A novel design of feeding Microstrip Patch Antennas (MPAs) using Half Mode Substrate Integrated Waveguide (HMSIW) technique is proposed. The design is based on the half-mode circular SIW cavity operating at TM_{010} mode. The proposed antenna structure is made of a single-layer substrate and fed by a 50 Ω microstrip line. This antenna has attractive features including wide bandwidth, low profile, and high radiation efficiency. Also, it is easy to integrate the MPA with planar circuits. The whole structure is numerically evaluated using HFSS software package. Results show a simulated impedance bandwidth (S_{11}(dB) ≤ -10 dB) of 9.6%, gain up to 7.5 dB and radiation efficiency is around 95%.

KEYWORDS: Substrate Integrated Waveguide (SIW), Circular Cavity, Microstrip Patch Antenna.

II. ANTENNA STRUCTURE

Geometry of the proposed antenna is shown in Fig. 1. It consist of a rectangular patch located on the top surface of the substrate layer which coupled by a semi-circular cavity. This structure is made of single layer and an inset microstrip feed line is used for feeding the cavity. The semi-circular cavity is formed by metallic vias and a dielectric aperture. In fact,