

# Countering Counterfeiting with RFID Technology

**The growing problem of fake medicine has forced the pharmaceutical industry into creating a more protected environment that is cost-effective, reduces risk, and can be extended throughout the supply chain**

Francesco Fantoni Guerri at Murata ID Solutions

Counterfeiting affects the pharmaceutical sector on a global scale, with the value of counterfeit products traded worldwide estimated to be around €4 billion per year. With the topic high on the agenda for governing bodies and manufacturers alike, some steps have already been taken to introduce anti-counterfeiting measures, such as tracking labels, to make medicines easier to trace and harder to replicate. However, to effectively tackle the challenge the grey market presents, the solution needs to be tamper-proof, cost-effective, and easy to realise on a large scale. This article explores why leveraging radio frequency identification (RFID) technology to improve supply chain visibility and integrity can be key to overcoming the challenge.

The volume of falsified and counterfeit medicines has been increasing steadily. Several factors, including high profit margins, low risk of detection, and weak penalties, make pharmaceutical products an attractive target for criminals. They are also relatively easy to pass onto consumers as authentic products. Regardless of the type of drug, counterfeit products present a serious risk to health and safety, and, in a worst-case scenario, they can cost lives. The practice also has profound financial implications.



Goods are registered at each point in the supply chain using an RFID reader with data uploaded immediately

It infringes intellectual property rights, damaging pharma manufacturers' profitability, while EU governments lose around €1.7 billion per year in revenue. Clearly, both manufacturers and governments have a lot to gain by eliminating the issue.

#### **Falsified Medicines Directive**

To make counterfeiting and falsifying pharmaceuticals more difficult, the

EU introduced the Falsified Medicines Directive (FMD), which came into force in 2011. It outlined several new measures to address the issue, including introducing stricter regulation around substances sourced from outside the EU and making identifying legitimate online resellers easier. However, from a manufacturer's perspective, one measure is particularly interesting. From 2019 onwards, marketing authorisation

holders were required to include two new safety features in the packaging of most prescription medicines and some over the counter drugs: a 2D barcode used as a unique identifier and an anti-tampering device, which shows if the package has been opened or altered. Manufacturers must upload the data in the unique identifier to a central EU repository, which is part of the end-to-end verification system. The resellers, pharmacies, and hospitals distributing the product will scan the identifiers. Only once the authenticity has been successfully verified against the data in the repository can the drugs be passed on to the patients. The goal of the process is to create a framework to help guarantee medicine authenticity and strengthen every part of the pharma supply chain.

### The Need for Stringent Anti-Counterfeiting Methods

The FMD has been a significant step in the fight against the grey market, but the measures it outlines still leave room for improvements. The main challenge is the tracking technology the authenticity validation relies on. Barcode-based labels and other technologies that rely on being read visually are vulnerable to replication

and tampering due to their prominent location and ease of reproduction. With the label visible on the package, it is also easy for third parties to identify what it contains, making it more attractive to thieves.

As modern supply chains grow in complexity, a greater level of asset control and real-time traceability is required. To effectively target the issue, the logistics chains need to become more transparent and traceable, with visibility stretching from the manufacturer to the customers. They will also need to become inherently more secure. However, to successfully take on the challenge, the pharma sector needs to have access to a tracking method that is cost-effective, tamper-proof, and, crucially, enables real-time accurate traceability of the single products. This is where RFID technology can prove to be a game-changer.

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### What is RFID?

RFID is a highly accurate identification technology that enables the tracking of large volumes of assets at a relatively low cost. The RFID labels are attached to the items that need to be tracked, and give out a signal that can be automatically captured by an RFID reader. RFID tags can be scanned simultaneously in hundreds and without line of sight, enabling individual assets to be tracked with high accuracy throughout the supply chain.

