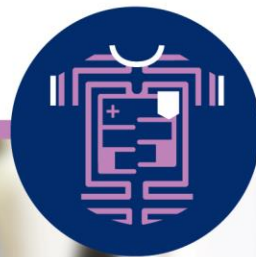


APPAREL AND GENERAL MERCHANDISE

Commonly Asked RFID Questions: Dispelling the Myths

R1.0 — SEPTEMBER 30, 2014



ABSTRACT

The Retail Sector began strategically deploying item level Radio Frequency Identification (RFID) in late 2008. Since that time there have been misunderstandings about the technology, its use case feasibility and its ROI benefits. This brief sets the record straight on RFID—providing definitive answers to the industry's most common questions about what RFID is and what it can do.



THE GLOBAL LANGUAGE
OF BUSINESS



Contents

1	Introduction.....	4
2	RFID Q&A	4
2.1	About RFID Technology	4
2.2	RFID and Your Company's IT Systems	7
2.3	The Business Case for RFID	8
2.4	Privacy and Intellectual Property Issues.....	13
3	Conclusion	14
4	Attribution	16

About GS1

GS1® is a neutral, not-for-profit, global organization that develops and maintains the most widely-used supply chain standards system in the world. GS1 Standards improve the efficiency, safety, and visibility of supply chains across multiple sectors. With local Member Organizations in over 110 countries, GS1 engages with communities of trading partners, industry organizations, governments, and technology providers to understand and respond to their business needs through the adoption and implementation of global standards. GS1 is driven by over a million user companies, which execute more than six billion transactions daily in 150 countries using GS1 Standards.

About GS1 US

GS1 US, a member of the global information standards organization GS1, brings industry communities together to solve supply-chain problems through the adoption and implementation of GS1 Standards. Nearly 300,000 businesses in 25 industries rely on GS1 US for trading-partner collaboration and for maximizing the cost effectiveness, speed, visibility, security, and sustainability of their business processes. They achieve these benefits through solutions based on GS1 global unique numbering and identification systems, barcodes, Electronic Product Code (EPC®)-enabled RFID, data synchronization, and electronic information exchange. GS1 US also manages the United Nations Standard Products and Services Code® (UNSPSC®). www.gs1us.org.

1 Introduction

RFID technology can be traced back to World War II¹. In 2004, the Retail Sector began discussing adding RFID to its supply chain and brick-and-mortar stores. In late 2008, several leading retailers and their trading partners began rolling out and testing item level RFID. Since then RFID has been transforming global commerce, but it has also been subject to many myths and rumors. It has been widely publicized that RFID has proven its value for improving inventory accuracy and availability. Further, as RFID deployments have increased, the cost of entry—as various business cases have emerged—has reduced.

RFID has been proven to provide many benefits to retailers, brand owners, logistics suppliers and other supply chain trading partners. It can be used to automate process, record item location, identify objects and provide increased network-wide inventory visibility and accuracy. But RFID has also had to deal with naysayers and many myths. The most egregious myth, of course, is that the technology is not ready for prime time, which many early adopters have quickly debunked—showing us that in reality, item level Electronic Product Code (EPC®)-enabled RFID deployments are delivering substantial benefits.

Let's analyze and respond to the most common questions surrounding RFID in retail.

2 RFID Questions & Answers

2.1 ABOUT RFID TECHNOLOGY

2.1.1 Question:

How can RFID technology be ready if there are no standards yet?

2.1.2 Answer:

A robust system of standards has, in fact, been in place for over a decade.

Since 2004, RFID has had several degrees of standardization including the code of the tag, frequencies, reader technologies and transmission—created by several organizations such as **GS1/EPCglobal®**, **ETSI**, **ISO 18000-6** and others.

- Under the GS1 umbrella, EPC development and standardization has been spearheaded by a wide range of stakeholders from multiple sectors; including retailers, manufacturers, technology suppliers, and logistics providers.
- GS1/EPCglobal technical standards have matured, and cover many aspects of RFID, from standardization of the identifiers encoded into the RFID tags, to the middleware that manages reader networks and filters data, to the methodology for exchanging “read” information both inside and between organizations.
- The GS1 EPC “Gen2” air interface protocol, first published by EPCglobal in 2004, is globally recognized as the foundation for RFID deployments in retail.
 - Over the past decade, EPC Gen2 has established itself as the standard for UHF (Ultra High Frequency) implementations across multiple sectors, allowing for usage in the global marketplace, interoperability between product manufacturers, improved read speeds, and enhanced security and privacy features.

