



EPC/RFID Manufacturers and Retailers Tool Kit: 101

Materials

Overview

The following EPC/RFID 101 Information Materials were developed by GS1 to assist retailers and manufacturers in educating a variety of audiences about EPC/RFID technology. The use of this material is recommended but not required to support training efforts. Materials included in this document are:

- *EPC/RFID 101 Briefing*
- *EPC/RFID 101 FAQ*

EPC/RFID 101 Briefing

Radio Frequency Identification (RFID)

RFID was first developed more than 60 years ago by the Allies during World War II to identify friendly aircraft in battle. Today, RFID serves a variety of purposes and is found in everything from automobiles to security pass cards. Consumers use it daily in systems like E-Z Pass in the US and Liber-T in France that speed the passage of autos through highway toll booths, and for SpeedPass which enables electronic payments at Exxon and Mobil fuelling stations.

Electronic Product Code (EPC)/RFID

EPC/RFID was conceived by researchers at the Massachusetts Institute of Technology's (MIT) Auto-ID Center. The Auto-ID Center's goal was to help retailers identify products as they move through the supply chain (how products move from manufacturing to the retail store shelf).

EPC/RFID tags are encoded with a unique number used to identify an individual product. Similar to a parcel tracking number, the GTIN and serial number in an EPC/RFID tag provides a means to uniquely identify a pallet, case or individual product.

How EPC/RFID Works

EPC/RFID tags serve the same purpose as a barcode. An EPC/RFID tag is encoded with the combination of a Global Trade Item Number (GTIN) and serial number to uniquely identify the product. To be read, an EPC/RFID-tagged product must pass by a special tag "reader". Reader and tag communicate with each other by means of electromagnetic waves. Once the product has been identified, the inventory system can record that the product has been moved to the sales floor or taken out of the store.

It is important to remember that EPC/RFID is one of many different types of RFID applications. RFID technology has been in use since WWII and common applications include vehicle remote access and automatic toll fee payments.

An EPC/RFID tag combines a silicon chip and an antenna. Information stored on the chip comprises the unique combination of a Global Trade Item Number (GTIN) and serial number. An EPC/RFID tag does not carry personally identifiable information, only information to identify a product.

In order to get information from an EPC/RFID tag, the tag is read using electromagnetic waves, rather than scanned optically like barcodes. When the EPC/RFID tag moves into range of an RFID reader (approximately 5 to 10 metres), radio waves are used to exchange the EPC/RFID tag's unique identification with the reader. The EPC/RFID has no power source of its own and can only transmit its GTIN and serial number when it's within approximately 5 to 10 metres of the reader. The actual distance from which an EPC/RFID tag can be read may

be shorter because barriers such as shopping bags and other factors such as the presence of metals, liquids or other sources of interference reduce the effective read range.

An EPC/RFID tag carries a Global Trade Item Number (GTIN) and serial number to uniquely identify a product. The tag does not carry any personal identification about individuals.

Unlike barcodes, which require that the barcode be visible to be properly scanned, several EPC tags can be scanned and identified in a matter of seconds without any manual handling or the tag even being visible. This makes inventory management and product identification faster, more efficient and more accurate.

Signage of products tagged with EPC/RFID

All products tagged with EPC/RFID should be identified by an EPC symbol on the package. EPC/RFID tags are used by retailers to manage products, not people. EPC/RFID tags do not contain, collect or store any personal information.



Protecting Consumer Privacy

An EPC/RFID tag contains no personally identifiable information. An EPC/RFID tag has no power source and can only transmit its unique identification when it is less than about 10 metres from a reader that activates the tag. The actual distance from which an EPC/RFID tag can be read may be shorter because barriers such as shopping bags and the presence of metals, liquids and other sources of interference can reduce the effective read range.