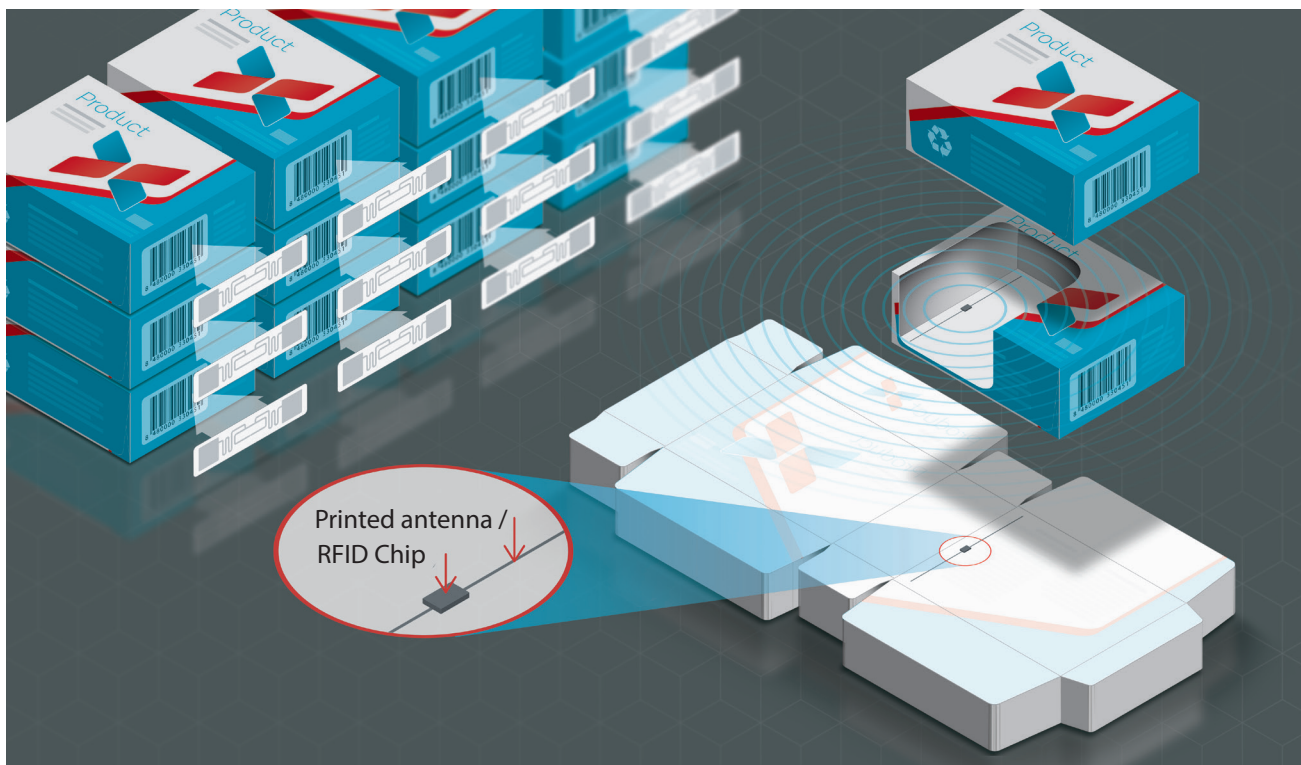
Moreover, each RFID tag is distinguished by a unique serial identifier that is impossible to duplicate, enabling the verification of product/asset authenticity.

The assets are scanned at critical stages of their journey to deliver real-time updates about their status.



RFID scanning technology can help to track and trace items throughout the pharmaceutical supply chain

# PMPS



Smart packaging based on an innovative RFID tag that can be attached to the inside or outside of the package

The data gained from the readings are managed with specialist software that interprets them and turns them into actionable insights displayed on a dashboard. The dashboard gives real-time visibility over each tracked asset and provides alerts in case of issues, enabling quick and proactive reactions. When leveraged to its full potential, RFID tracking can revolutionise the way businesses operate through instantaneous remote monitoring, rapid stocktaking, and real-time security updates.

## Transforming Pharma Supply Chains

The benefits of RFID tracking have already been realised in the first large-scale implementation in the pharma sector by Bayer S.p.A, the Italian division of Bayer AG. The company specialises in manufacturing pharmaceutical products for the Italian market. However, with an extensive supply chain with multiple logistics and transportation partners, Bayer had little visibility over its products once they left the warehouse. It often only

discovered issues such as missing or damaged products once the customer reported them.

