

## X-band Substrate Integrated Waveguide Rotman Lens

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This paper presents a novel substrate integrated waveguide (SIW) for X-band sensing applications. It employs a SIW Rotman Lens (RL) as a beam switching network. A prototype lens is designed with 7 beam ports and 9 array ports. The simulated results around the frequency of 10-GHz demonstrate the validity of the proposed design and scanning capability over  $\pm 24^\circ$ . The design process of the proposed microwave lens for X-band sensing application is implemented in SIW technology. In this work, a new lens with SIW technology is proposed to feed an array antenna to generate multiple beams. Since multiple beams are possible to be simultaneously obtained by reusing the antenna aperture, frequency and multiple functions can be incorporated in a single electronic system. The simulated results around the frequency of 10-GHz demonstrate. The proffered lens, which is comprised of seven beam ports, nine array ports and eight dummy ports, was designed to operate at the center frequency of 10-GHz, on an RO5880 substrate with electric permittivity of 2.2 and thickness of 0.508mm. The proposed Rotman lens is designed for a nine linear array radiation elements. Seven beam ports were implemented in the proposed lens to generate seven beams at  $0^\circ$ ,  $\pm 8^\circ$ ,  $\pm 16^\circ$  and  $\pm 24^\circ$ , respectively.

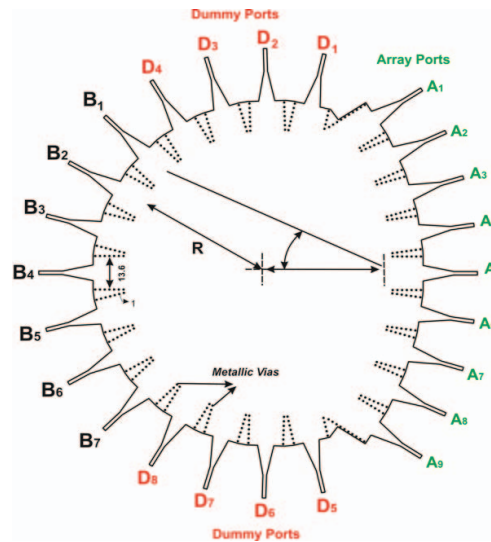


Fig. 1. Geometry of the realized SIW Rotman lens