- The all new **Gen2v2** (Oct 2013), furthers the capabilities of EPC-enabled RFID with additional security functionality, anti-counterfeiting capabilities, Electronic Article Surveillance (EAS) functionality, and privacy settings for consumers.

All of the GS1/EPCglobal standards are available at www.gs1.org/epcglobal.

2.1.3 Question:

Is RFID technology reliable?

2.1.4 Answer:

Yes, and there are a variety of time-tested data and use cases to support its reliability.

Some of the first recorded uses of RFID technology date back to World War II, as part of military operations in the 1940's. Over the years, RFID technology has found its way into our daily lives, controlling everything from building access and security, to toll collection, to automotive ignition switches and retail payment options. RFID's continued evolution and decreasing costs have made it possible for its successful implementation in the Retail Sector, where item level deployments of RFID have been in use on a daily basis since late 2008.

- In the last four years, RFID deployments have gained popularity and benefited from many technological advancements—resulting in more powerful, stable, and affordable equipment solutions.
- In the last six years, early adopter deployments at many leading retailers (1000's of individual doors) have proven that the technology can be deployed quickly and reliably and have resulted in accurate "last-item" visibility.

GS1 US recommends that you discuss your needs and requirements carefully with your technology vendor to ensure the best fit possible.

2.1.5 Questions:

Is RFID a glorified barcode? Will it replace the barcode?

2.1.6 Answer:

The two technologies are complementary and can be interoperable.

It's not an either-or situation. The technology use case for RFID is actually dependent on its application. The single purpose of a barcode is to provide a product with an identification code. The other product-related information (e.g. location, country of origin, production date, materials used, handling process, the company that placed the product onto the market, the batch number and the product number in that batch, valuable traceability information, which pallets arrived first, which products are approaching their sell-by dates, etc.) is stored on the embedded memory of the RFID tag, which can be retrieved anywhere in the supply chain—when and wherever it is needed. RFID, while sometimes more expensive, also has some physical advantages over barcodes:

- RFID does not require line-of-sight to be read and many RFID tags can be read almost simultaneously, making it a good choice for counting large groups of "items" quickly and with little to no human intervention.
 - Barcodes are designed to identify batches of products, while EPC-enabled RFID codes are designed to trace individual products.

- RFID tags can store much more product-related information than conventional barcode labels, which can be used to optimize production processes and supply chain visibility.
 - RFID tags are much more powerful than barcode labels. While a barcode identifies the manufacturer and the stock-keeping unit (SKU), a typical RFID tag can hold up to 2KB of data.
- RFID tags can also be programmed and reprogrammed, while barcodes can only be printed once and when information changes a barcode must be reprinted.
- Barcode printing is less expensive than RFID tagging, and in certain physical conditions (like environments with lots of metals or underwater), barcodes can be read more reliably than RFID.

RFID puts another set of tools in a company's automatic identification and data capture (AIDC) toolbox and gives them flexibility to choose, based on how the technology is being used.

The same GS1 identification and data exchange standards are supported by both technologies, so businesses are free to use what's right for their applications without needing to deploy/support separate data systems.

2.1.7 Question:

Will I have 100% read rates on every item, every time I read my RFID tags?

2.1.8 Answer:

Read rates are close to 100%, averaging between 95-99%.

Early deployments of RFID have shown that over time RFID tag read rates are in the 99.95% range³—as the probability of seeing a unit somewhere in the supply chain over time is near 100%. Today's reality is:

- Barcode scanning does not provide a 100% read rate.
- RFID deployments are seeing more than a 95% read rate and are improving that rate every day.
- Good engineering and system design will increase the read rate of tags, and some procedures may have to be altered to obtain acceptable read rates.

There are many factors that affect RFID tag read rates, including but not limited to:

- The distance the tag is from the reader.
- The substance the tag is placed on.
- The tag orientation and design.

GS1 US continues to work with the Retail Sector on deployments of EPC-enabled RFID. In order to reduce implementation challenges, the GS1 US team is actively engaged with leading organizations to enable excellent in-store Tagged Item Performance.

2.2 RFID AND YOUR COMPANY'S IT SYSTEMS

2.2.1 Question:

Does RFID generate terabytes of data that make it difficult for IT systems to handle?

2.2.2 Answer:

Storing terabytes of data is usually not necessary.

