

Diversity Performance of Modulated Scattering Antenna Array with Switched Reflector

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1 Introduction

The previous researches on the modulated scattering antenna array (MSAA) have shown that the second-order intermodulation scattering signal is relatively low compared with the direct received signal [1]. In this report, a switched reflector is used to solve this problem. The diversity performance of the MSAA with a switched reflector is investigated. It is shown that the diversity performance of MSAA can be improved by mounting a switch on the reflector.

2 Configuration and principle of MSAA with a switched reflector

The configuration of MSAA with a switched reflector is shown in Fig.1. As been shown, a switched reflector is mounted near by a modulated scattering element (MSE). When the switch is operated from "Short" to "Open", the received power of MSAA versus incident angle is different. Therefore, selection diversity can be realised.

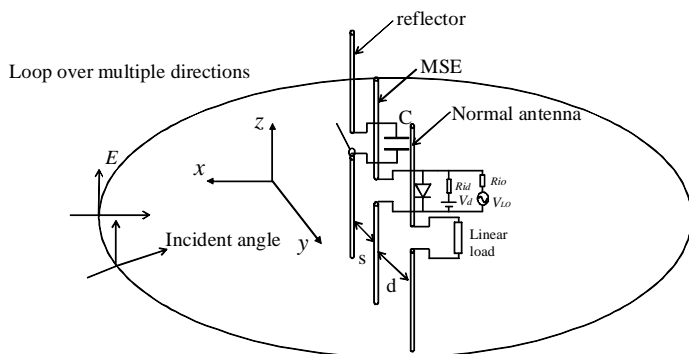


Fig. 1 Geometry of modulated scattering dipole antenna array with a switched reflector.

3 Simulation and Results

In the simulation, length of reflector, MSE and normal antenna is 0.6λ , 0.5λ and 0.5λ , respectively. Fig. 2 shows results of the received power of MSAA versus incident angles in the free space. It is noticed that when a state of the switch is changed from "Short" to "Open", received power level of MSAA have a remarkable difference with various incident angles. The cumulative distribution function (CDF) of the received power of MSAA is shown in Fig. 3. It is found that the performance of MSAA can be improved by introduction of

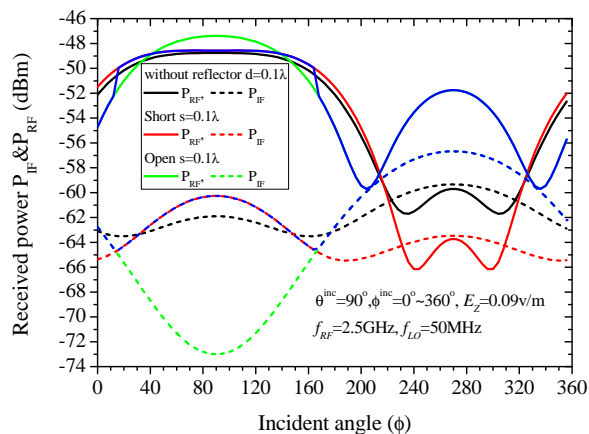


Fig. 2 Results of the received power of MSAA versus incident angle.

the switch on the reflector.

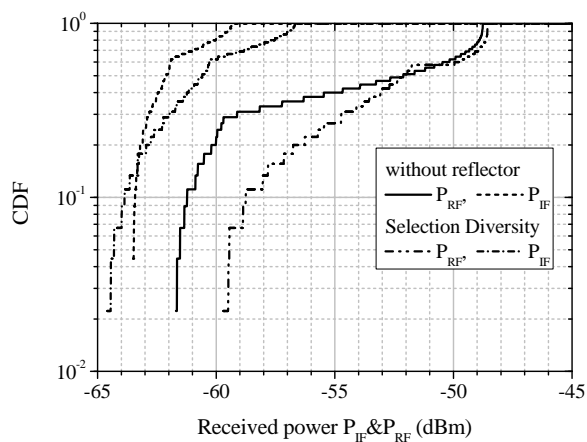


Fig. 3 CDF of the received power of MSAA.

4 Conclusions

The diversity performance of MSAA has been analyzed in this report. It has been found that when the switched reflector is mounted near by MSAA, the selection diversity can be used to improve the performance of MSAA.

References

- [1] Q. Yuan et al., *IEICE Electro. Express*, vol. 2, No. 20, pp. 519-522, Oct. 2005.