

Background information for ICCT's proposal to amend the UN Regulation No. 51

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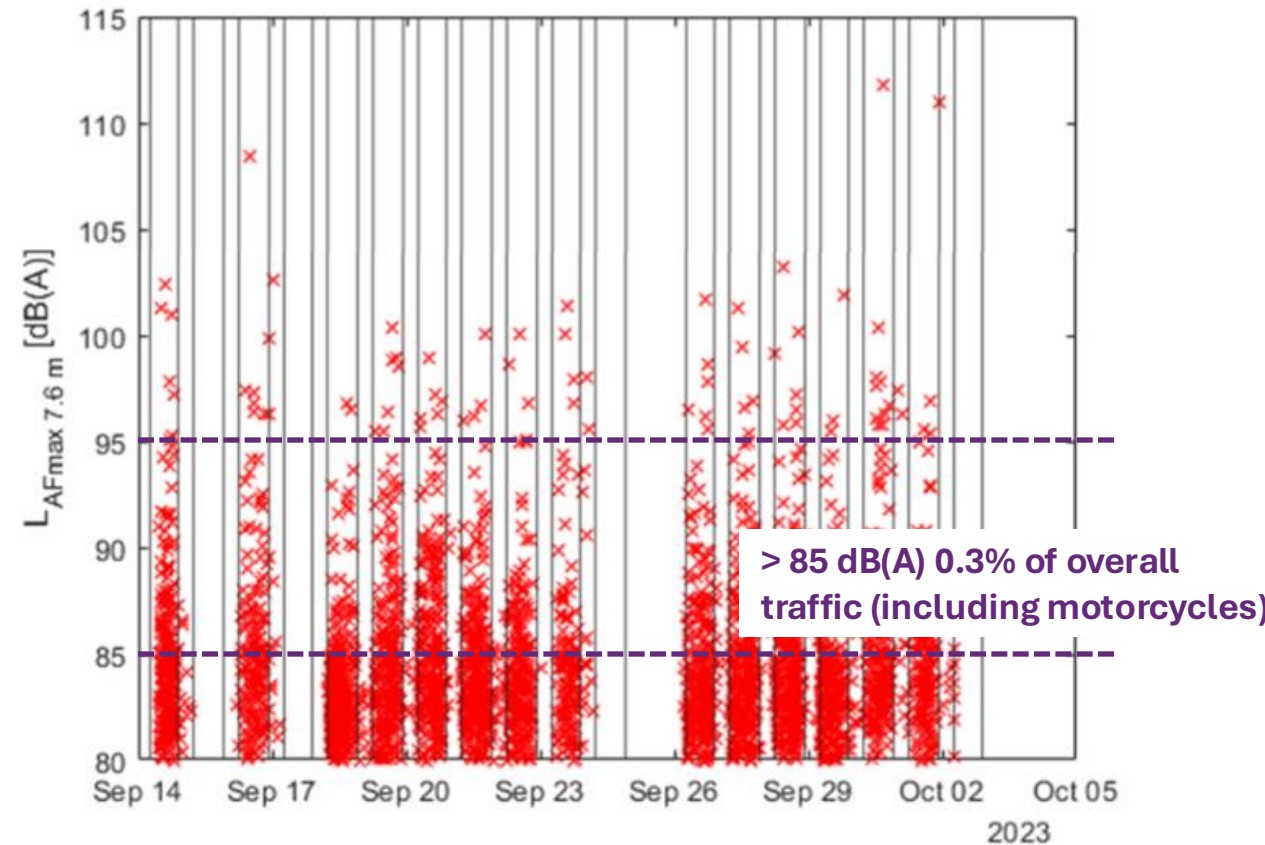
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ICCT's Proposal

- Not-To-Exceed (NTE) limits
 - 85 dB(A) at 7.5m within the *Annex 7* and *Annex 9* control range
 - 95 dB(A) at 7.5m beyond the ASEP and RD-ASEP control range (up to 80 km/h within *Annex 7* and 100 km/h within *Annex 9*) or in real-world operating conditions (for easier enforcement)
- Strengthened defeat device clause to safeguard consistent performance in real-world and testing conditions
- Other suggestions
 - NTE limits for stationary vehicle sounds

Objective 1: Safeguard public health in urban environment by limiting excessive vehicle noise

- An additional uniform maximum sound limit ensures that the vehicles does not emit noise at levels harmful to human health.
- Annoyance, a WHO indicator for measuring adverse health impacts of noise and which accounts for a number of diseases linked to noise, is associated with 95 dB(A).
- 85 dB(A) at 7.5m amplified to > 96 dB(A) at 2m, a distance at which pedestrians in urban environment are exposed to vehicle noises.



