Uplink Reference Signal Design for LTE Compatible GEO Multiple-beam Mobile Satellite Communication System

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***Abstract*—For 3GPP long term evolution (LTE) uplink, reference signal (RS) is an important kind of physical signal which is primarily used for demodulation and channel sounding. However, in the multiple-beam satellite environments, the inter-beam and intra-beam interference will break the orthogonality of uplink RS (UL-RS) from different user equipments (UEs), resulting in system performance degradation. In this paper, according to the characteristics of the satellite channels and inter/intra-beam interference, we analyze the compatibility problem, calculate the available capacity for the existing UL-RS in multiple-beam satellite environment, and propose a novel uplink RS scheme which includes UL-RS sparsing, OCC scrambling and resource configuration for LTE compatible GEO multiple-beam mobile satellite communication system. Simulation results prove the effectiveness of the proposed UL-RS scheme.**

***(Pt9)Keyword*—Design, Multi-beam, Satellite, UL-RS**

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