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Study of microstrip patch array antenna for side lobe suppression in the X-band region using uniform, binomial and Tschebyscheff excitation methods

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Abstract

In this paper, a microstrip patch array antenna is designed and simulated to operate in the X-band frequency region at 9.5 GHz. For X-band communication transmission, it is necessary to suppress the side lobe radiation pattern of the antenna as much as possible to avoid the transmission being intercepted and/or received by undesirable neighbouring satellites. The geometrical design of the microstrip patch array antenna is simulated and executed using CST Microwave Studio (CST MWS) in order to study the effects of various antenna parameters such as S11, gain, directivity, side lobe level, and angular width. It is shown that the proposed antenna exhibits a low side lobe level of -14.2 dB with an acceptable high gain and directivity of 16.5 dB and 17.7 dB, respectively. The antenna configuration also has a size of only 285 mm x 59.275 mm which is much more compact and lightweight compared to the standard reflector antennas that are used for most X-band communication transmission. © 2020, IIUM Press, International Islamic University Malaysia.

Author Keywords

Array antenna; Microstrip antenna; Side lobe suppression; X-band communication

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