

Acoustic assessment of the Acoustic Vehicle Alerting System (AVAS)

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INTRODUCTION

Electric and hybrid vehicles have many advantages. One of them is their contribution to the reduction of road traffic noise, which disturbs a considerable part of the population in Germany. Due to the lack of a combustion engine, vehicles with electric drive can be driven almost noiselessly up to a speed of about 30 km/h. When driving faster, the rolling noises of the vehicle tires usually dominate to such an extent that electric vehicles are as loud as vehicles with conventional combustion engine.

Road safety versus acoustic emission

To avoid jeopardizing road safety targets ("Vision zero"), the European Union decided in 2014 that all new types of electrically powered vehicles must be equipped with an artificial noise generator from 1 July 2019. This generator has to imitate the typical noises of a combustion engine at low speeds [1]. From 1 July 2021, all new vehicles with an electric drive must be equipped with AVAS. The exact technical requirements, such as frequencies, sound pressure level, etc., were internationally standardized in the UNECE R 138 [2]. However, the artificial sounds of an AVAS are in conflict with the goal of making the inner cities quieter and thus reducing possible health risks for the inhabitants.



Figure 1: experimental vehicle

Involving stakeholder groups

This research project will analyze - without prejudging the outcome - how the noise reduction potential of electric drives can be used in the future without jeopardizing road safety objectives by involving various experts from the stakeholder groups. The effectiveness and necessity of AVAS should thereby be clarified. In the search for solutions to the conflict of objectives described above, the aim is to analyze which technologies could represent a potential alternative to AVAS. Corresponding solutions may already have been developed, be in the development phase or exist as an idea. Combinations of solutions should also be taken into account. The solutions identified and assessed as realistic by the research contractors are to be discussed together with the stakeholders, resulting in solutions that can both exploit the noise reduction potential of electrically powered vehicles and maintain or increase road safety objectives.

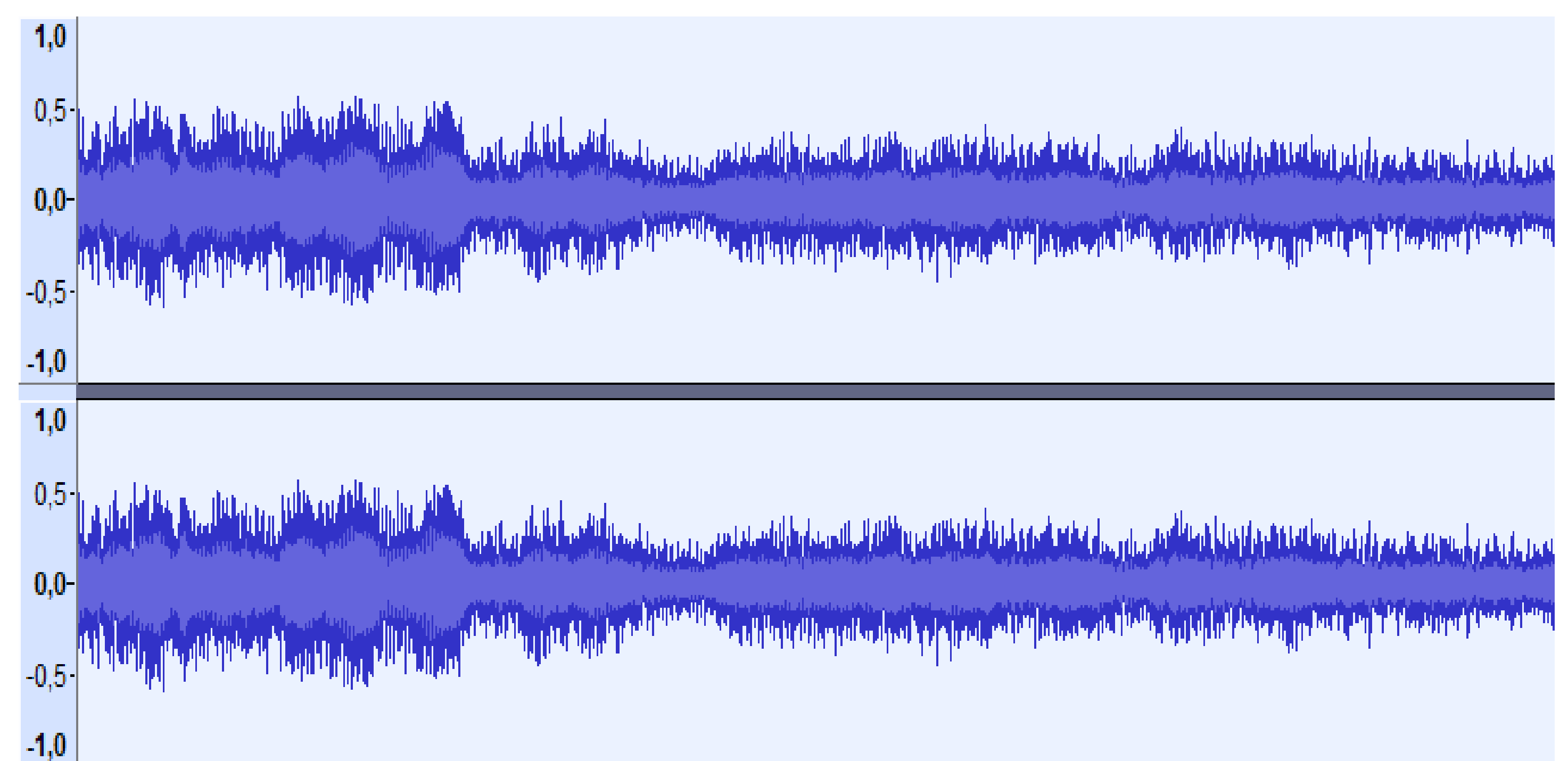


Figure 2: Typical AVAS sound during deceleration

REFERENCES

Regulation (EU) No 540/2014 of the European Parliament and of the Council of 16 April 2014 on the sound level of motor vehicles and of replacement silencing systems, and amending Directive 2007/46/EC and repealing Directive 70/157/EEC. Reference: OJ (EU) L 158, 27.5.2014, p. 131.

[2] Regulation No 138 of the Economic Commission for Europe of the United Nations (UNECE) – Uniform provisions concerning the approval of Quiet Road Transport Vehicles with regard to their reduced audibility [2017/71]. Reference: OJ (EU) L 9, 13.1.2017, p. 33.