# Toll Collection System using RFID (613 highway) jubail-Dhahran highway

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**Abstract:** RFID is a modern technology which provides several benefits for many applications around the world. Highway 613 is needed for regular and continuous maintenance to make the highway road much better and provide many facilities for the users RFID is a modern technology which provides several benefits for many applications around the world. Radio frequency identification (RFID) is a technology that enable the electronic and wireless labeling and identification of objects humans and animals .Highway 613 is needed for regular and continuous maintenance to make the highway road much better and provide many facilities for the users. This paper is aimed to automate highway 613 for this purpose using RFID,

**Keywords:** RFID, RFID reader, RFID tag, RFID sticker, PC, JIC.

**Introduction:**

There is another name for RFID called dedicated short range communication [DSRC]. There are three elements which are very important, Tag or Transponder - Reader or Interrogator - Data base (software) or computer. RFID is work when radio frequency reader scans the Tag for data and sends the information to data base which stores the data contained on the tag. The purpose of project is to use RFID as Toll Collection to make the highway payable automatically which we will use a unique RFID tag code on each vehicles. Further information will be discussed in this project. APassive Tag does not need for internal power supply because it's getting power from incoming radio waves from the reader and it is most used nowadays. Active Tag is need for an internal power supply in their circuit and for sending the response to the reader. Also it uses its own power supply. Semi-Passive Tag is need for power supply for their internal circuit, but for sending the response it depend in the radio waves that coming from reader. RFID Reader is transceivers, when they both send and receive, particular radio frequency (RF). If the object which has RFID Tag is attached within the range of radio waves. Then, the RFID Tag sends a feedback to the RFID reader. The RFID reader is taking from Tags, and then sends the data that coming from the RFID reader to the computer for processing the information. The RFID reader is coming in mini-size such as handheld reader, or it can be larger like the door in the mall.

| Type of Frequencies | | Range of Frequencies (Hz) | Rang of Length ( m ) |
|---|---|---|---|
| 1 | Low band | 125 to 134 KHZ | 10 cm |
| 2 | High band | 13.56 MHZ | 1 m |
| 3 | Ultra-high band | 860 to 960 MHz | 10 to 15 m |

Table 1. Types Frequencies of RFID

## Background

The highway in Saudi Arabia is needed for regular maintenance and it's very overcrowded of car which leads to disruption the main road, and this overcrowding may cause some accidents for people who are going to their work. We found a solution after searching and screening about this problem which many people are arguing about it that cause troubles to them. The solution is depending on a toll tax collection to cover cost of regular maintenance by using RFID to collect the tax, saving the time and money.



**Figure-1: Google map exact location**



**Fig 2 613 Highway Checkpoint**

## Methodology

Our target is highway 613 which is located between in east province of kingdom of Saudi Arabia..It conn Highway613,also knownas the Dhahran–Jubail Highwayman important highway located in the Eastern Province of Saudi Arabia. It connects hahran in the south and Jubail in the north, Saudi Arabia's largest industrial cities, crossing the cities between which are Dammam, Saihat, Qatif, Safwa City and nearby Ras Tanura. The distance to Persian Gulf from the highway varies from 2 to14 kilometers, with 2 roads connecting it with King Fahd International Airport which is 15 kilometers to the west. The speed limit is 120 kilometers per hour (75 mph) and the highway suffers. From traffic jams most of the time. The region this highway serves has a total population of approximately 2.5 million. The significance of the region lies on the existence of three cities; Dhahran being a major oil administration center, Jubail being a major operations center for petrochemical industry, and Ras Tanura which is a major oil refining and shipping port. The highway is now 100 kilometres long. It has 3 lanes and 2 shoulders for. Each of the two sides.

