



SNS COLLEGE OF ENGINEERING



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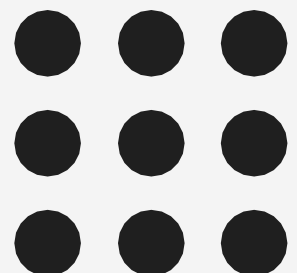
Department of Information Technology

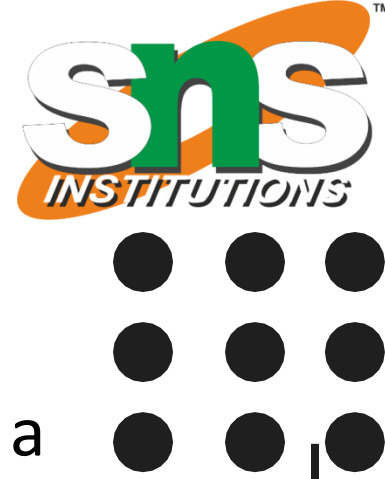
Course Name – 19IT503 Internet of Things

III Year / V Semester

**Unit 2 – FUNDAMENTAL MECHANISMS & KEY
TECHNOLOGIES**

Topic 5- Key IoT Technologies – RFID





Key IoT Technologies – RFID

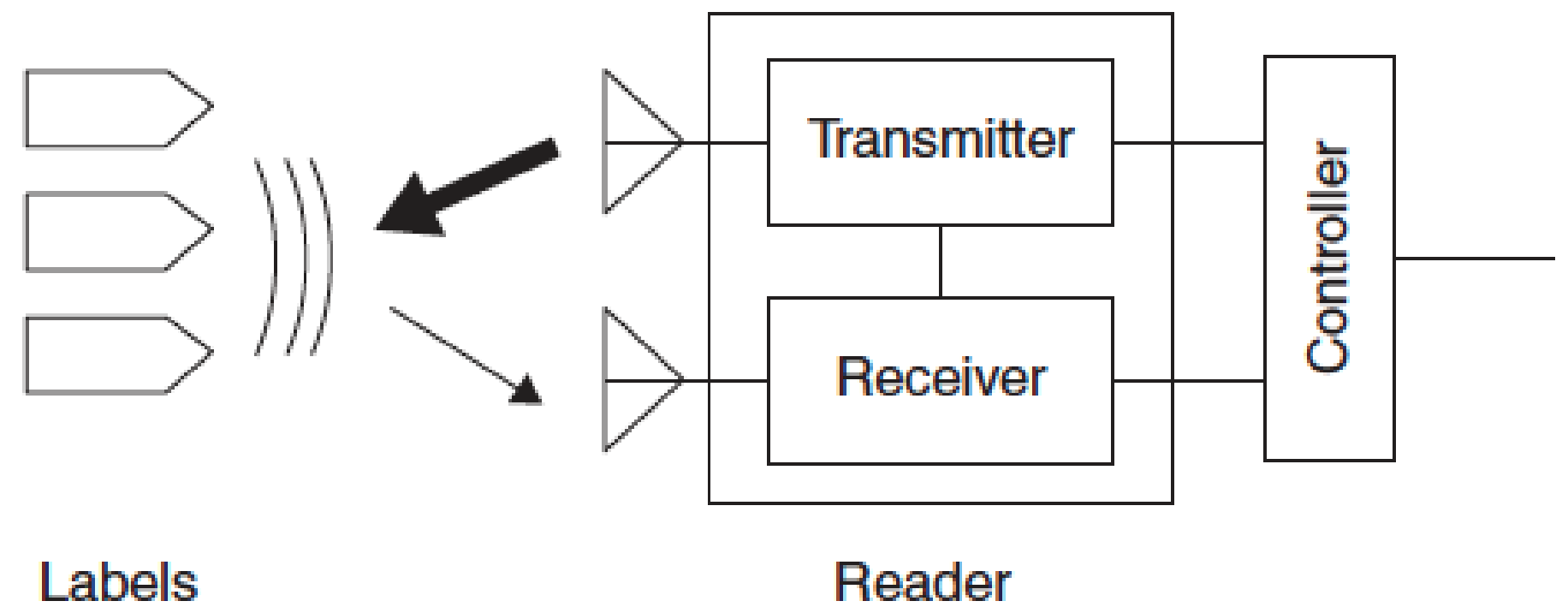
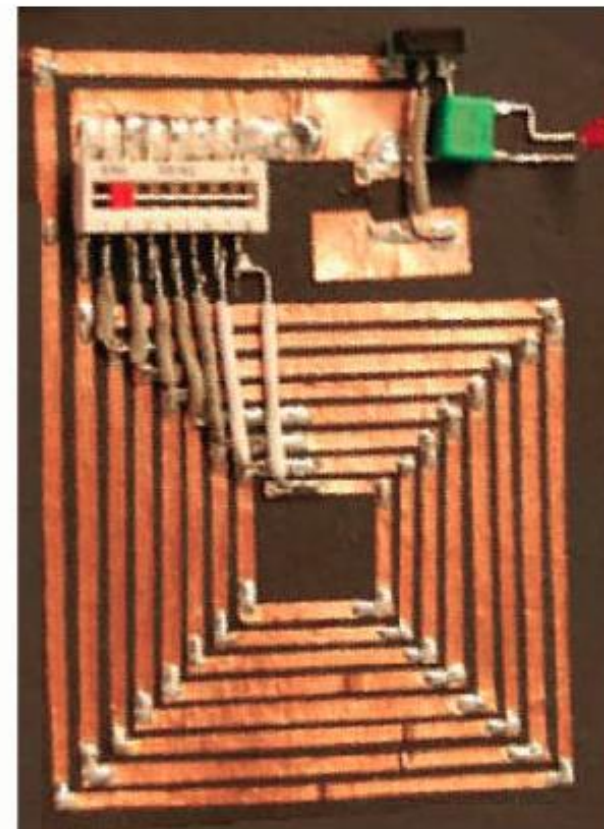
- RFIDs are electronic devices associated with objects (“things”) that transmit their identity (usually a serial number) via radio links.
- RFID tags are devices that typically have a read-only chip that stores a unique number but has no processing capability.
- RFIDs are also used in industrial environments, such as but not limited to dirty, wet, or harsh environments. The technology can also be used for identification of people or assets.

