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28. A Power and Rate Control Scheme for Efficient Radio Bearer Selection in MBMS Framework of UMTS

Abstract

Universal Mobile Telecommunication Systems (UMTS) is crowned as the next generation of GSM networks. This 3G technology caters the growing demand of innovative mobile delivery platform including internet and multimedia applications, with increased capacity and data capability, increasing transmission speed to 2Mbps per mobile user and establishes a new Global roaming standard. Power control is one of the most important aspects in Multimedia Broadcast/Multicast Service (MBMS) due to the fact that Node B's transmission power is a limited resource and must be shared among all MBMS users in a cell. Hence there is a need for power control during an MBMS session, to minimize power consumption. This paper proposes a power and rate control scheme for the efficient radio bearer selection in MBMS framework of UMTS. The selection of the most efficient transport channel in terms of power consumption is critical for the MBMS, since a wrong transport channel selection for the transmission of the MBMS data could result in worst performance and to a significant decrease in the total capacity of the system. UMTS common transport channel e.g. FACH (Forward Access Channel) and dedicated transport channel DCH (Dedicated Channel) are examined and an algorithm that defines the switching point between dedicated and common radio bearers is proposed. The proposed MBMS power and rate control scheme selects the transport channel that reduces **the critical Node B's resource i.e. Transmission power** in every cell of the network with multicast users. Simulation result shows that the proposed scheme has increased the switching point threshold from 8 UEs to 10 UEs in comparison with other power control scheme proposed in the literature, for the same speech service. Consequently, the proposed scheme yields a fairly modest capacity gain with fixed rate AMR (Adaptive Multi Rate) codec and exhibits a significant increased capacity gain with variable rate AMR codec.