

# RFID technology

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AN INDEPENDENT REPORT ON

## RFID Gen2

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Market Analysis By:



- ▶ How is Gen2 related to ISO-based standards?
- ▶ Does it address interoperability issues?
- ▶ Is this the basis for standards-based solutions?
- ▶ How does Gen2 impact your RFID deployment?

Three years ago RFID appeared to be suffering an identity crisis. Its role in the supply chain (versus bar code) seemed largely undefined. Competing and conflicting technologies such as Wireless LANs and less-expensive Automatic Identification and Data Capture (AIDC) systems continued to be deployed to automate processes and provide greater in-transit visibility. During this time many vendors, channel organizations, and end users interested in RFID seemed to be lying in wait for a breakthrough implementation to establish RFID as a viable, mainstream technology in the supply chain.

When Wal-Mart announced it would require all of its suppliers to use RFID, the industry received the shot in the arm it was seeking. The US Department of Defense (DoD) and other retail

RFID systems in the retail CPG vertical reached an estimated \$161 million in 2005, with hardware accounting for approximately 41% (see Exhibit 1). VDC anticipates a compounded annual growth rate (CAGR) of nearly 57% over the next five years, with revenue shipments exceeding \$1.5 billion in 2010.

According to RFID suppliers and users, compliance mandates are what drove adoption and growth in 2005 – though not to the levels many anticipated. With live deployments occurring in 2005, there is no question that a milestone has been achieved. Nonetheless the number of tagged retail CPG pallet shipments remains low (approximately less than 1% of total shipments).

VDC argues that stronger retail CPG shipments were restricted in 2005 due to several key factors:

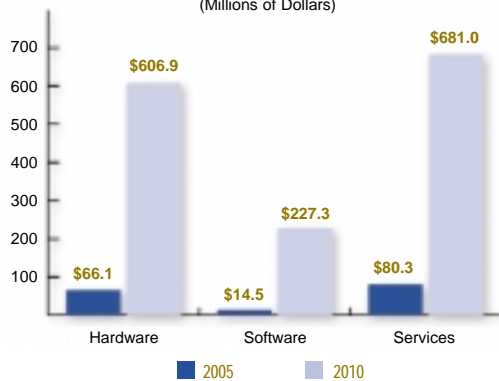
- Most of the companies adopting RFID because of mandates initially find it challenging to measure an internal return on investment (ROI). ROI is realized when real-time RFID information becomes part of the enterprise's underlying business processes – a level the majority of purely compliance-based adopters have not yet reached; and

- While label converters and channel organizations bought a significant amount of Gen1 inventory during Q4 2004 and Q1 2005, a sizeable portion of this inventory remains in the channel.

Although several retailers have announced RFID mandates, none has been more aggressive than Wal-Mart in terms of moving their initiative forward. Despite a fair amount of initial skepticism concerning the feasibility of Wal-Mart's start-up timeline, the company did successfully go 'live' in January 2005. In early March, Wal-Mart reported that more than 100 of its suppliers are using the technology in 3 distribution centers serving 104 Wal-Mart stores and 36 Sam's locations in Texas. The company reportedly had achieved 5.6 million reads of 23,000 pallets and 663,000 cases.

Still, achieving this volume only required Wal-Mart supplies to ship a limited number of SKUs (estimated at typically fewer than 10) with RFID transponders. VDC research reveals that the vast majority of Wal-Mart suppliers are doing only what is necessary to meet compliance. On the other hand, while many suppliers are begrudgingly following the mandate, few, if any, have ignored it. Without question, RFID mandates trump the business case (see Exhibit 2).

Exhibit 1  
Global Shipments Of UHF EPC RFID Systems  
To The Retail CPG Vertical, Segmented By Product Category  
(Millions of Dollars)



- A large percentage of mandated suppliers limited their deployments, meeting minimal mandate requirements (predominantly through manual slap-and-ship installations);

- EPC technology performance (i.e., read rate accuracy, dense reader mode operation, etc.) was not stellar at the beginning of 2005, improving as the year progressed –

most notably through the introduction of higher-performing next-generation offerings and firmware upgrades;

- The ISO-18000-6C standards approval process has been more protracted than expected, delaying Gen2 product development and user adoption (particularly outside North America);

giants such as Target, Tesco, Metro, and Albertsons soon followed with similar mandates. Since then, RFID has been gaining significant momentum.

According to Venture Development Corporation's recently released Retail CPG Vertical Market volume of its annual RFID Business Planning Service, the global market for

### The Impact of Gen2

Few would challenge the claim that the ratification of the Class 1 Generation 2 (Gen2) specification by EPCglobal was a watershed moment for the RFID industry. However, VDC believes varying interpretations of Gen2's market impact exist.

The optimist would argue that the ratification of Gen2 has been the most important announcement since Wal-Mart's RFID mandate. Gen2 is positioned as 'royalty-free' and will soon be ratified by ISO as ISO 18000-6C (reportedly by March 2006). Vendors, users, and Wal-Mart no longer have to hold onto the promise of Gen2; it has become a reality.

