

# Gemalto Explains

## The difference between contactless smart cards & RFID tags

### Overview — What happens in RF (radio frequency) communication:

- 1** When a contactless smart card or an RFID tag passes within range, a reader sends out radio frequency electromagnetic waves.
- 2** The antenna, tuned to receive these waves, wakes up the chip in the smart card or tag.
- 3** A wireless communications channel is set up between the reader and the smart card or tag.

The **contactless smart card** contains a microprocessor, a small but real computer that makes calculations, communicates both ways, remembers new information and actively uses these capabilities for security and many other applications.



**RFID tags** are devices that typically have a read-only chip that stores a unique number but has no processing capability. It is more like a radio-based bar code used mostly for identification (hence "radio frequency identification").

RFID chips are much smaller than smart chips



### Characteristics of a contactless smart card:

- Strong security capacities:
  - Mutual authentication before providing access to information.
  - Access can be further protected via PIN or biometric encryption to protect data on card during exchange.
  - Hardware and software protection to combat attacks or counterfeiting.
- Hundreds of security features mean an individual's personal ID, financial details, payment transactions, transit fares or physical access privileges can be safely stored, managed and exchanged.
- Read and write memory capacity of 512 bytes and up, with very large memory storage possible.
- Short distance data exchange, typically two inches.

### Characteristics of an RFID tag:

- Minimal security capacities:
  - One-way authentication; card cannot protect itself.
  - Insufficient storage for biometrics.
  - No on-chip calculations of new information.
  - Relies on static keys.
- Single function; used to help machines identify objects to increase efficiency. Example: inventory control.
- Small memory (92 bytes); often read-only.
- Larger distance data exchange, typically several yards


Because of their more restricted capabilities, RFID tags are generally cheaper.

# How it works

## Smart card technology

### What is smart card technology?

Smart card technology uses a computer and software with 100s of built-in security features.

The contacts on the surface of the device are connected...  ...to wires running from a computer chip under the surface.

The whole piece is embedded into a plastic card or hard token.



Smart card technology is used to create personal, portable security devices:

