ABSTRACT

This study discusses the implementation and testing of an FM-RDS radio transmitter system based on Raspberry Pi for community radio station needs. The system utilizes the pi_fm_rds module as the main software, a jumper cable as the antenna, and an SDR (Software Defined Radio)-based receiver for broadcast verification. The implementation process includes software installation and configuration, MP3-to-WAV file conversion, and audio transmission accompanied by RDS data such as Program Service (PS) and Radio Text (RT). Test results show that the system is capable of broadcasting audio with good quality while embedding RDS information in real-time, which can be correctly received and displayed by the receiving device. Using a 20–30 cm jumper cable antenna provides an effective range of approximately 1–5 meters indoors and up to 10–20 meters outdoors, with GPIO output power of around 10–15 mW without amplification. Factors such as antenna length, transmission power, environmental conditions, and connection quality influence the system's performance. This implementation not only provides a means of local broadcasting but also serves as a learning medium for broadcasting technology for communities and students.

Keywords: Raspberry Pi, FM radio transmitter, RDS, pi_fm_rds, community radio station, audio streaming, digital broadcasting, MP3 to WAV conversion, jumper cable antenna, SDR.