

Radio Frequency Identification (RFID)

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In news

Commission for Air Quality Management for Delhi-NCR has warned that commercial vehicles without RFID tags or inadequate balance in the tags, will not be allowed entry from January 1.

What is Radio Frequency Identification (RFID)?

- RFID is a technology behind Fastag which uses radio frequency waves to track the items and transfer the data without being in contact by reading and capturing the information stored on a tag which is attached to the object.
- It also uses electromagnetic fields to automatically identify and track tags attached to objects.
- An RFID system consists of a tiny radio transponder; a radio receiver and transmitter.
- A radio-frequency identification system uses tags, or labels attached to the objects to be identified.
- Two-way radio transmitter-receivers called interrogators or readers send a signal to the tag and read its response

How does it work?

When triggered by an electromagnetic interrogation pulse from a nearby RFID reader device, the tag transmits digital data, usually an identifying inventory number, back to the reader. This number can be used to track inventory goods.



Types of RFID tags

RFID tags are made out of three pieces: a microchip (an integrated circuit which stores and processes information and modulates and demodulates radio-frequency (RF) signals), an antenna for receiving and transmitting the signal and a substrate. The tag information is stored in a non-volatile memory. **The RFID tag includes either fixed or programmable logic for processing the transmission and sensor data, respectively.**

RFID systems can be classified by the type of tag and reader.

- **A Passive Reader Active Tag (PRAT)** system has a passive reader which only receives radio signals from active tags (battery operated, transmit only). The reception range of a PRAT system reader can be adjusted from 1–2,000 feet (0–600 m), allowing flexibility in

applications such as asset protection and supervision.

- **An Active Reader Passive Tag (ARPT)** system has an active reader, which transmits interrogator signals and also receives authentication replies from passive tags.

An Active Reader Active Tag (ARAT) system uses active tags awoken with an interrogator signal from the active reader. A variation of this system could also use a Battery-Assisted Passive (BAP) tag which acts like a passive tag but has a small battery to power the tag's return reporting signal.

Fixed readers are set up to create a specific interrogation zone which can be tightly controlled. This allows a highly defined reading area for when tags go in and out of the interrogation zone. Mobile readers may be handheld or mounted on carts or vehicles.

Usage of RFID

- In India, RFID technology is used in Fastags
- An RFID tag attached to an automobile during production can be used to track its progress through the assembly line
- RFID-tagged pharmaceuticals can be tracked through warehouses; and implanting RFID microchips in livestock and pets enables positive identification of animals.

A brief note on Fastag

- FASTag is a small sticker that needs to be stuck on your car's windshield.
- The sticker employs Radio-frequency Identification (RFID) technology to identify the vehicle and its associated payment option.
- When the sticker is scanned, the operator can directly debit toll charges from your bank account or attached wallet.
- This system eliminates the need for a manual point of sales machine for debit or credit cards and is extremely

fast.

- Toll booths are now equipped with RFID scanners and can automatically deduct toll charges within seconds.
- Users need to ensure that the tag's online wallet has sufficient balance and can easily top-it-up like any other utility.
- All toll collection points in India are being upgraded to have at least 75% lanes reserved for ETC (Electronic Toll Collection) tags.
- The roll-out of FASTag has been done under NPCI's (National Payments Corporation of India) National Electronic Toll Collection program.
- The program brought together a plethora of stakeholders ranging from highway operators to banks.