GS1 is a neutral, not-for-profit organisation consisting of manufacturers, technology solution providers, and retailers and is responsible for developing standards for EPC/RFID. The "*GS1 Guidelines on the Use of EPC/RFID for Consumer Products*" promote consumer notice, education, and choice about the technology and include consumer privacy protections.

EPC/RFID Technology Offers Key Benefits for Consumers and Retailers

Consumers:

EPC/RFID can help make shopping easier. Potential benefits of EPC/RFID include:

- Reducing the number of products that are out-of-stock
- Offering better product selection
- Providing better protection from counterfeit products
- Monitoring product freshness for goods with expiration dates
- Providing easier identification for recalls
- Simplified returns and streamlined warranty processing

Businesses:

EPC/RFID can improve inefficiencies from manufacturer to point of sale. Each year billions of dollars are lost due to poor supply chain visibility. By dramatically improving this process, EPC/RFID has the potential to:

- Provide significant annual savings
- Reduce the need for inventory held in "safety stock"
- Increase sales by reducing the number of out-of-stock products
- Reduce transportation costs and shipping volumes
- Provide more accurate forecasts and stock replenishments
- Significantly reduce theft in the supply chain
- Increase the competitiveness of companies using the technology.

For more information about EPC/RFID please visit: <http://www.gs1.org/epc-rfid>



EPC/RFID 101 Frequently Asked Questions

What is an Electronic Product Code?

The Electronic Product Code, or EPC, forms the bridge between our barcode-based use of the GS1 identifiers and the world of Radio Frequency Identification (RFID). EPC gives us a way of encoding GS1 identifiers on an RFID tag. EPC also provides a way of serialising the GTIN (Global Trade Item Number) to better support visibility and traceability applications. This provides significant advantages for businesses and consumers. An EPC can be associated with specific product information, such as date of manufacture, origin and destination of shipment. This provides significant advantages for businesses and consumers. Like barcodes, EPCs do not carry personally identifiable information.

How do EPC/RFID tags work?

EPC/RFID tags serve the same purpose as a barcode. An EPC/RFID tag is encoded with the combination of a Global Trade Item Number (GTIN) and serial number to uniquely identify the product. To be read, an EPC/RFID-tagged product must pass by a special tag "reader". Reader and tag communicate with each other by means of electromagnetic waves. Once the product has been identified, the inventory system can record that the product has been moved to the sales floor or taken out of the store.

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What are the benefits of EPC/RFID? For the consumer? For business?

EPC/RFID has the potential to help businesses improve supply chain efficiencies and visibility. This, in turn, would benefit consumers through improved product availability, speed of service, and quality assurance.

EPC/RFID can help businesses transform their processes in order to improve their own efficiency while providing additional consumer benefits. Poor supply chain visibility results in billions in annual losses to businesses due to lost, stolen and out-of-stock inventory. The technology behind EPC/RFID can help businesses track inventory more effectively, reorder products more efficiently and reduce the number of times a product is "out of stock".

In addition, EPC/RFID may also help companies track their shipments to prevent tampering and to prevent counterfeit or illicit goods from entering the marketplace. EPC/RFID's ability to track specific items from manufacture to destination can effectively combat such problems. Items can be routed reliably, and those with fake or duplicate identification can be investigated and removed quickly and easily.

Of great importance to businesses is that the use of EPC/RFID is based on the same GS1 standards businesses have been using for product identification and electronic commerce for many years. Companies can therefore continue to leverage their current enterprise applications and infrastructure while incorporating the advantages of RFID's innovative features into their business processes.

How were RFID and EPC/RFID developed?

RFID has been around for a few decades and is used every day in closed-loop applications such as automated manufacturing processes and motorway toll collection. A precursor to the current RFID technology was first developed by the allies in World War II to distinguish between friendly and enemy aircraft.

EPC/RFID was initially conceived by researchers at the Massachusetts Institute of Technology's (MIT) Auto-ID Center, working to help businesses identify items in the supply chain, automatically and in real time. Before EPC/RFID could be implemented in the open supply chain, it required global standardisation efforts to reflect the needs of a broad range of businesses, anchored in existing identification standards.

