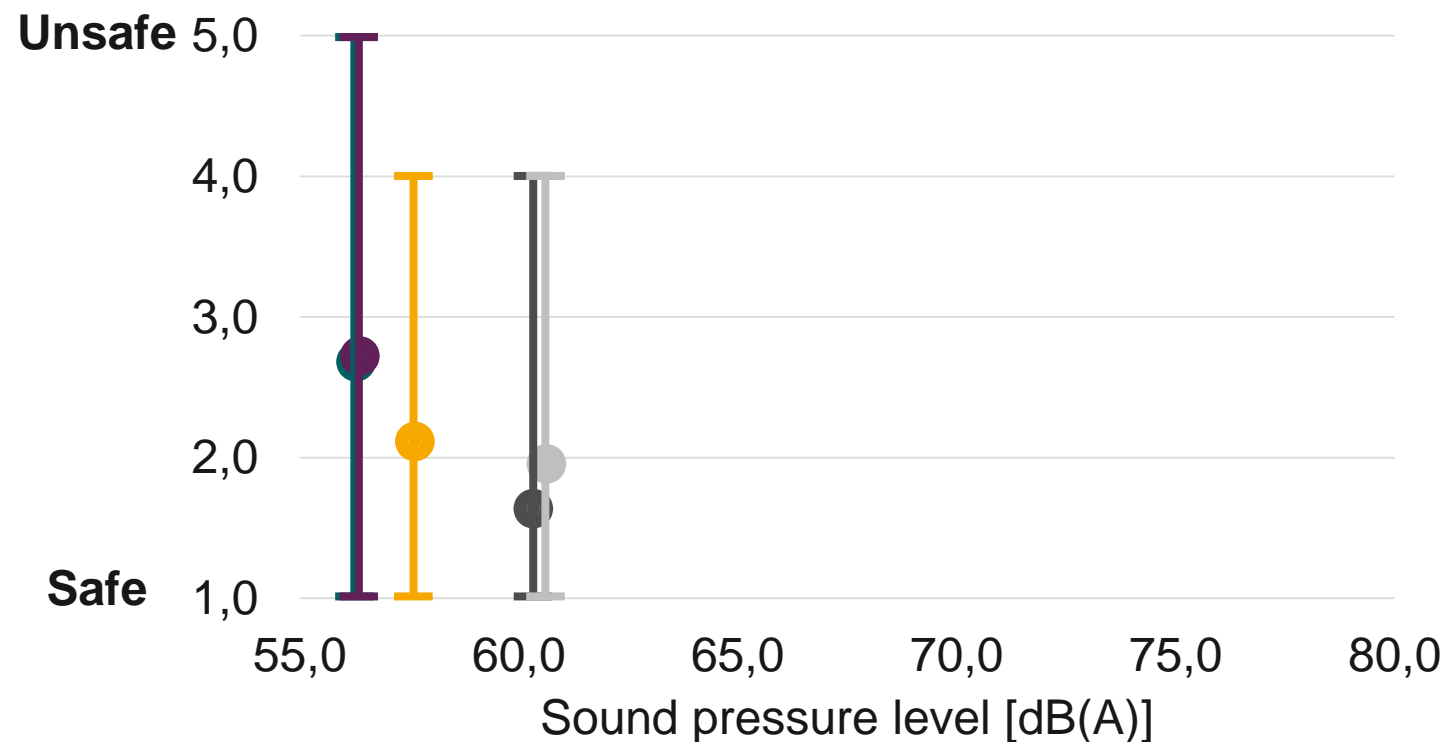
Measurement results
Correlation

#1 - ICE **#2 - SES** **#3 - AVAS** **#4 - Van** **#5 - Pure**

Condition	Speed [km/h]	Accel. [m/s²]
1	20	0
2	0	3

Vehicle	Min	Max
#1 – ICE	1	5
#2 – SES	1	5
#3 – AVAS	1	5
#4 – Van	1	5
#5 – Pure	1	5

Note: The plots show the arithmetic mean and minimum/maximum

How do you feel in crossing the road?

