

# PERFORMANCE AND SENSITIVITY RFID SENSOR AND DISRUPTION

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## Abstract

This paper presents experiment sensitivity of RFID sensor dan disruption. The experiment was done by varying the distance, material brokers, environmental disruption and third combination trial. The results of these experiments showed that if the existence of a barrier in the form of books, glass, plywood and wood where the average distance between the RFID and 6cm obstructions can be detected. While in the car plate and and handy talky was not detected due iron to blocking wave readable by RFID and the handy talky are difrekuensi UHF band.

## 1 INTRODUCTION

### 1.1 Introduction to RFID

RFID starter kit is a development tool based RFID reader type ID-12 which has been in complete with RS-232 communication lines and the buzzer as an indicator of reading and writing LED indicator. This module working frequency 125 kHz for a card formatted input voltage EM4001 & 9 -12 VDC power supply.

RFID tag with an RFID reader to communicate with each other, where the RFID tag and RFID reader should be in-tune at the same frequency. Frequency systems can be configured to work on various frequencies, starting from the UHF (Ultra High Frequency) and even a microwave wave. RFID (Radio Frequency Identification) using gelombang RF (Radio Frequency) and wireless technology with working frequencies between 50 KHz to 2.5 GHz.

RFID consists of 3 main components: RFID tags, RF transceiver that allows you to generate RF signals and RF reader that is a useful electronic devices to retrieve data from an RFID tag that in radiated through the RF waves. RFID tags contain a microchip and antenna coil.

### 1.2 PROBLEM FORMULATION

See RFID as one of the reliable identification technology, which include being able to read a data object of a certain size without going through direct contact (contactless) and do not necessarily align with the object that is read, also can store information on the RFID tag.

### 1.3 STATE OF THE ART

By conducting experiments in various conditions, including:

1. Reliability in the distance
2. Reliability in obstruction object
3. The reliability of noise

## 2 APPROACH

RFID tags that hold the codes as a substitute for self-identity. Commonly used in the process of this implantation is passive RFID. Based on its activity, RFID tags can be distinguished into two, namely the active tags and passive tags. Active tags tend to be bulky and more expensive price tag on it because it is actively transmitting data to the RFID reader. While passive tags receive power supply from the magnetic field generated by the tags themselves with RFID reader to generate a series of microchip contained in the tag and will reflect back RF wave transmitted by the RFID reader to him, along with information on the tag by doing the wave modulation which reflected these.

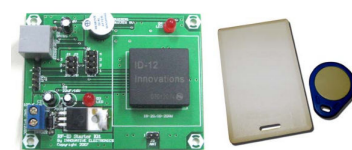


Figure 1: Modul RFID Starter Kit

Table 1: Results Sensors Against Type In Car Plate and Kasa Iron With 0.1 cm thickness

TYPE OF BARRIER	X1(cm)	X2(cm)	XD(cm)	X3(cm)	HASIL
PLATE CAR / gauze IRON	2	1	0,1	1 - 4	N
PLATE CAR / gauze IRON	2	2	0,1	1 - 3	N
PLATE CAR / gauze IRON	2	3	0,1	1 - 2	N

Table 2: Results Sensors Against Type In Glass with thickness of 0.5 cm

TYPE OF BARRIER	X1(cm)	X2(cm)	X3(cm)	XD(cm)	HASIL
GLASS, BOOKS, FABRIC gauze, etc.	2	1	0.5 and 2	1	Y
GLASS, BOOKS, FABRIC gauze, etc.	2	1	0.5 and 2	3	Y
GLASS, BOOKS, FABRIC gauze, etc.	2	1	0.5 and 2	4	N
GLASS, BOOKS, FABRIC gauze, etc.	2	2	0.5 and 2	2	Y
GLASS, BOOKS, FABRIC gauze, etc.	2	2	0.5 and 2	3	N
GLASS, BOOKS, FABRIC gauze, etc.	2	3	0.5 and 2	1	Y
GLASS, BOOKS, FABRIC gauze, etc.	2	3	0.5 and 2	2	N

## 2.1 RFID Reader

RFID reader is a device that can communicate without direct contact with a tag for identification when connected in an association of communications data without direct contact (wireless) at radio frequencies. In the RFID reader ID-12 This has 11 pins. For physical and operational characteristics as shown in the picture below



Figure 2: Reader ID-12

equipped with a variety of materials that will be used as a barrier to the communication between tag and reader

- (c) Conducting experiments on a tool that has been designed.

### 3. Testing tools

Equipment that has been created and then tested with various state and do check whether they have been in accordance with what has been planned

## 3 RESEARCH SCENARIO

The author did some writing method used in compiling and analyzing this thesis are:

### 1. Library Studies

The author uses several written sources as reference information obtained from library books, internet sites, datasheet and related journals for reference and comparison.

