Proc. of the Intl. Conf. on Nanotechnology for Better Living, 2016
Editors K. K. Kar, A. Shah and R. Sharma
Vol. 3, No. 1, p. 161
doi:10.3850/978-981-09-7519-7nbl16-rps-161

A wideband plasmonic CPW fed optical antenna

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In this paper we report a comparative study of the characteristic impedance for the nanostrip waveguide (NSW) [1] and the plasmonic coplanar waveguide (CPW). The coplanar structures have been received as a promising candidate for an alternative to the nanostrip technology [2] and have a wide range of realizable impedance in comparison to NSW. Impedance range is (8Ω-30Ω) in the case of NSW; while it is (10Ω-220Ω) for plasmonic CPW. Plasmonic waveguides supporting sub-wavelength transmission and manipulation are the essential structures to enable incorporation of ultra-compact plasmonic devices.

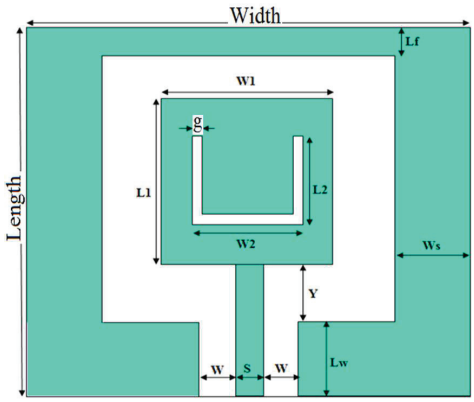

Figure 1: Structure of wideband Plasmonic CPW fed optical antenna

A wide band Plasmonic CPW fed rectangular patch antenna for optical communication is also presented in this paper. The antenna has compact size of 1000 nm x 1000 nm. The proposed optical antenna emits a directional beam with good directivity and radiation efficiency. The proposed antenna has a very wide bandwidth which is useful to communicate in all optical windows. Proposed wideband plasmonic CPW fed optical antenna structure is shown in Figure 1. The simulated characteristics of the proposed wideband plasmonic CPW fed optical antenna are shown in Figure 2. The simulation results show that the radiation efficiency of proposed antenna is 82% at 1550 nm and 51.32% at 1350 nm wavelength. The directivity at 1550nm is 4.03 dBi and at 1350 nm is 3.74dBi.

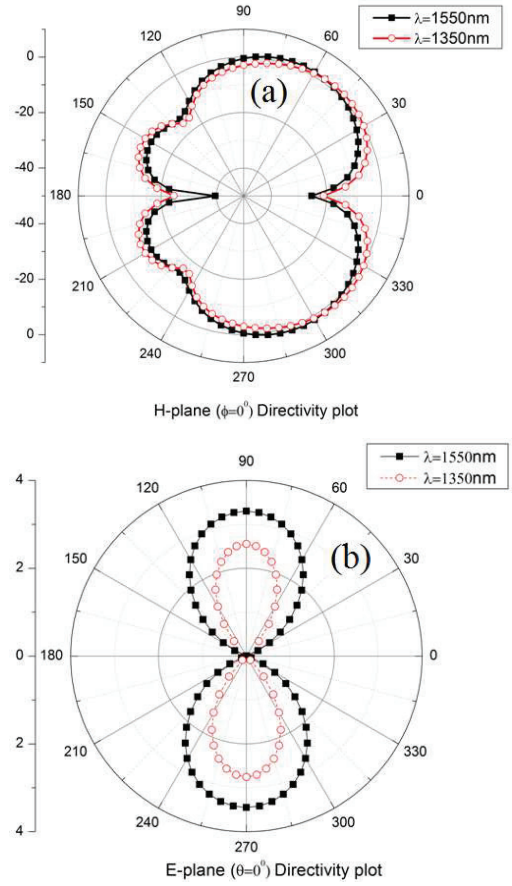

Figure 2: (a) Simulated E-Plane directivity plot (b) Simulated H-plane directivity plot

References

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