Who is creating standards and managing implementation of EPC/RFID?

Under the GS1 umbrella, EPC/RFID development and standardisation has been spearheaded by a wide range of stakeholders from multiple sectors, including manufacturers, technology and logistics providers, and retailers.



As EPC/RFID technical standards have matured, the work of maintaining and extending them has been taken up by GS1's Global Standards Management Process, or GSMP.

What about consumer privacy concerns?

EPC/RFID tags are created for businesses to manage products, not people. An EPC/RFID tag contains no personally-identifiable information. GS1 and its community recognise that, for EPC/RFID to gain broad public acceptance, consumers must have confidence in its value and benefits, as well as in the conscientious application of this technology.

GS1 member companies are committed to gaining and retaining this public confidence. Privacy has been a focus of EPC/RFID development efforts since the earliest stages of the effort to standardise RFID for open supply chain issues.

GS1 has created a multi-industry, global Public Policy Steering Committee to anticipate and engage in policy issues and address them through education and outreach to key stakeholders in the public and private sectors. GS1 members have developed self-regulating guidelines that can evolve as the technology develops.

The GS1 Guidelines on EPC/RFID for Consumer Products promote consumer notice, education, and choice about the technology and include consumer privacy protections.

More information can be found at: http://www.gs1.org/epcglobal/public_policy/guidelines and <http://www.gs1.org/guidelines-epc>

Can products that have EPC/RFID tags be identified once they are in the home?

EPC/RFID tags only transmit product data when prompted by a signal emitted by a nearby RFID reader.

Consumers will be informed of the choices that are available to remove or disable EPC/RFID tags on the products they acquire. Consumers may sometimes wish to keep the tags for ease of product returns, recalls, and recovery of stolen goods.

Such applications are still at an early stage but, as new developments occur and EPC/RFID deployment continues to grow, the GS1 Guidelines on EPC/RFID for Consumer Products will evolve, while continuing to represent the fundamental commitments of industry to consumers.

It is hoped that further developments, including advances in technology, new applications, and enhanced post-purchase benefits, will provide even more choices to both consumers and companies on the use of EPC/RFID tags.

What kind of consumer input has there been?

The research and development process has been open and transparent. Starting with the early efforts of the Massachusetts Institute of Technology's (MIT) Auto-ID Center and carrying over to the EPCglobal initiative, there has been extensive input from consumers, industry, community leaders, and others to understand and address concerns.

GS1 has participated in open forums on RFID, testified before legislative committees and governmental associations, and we reached out to influential consumer groups and other interested associations such as the National Consumers League and the Center for Democracy and Technology.

When can we expect to see widespread item-level tagging?

Item-level tagging continues to gain momentum. Item-level tagging is already being rolled out in many product categories, in support of better inventory management and the desire to reduce out-of-stock issues. Item-level tagging applications will continue to grow based on demand and need for increased efficiency in the supply chain.

Are the tags safe for people? The environment?

RFID devices operate on a signal that is similar to cordless phones. There are national and international regulations for operating RFID equipment at safe radio transmission levels. There is no medical evidence to suggest the technology poses a concern to human health when operating according to official national



regulations. As the EPC/RFID technology evolves, there will be more and more opportunities to enable sustainability, including more efficient and reliable sorting of recyclable items.

What information is captured about the buyer?

When an item carrying an EPC/RFID tag is purchased, no information is encoded on the EPC/RFID tag about the buyer. As with any non-cash transaction today, separate and apart from an EPC/RFID tag or barcode, the retailer must still capture, if only temporarily, the information required to complete the transaction.

Where are the tags located?

The tags are placed on the product packaging, usually near the UPC or EAN label. To identify whether a product is tagged with EPC/RFID, look for the EPC symbol.