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Near-end listening enhancement algorithms – approaches for measurement and evaluation

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Mobile phone calls in noisy environments may be extremely stressful for the person located at the near-end side. Even with high effort, it can be difficult for the listener to follow the talker from the far-end side. An improvement for this issue is proposed by recently developed so-called near-end listening enhancement (NELE) algorithms, which are more and more present in state-of-the-art mobile phones.

These algorithms perform different manipulations on the down-link speech signal to improve listening effort and/or intelligibility for the listener. Usually this is applied in conjunction with side-information about the current background noise. In today's mobile phones, the background noise signal can often be provided by one or more microphones which are used for noise reduction in sending direction.

On the one hand, the device may adapt (and thus, potentially degrade) the down-link speech signal in order to improve intelligibility for hard listening situations. On the other hand, speech quality should not drop below a certain minimum level.

So far, no measurement methods are available for this kind of algorithms, neither on a technical (e.g. measuring achieved gain in dB) nor on a psycho-acoustical base. Since terminal testing cannot access inner information or signals of the device under test, an evaluation always has to regard the device as a "black box".

This contribution describes challenges regarding the measurement setup and the evaluation of devices which include such algorithms. The applicability of established, more sophisticated measurements and assessment methods are also discussed. Finally, proposals for new metrics are given in the outlook.

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