

## High gain dual-band couple feed transparent THz antenna for satellite communications

### ABSTRACT

An Indium-doped tin oxide (ITO) based optically transparent aperture coupled rectangular patch antenna is resonated at 0.750 and 1.1 THz and then its performances is analyzed. The aperture couple feed method has been used to feed the antenna. The antenna characteristics such as bandwidth and radiation properties are investigated. The proposed antennas' specifications are investigated and then compared with both gold, copper and conventional aperture coupled rectangular antenna at the desired resonant frequencies (0.75 and 1.1 THz). Then to improve performance of the antenna, the patch is covered by a layer of Carbon Nano Tube (CNT). The proposed transparent antenna have achieved impedance bandwidth of 38% and 19% in the band of 0.75 GHz and 1.1 THz respectively. The proposed antenna has a peak gain of 7.7 and 10.3 dB which is better than conventional rectangular patch antenna gain; besides, the radiation efficiency is more than 85% across the operation frequency band. The design technique was verified through the simulation and the results show its capability to improve overall performance of the THz antennas.

**Keyword:** Transparent; Dual bands; Shrunk size; Loss; Performance