

EXTRACT

CUSTOMER:

- **Organization:** Marriott International
- **Properties involved:** Three luxury hotels in China
- **Sector:** Hospitality / Hotel Linen Management

CHALLENGE: During high-occupancy periods, linen cycles accelerate dramatically. Manual counting, paper-based housekeeping records, and unclear handover accountability were causing inefficiencies, inventory inaccuracies, and operational delays across multiple departments.

RFID SOLUTION KEY FEATURES:

- **150k Datamars UHF LaundryChips™ FT401-ST**, powered by Impinj M800 series endpoint ICs with support for Gen2X, sewn into all linen items (bed sheets, towels, bathrobes), integrated into a Smart Linen Management System covering the full hotel linen cycle: clean linen check-in, housekeeping hygiene management, soiled linen check-out, and periodic inventory checks.
- **Smart Cabin bulk-reading points powered by Impinj for linen handover.**
- UHF handheld readers powered by Impinj E Family Reader ICs with support for Gen2X, used by housekeeping and room management teams for room-level operations and inventory control.

RESULTS & SAVINGS:

based on a **200-room hotel, ~80% occupancy:**

- Linen counting time: **-90%** (from 90 min to 10 min)
- Housekeeping report recording: **-90%** (from 90 min to 10 min)
- Warehouse stocktaking: **-80%** (from 5 hours to 1 hour)
- **Full traceability and accountability** at every handover point, from the Smart Cabin area to individual rooms
- **Real-time inventory visibility** with automated reporting.

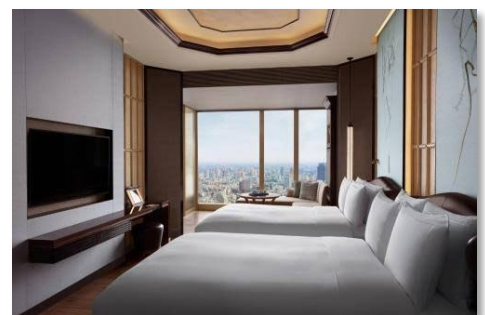
KEY INSIGHT: By deploying Datamars LaundryChip™ 401 at item level across the full linen cycle, Marriott transformed a manual, error-prone process into a fast, accurate, and fully traceable operation - proving that in high-volume hospitality environments, reliable RFID tagging is the foundation of operational excellence.



Datamars LaundryChip™ FT-401ST sewn inside a linen hem



Impinj M800 endpoint ICs with support for Gen2X



A Marriott hotel property in China

COMPLETE CASE STUDY

RFID-Powered Linen Management at Marriott International: How LaundryChip™ 401 Enabled Full-Cycle Visibility Across Three Luxury Hotels in China

Marriott International is one of the world's largest hotel groups, operating over 6,500 properties across 127 countries and regions, including more than 570 hotels in China alone.

In a high-occupancy luxury hotel, linen is not a background commodity - it is a critical operational asset. Bed sheets, towels, bathrobes, and other textile items move continuously through a fast cycle of receiving, distribution, use, collection, and outbound handover to laundry facilities.

At scale, this process involves thousands of individual items per day, managed across multiple departments and shifts. To bring this cycle under control, three Marriott luxury hotels in China deployed a full RFID-based linen management system.

At the core of the solution: **Datamars UHF LaundryChip™ 401 RFID tags**, powered by **Impinj M800 series endpoint ICs with support for Gen2X**, specifically designed to deliver consistent identification performance in high-density, high-intensity textile environments.



A Marriott hotel property in China



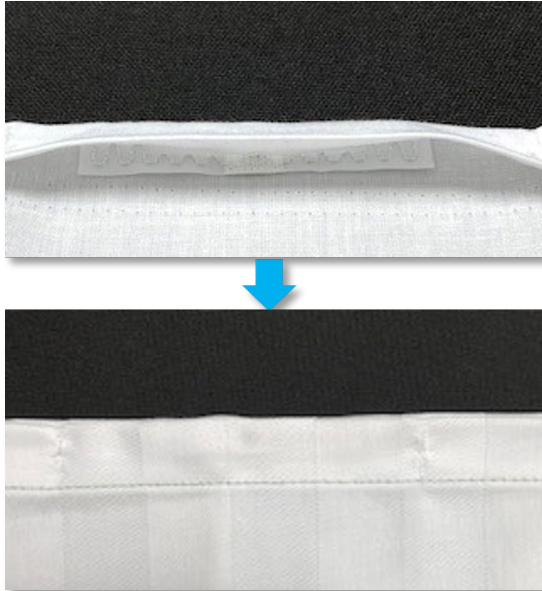
A Marriott hotel property in China

CUSTOMER:

