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A synthesized road traffic noise scenario for health impact assessment

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Within the Horizon 2020 project LEON-T (Low particle Emissions and lOw Noise Tyres), one of the aims is to investigate the effect on cardiovascular health from the effect on sleep of noise from heavy vehicle (EU class N2 and N3) tyres. Effects of noise on sleep are investigated by performing sleep experiments in a controlled lab environment where participants sleep several nights subjected to different traffic noise scenarios. The traffic noise scenarios have been constructed using synthesized tyre noise allowing for variation in parameters such as tyre tread pattern design, tyre air cavity resonance, traffic flow properties and distance between traffic noise source and receiver. The synthesized scenarios have been designed in close cooperation with experts on health effects from noise in order to expose the participants to such stimuli that provide relevant and valid responses. For the initial sleep experiment properties such as high or low traffic flow, individual vehicle noise level and level of perceptually salient tonal components in the synthesized tyre sound are investigated. This paper describes the synthesized vehicle sounds and the traffic noise scenario design process for the scenario used in the first sleep experiment.

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