This could be true, if a company makes the business decision to keep every piece of data, but in actuality that level of data storage is unnecessary. Similar to point-of-sale (POS) processing, where companies have made the business decision to not keep every piece of POS data in perpetuity, a company can use its business judgment and associated processes to decide which RFID reads:

- To keep (usually the reads related to exceptions)
- To summarize into business information or Key Performance Indicators (KPIs)
- Can be safely deleted once they have been acted upon

Typically a company's database administrator and business lead determine the appropriate data retention policy as part of the EPC-enabled RFID roll-out plan.

2.2.3 Question:

Is it true that deploying RFID takes a lot of IT resources?

2.2.4 Answer:

RFID deployments can be as simple or as complex as you would like to make them.

Simple solutions are typically run as standalone implementations, with limited integration into a company's legacy infrastructure. In these deployments one can have the RFID equipment be part of a standalone or cloud-based server.

EPC-enabled RFID IT integration is made simpler by the fact that it uses the same product identifier as the Universal Product Code (U.P.C.) (also known as the Global Trade Item Number® or GTIN®) as a company's POS, inventory and transactional systems. As that data is already understood and processed by these incumbent systems, leveraging it and extending it to a company's RFID implementation means that the company's logistics, IT and/or operations teams do not need to start over when adding in an RFID implementation solution. Further, many early adopter deployments are beginning to transition RFID operational support responsibility to their Store Operations and Logistics teams, with IT providing support-only activities.

Your deployment can grow as your budget does—build on a single successful business case, such as a Display Execution project, then add equipment as you expand and gain experience. We suggest you speak with several technology providers about your deployment needs and the integration options available.

2.3 THE BUSINESS CASE FOR RFID

2.3.1 Question:

What proven business case shows that RETAILERS need to deploy RFID?

2.3.2 Answer:

There are numerous use cases pointing to RFID as an enabler of omni-channel strategies.

RFID helps to ensure that the right goods are available, in the right place, at the right time. It improves the efficiency, precision and reliability of the whole supply chain. Numerous retailers around the globe are improving inventory accuracy, decreasing out-of-stocks (OOS), improving loss detection and getting more product into customers' hands than ever before—thanks to EPC/RFID. Item level RFID is driving visibility and efficiency as well as playing a critical role in helping retailers create a seamless omni-channel customer experience.

RFID's ability to read tags without direct line of sight provides countless advantages over barcodes and allows retailers and brands to extract benefits proven by research and real world deployments. Products can be counted very quickly with very little labor (20,000+ items per hour with RFID vs. the average of 250 with a barcode⁵), resulting in substantial savings in inventory management.

RFID-enabled systems help companies:

- Reduce costs and improve labor productivity
- Improve inventory accuracy and customer service
- Increase on-shelf stock levels and improve loss detection
- Improve product location timeliness
 - Display Execution
 - Store Floor
 - Backroom

Retailers Agree

“Without RFID, a retailer is able to sell an item online, but, subsequently, [may be] unable to fulfill an order, because it cannot be found in the store, because either the inventory is inaccurate or is too hard to find the specific item on the floor.”

Dan Smith, Chief Information Officer
Hudson's Bay Company (HBC)

“Implementing EPC-enabled RFID technology has been one of the most significant technological steps Macy's has taken toward improving our supply chain performance, and ultimately our customer service, in the last 20 years. It is one of the keys to our omni-channel success, and because we've already seen solid results, we plan to expand its use, as our business growth and consumer loyalty depend on it.”

Peter Longo, President
Macy's Logistics & Operations

“RFID technologies will play an important role in improving ‘available to sell now,’ by location, inventory accuracy. Inventory accuracy is essential in executing Omni-Channel customer service and sales growth strategies. Inventory accuracy begins with supplier sourced tagging. The incorporation of RFID tagging standards across the supplier community will enable retailers, suppliers, and freight handlers to leverage advanced supply chain technologies to reduce logistics costs, improve item level accuracy, and generate new levels of customer satisfaction in our businesses.”

James A. Lance, SVP/CIO
The Bon Ton Stores, Inc.

RFID has the ability to³:

- Raise inventory accuracy from an average of 63% to 95%
- Increase inventory count rates from 250 to 20,000+ items per hour⁵
- Cut OOS at retail by up to 50%
- Increase item availability to boost sales from 2% to 20%
- Improve inventory labor productivity by 96%
- Reduce cycle count time by 96%
- Lower inventory risks and costs
- Enable electronic proof of delivery through the supply chain

2.3.3 Question:

What proven business case shows MANUFACTURERS need to deploy RFID?