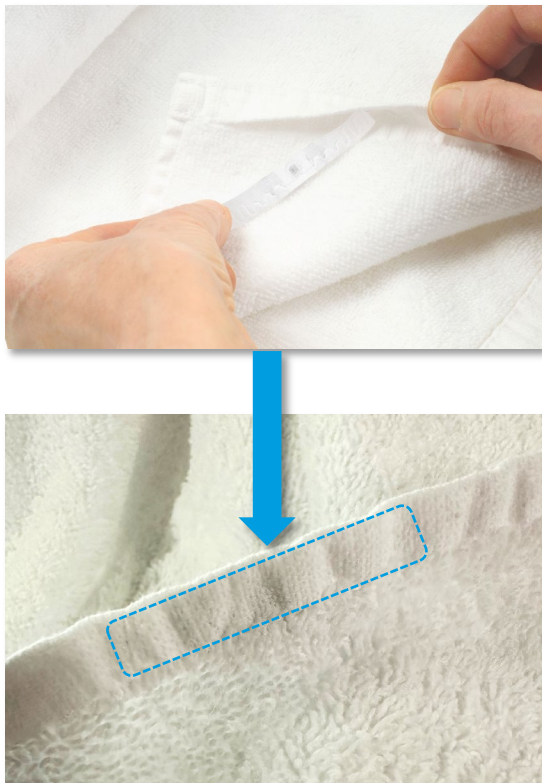
- **Organization:** Marriott International
- **Properties involved:** Three luxury hotels in China
- Daily linen flows involving high volumes of textiles and multiple SKUs moving across housekeeping, storage, laundry collection, and outbound handover. Reference model based on a 200-room hotel with approximately 80% average occupancy.

Issue to solve: During peak occupancy periods, the speed and volume of linen flows expose every inefficiency in manual processes. Marriott identified four critical operational issues that needed to be resolved:

1. **Time-consuming counting and frequent errors.** High item volumes and multiple SKUs made manual stocktaking slow, labor-intensive, and prone to missed items - particularly during peak demand, when speed matters most.
2. **Delayed and labor-intensive housekeeping records.** After room cleaning, staff had to manually record and compile linen usage reports - a process that consumed valuable time, introduced errors, and offered no real-time visibility into actual stock levels.



Datamars LaundryChip™ FT-401 sewn into a linen hem (hem opened) – INSIDE AND OUTSIDE VIEW



Datamars LaundryChip™ FT-401 sewn into a towel hem – INSIDE AND OUTSIDE VIEW

3. **Limited transparency in collection and outbound handover.** Discrepancies between physical counts and system records were common at collection, staging, and outbound handover points. Without a reliable verification mechanism, accountability was unclear and disputes with laundry service providers were difficult to resolve.
4. **Impractical warehouse inventory checks.** Full stocktaking was so time-consuming that frequent cycle counts were simply not feasible, leading to a progressive drift between physical inventory and reported figures.

In short: the existing process could not keep pace with the operational demands of a luxury hotel running at high occupancy.

The RFID Solution

The project established a traceable, measurable, and verifiable closed-loop linen management process by applying RFID technology at item level and scanning at every key checkpoint within the hotel.

