

Design and Simulation of a Corrugated Polarizer and Waveguide-based OMT for a 129 GHz VLBI Receiver of KVN

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In millimeter-wave VLBI systems, dual-circular polarization observations are generally performed. As the highest frequency band of KVN(Korean VLBI Network), a 129 GHz band receiver is being designed for prototype. To reduce the receiver noise temperature, it is necessary that passive components including polarizer and OMT are inserted into the cryogenically cooled dewar. Traditionally septum polarizers are used at lower frequencies like 22 and 43 GHz bands because of its simplicity. But this type polarizer has relatively narrow bandwidth and is difficult to be fabricated and assembled at higher frequencies. To overcome these drawbacks, corrugated phase shifter or polarizer integrated into waveguide-based OMT is expected to be employed for the 129 GHz VLBI receiver of KVN. Intensive simulations using commercially available tool like CST MWS are being carried out to optimize and predict the performance of the proposed polarizer and OMT. In this paper, the design and theoretically calculated performance of our prototype polarizer and OMT for the 129 GHz band receiver will be presented.