Measurement results
Correlation
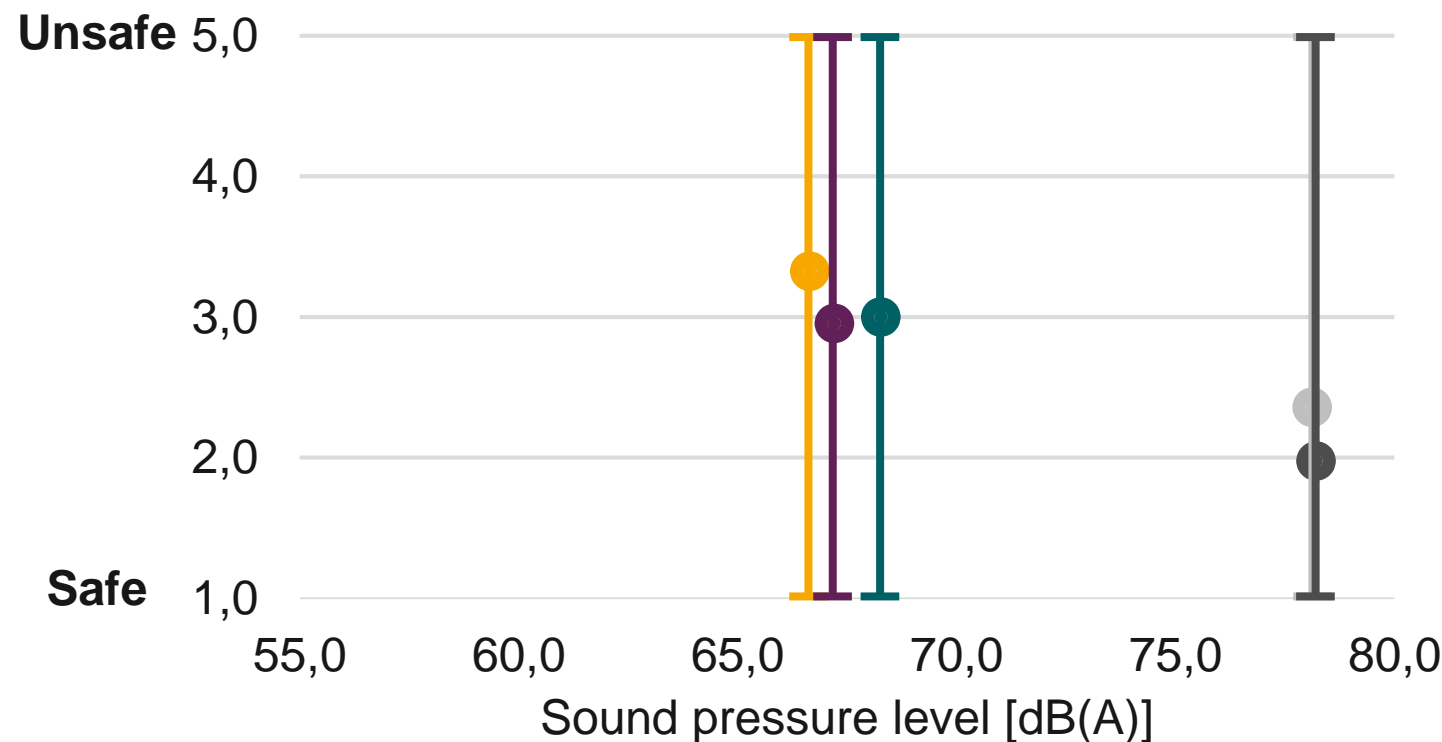