The RFID Tag: Datamars UHF LaundryChip™ 401

At the foundation of the system, Datamars UHF LaundryChip™ FT401 tags were sewn into every linen item - bed sheets, towels, and bathrobes - providing each piece with a unique RFID identity. The choice of the LaundryChip™ 401 was driven by the specific demands of the hospitality environment:

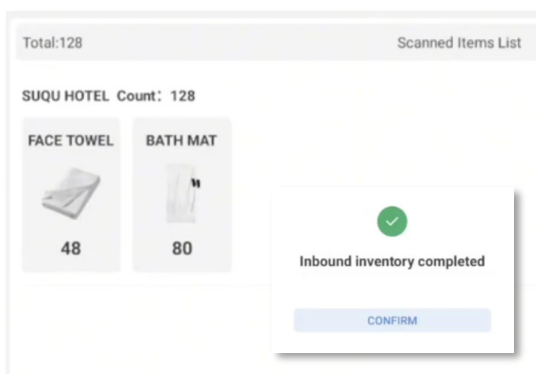
- **High-density bulk reading.** In a luxury hotel, linen moves in large carts and baskets containing hundreds of items. The LaundryChip™ 401, with its patented Double Loop Antenna, is engineered to deliver reliable read performance even in tightly packed, high-density bulk - over 1,000 tags read in just 3 seconds - ensuring accurate counts without unpacking or manual handling.
- **Mechanical and electronic endurance.** Hotel linen undergoes intensive industrial washing, drying, and ironing cycles on a continuous basis. The LaundryChip™ 401 is specifically designed to withstand these harsh conditions across hundreds of cycles, with no degradation in read performance or structural integrity. [...]



Impinj M800 Series Endpoint ICs



Clean linen inbound scanning performed through a high-density RFID cabinet



Clean linen inbound quantities automatically recorded after RFID bulk scanning.

Its extremely compact micro-module provides superior mechanical resistance: a smaller module is inherently more robust than a larger one.

- **Imperceptibility.** In a luxury hospitality setting, guest experience is paramount. The LaundryChip™ 401 is thin, small, and completely unnoticeable once sewn into the textile hem - guests never detect its presence. OEKO-TEX Standard 100 certified, the tag is tested to be safely in direct contact with human skin.
- **Item-level intelligence.** Each tag carries a unique RFID ID linked to the item's category, status, location, and lifecycle data - enabling not just counting, but genuine asset management.

The IC: Impinj M800 Series with Gen2X

The LaundryChip™ 401 deployed in this project is powered by an **Impinj M800 series endpoint IC with support for Gen2X**, ensuring state-of-the-art RF performance, sensitivity, and reliability in dense multi-tag reading scenarios. Gen2X is a standards-compatible enhancement to the RAIN radio standard that adds key solution innovations Impinj has developed working with Fortune 500 enterprises to unlock Physical Intelligence – real-time, item-level visibility and traceability at scale.

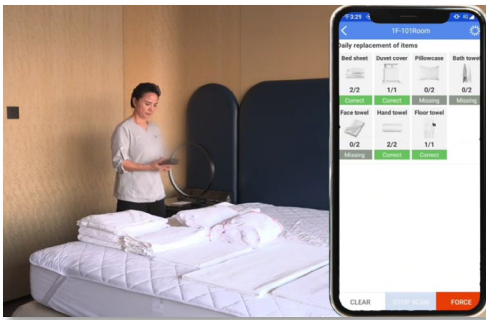
The Readers and Reading Points

The RFID infrastructure was designed around two complementary reading methods, each matched to a specific step in the operational workflow.

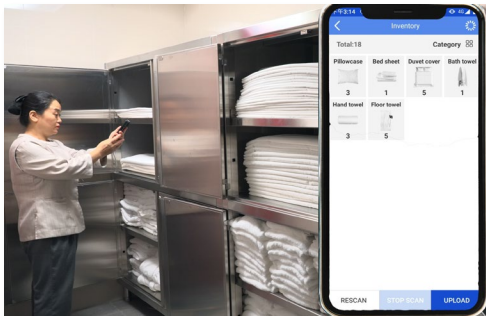
- For clean and soiled linen handover at the hotel, bulk reading is performed in the **Smart Cabin area**: the laundry employee pushes the linen trolley inside the cabin, the system reads all RFID-tagged items in bulk, and the hotel laundry manager witnesses and validates the handover. This creates a shared, verifiable record between the hotel and the laundry service provider.
- For **housekeeping operations** and periodic **inventory checks**, staff use **UHF handheld readers, powered by Impinj E Family Reader ICs with support for Gen2X**, and PDA devices equipped with a compact antenna. These mobile devices allow linen to be scanned directly at room level, supporting accurate usage confirmation, linen replacement tracking, and stock visibility without interrupting the housekeeping workflow.



