Influence Of The Metal Oxide Ohmic Resistance Of Energy Saving Glass On The Transmission Of Gsm Signal Using Bandpass Frequency Selective Surface

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Abstract

Recently, energy saving glass is commonly applied in the modern engineered building. This is due to its advantages of keeping the heat inside the building in winter while rejecting the heat when in summer. The typical energy saving glass is made by applying a very thin metallic oxide such as silver oxide or tin oxide on one side of the float glass. But at the same time, it has the disadvantages of attenuates useful microwave frequencies that ranging from 0.8 - 2.2 GHz. The example of the microwave frequency at this range are GSM mobile signal, GPS and personal communication. Frequency selective surface (FSS) has been introduced to overcome this drawback of energy saving glass. In this study, the transmission of the microwave signal is observed through the simulation using Computer Simulation Technology Microwave Studio. Bandpass frequency selective surface of cross dipole shape is used for the simulation. In the simulation, conductivity and electrical properties of glass and metal oxide thin film are important. The microwave transmission was evaluated at various sheet resistance of metal oxide thin film. The results show that the minimum transmission lost increased with the ohmic resistance increased. On the other hand, the peak frequency at various sheet resistance shows constant value at around 1.25-1.30 GHz. The full width half maximum of the microwave transmission increases with the sheet resistance value. The results suggest that FSS structured metal oxide thin film with lowest sheet resistance transmits more signal in the range for GSM phone signal.

Keywords: Frequency selective surface (FSS), GSM signal, thin film deposition and sheet resistivity.
at 8 sccm of oxygen flow rate. However, the oxygen emission intensity increased drastically with RF power at 16 sccm of oxygen flow rate. The correlation between the plasma properties and copper oxide deposition rate will be discussed at the conference.

Keywords: Copper oxide; Reactive magnetron sputtering; Optical emission spectroscopy.