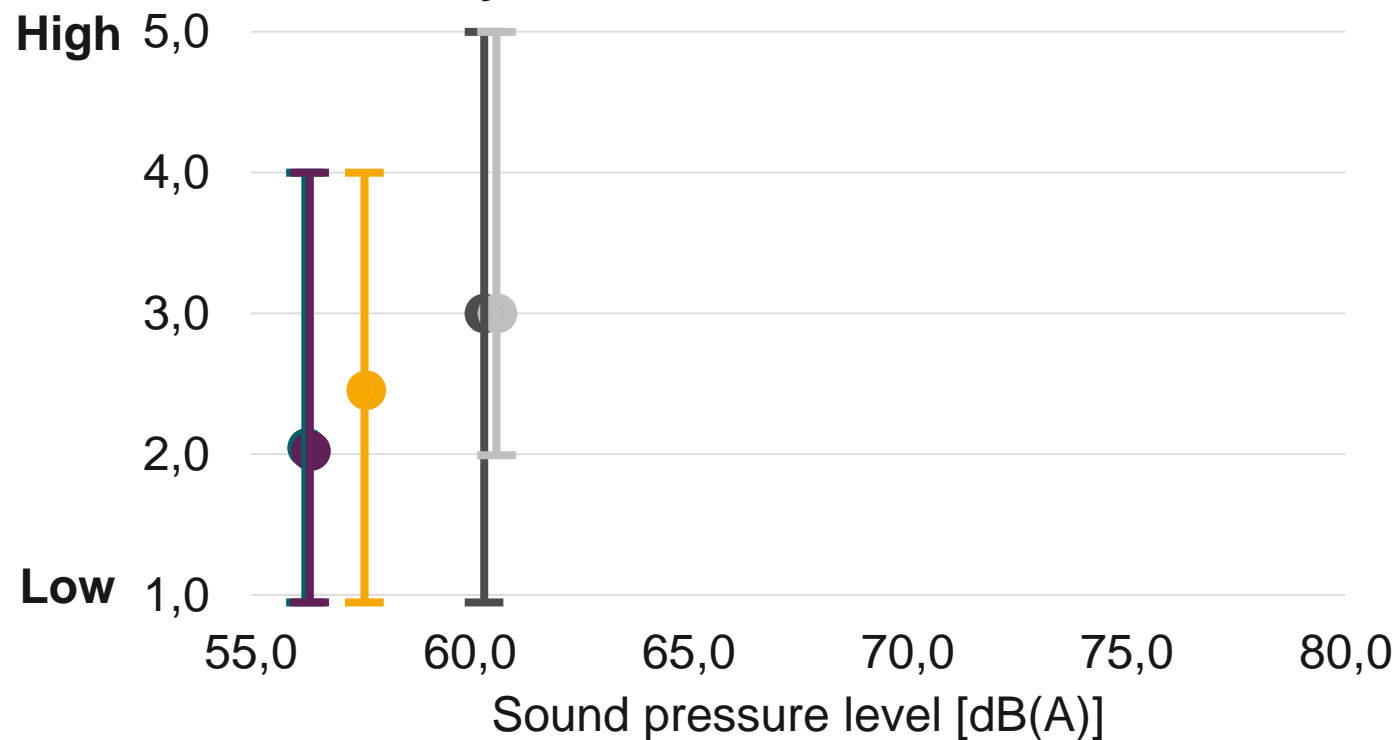#1 - ICE   #2 - SES   #3 - AVAS   #4 - Van   #5 - Pure