Scanning the clean linen



Uploading the linen information and replacing the linen



Linen inventory check performed with a handheld RFID reader powered by Impinj E Family Reader ICs with support for Gen2X



Soil linen outbound scanning performed through a high-density RFID cabinet

The Process

The RFID-enabled linen management system covers four operational steps inside the hotel:

1. **Clean linen check-in.** When clean linen arrives at the hotel, the laundry employee and the hotel laundry manager meet at the Smart Cabin area. The laundry employee pushes the clean linen trolley inside the cabin, where all RFID-tagged items are read in bulk. The hotel laundry manager witnesses the process, and the system automatically records the clean linen received - item by item, category by category - replacing manual counting with a faster, more accurate, and verifiable check-in process.
2. **Housekeeping hygiene management.** During room servicing, each housekeeper uses a PDA handheld reader with a compact antenna. The housekeeper brings clean linen from the trolley into the room, removes the soiled items, then scans the room number with the PDA, scans the linen items to be replaced, and confirms the replacement in the system. Linen usage is recorded directly at room level - eliminating manual paperwork and providing real-time visibility into replacement and consumption data across floors and shifts.
3. **Soiled linen check-out.** When soiled linen is ready for outbound handover, the same bulk verification process used at clean check-in takes place at the Smart Cabin area. The laundry employee pushes the soiled linen trolley into the cabin while the hotel laundry manager witnesses the reading. The system automatically identifies the items being checked out and generates a digital outbound record - resolving one of the most persistent sources of discrepancies and disputes with laundry service providers.
4. **Periodic inventory checks.** For monthly or quarterly stocktakes, the room manager uses a handheld RFID reader to perform bulk scans of linen items across storage and floor areas. A process that previously took five hours is now completed in approximately one hour, with greater accuracy and no disruption to ongoing operations.



Linen inventory check performed with a handheld RFID reader powered by Impinj E Family Reader ICs with support for Gen2X.

The result is a fully digital, closed-loop process where every linen item is tracked from arrival to departure, with full traceability at every stage.

Savings and results

Based on the operations of a 200-room hotel with an average occupancy rate of approximately 80%, the RFID linen management system delivered significant, measurable efficiency improvements after deployment:

Process	Before RFID	After RFID	Improvement
Linen counting	~90 minutes	~10 minutes	-90%
Housekeeping report recording	~90 minutes	~10 minutes	-90%
Warehouse stocktaking	~5 hours	~1 hour	-80%

Beyond time savings, Marriott reported four key operational benefits:

- **Faster linen dispatch during peak periods.** Rapid counting enabled more timely distribution of clean linen to floors and rooms, directly supporting service quality during high-occupancy periods.
- **Higher data accuracy.** Improved consistency between physical inventory and system records, reducing the gap that had previously accumulated through manual processes.
- **Automated reporting.** Minimized manual paperwork and eliminated missing entries, freeing housekeeping staff to focus on guest service rather than administrative tasks.
- **Clearer handover accountability.** Every inbound and outbound movement is now traceable and verifiable, providing clear evidence at each handover point and resolving a long-standing source of operational friction.

Conclusion

This deployment at three Marriott luxury hotels in China demonstrates **how RFID technology** - when built on the right tag foundation - **can transform linen management from a labour-intensive, error-prone process into a fast, transparent, and fully traceable operation.**

The Datamars UHF LaundryChip™ 401, powered by an Impinj M800 series endpoint IC with support for Gen2X, proved to be the ideal choice for this environment: purpose-built for high-intensity textile cycles, capable of delivering flawless bulk reading performance in dense linen flows, and engineered to maintain full mechanical and electronic integrity across hundreds of industrial wash cycles.

For high-occupancy hotels managing large volumes of flat linen under constant time pressure, the combination of item-level RFID tagging with the LaundryChip™ 401, Smart Cabin bulk reading, and handheld/PDA room-level scanning delivers exactly what operations need: **speed, accuracy, accountability, and real-time visibility across the entire linen cycle.**