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Title:

Review of Headrest Speakers for Communication Privacy in Vehicles

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Abstract:

Vehicle manufacturers increasingly rely on headrest loudspeakers as a piece of the puzzle to improve acoustic privacy for all passengers in the vehicle cabin. The advantages are obvious, the speakers emit the sound close to and in the direction of the listener's ear. Thus, the playback levels can be significantly reduced, for example compared to door loudspeakers, which are typically used for hands-free phone calls or music playback. On the other hand, the position of the headrest speakers behind the head reduces the familiar feeling of sound coming from the front. This contribution discusses the improvement potential of headrest speakers in terms of privacy for the different passenger positions in vehicle cabins. The measurements combine technical parameters like level and spectral attenuations and perception-based parameters like listening effort. Headrest speaker playback is compared to traditional door loudspeaker playback, in quiet conditions (representing the influence of the cabin acoustics) and with masking driving noise. The benefit can roughly be quantified around 10 dB or – in terms of listening effort – around 1 MOS (Mean Opinion Score, 5-point scale), both depending on the seat positions.

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