

# Passive **RFID** Enters Fast Lane in **Transportation and Logistics**

*Battery-assisted passive tags deliver performance similar to active tags at a fraction of the cost.*



Transportation and logistics (T&L) companies play a pivotal role in the movement of merchandise through supply chains. As such, they can provide additional value for their retail clients by deploying RFID infrastructures for tracking cases and pallets using limited-memory C1G2 (Gen2) Passive UHF labels.

In addition, T&L carriers are looking at RFID solutions to track their own assets such as truck trailers, rail cars, and cargo containers for air and sea freight. These assets need to be tracked as they are entering and exiting the carriers' facilities (yards, ports and tarmacs) and easily located while on site. Moreover, logistics companies need to log usage and maintenance histories to effectively manage their assets. With a maximum read range of 3 meters, susceptibility to electromagnetic interference and limited tag memory, Class 1 Passive UHF RFID does not support the level of performance required to support these asset management applications.

Asset management applications have historically employed active (Class 4) RFID systems. Active systems can operate at long ranges (~100 m). However, Class 4 systems cost considerably more than Class 1 and require a totally separate and incompatible reading infrastructure.

Battery-assisted passive (Class 3) systems from Intellex Corporation offer the best of both worlds for transportation and logistics companies. They provide the performance advantages of Class 4 RFID systems for lower price points.

At a fraction of the cost for an active system, Intellex systems support long read ranges, rewritable tag memory for storing manifests, maintenance records and custody information, and can serve as data loggers for sensor-based applications.

Perhaps more compelling than its price/performance advantage over Class 4 active is the Intellex Class 3 system's compatibility with Class 1 passive. The system supports passive C1G2 mode between tags and readers allowing operations in either pure-passive or battery-assist mode. This compatibility affords T&L carriers the flexibility to combine Class 1 and Class 3 tags and readers within a single, interoperable infrastructure. In other words, it allows users to adopt EPCGlobal standards-based products with flexibility while future proofing their technology investments.



This paper describes how Intellex Class 3 battery-assisted passive RFID systems can uniquely enable key functionalities for T&L carriers in the areas of **Yard Management**, **Nested Visibility** and **Mobile Asset Management**, including:

- Checking vehicles in and out at entrances and exits
- Providing time-critical information to support loading, staging and put-away activity
- E-manifest for Proof of Delivery (POD) increasing supply chain accuracy
- Returnable container tracking
- Tracking indoor and outdoor assets over large areas in real time

### Yard Management



Over-the-road carriers' operating profits are directly impacted by how efficiently they utilize capacity. At the freight consolidation and cross-docking facilities, capacity is often limited (in terms of warehouse space, yard space and dock door availability for unloading). Effectively scheduling this capacity is made more difficult by the unpredictable nature of arriving freight. The worst case scenario is to tie up a dock door unloading freight that will consume warehouse space for several days while a trailer containing high-priority freight sits in the yard. To make matters worse, the freight on the warehouse floor will likely be handled several times – increasing its chances for getting misplaced, lost or damaged.

Electronic manifests stored in the Intellex Class 3 RFID tags' 60 Kb of rewritable memory can be read automatically (at long range) as the trailers to which the tags are affixed enter the yard. This enables the carrier to immediately compare the manifest to the master schedule and determine whether to route the trailer to a specific receiving dock for unloading or to a staging area in the yard.

By more effectively staging lower priority trailers in the yard, the facility increases throughput and warehouse capacity while reducing the number of times merchandise is being handled. When its time to be unloaded, the staged trailers can be easily located (by virtue of the Intellex Class 3 system's long read range). As the trailer is backed up to the dock for unloading, its Class 3 tag can be read at close range in Class 1 mode at the dock door by Intellex readers or existing Class 1 readers from other manufacturers – thus verifying the right trailer is at the right receiving dock.

### Nested Visibility



Retail mandates from Wal-Mart, Best Buy, Target and others have suppliers tagging cases of products shipped from their manufacturing locations. "Slap & Ship" as it's commonly known in the supply chain industry, manufacturers are source tagging product at the case level to comply with retailers.

