Flexible GSM Equalizer for User-Defined QoS, Based on Software Defined Radio[1]

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Abstract

Flexible mobile communication systems, based on Software Defined Radio (SDR) methodology, have already started to take its way seriously to practical realization. Fast growing mobile communications form the most powerful motivation for the widespread interesting in SDR. This generation of communications will facilitate the realisation and deployment of reconfigurable wireless communication systems, able to respond to the demands for user defined quality of service (QoS), which is very important for the satisfaction of users in the context of expanding wireless services and reducing their cost.

Global System for Mobile communications (GSM) has been widely penetrating the mobile communication markets around the world. It uses an adaptive equalizer to mitigate fading effects on the wireless channel.

In this paper, we base on the principle of SDR concept to design a flexible GSM equalizer with variable parameters in accordance to channel condition and the level of QoS defined from user.

In the introduction of this paper, we present a background on SDR, in section 2, we give a quick demonstration of main GSM features and ways to improve QoS in it. After a short recognition of key fading effects in section 3, we analyze in section 4 the Soft Output Viterbi Algorithm used to perform equalization tasks in GSM. In sections 5 and 6, we use simulation results to effectively categorize variable parameters of the flexible equalizer upon user defined level of QoS. We show also the importance of such approach in effectively utilizing hardware resources dedicated for performing digital signal processing tasks, and in reducing power consumption required for these tasks.
KEYWORDS: Software Defined Radio (SDR), user defined QoS, Global System for Mobile communications (GSM), Soft Output Viterbi Algorithm (SOVA), flexible equalizer.