ABSTRACT

Weather Radar plays an important role in telecommunications technology which is widely implemented in several fields such as agriculture, transportation and weather prediction. The X-Band frequency weather radar antenna has the advantage of detecting particles in the air, but this antenna is still minimally used because it requires significant meteorological and climatological characteristics. The weather radar antenna also has a very small radius which requires an increase in the gain parameter and has an accurate direction. Therefore, an array method is needed, especially with 3x3 array elements, which can increase the gain value on the antenna. The 3x3 array method has a more directional radiation pattern so it can improve the quality of the signal received. In designing the 3x3 array antenna there are 2 designs, namely a 3x3 array antenna with a length between patches \lambda/2 and a 3x3 array antenna with a length between patches \lambda/4. Where the two designs have significant differences in value. On a 3x3 array antenna with a distance of \lambda/2, a working frequency of 10.2 GHz, return loss -15.092 dB, VSWR 3.094, bandwidth 325 MHz, gain 8.35 dBi, and the radiation pattern are unidirectional. Meanwhile, with a 3x3 array antenna with a distance \lambda/4, the working frequency is 10.3 GHz, return loss -11.165 dB, VSWR 5.369, bandwidth 200 MHz, gain 7.37 dBi, with a unidirectional radiation pattern. Through these 2 designs, the use of an array antenna with a patch length of \lambda/2 is better than \lambda/4, because the distance \lambda/2 provides a good balance between gain and bandwidth so that the antenna can achieve high gain and a fairly wide bandwidth. . while the distance \lambda/4 will shift the bandwidth, which is not suitable for weather radar antenna applications.

Key words: 3x3 array antenna, gain, weather radar, X-Band frequency