Abstracts

Experimental study of large rectenna array for microwave energy transmission

N. Shinohara and H. Matsumoto. "Experimental study of large rectenna array for microwave energy transmission." 1998 Transactions on Microwave Theory and Techniques 46.3 (Mar. 1998 [T-MTT]): 261-268.

For a field experiment on microwave power transmission (MPT) which was jointly conducted by the Radio Atmospheric Science Center of Kyoto University, Robe University, and Kansai Electric Power Company from 1994 to 1995, we had developed and tested a new type of rectenna (rectifying antenna) based on a circular microstrip antenna (CMA). A square shape of array with an area of 3.2 m/spl times/3.6 m was then constructed using the developed rectennas for experiment. The whole rectenna array is composed of 256 sub-arrays, each with nine rectenna elements. We place the rectenna sub-array with better RF-DC conversion efficiency in the central area of the whole rectenna array. Such spatial optimization is needed because the power density of the microwave beam used in the experiment has a spatial gradient with a peak at the center of the beam. We then examined dependence of the rectenna array characteristics on the electrical connection of the sub-arrays. The difference of the output DC power of the whole array for five different electrical connections is within 5%. The load characteristics, therefore, suffers little change even if the electrical connection of the rectenna sub-array is changed.

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