2.3.4 ANSWER:

Manufacturers benefit from RFID in similar ways as retailers.

The benefits of using RFID in the upstream supply chain have received far less publicity than those benefits at the retail store level. A [2011 study](#), commissioned by GS1 US and American Apparel and Footwear Association (AAFA), identified more than 60 source-to-consumer RFID use cases. Practitioners determined RFID technology excels over current barcode-only and/or manual processes; manufacturers who have installed RFID equipment showed:

- Increased inventory accuracy in receiving, pick/pack operations and shipping
- Improved efficiency in their trailer load process

In fact, receiving, pick/pack and shipping accuracy are often cited by Brand Owners as the core business case for RFID. Studies can be found at:

- gs1us.org/industries/apparel-general-merchandise/tools-and-resources/research
- rfid.auburn.edu/research-papers.cfm
- gs1.org/epcglobal/implementation

Manufacturers Agree

“The reach of RFID is far beyond just inventory control. It is just the starting point. RFID’s ability to help provide visibility—throughout the whole supply chain through to the retail point-of-purchase—to create value for the consumer, has endless possibilities. We have new learnings every day and see new opportunities to gain insights into better management of our brands. We are proud to be early adopters and helping to champion this technology.”

Jay Craft, Vice President

Product Development
VF Jeanswear
VF Corporation

“We are happy to see that so many retailers are now committed to an RFID direction—helping us establish production lines for a retailer’s private label products and for sourcing products for their suppliers. As adoption grows and standards mature, there will be both efficiency gains and cost reduction benefits for all.”

Robert Burton, Executive VP

Li & Fung Trading Ltd.

RFID solutions are:

- Proving their value in helping manufacturers reduce operating expenses and improve margins
- Streamlining the pack-out process and reducing inventory errors (with instantaneous counting)
- Reducing labor costs, handling errors and improving productivity (via automation of current manual inventory tracking tasks)
- Lowering required inventory levels, increasing working capital savings and lowering associated carry cost expenses (by optimizing inventory levels and reducing safety stock)
- Reducing obsolete inventory write-downs (through better planning and visibility)
- Improving production asset visibility, helping to track inventory locations and reducing maintenance issues
- Reducing claims and returns (by assuring the right goods are sent where they should be)
- Enabling better audit and asset control (lowering inventory shrinkage as well as helping to eliminate losses and theft by keeping better track of goods)

2.3.5 Question:

Is it true you must have hundreds of stores, high volume and/or sell products at high margins to get the benefits of RFID?

2.3.6 Answer:

RFID can benefit any organization that needs better inventory and/or supply chain visibility. The ability to count items faster and with greater accuracy can benefit any sized organization.

Early RFID pilots occurred in single stores and proved ROI can be achieved within 1-2 years. Additionally, in the last five years, costs have dramatically dropped for equipment and labels—allowing benefits on even the lowest priced items.

One simple high ROI deployment use case focuses on ***Display Execution and Compliance***—as a retailer cannot sell what is not available on the sales floor. With this use case:

- Associates can easily capture which items (shoes, handbags and/or luggage) are on the display floor and generate a report that compares what is on the display floor to what is expected to be present
- Retailers, who have reached nearly 100% display compliance, have seen immediate impact on sales with a payback ROI of less than one year

2.3.7 Question:

How do I convince upper management to deploy RFID?

2.3.8 Answer:

If omni-channel remains a top priority, upper management should be open to using RFID to enable a seamless shopping experience.

RFID technology continues to redefine retailing. Executives at leading retailers have come out in support of EPC-enabled RFID technology as the foundation for creating a successful omni-channel strategy.

Consumers want the [seamless shopping experience](#)—they want to shop for what they want, where they want, when they want—and a growing number of retailers have RFID programs in place to help deliver a homogeneous customer experience across all channels. RFID has moved beyond inventory replenishment; it is an important component to enable the supply chain visibility and inventory accuracy needed to know what's available, where it's located and how to best deliver it. Retail Executives understand that leveraging EPC-enabled RFID to find the “last item” has become the leading use case and is the key to delighting their customers in every product category.

A recent Capgemini Consulting and GS1 US omni-channel retail study, “[How to Create an Always-On, Always-Open Shopping Experience](#),” revealed that new standards, such as EPC-enabled RFID, are enabling leading retailers to drive real-time pinpoint precision in their inventory accuracy.

GS1 US welcomes these executives to join our [Peer-to-Peer group](#) in order to share in the learnings of other leading retailers and brands.

