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A STUDY OF 4G LTE NETWORK ACCESS BASED ON KA BAND MULTIPLE SPOT BEAM SATELLITE COMMUNICATION SYSTEM

Abstract

It is familiar for us that Iridium and Globalstar satellite communication terminal is the only way to communicate with the outside in case of emergency such as earthquake. And Thuraya can also support mobile and laptop access its satellite network with special terminal. However , these satellite system adopt L band frequency to support network access with the disadvantage of narrow band, low gain, low throughput capacity and expensive . And it just can be used emergency and is not popular. The highlight of Ka band multiple spot beam satellite is flexible spot beam, high throughput capacity, high gain, low cost and it can satisfy daily requirement. While the base station of 4G LTE can support maximum 200Mbps throughput with whole IP architecture and traffic and it require high QoS guarantee to support such VoIP service. It is impossible for traditional VSAT network and L band satellite communication to satisfy the specification. We propose an architecture combined the Ka band multiple spot beam satellite and 4G LTE seamlessly and support Wi-Fi access through satellite communication. The satellite terminal based on DVB-S2/RCS protocol transform the DVB frame to IP data and then the IP data is encapsulated to LTE frame which is transferred between satellite terminal and 4G LTE base station. The subscribers can access the 4G LTE base station with handheld terminal such as mobile phone. The challenge is how to guarantee the QoS in this process, we propose TCP acceleration to optimize the dynamic response of the network and cross-layer resource allocation algorithm which can satisfy the QoS requirement from 4Guarantee LTE and satellite communication. The mathematical analysis and simulation results demonstrated this architecture can satisfy the requirement of seamless connection and we can through 4G LTE network to access satellite communication network.