## *ABSTRACT*

*Weather radar is a telecommunications technology used to analyze weather events, provide early warning of extreme weather, determine rainfall and measure range with precision in various weather conditions. Weather radar focuses on getting good resolution so that it can detect relatively small targets at both near and far distances. In this study, a "4x4 MIMO Microstrip Antenna with Butler Matrix for X-Band Weather Radar Applications at 9.4 GHz frequency was designed" in order to achieve good resolution and performance, and to increase the gain value, determine the results and effects of the butler matrix. MIMO model, array method and butler matrix are expected to achieve the desired specification. The desired parameters are VSWR 2, gain 8 dB, return loss -10 dB, bandwidth 60 MHz, unidirectional radiation pattern, mutual coupling -20 dB and correlation coefficient 0.2. This design uses AWR Design Environment software with FR-4 Epoxy substrate, relative dielectric constant 4.3, loss tangent 0.0265 and substrate thickness 1.6 mm. The results obtained have met the antenna specifications, namely VSWR, gain of 8042 dB, return loss, bandwidth, unidirectional radiation pattern, correlation coefficient. These results have met the specifications for microstrip antennas for weather radar applications with high bandwidth and gain and directional radiation patterns.*



***Keywords:*** *Weather Radar, Microstrip Antenna, MIMO, Butler Matrix, X-Band*