2.3.9 Question:

Does deploying RFID take a lot of capital?

2.3.10 Answer:

Not necessarily—the cost to deploy RFID varies depending on the type of solution being deployed.

The RFID solution can be as simple as a single standalone handheld reader, or as complex as a fully integrated system with fixed infrastructure at doors and fixtures. The solution delivers both direct and indirect ROI.

- Direct ROI can be typically achieved in less than two years—for instance, implementing a **Display Compliance** project can bring ROI to an organization within one calendar year.
- Indirect ROI is delivered in the form of better quality data and reduced handling errors, improved labor productivity, and faster inventory counting via automated process, as well as a higher level of customer satisfaction by assuring the right goods are sent where they should be.

Operationally, a basic RFID system typically includes labels, printer/encoders, interrogators, middleware (for managing and filtering data), and software (new and modifications to legacy systems) to handle RFID-generated data. Further, technology providers offer RFID solutions in a number of different ways: direct sale, turnkey and/or as third-party hosted solutions, which can be purchased and/or leased.

Increasing adoption of RFID has driven costs down; we suggest you speak with several technology providers about your deployment needs and the integration options available.

2.3.11 Question:

Why are only a few retailers deploying RFID today?

2.3.12 Answer:

There are more than what is currently being reported.

There have been a number of well publicized North American and European RFID deployments, which are far outnumbered by the actual number of companies piloting or deploying RFID without public recognition.

GS1 US suggests that you have regular conversations with your retail trading partners to discuss plans for RFID deployment.

2.3.13 Question:

Does GS1 impose large fees for using EPC?

2.3.14 Answer:

GS1 and GS1 US do not charge any fees for the specific use of RFID technology.

Voluntary GS1/GS1 US membership is common for companies interested in being a leader in the development of standards and guidelines but there are **no fees associated** with deploying EPC-enabled RFID paid to GS1/GS1 US.

Many companies deploying EPC-enabled RFID license a GS1 Company Prefix, which allows their trading partners to identify them as the brand owner of the product. The GS1 Company Prefix is used to build the EPC, which is an identifier that identifies a specific physical product. The RFID tag is the data carrier that holds the EPC identifier.

In order to help solve business problems and share experiences of their RFID deployments, many of these companies also lead the development of standards and guidelines and have become members of the [GS1 US Apparel and General Merchandise Initiative](#). Brand owners and retailers can also select to participate in the [GS1 US EPC Item Level Readiness Program](#), which provides the education, training, tools and community support that the apparel industry needs to implement EPC item level tagging into day-to-day operations. Participation with GS1 US, our educational program and Initiative are optional.

2.3.15 Question:

Is there any advantage to being an early adopter?

2.3.16 Answer:

Many view this as a tool to gain a competitive advantage.

It's more important than ever to have the right product in the right location at the right time—and to implement new technology the right way. In this connected omni-channel world, retailers and brands are looking for new ways to help them forecast trends more accurately, collaborate with global trading partners more efficiently, and improve inventory management. To accomplish these goals, companies are turning to EPC-enabled RFID technology more than ever before.

As with any other new technology, early adopters complete their learning curve and have mature deployments that yield business value sooner. A growing number of brands and retailers are already using EPC-enabled

RFID across several lines of business and are reporting great success. Leveraging EPC-enabled RFID throughout their supply chain, retailers and their trading partners are now able to more closely collaborate and allow for a plethora of possible interactions with the customer.

2.4 PRIVACY AND INTELLECTUAL PROPERTY ISSUES

2.4.1 Question:

What are some things I can do to manage privacy issues involved with using RFID technology?

2.4.2 Answer:

GS1 has created resources to help EPC users gain consumer confidence.

EPC tags are created for businesses to manage products, not people. An EPC tag itself contains no personally identifiable information. GS1 and its community recognize that, for EPC to gain broad public acceptance, consumers must have confidence in its value and benefits and in the integrity of its use. EPC participants are committed to gaining and retaining this public confidence. Since the earliest stages of the effort to commercialize RFID for supply chain issues, privacy has been a focus of EPC developers and subscribers. Businesses who implement RFID technology should use it responsibly to avoid creating privacy issues for themselves.

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 guidelines that can evolve as the technology develops—the [GS1 EPCglobal Guidelines](#) on EPC for Consumer Products promote consumer notice, education, and choice about the technology and include consumer privacy protections. Retailers and brands can also educate themselves and support the education of their customers with these GS1/EPCglobal toolkits:

- gs1.org/epcglobal/public_policy/manufacturers_tool_kit
- gs1.org/epcglobal/public_policy/retailers_tool_kit

2.4.3 Question:

Do intellectual property (IP) issues involving RFID technology exist?

