Cascaded Signal Processing in Bluetooth Connections

Communication via headsets and hands-free devices often use the Bluetooth connection to a mobile phone for voice transmission. Cascaded signal processing in the hands-free device and additionally in the mobile phone (noise reduction, echo cancellation, echo suppression, …) can be a consequence of this interconnection. The Bluetooth hands-free profile addresses this issue and defines a control command (AT-command) to configure the Bluetooth connection and disable internal signal processing in the mobile phone. A large number of mobile phones support this command since it is part of the integrated Bluetooth stack. However, the link to the audio signal processing is often not correctly implemented and internal signal processing remains active. This significantly influences and often degrades speech quality of the complete system, the headset in conjunction with the mobile phone or the hands-free terminal working in conjunction with these phones. This is a very critical aspect e.g. for the automotive industry offering hands-free implementations using the Bluetooth link to customers' mobile phones for speech transmission. Comparison tests based on ITU-T P.1100 using a new reference Bluetooth interface were carried out on a high number of mobile phones. Typical results are discussed that clearly demonstrate how dramatically speech transmission quality can be influenced.

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