### 2. Design Tools

In designing a tool that made the author, namely:

- (a) Prepare the tools used for the purpose of experiments that have been designed
- (b) Conduct planning and designing security systems with the RFID module is

## 4 ANALYSIS DATA & RESULT

### 4.1 Sensor sensitive to changes in distance or without Conductor

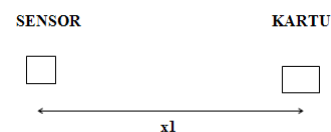


Figure 3: The distance between the sensor and Cards

Table 4: Results Sensors Against Interference in Handy Talky

TYPE OF BARRIER	X1(cm)	XD(cm)	X2(cm)	RESULT
HANDY TALKY (MOTOROLA T5720)	2 - ~	0.5	1 - ~	N

Table 5: Results Sensors against Interference in Router Wifi

TYPE OF BARRIER	X1(cm)	XD(cm)	X2(cm)	Result
WIFI	2	1	1	Y
WIFI	2	1	2	Y
WIFI	2	1	3	Y
WIFI	2	1	4	N

Table 3: Results on Change of Proximity Sensor

x1(cm)	RESULT
1	Y
2	Y
3	Y
4	Y
5	Y
6	Y
7	N
8	N

Description: Y= Response, N= No Response

Based on experiments that have been done with the author in table 4 and table 2, the conclusion as follows:

- Range furthest readings from RFID readers that the author uses is  $\pm 6$  cm.

#### 4.2 Sensor sensitive to changes in the type / size and variety of barrier thickness, such as (paper, metal, digroundkan metal, wood, glass, etc.).

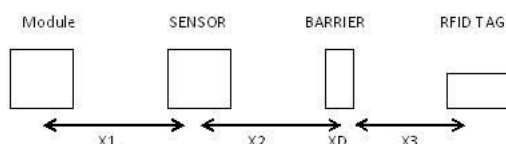


Figure 4: Distance between Sensors, Barriers and Cards

Based on experiments that have been done with the author , the conclusion as follows:

- Total types of barrier = 6 cm maximum

- RFID Reader can not read the tags when obstructed by the material made of iron which is exemplified in the iron plate above.

#### 4.3 Sensitive Sensor Distance and Disturbance on wifi and handy talky

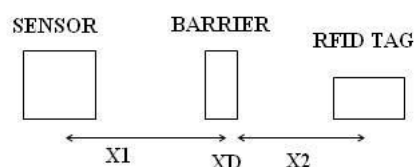


Figure 5: Distance between Sensors, Barriers and Cards

Based on experiments that have been done with the author in table 4and table 5, the conclusion as follows:

- WIFI Router can still be detected because this type of different frequency bands with RFID sensors.

For Handy talky not detected because it is located on the UHF frequency band (868 to 956 MHz) is very disturbing because the minimum distance was not detected.

## 5 DISTANCE SENSOR SENSITIVE TO CHANGES IN

Table 6: Results Combination Against Censorship Hearing On Car With Plate Thickness 0.1 cm

TYPE OF BARRIER	X1(cm)	XD(cm)	X2(cm)	Result
CAR PLATE WITH BOOK	2	0.1	3	Y
CAR PLATE WITH BOOK	3	0.1	2	Y
CAR PLATE WITH BOOK	4	0.1	1	Y

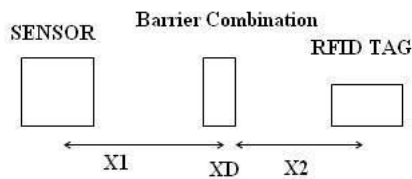


Figure 6: Distance between Sensors, Barriers and Cards

Based on experiments that have been done with the author, the conclusion as follows:

- Total types of barrier kinds of books with a glass, a book with plywood, a book with wood = 6 cm maximum.
- For Car Plate and handy talky still not be detected so as not to influence it with a combination.

## 6 CONCLUSION

Tools can serve as an access control experiments using RFID. Hasil performance is the reliability of RFID on various conditions of distance and the Environment. The test produces results that

1. Reading Distance: Maximum distance between sensor with a card reading tags of 6cm.
2. Disorders intermediaries:
  - (a) Books with a thickness of 1 cm: can be accessed

- (b) Book with a thickness of 2 cm: can be accessed
- (c) Glass: accessible
- (d) Wood can be accessed
- (e) Iron plate: not accessible
- (f) Handy Talky: inaccessible
- (g) Mosquito netting fabric type: can be accessed
- (h) Mosquito netting types of ferrous metals: not accessible

3. Noise Noise: Noise that light does not

### 6.1 RECOMMENDATION

- Research to increase the reliability of radio frequency interference
- Research the sensor and to laying the practical implementation

## References

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