Members of this camp believe the occasion would mark the beginning of robust growth and aggressive end-user adoption. After all, end users are more comfortable with standards-based solutions. And, users, particularly those in Asia, would likely be less resistant to RFID technology with an ISO standard in place.

Those who take a slightly pessimistic view would argue that the previous statements sidestep major issues such as technology performance and product availability. Gen2 is not a panacea for the challenges facing the industry. For example, compliant products need to first be built and tested to measure performance before the industry can declare victory. After all, Gen2 is not the solution; it lays the foundation for them to be developed.

Perhaps Gen2 should be positioned somewhere between these two interpretations. In this respect, VDC offers a third perspective. While the prospects of Gen2 in terms of market development are promising, the industry cannot rest too much weight on the success of RFID in the supply

chain on the ratification of this particular ISO standard alone.

The passage of the Gen2 specification is the first of many steps. In fact, getting the standard ratified by EPCglobal may have been the easiest one. First, Gen1 solutions must continue to receive the necessary upgrades to become compatible and interoperable with Gen2. The next step is to test commercially available Gen2-compliant products in real world environments. And, as mentioned, Gen2 has yet to become recognized by ISO, making it a truly global standard.

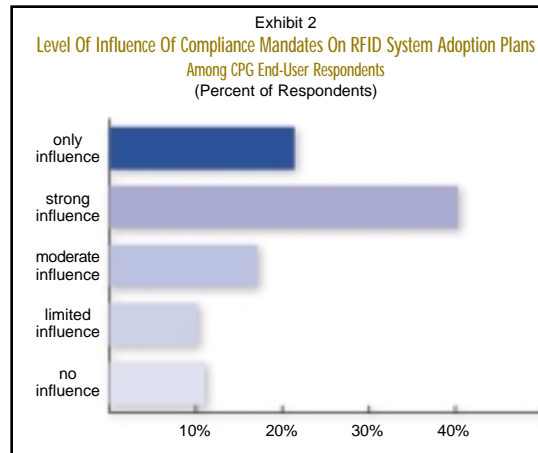
VDC believes that the industry requires open access to RFID technology and platforms, allowing for multiple suppliers and lower prices. The Gen2 protocol is the technical framework on which all future UHF EPC products will be built, including ICs, transponders, readers, etc. In addition, the specification is considered 'royalty free' and heralded as the first UHF open architecture completely designed by a committee.

C1G2 makes several improvements over the various EPC and ISO standards previously used, including:

- using frequency and power in a fashion that complies with major national and international regulatory requirements;
- making improvements to the security of data on the transponder and the ability to lock identification fields in the transponder (no encryption capabilities); and
- providing for a strong 'kill' mechanism whereas all data on the transponder can be erased as

it passes through a reader.

Moreover, the standard is positioned to ensure global interoperability, international vendor support, and multiple read/write capabilities – thereby potentially delivering a quicker ROI and faster data communication speeds. For example, projected read rates in the US (under a simulated environment) are 1,500



tags per second versus roughly 100 tags per second for tags available today.

Although the next compliance deadlines loom, RFID solution vendors need to be afforded the opportunity to engineer and deploy robust, reliable systems based on the Gen2 specification. This will not happen overnight. Furthermore, the approval of Gen2 has had significant implications on perspectives of RFID technology performance, especially among end users. Users have heard so much about Gen2 that it has the unenviable position of having to prove itself. And, while we feel the market potential for RFID solutions is immense, we argue the market remains very much a work-in-process. Without question, 2006 will prove to be another interesting year for RFID.



ADT's RFID security systems are based upon the premise that no single RFID technology is best suited for all the market requirements that exist. ADT is committed to providing RFID solutions that are modular, flexible, and compatible with our customer existing technology infrastructures. These solutions allow users to select the product and technology that best fits their needs, and to migrate to new RFID manufacturing designs as they become available. ADT's RFID approach is to offer radio frequency identification solutions that work with industry-standard protocols — and that allow users to expand and change their RFID networks as the technology evolves.

- ▶ Enables automatic identification of items and people without scanning individual labels or cards
- ▶ RFID solutions for loss prevention, case and pallet tracking applications in the retail supply chain
- ▶ Solutions are modular, flexible and adaptable, based upon a platform of Agile RFID readers, and compatible with EPC (Electronic Product Code) open standards

#### About the Study

The retail CPG supply chain discussed here is currently under investigation by VDC as part of its 2005-2006 RFID Business Planning Service that consists of 8 vertical market and 7 technology market volumes. For further information about the "RFID Business Planning Service 2005-2006: Global Asset and Transaction Management Systems Market Analysis" contact Michael J Liard, RFID Practice Director at Venture Development Corporation. To view the program proposal, go to: [www.vdc-corp.com/autoid/annual/05/br05-21.html](http://www.vdc-corp.com/autoid/annual/05/br05-21.html)

#### About VDC

Venture Development Corporation (VDC) is an independent technology market research and strategy consulting firm that specializes in a number of retail automation, RFID, AIDC, embedded, component, industrial, and defense markets. VDC has been operating since 1971, when graduates of the Harvard Business School and Massachusetts Institute of Technology founded the firm.



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