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| INTERNATIONAL TELECOMMUNICATION UNION | **Focus Group OnCar Communication** |
| **TELECOMMUNICATIONSTANDARDIZATION SECTOR**STUDY PERIOD 2009-2012 | **FG CarCOM-C-34** |
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|  |  | Detroit, 16-17 July 2012 |
| **CONTRIBUTION** |
| **Source:** | Volkswagen AG, Technische Universität Braunschweig |
| **Title:** | Proposal of a Reference-free SNR Measurement |

This contribution aims to report the current state of the reference-free SNR measurement approach which was proposed in the FG CarCOM meeting held in Braunschweig, Germany, on Dec. 8-9, 2011. An approach developed for wideband signals only was published on the DAGA 2012 conference [1]. Since then, the approach has been enhanced to work consistently with narrowband signals, too. Slight modifications of the original algorithm turned out to show improved quality for narrowband signals. The new modified approach is even simpler than the original one. The performance of the new algorithm can be seen in the Tables below.

The new consistent approach is accepted for publication at the ITG Conference on Speech Communication [2] which will be held in Braunschweig, Germany, on Sep. 26-28, 2012 (see attachment), offering online access to the paper for interested readers over IEEE Xplore (in such cases a full description of the algorithm in the Recommendation is not necessary and typically not done).



Correlation coefficients for different measurement durations $T\_{m}$



Absolute estimation errors and their frequency, for different measurement durations $T\_{m}$

As can be seen, all correlation coefficients, even those for the short measurement duration of 8 s, exceed the value of 0.99. As we aimed at, the absolute estimation errors are smaller than 1 dB in at least 93% of the cases for an 80 s measurement (smaller than 2 dB in 99%), and smaller than 2 dB in at least 88% of the cases for an 8 s measurement.

References:

[1] Fodor, B.; Fingscheidt, T. “Reference-free SNR Measurement for Stationary Noises”, in Proc. of DAGA, Darmstadt, Germany, Mar 2012.

[2] Fodor, B.; Fingscheidt, T., “Reference-free SNR Measurement for Narrowband and Wideband Speech Signals in Car Noise”, in Proc. of ITG Conference on Speech Communication, Braunschweig, Germany, Sep 2012, accepted for publication.

We propose to include the following text into the Draft Recommendation:

On page 25 of the Draft Recommendation the literature reference must be cited:

“…

**8.2.1.1.4.1 Parameter description**

The SNR measurement is based on individual broadband estimations of the speech signal power and the noise signal power and is performed using the reference-free measurement method described in [28].

…

**8.2.1.1.4.2 Test**

…

6) The SNR is calculated according to [28] for both microphones.

…”

On page 2 of the Draft Recommendation a new reference [28] shall be added:

“…

**2) References**

…

[28] Fodor, B.; Fingscheidt, T., “Reference-free SNR Measurement for Narrowband and Wideband Speech Signals in Car Noise”, in Proc. of ITG Conference on Speech Communication, Braunschweig, Germany, Sep 2012.”

Attachment:



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