RFID = Radio Frequency Identification

RFID, no need for direct line of sight

Different types of RFID

Low Frequency (LF), typically between 30 Kilo Hertz and 300 Kilo Hertz, has short reading range up to a cm, reading speed is slow, very resistant to external resistances. Used for access control and for animal control.

High Frequency (HF), typically between 3 Mega Hertz to 30 Mega Hertz, has a longer reading range from 10cm to a metre, interferences affect HF RFID moderately. Used ticketing, payments and data transfer applications.

Ultra-High Frequency (UHF), typically between 300 Mega Hertz to 3 Giga Hertz, even longer reading range of more than 12 metres, very sensitive to interference, used for long distance tracking, like for rail cars and shipping containers.

Active RFID transmit their own signal using their own power, probably from a battery, usually operate at UHF, used on very large objects, reading from 100 metres away.

Collision Detection, important to allow reading of data, types of collision are reader collisions, where the readers are all trying to read the same tag, and tag collisions when multiple tags are trying to be read by the same reader at the same time.

**TAGS**

Micro Chip stores and processes information and controls radio frequency.

Antenna for sending and receiving signals.

Substrate to hold all other tag components together.

Tag information stored in non-volatile memory, Tag holds either fixed or programmable logic.

Active tags periodically transmit their data ID signal. A passive tag uses the radio waves of the receiver to operate, however it requires a power level roughly a thousand times more powerful than the active tags.

Tags can either be read only, where they will have been assigned a unique serial key by the factory that produced them, that is then used as a key in a database. Others may be read and write as much as they need to, having the ability to override the data, and specific data can be written by the user. Some tags may be written once, and then set after that permanently.

The RFID tag receives a message and then responds with its message and its unique identification. Some readers can read multiple tags at the same time due to them having unique identifiers on each tag.

**READERS**

Passive Reader Active Tag (PRAT) – has a passive reader, only receives signals from active tags. PRAT can be used from 1 to 600m so it is adaptable and can be used in tracking of objects and people.

Active Reader Passive Tag (ARPT) – active reader, sends out interrogation signals, and receives authentication signals from passive tags.

Active Reader Active Tag (ARAT) – active reader, receives an interrogator signal from an active tag, or if the tag is Battery assisted powered (BAP), so that it can transmit the response signal under its own power.

[RFID Tags: What Are They And How Do They Work? (nortechcontrol.com)](https://blog.nortechcontrol.com/rfid-tags#:~:text=RFID%20tags%27%20essence%20could%20be,receive%20and%20transmit%20the%20signal.)