

What is EPC Page:

### **What is EPC (Electronic Product Code)?**

The EPC is a unique number that identifies a specific item in the supply chain. The EPC is stored on the silicon chip portion of the RFID tag. Once the EPC is retrieved from the tag, it can be associated with dynamic data such as from where an item originated or the date of its production. Much like a Global Trade Item Number (GTIN) or Vehicle Identification Number (VIN), the EPC is the key that unlocks the power of the information systems that are part of the EPCglobal Network.

The goal of EPC Global (formerly Auto ID) is to set the standards referenced above and provide an interoperable set of protocols for the encoding/decoding, data types and formats of RFID tags used in supply chain execution.

The EPC standard is referred to as the Gen-2 tag, and is a 915 MHz Read/Write tag containing at least 128 bits of data.

### **RFID Tags – a deeper dive.**

**Active RFID tags** are typically battery-powered and can be both read and written by a remote transceiver using an antenna which emits and receives radio waves. The value of Active tags is greater storage capacity and longer read ranges - Up to 100M. They can however be expensive...Ranging from \$5 - \$100 per tag.

**Passive Passive RFID** tags obtain power generated by the radio waves produced by the transceiver to send a response, they can be read/write, but have smaller memory than active tags. Read ranges are from 3 inches - 10M depending on the frequency selected. Costs, although dropping rapidly, are still from \$1 - \$10.

**Low Frequency (LF) RFID**, which operates at 120-140KHz, is a mature technology that has been around for many years in industries that include agricultural animal tracking and security door access. Advantages of Low Frequency RFID technology include sturdy tags and superior insensitivity to read interference from liquids and metals. The main disadvantage is that the tags require long windings of copper wire in the manufacturing process that adversely affects both the RFID tag's size and cost of production. As a result, the LF RFID technology has a limited market and is being replaced by higher frequency RFID technologies in many newer applications.

**High Frequency (HF) RFID**, operating at 13.56MHz, uses a similar technology to LF RFID but has notable advantages in terms tag cost, data size and form factors since it does not require long winding of copper wire in the tag manufacturing process. Available form factors range from flat inlet tags to environmentally robust tags similar to those used in LF RFID applications. Other advantages of the HF RFID technology are greatly increased data storage capacity and specific ISO standards for high security applications.

The increased data storage capacity has led to the creation of "mobile database" applications where data records are stored on RFID tag instead of a networked database. Security applications using the ISO 14443 RFID specification can use HF RFID tags to conduct the same financial transactions as smartcards, but without the mechanical wear and higher costs. The main limitation of HF RFID technology is the typical read range of three to six inches.

**Ultra High Frequency (UHF)** RFID technology, operating at 915MHz, is specifically designed for retail and supply chain management. Data storage is typically limited to enough bytes for a UPC, EPC or SKU number. The main advantages of UHF RFID are the increased read range and high number of RFID tags that can be read in an operation. The technology used in UHF RFID technology is fairly new with many companies working to reduce the cost of both readers and tags. Wal-Mart has been one of the largest proponents of using UHF RFID to improve supply chain automation and reduce costs associated with tracking of retail supplies. Today, UHF tags are gaining significant traction in "closed loop" applications. Closed loop applications are applications where the data is not being shared with traditional trading partners, but rather is being used for internal, process improvement applications only. Specifically, inventory tracking, machine tracking, asset tracking and the like are excellent applications for this technology.

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