

SPACE COMMUNICATIONS AND NAVIGATION SYMPOSIUM (B2)  
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CAPACITY EVALUATION FOR TD-SCDMA MULTI-BEAM GEO SATELLITE COMMUNICATION  
SYSTEMS**Abstract**

To obtain large capacity, high quality future mobile satellite communication systems, we must use a proper Multiple Access (MA) technique in a multi-beam system. Multiple accessing to the radio channel is a very important aspect that determines the efficiency of wireless network and leads a large extent of the complexity and performance to the systems, such as low power requirements and more efficient spectrum allocation due to frequency reuse between satellites and spot beams. In this paper, several Code Division Multiple Access (CDMA)based multiple access protocols are studied and evaluated in the multi-beam Geostationary Earth-Orbit (GEO) satellite environment to analyze the efficiency and adaptability for the broadband satellite communication system. This paper mainly analyzes the Time Division Synchronous Code-Division Multiple Access (TD-SCDMA) which is a kind of multiple access technique with good performance for the terrestrial communication. The paper gives the capacity and power efficiency theoretical analysis and calculation in the TD-SCDMA communication system firstly, and compares the performance of TD-SCDMA with WCDMA and MF-CDMA. The paper will give a description of a statistical model for a mobile satellite link and the interference model of the multi-beam satellite, and compute the C/I of the link. The simulation results demonstrate the theoretical analytical model specified for TD-SCDMA systems available. According to our proposals, the TD-SCDMA satellite communication is an effective communication style. Planning and optimization can be processed efficiently.

Keywords - TD-SCDMA; mobile satellite communication; GEO; multi-beam; system capacity; power efficiency