Looking to overcome this challenge, Bayer turned to Murata ID Solutions for an answer. The company is a division of Murata Electronics focused on providing turnkey RFID and IoT solutions to help companies collect raw data from their operations and turn them into actionable insights to gain real-time visibility across the supply chain. Even though RFID technology is widely utilised across industries, the pharma sector is still in the early phase of adoption. The assets Bayer wanted to track were boxes of pharmaceutical products and the pallets used to ship them. Murata ID Solutions suggested a four-part solution involving consultancy (feasibility study), RFID labels, RFID printers and readers, and the business' intelligence software to interpret the data.

Bayer's distribution partners had RFID readers and stations installed across the logistics network, enabling

efficient tracking of every single box at each step of the distribution journey. The boxes of products are scanned up to 15 times during their journey and, each time a label is read, the information is sent straight to the live dashboard, which translates it into easily actionable insights. By monitoring this information, Bayer can track the products in real time and be alerted to any data anomalies, such as missing products.

An additional key benefit of RFID is that the tags don't need to be visible to be read. Each pallet of products is therefore wrapped in opaque white film improving security and reducing the risk of theft as it is impossible to visually identify what the shipment contains.

The company can now take a proactive approach to prevent potential issues instead of relying on customers to report them. There are no blind spots in the supply chain, which has helped improve customer service and take security, resilience, and productivity to a new level. As a result, Bayer has been able to minimise the costs and delays





*As opposed to barcodes, the durable design means that it is resistant to high and low temperatures and changes in air pressure*



arising from distribution errors and returns. Other benefits include reduced pallet losses and theft, better stock coordination and reduced turnover times, and simplified documentation for distribution partners.

### **Tackling the Grey Market with RFID Smart Packaging**

As shown in the above case study, box-level RFID tracking is a simple and cost-efficient way to build a more transparent and safer supply chain.

However, applying the technology at item level also brings great value as it can help prevent anti-counterfeiting and grey market control of goods. An effective way to realise this is to make each product's packaging trackable.

Smart packaging has revolutionised asset tracking and counterfeit-proof labelling. The solution is based on an RFID tag consisting of an adhesive RFID chip with a printed antenna. This very small and flexible chip can be attached to the outside or on the inside of the packaging, turning the package itself into an RFID tag, and encompassing all the benefits of traditional RFID tracking, including real-time end-to-end traceability.

As the chip can be attached during the manufacturing process when the package is printed, time and labour costs are significantly reduced, making the tag ideal for large-scale applications. Unlike RFID inlays, the smart RFID chip is compatible with metallic packaging material, making it suitable for a variety of pharma packaging.

As opposed to barcodes, the durable design means that it is resistant to high

and low temperatures and changes in air pressure. This is vital for securing the integrity of biomedical products that need to be kept in strictly controlled temperatures, where scanning visual labels is often a challenge due to condensation or fear of contamination. The RFID tag removes the risk as the products don't need to be physically accessed to be scanned.

Like traditional RFID tags, each smart chip has a unique serial number that can be linked to production records. What's more, additional information can also be linked to the RFID tag's unique serial number to help further verify the product's authenticity. This could include supply chain data, such as the country of origin and the destined country of sale, or information relating to the materials, ingredients, or manufacturing processes used. The data will prove that a specific product is genuine and that it is sold in the correct, regulated markets. Together with the real-time visibility and traceability enabled by the RFID technology, it will help validate distribution channels during the logistics processes, giving operators an easy and secure way to manage authenticity.

### **Conclusion**

With lives, reputation, and profitability at stake, the grey market is a threat the pharma sector can't afford to ignore. Fortunately, technology is increasingly rising to the challenge, providing operators with a cost-effective way to improve security on a company, shipment, and product level. By leveraging anti-counterfeiting technologies such as RFID, manufacturers can get better control over their supply chain and

safeguard product integrity, while reaping the multiple benefits of having access to real-time operational data.

### **References**

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**Francesco Fantoni Guerci** is CEO at **Murata ID Solutions** – a spin-off company of the University of Parma, Italy, and now part of the Murata Group. Francesco has led the company from its start-up phase to date, and his focus is on developing new business solutions and strategic relationships with channel partners. An engineer from the Politecnico di Milano, Italy, his career in operations progressed in his roles as Production Manager, Technical Director, and Supply Chain Director in major companies such as Parmalat, Bobst Group, and Parmacotto.