

ABSTRACT

The density of cellular communication in Indonesia continues to increase along with the growing number of mobile users each year. This rapid growth has resulted in higher traffic within cellular networks, which in turn triggers interference originating from unknown or unwanted signal spectrums. Such conditions may reduce communication quality and disrupt the stability of network services. To overcome this problem, a reliable interference detection device is required, one of which can be realized through the utilization of an antenna with specific characteristics.

In this research, the design and simulation of a microstrip log periodic dipole array (LPDA) antenna were carried out to function as a cellular interference detector. The antenna is designed to operate within a frequency range of 700–3600 MHz, thereby covering multiple generations of cellular networks in Indonesia, including 1G, 2G, 3G, 4G, and 5G. The antenna design emphasizes a relatively small and lightweight structure, while maintaining high gain and wide bandwidth. The main objective of this design is to enhance flexibility in antenna usage, particularly for interference detection in practical applications.

The designed log periodic dipole array antenna applies key parameters of $\tau = 0.925$, $\sigma = 0.175$, and a target gain ranging between 5 and 8.5 dB. The fabrication process is carried out using microstrip technology, with FR4 as the dielectric substrate, while the antenna elements are made of copper due to its excellent conductivity. The feeding of the transmission element employs the feedline method with a width of 2.90 mm, resulting in a characteristic impedance close to 50 ohms. With this design, the log periodic dipole array antenna is able to meet the required specifications to effectively detect various cellular signal interferences across a wide spectrum.

Keywords: *Interference, Log-Periodic Dipole Array, compact size, feedline*