

PORNPAT PRAMERUDEECHAISAK : READING RANGE
ENHANCEMENT FOR UHF RFID READER BY ADDING THE
STRUCTURE OF METAMATERIALS. THESIS ADVISOR :
ASSOC. PROF. RANGSAN WONGSAN, D.Eng., 96 PP.

READING RANGE ENHANCEMENT/UHF RFID READER/METAMATERIALS

Nowadays, the UHF RFID reader is more widely used and rapidly growth but its cost in the markets still be high. This work presents the method for improving the performance of UHF RFID reader's antenna to increase the reading range more than the conventional RFID reader at center frequency 910 MHz. The proposed structure is designed as the array of split-ring resonators (SRRs), which located at the front of the conventional RFID reader without any modifying or adding RF amplifier into the circuit of the UHF RFID reader, whereas the metallic sheet has been placed at the backside of UHF RFID reader as the reflector. The proposed structure of metamaterials can improve the gain around 9.7 dB at the operating frequency of 910 MHz when compared to the original one with the reflection coefficient (S_{11}) is around -18.26 dB and cover the desired bandwidth of UHF RFID (860 – 960 MHz). After that, the prototype of the SRR structure is fabricated and tested, then compared to the calculated results simulated by using CST software. Finally, we found that the prototype structure can increase the reading range up to 370 % compared to the conventional UHF RFID reader.

School of Telecommunication Engineering Student's Signature Pornpat

Academic Year 2018

Advisor's Signature W. Rangsan