2.4.4 Answer:

As with any meaningful technology, patents and other forms of intellectual property are often used to protect RFID technology.

GS1 implements an IP policy designed to foster open communications and facilitate licensing among its participants. However, this cannot prevent third parties from asserting intellectual property rights from time to time. Because the issues that arise are usually specific to each particular deployment, GS1 US cannot speak on behalf of its individual members or about any litigation that could affect member companies. We suggest



you speak with your legal representative and the many technology providers about your options for deployment.

GS1 US remains committed to EPC-enabled RFID and believes that the technology continues to have strong business benefit in the supply chain.

3 Conclusion

Since late 2008, retailers and brand owners are turning to EPC-enabled RFID technology to help them quickly and accurately identify, capture and share product information and location data. In fact, [EPC-enabled RFID](#) is the foundation for actionable intelligence—if you can't "see" something, you can't measure it—and if you can't measure it, you can't control it—and if you can't control it then it's probably costing your business too much.

EPC-enabled RFID adoption is exploding because its benefits³ have already been proven in the real world; it:

- Raises inventory accuracy from an average of 63% to 95%
- Increases inventory count rates from 200 to 12,000+ items per hour
- Cuts OOS at retail by up to 50%
- Increases item availability to boost sales from 2% to 20%
- Improves inventory labor productivity by 96%
- Reduces cycle count time by 96%
- Lowers inventory risks and costs
- Enables electronic proof of delivery

Having a unique EPC for each product instance gives your business access to key information as that product moves along the supply chain; the specific instance (serial number) of a product allows you to:

- Trace history of a product as it moves through supply chain
- Measure transit time from the factory to the store sales floor
- Know when a specific lot has reached the store
- Know if exactly the same products you shipped were actually received
- Learn how retailers cycle inventory
- Ensure that every single recalled product is returned

To accomplish these goals, retail companies are turning to EPC-enabled RFID technology more than ever before. What's behind this unprecedented growth rate? Retailers and brands are witnessing the transformation of today's supply chain—and those who are taking an active role in the adoption and usage of standards-based technology in their everyday business practices are seeing a boost in sales and in customer satisfaction. These companies are reducing their inventory, distribution, and labor costs, while achieving visibility in their product inventory like never before. With a well-thought-out plan, you can do the same. When items are tagged at the point of manufacture or at the earliest point in their life cycle, companies see benefits throughout the supply chain. This saves untold labor hours, reduces overall costs and allows for faster payment.

Omni-channel retail is here to stay and will be the key to future business growth. RFID is foundational for delivering a successful omni-channel strategy to delight your customers in every product category. It has moved beyond inventory replenishment. It is an essential component to enable the supply chain visibility and inventory accuracy needed to know what's available, where it's located, and how to best deliver it—helping meet consumer expectations anytime, anywhere. A growing number of retailers are already using EPC-enabled RFID across several lines of business and are reporting great success. Leveraging EPC-enabled

RFID throughout their supply chain, retailers and their trading partners are now able to more closely collaborate and allow for a plethora of possible interactions with the customer.

In today's always-on, always-open connected-consumer world, retailers and brands are looking for new ways to help them forecast trends more accurately, collaborate with global trading partners more efficiently, and improve inventory management. The [GS1 US EPC Item Level Readiness Program](#) provides the education, training, tools, and community support that the apparel and general merchandise industries need to implement EPC-enabled item level tagging in day-to-day operations. It allows businesses to leverage their existing technology investments such as ERP, inventory management, point-of-sale and other enterprise systems, which translates to more cost-effective deployment with less risk and a shorter return on investment.

For more information about the Program contact the GS1 US Apparel and General Merchandise Team at apparelgm@gs1us.org or learn more at www.gs1us.org/EPCItemLevelReadiness.

4 Attribution

1. RFID Journal, "[The History of RFID Technology](#)," Jan 16, 2005, Mark Roberti.
2. VDC Research Group, "Barcode and RFID Convergence: Enabling Greater Visibility through Standards," November 2010.
3. Auburn University RFID Lab [Studies](#).
4. IDTechEx, "[RFID Forecasts, Players and Opportunities 2014-2024](#)."
5. American Apparel real-life case studies, showing actual readings using current technology show upwards of 20,000 RFID tag reads per hour.

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