Noise camera test in Geneva – Rue de Lyon 50km/h, BAFU (2024)

Objective 2: Enhance efficiency and effectiveness of surveillance and enforcement mechanisms

- A single maximum limit provides clear, technologically neutral and quantifiable benchmark for effective market surveillance and enforcement efforts.
- Use of the ASEP curve (Annex 7) and the expected sound model (Annex 9) is complicated for non-experts.
- Current approach and that in preparation (*Annex 7* and *Annex 9*) set sound emission limit based on parameter among which speed and acceleration.
- Allows non-compliance detection through roadside enforcement, noise radar, or in-service conformity testing.
- Reduces administrative burdens for enforcement authorities.

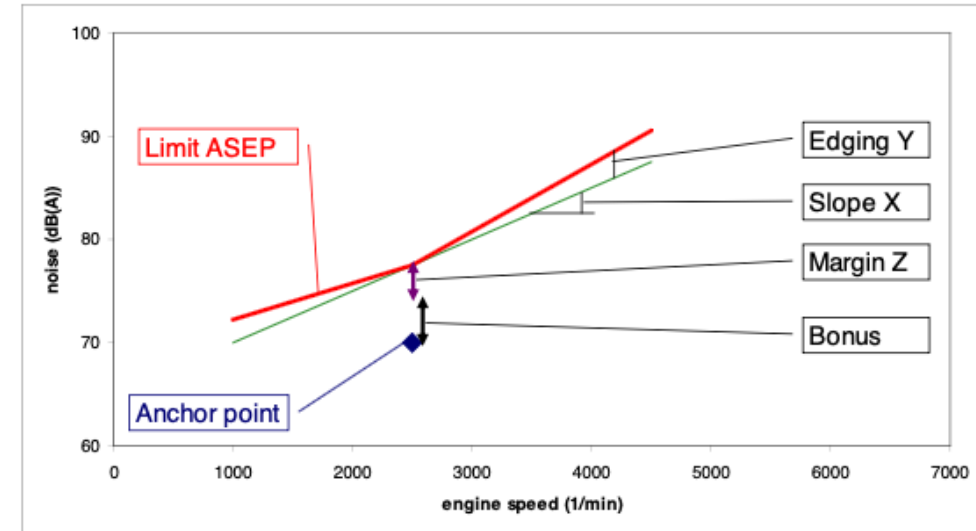


Figure 1: ASEP proposal of the GRBIG; sketch of the limit curve and the different coefficients which determine the stringency.

Kortbeek and de Graaff (2009)

Necessary Evaluation for Establishing the Sound Expectation Model			
Parameter	Value	Unit	Measurement
Select Parameter SET	A		Select the applicable value A, B or C from the Parameter table (see 4)
Applicable Column of Parameter Table	1		

Necessary Data Evaluation in Cases where no Engine Speed is available in Annex 3 Pass-By Tests			
Hybrid Engine Operation Principle	N		From (1) Vehicle Data, serial (2), parallel (3) or no hybrid (N)
Was the ICE operational during A/C1 Test in Annex 3.7	Y		Mandatory in case of HEV, for ICE and EV selection is ignored
Was the ICE operational during C/C2 Test in Annex 3.7	Y		Mandatory in case of HEV, for ICE and EV selection is ignored
Determined Hybrid Case	1		Choice is mandatory in Case of Hybrids (CAES 3 and 4)
Which gear was used for the Acceleration Test Annex 3	2		Choice is mandatory in Case of Hybrids (CAES 3 and 4)
Vehicle Speed in Engine Speed Tests	35.0	km/h	
Vehicle Speed for the Constant Speed Test Annex 3	5		Choice is mandatory in Case of Hybrids (CAES 3 and 4)
Vehicle Speed for Engine Speed Tests	35.0	km/h	

Applicable Values from Annex 3 pass-by test (if model, corrected by HYBRID CASE and LOW PASS CONSIDERATIONS)			
$L_{PA,acc}$	74.0	dB(A)	
$L_{PA,acc}$	196.5	dB(A)	
$L_{PA,acc}$	69.3	dB(A)	
$L_{PA,acc}$	1762	dB(A)	

Check for Minimum Vehicle Dynamics (Required for Model Construction)			
Check Dynamics $L_{PA,acc}$ $L_{PA,acc}$	6.7	dB	See Annex 9 Appendix Paragraph 3.7
Assign minimum dynamics	N		