The purpose of case level tagging was to improve efficiencies by reducing inventory in the supply chain. It was intended to provide more accurate inventory information as product moved through the supply chain. However, product composition such as liquids, metal content and packaging limits

reliable read accuracy of multiple product cases that can be read on a pallet. So to get reliable case level reads, pallets are broken down at the distribution center after receiving and cases are read in a single file (one at a time.)

Intellex tags on returnable pallets and containers allow users to update a pallet level or container level tag as it is being loaded. This nested approach allows reading all the EPC numbers from the case level tags and writing them to the 60 Kb rewritable memory in Intellex tags. Intellex readers are capable of reading C1G2 tags and writing to the Class 2 or Class 3 higher level tag at the same time by operating in both modes simultaneously. Tagging airline containers, sea containers and cargo containers with Intellex tags allows better visibility in the supply chain and faster throughput in transferring cargo in cross-load operations, especially in the express freight industry.

Reusable, rewritable Intellex Class 3 tags on returnable containers also allow tracking them inside warehouses and outside in the yard. Bill of materials or BOM information stored in the tag memory can be updated real time as product or parts are used from the particular container. Knowing the exact quantity of product available helps the decision making process in the manufacturing environment – eliminating partially-filled containers and triggering accurate buying based on true consumption and demand.

Intellex tags and reader systems operating in Class 3 mode allows automatic POD for shipments that have multiple tagged components inside a shipping crate. In this particular example, several tagged components are read through a wooden crate to ensure that all sub-assemblies required to build heavy equipment are shipped together. Verification is done by reading the Intellex Class 3 battery-assisted passive tags after the crate is sealed in the shipping process to generate the shipping manifest and at receiving before accepting delivery of shipment.



### **Mobile Asset Management**

Optimal management of mobile assets (such as tugs, trailers, forklifts, etc.) improves operational efficiencies that result in labor savings and reduced operational costs through better utilization of the assets.

These assets need to be searched efficiently in terms of their zonal location in a warehouse or in a yard, so that they can be effectively deployed to subsequent operations. Furthermore, an accurate control of their custody chain (i.e., is the asset in control of an authenticated user) is required for safety and hazard control. Establishing a custody chain is also helpful for assigning appropriate billing in certain cases. In addition, providing maintenance personnel access to maintenance or calibration records on the asset itself at the point of use can be critical for expediting maintenance and repair activities.

### **Zonal Locating**

Intellex readers placed throughout large areas can define zonal grids and track tagged assets (bearing Intellex battery-assisted passive tags) from distances of up to 50 meters. This generates real-time information on asset movement and current zonal locations. Armed with graphical displays of this information, facilities managers can quickly identify and deploy assets to the operations that need them. This improves asset utilization and operational throughput at the facility.





### **Event Logging**

The Intellex battery-assisted passive tags contain 60 Kb of rewritable memory. This capability can be used to log chain of custody events for shared and leased assets, making it easier to reconcile billing and liability disputes. It can also be used to ensure that only certified personnel are operating the equipment.

Maintenance and calibration activities can also be recorded directly to the Intellex on-board tag memory. When subsequently servicing the equipment in the field, the asset's service history can be read directly from the tag without relying on network connectivity to a central database. This increases the service technician's ability to more quickly diagnose and repair the problem and get the equipment back into service.

### **The Best of Both Worlds**

By combining Class 4 capabilities (at a fraction of the cost) with Class 1 compatibility, Intellex offers breakthrough performance at a breakthrough price – all within a standards-compliant framework. This creates truly compelling value propositions for transportation and logistics applications in yard management, nested supply chains and mobile asset management. To learn more about Intellex RFID solutions for transportation and logistics, visit [www.intelleflex.com](http://www.intelleflex.com).

### **Salient Features of Intellex Technology**

- 64 Kb total, 60 Kb user rewritable memory
- Multi-protocol readers that can read C1G2, C2 and C3 tags
- Up to 50 meter range
- Fraction of the cost of active tags



Intellex Corporation, 2465 Augustine Drive, Santa Clara, CA 95054

Phone 877 MY IFLEX (877 694 3539) or +1 408 200 6500 Fax +1 408 200 6599 [www.intelleflex.com](http://www.intelleflex.com)

© Intellex Corporation 2007. All rights reserved.

Intellex and the Intellex logo are trademarks of Intellex Corporation. All other trademarks are property of their respective owners.

WP-10066 (08/07)