University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Applied Science

of

FARZEEN IQBAL

BSc (University of Victoria, 2010)

"Design of Substrate Integrated Waveguide H-Plane Horn Antenna with Symmetric Beam"

Department of Electrical and Computer Engineering

Thursday, July 27, 2017
10:00 A.M.
Engineering and Computer Science Building
Room 467

Supervisory Committee:
Dr. Jens Bornemann, Department of Electrical and Computer Engineering, University of Victoria (Supervisor)
Dr. Poman So, Department of Electrical and Computer Engineering, UVic (Member)

External Examiner:
Dr. Colin Bradley, Department of Mechanical Engineering, UVic

Chair of Oral Examination:
Dr. Neil Burford, Department of Chemistry, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

Millimeter-wave Substrate Integrated Waveguide (SIW) technology presents itself as the most viable solution for the development of RF systems. It is a cost- effective solution, suitable for mass production of such systems. Like planar circuits, SIW structures are compact, light weight and easy to fabricate. They also preserve some of the major advantages of metallic waveguides, namely, low loss, high quality factor and high power handling capabilities.

In RF systems, rectangular waveguide horns have found various applications due to their exceptional radiation properties. From their simple construction, ease of excitation, usefulness and high gain, they are readily used as feed component in various RF systems, they also aid as the standardization for calibration and gain measurements of other high gain antennas. We are aware that, in an H-plane horn antenna, the rectangular waveguide is ared in the direction of the H-field. A large aperture in the H-plane presents the narrower beam whereas a small aperture in the E-plane gives a wider beam. In this research, the design of a SIW H-plane horn antenna with an approximately symmetric beam in both the E and H-planes is proposed, using the commercially available electromagnetic field solver CST Microwave Studio to design and simulate proposed antenna characteristics and performance. Also, radiation patterns are analyzed and in order to validate the simulation results, measurements are performed on a fabricated prototype antenna.