**DATA FLOW DIAGRAM**

VEHICLE/TAG ⮕ READER ⮕ PC/SYSTEM
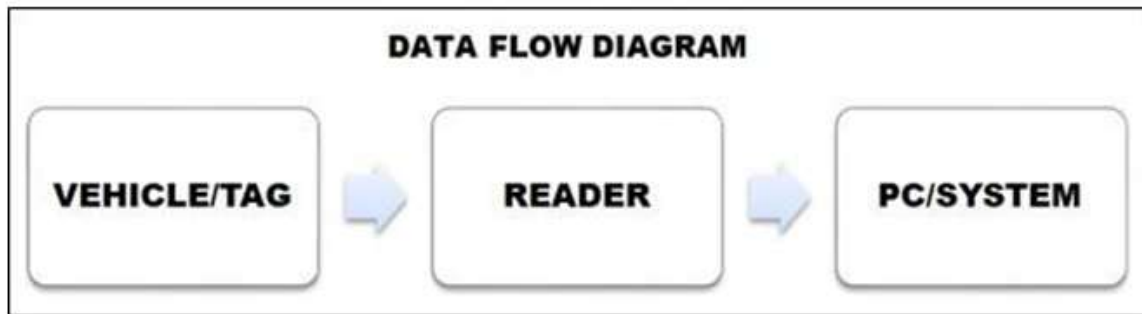
In the beginning of 2020, each vehicle has to using RFID Tag. There will be a RFID reader which connected to the system in Toll Station. The Toll Station is located in Jubail-Dammam Checkpoint as an example. First of all, the process is working when the vehicle enter into coverage area of the reader. Second, the RFID Tag is detected by the RFID reader, then after reading the code from RFID Tag will send it to the system. Which connected to the computer. The system will recognize the vehicle by the unique code. Then, it will collect the tax from the user of the road. The highway contains of three lines which two lines are for who has a RFID tag on his/her car, and one line is for who does not have a tag on his/her car he will be paid manually until the end of 2020. From starting on 2021, people who are using the 613 highway and does not have a RFID tag, they will receive a ticket from government. The purpose of our project is each car that drives in eastern province should have a tag on 2021
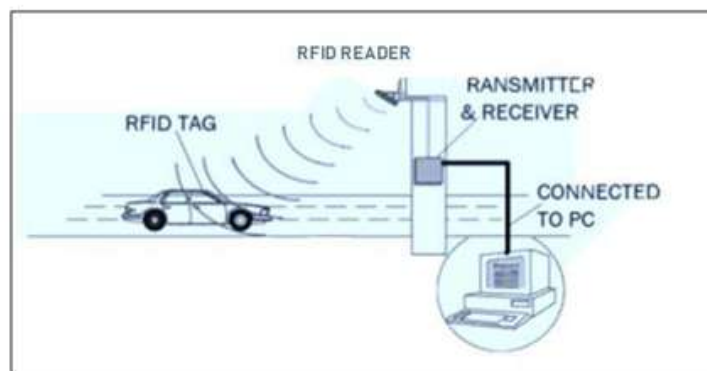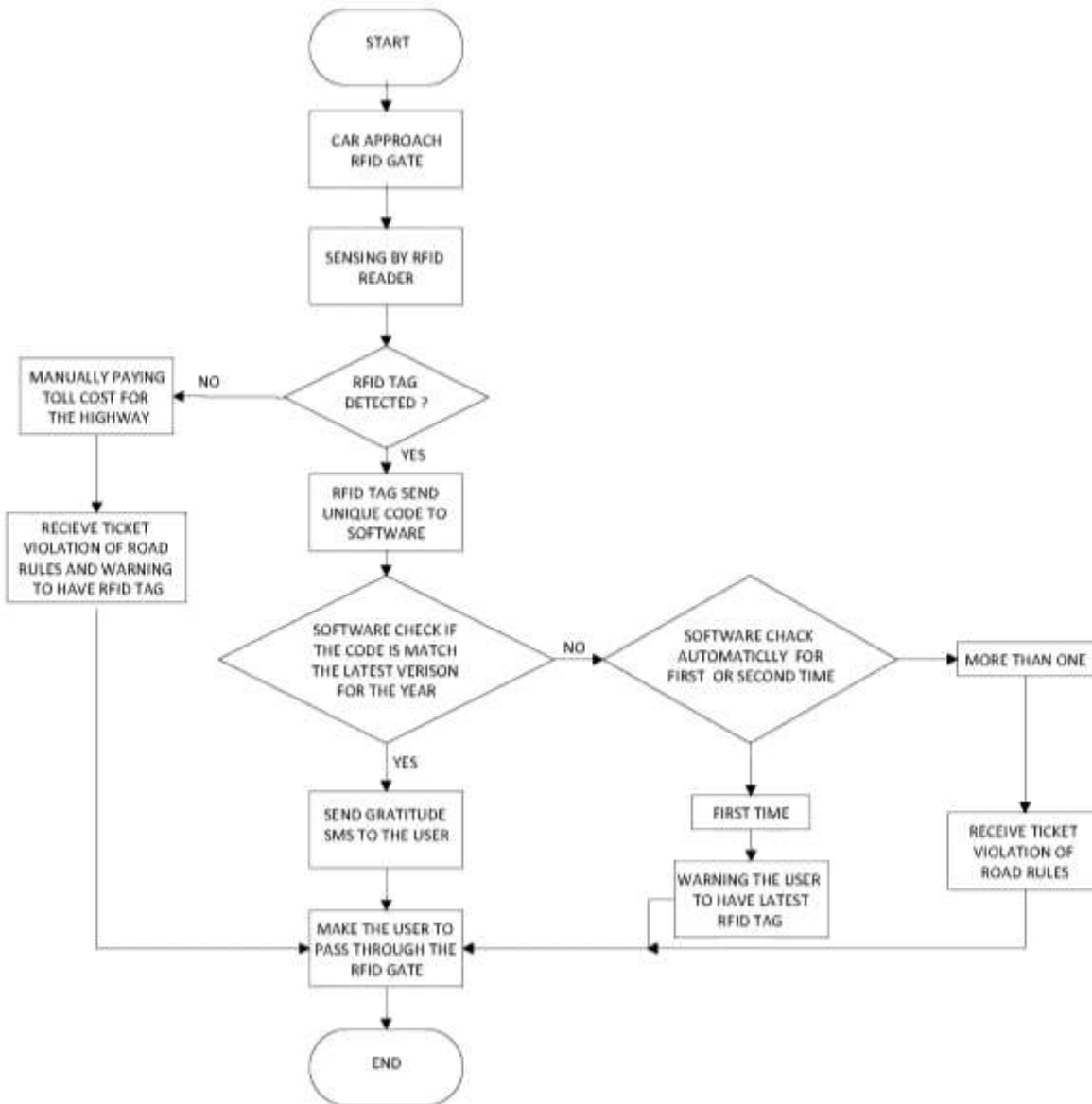






**Figure 3.Toll Collection System Using RFID (613 Highway) JUB-DHU**

**Flowchart diagram in figure-8 explaining detailed methodology of the project.**

**Conclusion:**

According to our research and studies, we believe our project will provide better services such as regular maintenance for road surface and reduce the crowded by using RFID on the checkpoint. This is will be very helpful for the government to maintain the highway with lower cost. RFID technology is need some handles before becomes widespread in the world. One of that major is the high costs and the others are privacy issue. In the long run, the RFID technology is perfect which would be a big helpful for the human being.

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