

Speech Quality Evaluation in Telephone Networks

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INTRODUCTION

An In-service, Non-intrusive Measurement Device (INMD) [1, 2] extracts quality-defining parameters from an existing telephone link without disturbing the link. Such a device serves as a network monitor. A large number of these devices, placed at switches (on PCM-coded lines) in the whole network, can observe a multitude of telephone calls. A central evaluation gives evidence about the quality-of-service parameters of the network. Classical parameters to be measured are the noise level, the active speech level, and the echo loss and delay. However, in modern networks these typical parameters are not sufficient for reliable statements about the speech quality as there are additional disturbances, e.g. packet loss in IP-telephone services, frame loss in mobile communications, comfort noise inserted by DTX-Systems (Discontinuous Transmission), cascading of different digital transmission systems, and others. This paper proposes two algorithms to measure additional characteristics of telephone links. The first algorithm presented here allows to detect the GSM-FR codec [3] in transmission systems. For this purpose, a spectral attenuation around 2700Hz introduced by the coding principle is evaluated for short signal blocks. The error rate is below . The second algorithm presented here samples frequency points of the background-noise spectrum throughout the duration of speech utterances, by making use of minima statistics in frequency-tracks and speech segments. These frequency points are compared to the noise in speech pauses in a statistical manner to evaluate differences and decide about the occurrence of comfort , but noise. The error rate for the used data base is below further investigations are necessary to verify the algorithm.