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DEVELOPMENT OF A HIGH-DIRECTIVITY GLASS REFLECTARRAY ANTENNA FOR COMMERCIAL COMMUNICATION APPLICATIONS

Abstract

As the commercial satellite revolution is triggering a new race in the recent years, the requirements of communication applications between devices on earth and satellites are significantly increasing. Various function modes such as power and communication integrated in one single system is becoming a challenge. In order to integrate various communication devices with solar power system, glass antenna becomes an alternative option. However, the traditional antenna with low-directivity is impossible for high throughout communication. The solar array and antenna integrated in one common surface with high-directivity is seldomly reported. To solve these problems, this paper proposed a glass-reflectarray framework to integrate the solar array and high-directivity antenna in one common surface. The proposed glass reflectarray antenna consists of a dipole array processed on glass material and a horn feed located on its focal plane. The antenna is simulated by full-wave EM simulation software CST. The directivity, return loss, and bandwidth performances are estimated. The directivity is range from 28.1 to 31.2dBi at the required frequency bands, the beamwidths of 4.8 and 4.3 degree are achieved. The analysis results show that the bandwidth of antenna is over 2GHz with return loss less than -10dB. The design issues, analysis processes and the potential applications on satellite communication of the proposed antenna are presented in detail. The proposed antenna could be a good option to integrate power and communication systems for low-cost and high-directivity satellite communication applications.