

Building of Exciters of Multiband Mirror Antennas for Satellite Communication Systems

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Abstract. The objective of the paper is to justify the approach to optimization of the parameters of the corrugated horn based exciters of multiband mirror antennas for different combinations of the overlapping bands and their realization in practice.

The issues of building the feed systems based on the corrugated horns for multiband transeceiving mirror antennas of satellite communication systems are studied. The conducted interrelation analysis of performance indicators of the satellite communication system with energy characteristics of the radio channel enabled one to justify the performance indicator of the multiband mirror antenna of the receiving ground station and its exciters. The performance indicator of the multiband mirror antenna is in the form of a multiplicative function taking account of the antenna noise Q-factor in each of the overlapping bands, and two co-factors determining the decrease in the effective noise Q-factor due to depolarization effects of the received signals and inaccuracy in antenna pointing during autotracking of SC.

Employing a corrugated horn as exciters of multiband mirror antennas exciting the main H_{11} mode and the highest H_{21} mode permits one to create exciters for multiband mirror antennas with different functional capabilities, in particular with the modes of programmable guidance and autotracking based on the extreme and monopulse methods. The considerations of designing the exciters for communication systems with satellites in various types of orbits are studied.

Keywords: multiband mirror antenna, corrugated horn, performance indicators of multiband mirror antenna