

RINGKASAN

ANALISIS PEMILIHAN BAHAN DAN KETEBALAN *SHIELDING* TERHADAP PENGURANGAN EMI PADA *CONTROLLER* NIRKABEL BERBASIS RFM95W DAN ARDUINO NANO

Firdaus Reza Mahendra

Emisi elektromagnetik (EMI) merupakan gangguan pada perangkat elektronik yang dapat memengaruhi performa dan kompatibilitas elektromagnetik (EMC) perangkat lain, termasuk pada perangkat transmisi nirkabel berbasis modul LoRa RFM95W dan Arduino Nano sehingga diperlukan mitigasi dengan metode *shielding* seperti Faraday Cage. Penelitian ini menganalisis pengaruh bahan dan ketebalan *shielding* terhadap pengurangan emisi elektromagnetik (EMI) pada perangkat berbasis modul LoRa RFM95W dan Arduino Nano dengan bahan *aluminium tape*, *copper tape*, dan *silver tape*, dengan ketebalan satu hingga tiga lapis. Pengujian dilakukan sesuai standar CISPR 16 dan 32 menggunakan alat seperti *Semi Anechoic Chamber* (SAC), *Full Anechoic Chamber* (FAC), antena pengukur, dan perangkat lunak Electra 5.1.

Hasil penelitian menunjukkan bahwa *silver tape* memiliki kemampuan terbaik dalam mereduksi EMI berkat tingkat konduktivitasnya yang tinggi. Penambahan lapisan *shielding* meningkatkan kemampuan peredaman EMI, meskipun peningkatan tersebut hanya signifikan hingga lapisan kedua. *Aluminium tape* dan *copper tape* tetap menjadi alternatif yang baik karena harganya lebih ekonomis.

Kata kunci : *Electromagnetic Compatibility*, *EMI Shielding*, *Shielding Faraday Cage*, *CISPR 16*, Sistem Transmisi Nirkabel, Modul RFM95W, LoRa.

SUMMARY

ANALYSIS OF MATERIAL SELECTION AND SHIELDING THICKNESS ON EMISSION REDUCTION IN WIRELESS CONTROLLER BASED ON RFM95W AND ARDUINO NANO

Firdaus Reza Mahendra

Electromagnetic emission (EMI) is a disturbance in electronic devices that can affect the performance and electromagnetic compatibility (EMC) of other devices, including wireless transmission devices based on LoRa RFM95W and Arduino Nano modules so that mitigation is needed with shielding methods such as Faraday Cage. This study analyzes the effect of shielding material and thickness on the reduction of electromagnetic emission (EMI) on devices based on LoRa RFM95W and Arduino Nano modules with aluminum tape, copper tape, and silver tape, with a thickness of one to three layers. Tests were conducted according to CISPR standards 16 and 32 using tools such as the Semi Anechoic Chamber (SAC), Full Anechoic Chamber (FAC), measuring antenna, and Electra 5.1 software.

The results show that silver tape has the best ability to reduce EMI due to its high conductivity. The addition of a shielding layer improves the EMI reduction capability, although the improvement is only significant up to the second layer. Aluminum tape and copper tape remain good alternatives because they are more economical.

Keywords : Electromagnetic Compatibility, EMI Shielding, Shielding Faraday Cage, Wireless Transmission System, Modul RFM95W, LoRa.