Condition	Speed [km/h]	Accel. [m/s²]
1	20	0
2	0	3

Vehicle	Min	Max
#1 – ICE	1	5
#2 – SES	1	4
#3 – AVAS	1	4
#4 – Van	2	5
#5 – Pure	1	4

Note: The plots show the arithmetic mean and minimum/maximum

How do you rate the sound emission?

High 5,0
4,0
3,0
2,0
Low 1,0

55,0   60,0   65,0   70,0   75,0   80,0

Sound pressure level [dB(A)]

Measurement results
Correlation

#1 - ICE #2 - SES #3 - AVAS #4 - Van #5 - Pure

Condition	Speed [km/h]	Accel. [m/s²]
1	20	0
2	0	3

Vehicle	Min	Max
#1 – ICE	3	5
#2 – SES	2	4
#3 – AVAS	1	5
#4 – Van	2	5
#5 – Pure	1	5

Note: The plots show the arithmetic mean and minimum/maximum

How do you rate the sound emission?

Sound pressure level [dB(A)]
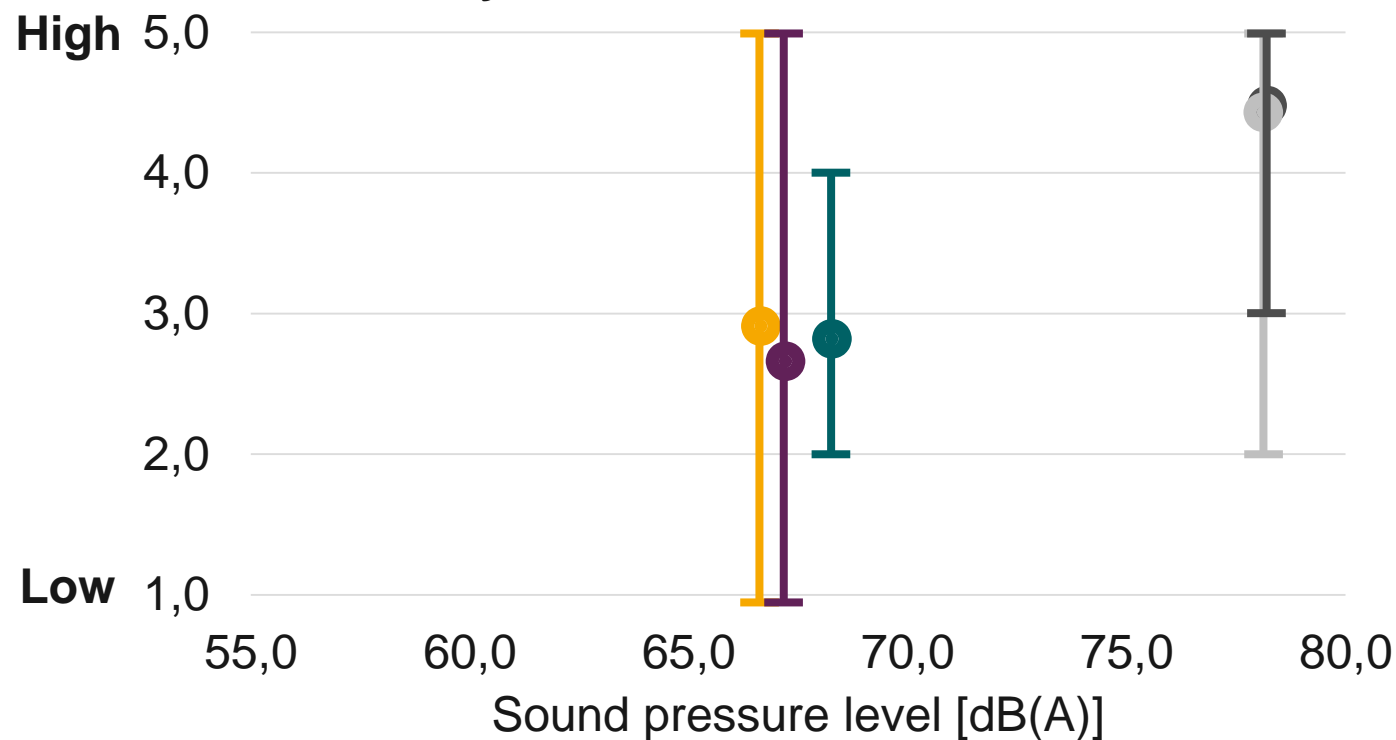
Contact

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