Contactless smart cards (SCs) are more sophisticated than RFID tags, being that they contain a microprocessor that enables

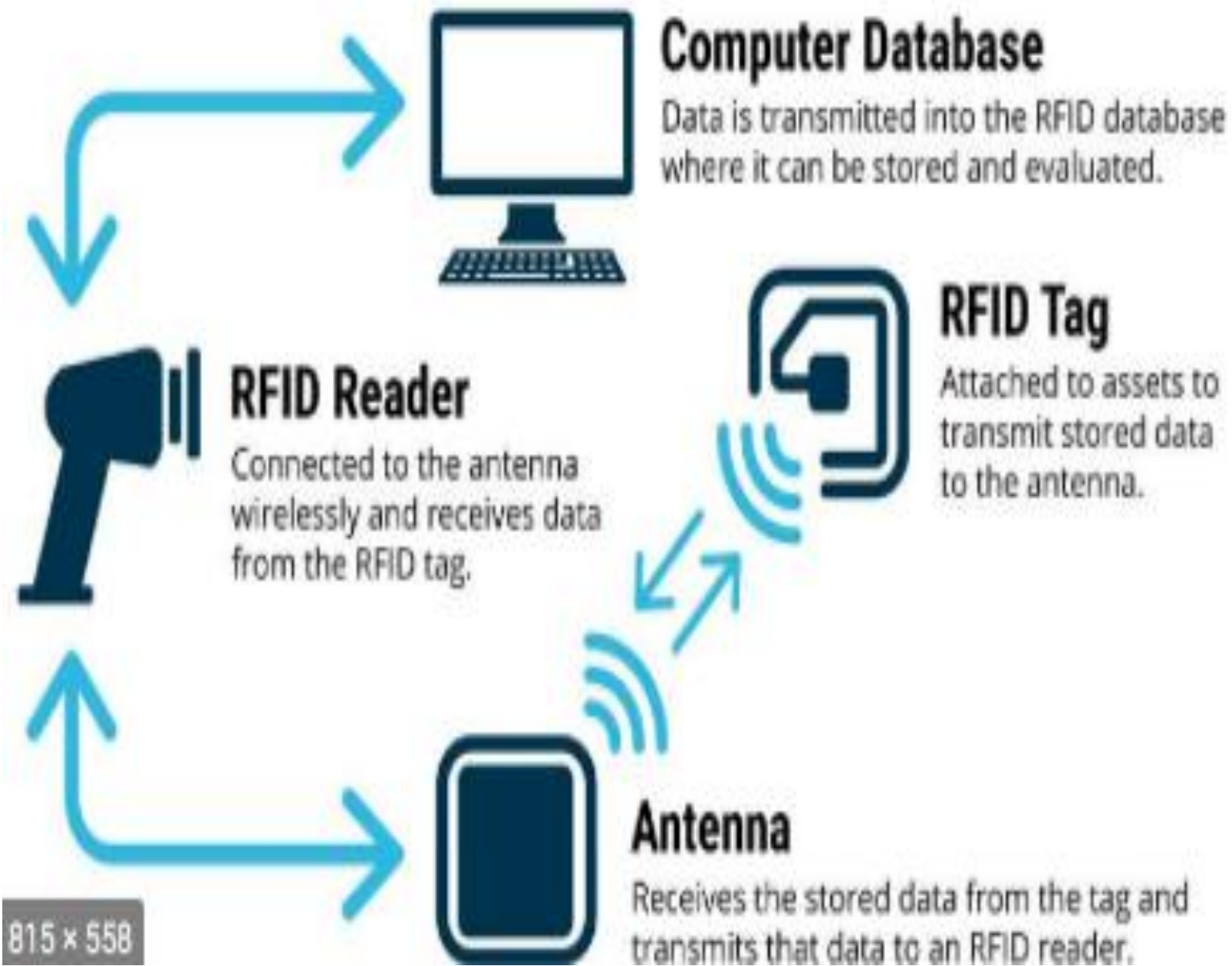
- (i) on-board computing,
- (ii) two-way communication including encryption, and
- (iii) storage of predefined and newly acquired information

Key IoT Technologies – RFID

- When an RFID tag or contactless SC passes within a defined range, a reader generates electromagnetic waves;
- the tag's integrated antenna receives the signal and activates the chip in the tag/SC, and a wireless communications channel is set up between the reader and the tag enabling the transfer of pertinent data.



Key IoT Technologies – RFID





Key IoT Technologies – RFID



RFID EXAMPLES

- Warehouse retailer automotive
- Grocery chain transportation
- Distribution center asset management
- Manufacturing
- Inventory management
- Warehousing and distribution
- Shop floor (production)
- Document tracking and asset management
- Industrial applications (e.g., time and attendance, shipping document tracking, receiving fixed assets)
- Retail applications



Key IoT Technologies – RFID



RFID

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”).

Characteristics of an RFID tag

Minimal security:

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 (132 bytes); often read-only Larger distance data exchange, typically several yards



Key IoT Technologies – RFID

SMART CARDS

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.

Characteristics of a contactless 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

Read and write memory capacity of 512 bytes and up, with very large memory storage possible

Short-distance data exchange, typically two inches



Key IoT Technologies – RFID

RFID Standards

- The ISO 14443 standard describes components operating at **13.56 MHz** frequency that embed a CPU; power consumption is about **10mW**; data throughput is about **100 Kbps** and the maximum working distance (from the reader) is around **10 cm**.
- The ISO 15693 standard also describes components operating at **13.56 MHz** frequency, but it enables working distances as high as **1 m**, with a data throughput of a few Kbps.
- The ISO 18000 standard defines parameters for air interface communications associated with frequency such as **135 KHz, 13.56 MHz, 2.45 GHz, 5.8 GHz, 860–960 MHz, and 433 MHz**. The ISO 18000–6 standard uses the **860–960MHz** range and is the basis for the Class-1 Generation-2 UHF RFID, introduced by the EPCglobal Consortium.



THANK YOU