

Developing Antenna for ETS-VIII Applications

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Abstract

In the end of 2006, by the H-IIA Launch Vehicle No. 11 from the Tanegashima Space Center, in the south of Kagoshima Prefecture, ETS-VIII (Engineering Test Satellite VIII) has been launched successfully. The ETS-VIII, is one of the largest geostationary S-band satellites in the world to meet future requirements of field communications, broadcasting and global positioning [1].

Up to now, various antennas have been developed aimed at ETS-VIII [2]-[3]. The performances of the antenna [2] have been experimented outdoor by use of a pseudo-satellite station. Moreover, the array antenna system for mobile ground terminal using GPS and gyroscope terminal unit as automatic-navigation system to track the ETS-VIII satellite was proposed [3].

In order to obtain a good performance antenna in [3], a left hand circularly polarized array antenna without a switching circuit is investigated to clarify a suitable result on return loss, frequency characteristic and radiation pattern. The antenna configurations also obtain a small, light and low profile. The antenna was simulated by the Method of Moments using probe-fed pentagonal array antenna as radiating patch and triangular array antenna as parasitic patch with dielectric permittivity 2.17 and examined in the anechoic chamber measurement. The measured results agree well with the simulated results of 5 dBic gain bandwidth, and the 3-dB axial ratio coverage in the conical-cut direction satisfy the specifications for ETS-VIII.

- [1] JAXA Homepage, "Engineering Test Satellite (ETS-VIII)," http://www.jaxa.jp/projects/sat/ets8/index_e.html.
- [2] J. T. Sri Sumantyo, K. Ito, and M. Takahashi, "Dual band circularly polarized equilateral triangular patch array antenna for mobile satellite communications," *IEEE Trans. Ant.Prop.*, vol. 53, pp. 3477-3485, Nov. 2005.
- [3] Basari, Muhammad Fauzan Edy Purnomo, Takanori Noro, Tamotsu Houzen, Kazuyuki Saito, Masaharu Takahashi, and Koichi Ito, "Development of electronically controlled array antenna system for ETS-VIII applications", Proceedings of iWAT 2008, Chiba, Japan, Mar. 2008.