Type above of the Constant Speed Test (Determined either by Measurement or Standard Value from Parameter Table - see CLASSIFICATION TABLE, NO CHECKUP $L_{PA,acc}$ $L_{PA,acc}$)			
Determination of a factor	54		Select from Parameter Table (7) or by Direct Measurement (8)
Check validity of $L_{PA,acc}$ (after Street Measurement (8) is selected)	VALID		Check if energy of $L_{PA,acc}$ is lower than 90% of energy from $L_{PA,acc}$
Factor determined by Direct Measurement (8)	85	%	Determined based on the selection above

Maximum vehicle acceleration determined by discrete tests, which are not part of the ASEP assessment (see Annex 9, Appendix 1, paragraph)			
Maximum Acceleration determined	2.2	m/s ²	See provisions of Annex 9 Appendix paragraph 3.1.1.1
Selected gear in range (2) for the test	3		Select (2) for tests of EV and (3) for HEV in the mode
L_{PA} determined for the test	35.0	km/h	Average of the 4 runs of Annex 3, value to be entered in the first decimal
L_{PA} as reported	45.0	km/h	Average of the 4 runs of Annex 3, value to be entered in the first decimal
L_{PA} as reported	57.0	km/h	Average of the 4 runs of Annex 3, value to be entered in the first decimal
L_{PA} as reported	1300	km/h	Average of the 4 runs of Annex 3, value to be entered as integer
L_{PA} as reported	3200	km/h	Average of the 4 runs of Annex 3, value to be entered as integer
L_{PA} as reported	4000	km/h	Average of the 4 runs of Annex 3, value to be entered as integer
Vehicle Speed in Engine Speed Tests L_{PA} L_{PA} 1300	32.7	km/h	With automatically select 30 for EV and 30 for HEV in EV mode

CAES (see Annex 9 Appendix)			
CAES	3.1.1.1	3.1.1.2	3.1.1.3
1	2	3	4
$L_{PA,acc}$	74	74	73.2
$L_{PA,acc}$	196.5	196.5	196.7
$L_{PA,acc}$	69.3	69.3	69.6
$L_{PA,acc}$	1762	1762	1762

CAES (see Annex 9 Appendix)			
CAES	3.1.1.1	3.1.1.2	3.1.1.3
1	2	3	4
$L_{PA,acc}$	74	74	73.2
$L_{PA,acc}$	196.5	196.5	196.7
$L_{PA,acc}$	69.3	69.3	69.6
$L_{PA,acc}$	1762	1762	1762

LOW PASS VEHICLE CHECK (Simulation of constant speed reference)			
Mark	CAES	CAES	CAES
1	2	3	4
$L_{PA,acc}$	74.0	74.0	74.0
$L_{PA,acc}$	196.5	196.5	196.5
$L_{PA,acc}$	69.3	69.3	69.3
$L_{PA,acc}$	1762	1762	1762

Gear			
1	2	3	4
$L_{PA,acc}$	74.0	74.0	74.0
$L_{PA,acc}$	196.5	196.5	196.5
$L_{PA,acc}$	69.3	69.3	69.3
$L_{PA,acc}$	1762	1762	1762

Objective 3: Promote transparency and accountability in regulatory processes and industry performance

- Enables citizens, local communities, and other organizations to better understand how the vehicle noise is regulated.
- Empowers citizens to advocate for healthier urban environments and promotes citizen participation in noise monitoring.
- Improves accountability from both regulators and manufacturers



Soundless.app

Paragraph 6.2.3. Defeat device

The vehicle manufacturer shall not intentionally alter, adjust, or introduce any mechanical, electrical, thermal, or other device or procedure ~~solely~~ for the purpose of fulfilling the sound emission requirements as specified under this Regulation. ~~which is not operational during typical on-road operation.~~

- “**Solely** for the purpose of fulfilling the sound emission requirements” can permit the use of a device or procedure used not only to meet the requirements but also for other purposes, such as to protect vehicle components or performance.
- “**which is not operational during typical on-road operation**” allows the use of device in a small subset of conditions prescribed in the type-approval test, which are hardly encountered in real-world driving.

Other suggestions to amend UNR 51

- *Annex 9*
 - Widened performance range from 35 m²/s³ to 55 m²/s³
 - Expanded engine speed range of a vehicle to 100% of S
- *Paragraph 6.2.2.*
 - NTE limit of 95 dB(A) for vehicle stationary sounds within the Annex 3 control range
 - NTE limit of 110 dB(A) for vehicle stationary sounds beyond the Annex 3 control range (e.g. snap free acceleration test)

Thank you for your attention!

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