

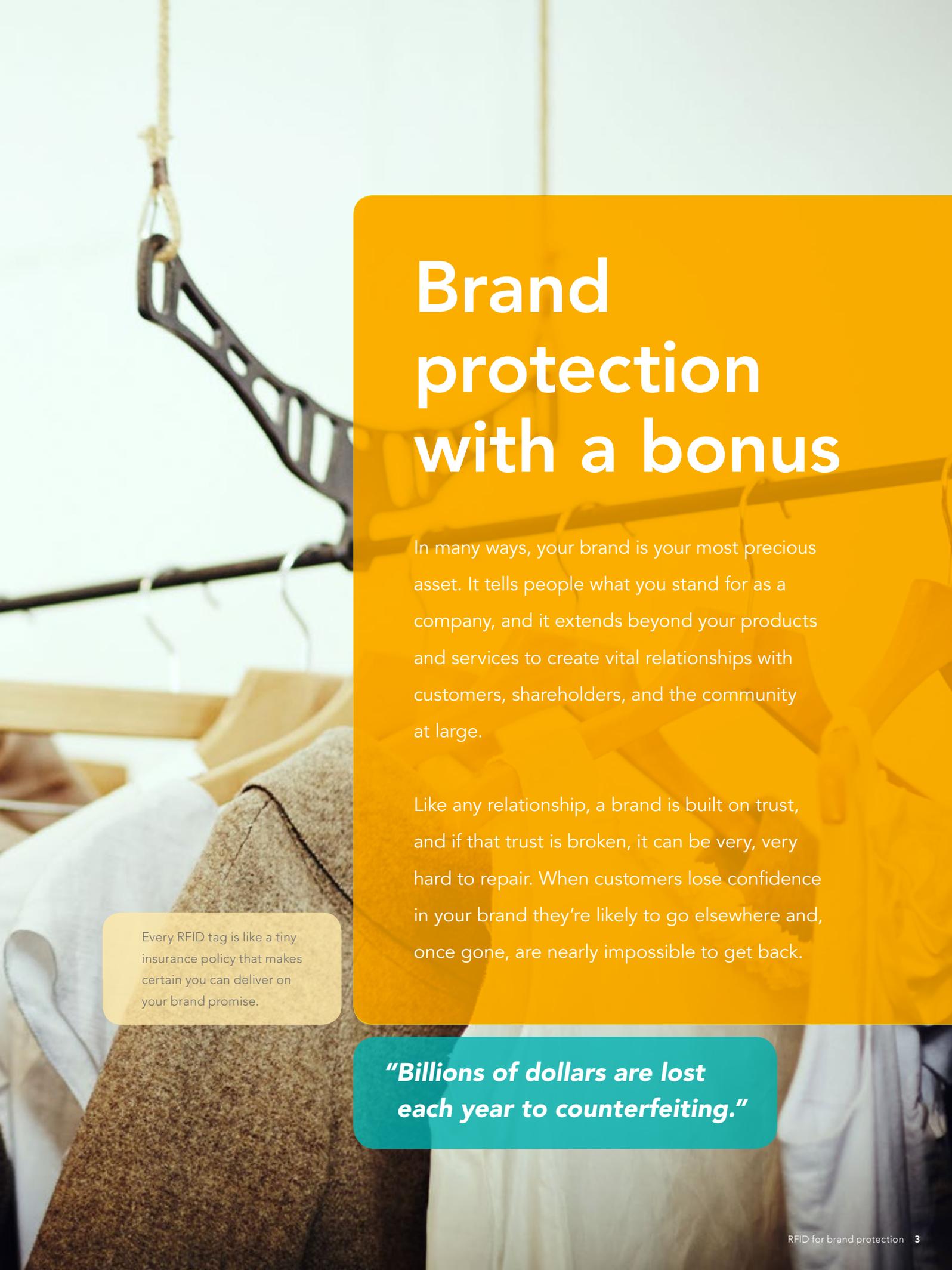


RFID for brand protection

Secure your most valuable assets
& increase customer engagement







Brand protection with a bonus

In many ways, your brand is your most precious asset. It tells people what you stand for as a company, and it extends beyond your products and services to create vital relationships with customers, shareholders, and the community at large.

Like any relationship, a brand is built on trust, and if that trust is broken, it can be very, very hard to repair. When customers lose confidence in your brand they're likely to go elsewhere and, once gone, are nearly impossible to get back.

Every RFID tag is like a tiny insurance policy that makes certain you can deliver on your brand promise.

"Billions of dollars are lost each year to counterfeiting."

Globalization and counterfeiting

Being part of the global economy puts extra pressure on any brand. The constant flow of goods and services across national borders, the frequent use of outsourcing, and the heavy reliance on complex supply chains make it harder than ever to ensure the authenticity of products. Across every economic sector, and at every level of value – from high-end luxury goods to everyday household items – the presence of faked, forged, and pirated goods is growing at an alarming rate, and poses a serious threat to even responsible companies.

The International Chamber of Commerce finds that, in the G20 alone, the cost of counterfeit and pirated goods has nearly tripled in the past three years, and will represent between \$1.2 and 1.7 trillion by the end of 2015. But counterfeit products mean more than lost revenue, though, since tainted goods can put people at risk and can threaten public safety. For today's companies, protecting a brand means preserving trust while also avoiding tragic consequences.

RFID: a better kind of brand protection

One of the strongest weapons in the brand-protection arsenal is RFID technology. Wireless RFID tags have unique identifiers, which essentially give each item its own unique DNA.

This makes it easier to track an item on its way through the supply chain and, at the same time, verify authenticity, ensure quality, and keep people safe. RFID offers a more comprehensive way to safeguard your brand, because RFID supports a multi-pronged approach that includes authentication, track and trace, and tamper evidence.

What really sets RFID apart, though, is that RFID can do what no other anti-counterfeiting technology can – create deeper, more meaningful relationships with your customers. RFID is different because it not only protects your brand, it adds value, too.

NXP: the right choice for RFID

As the most trusted provider of RFID solutions globally, NXP is the right choice for any RFID implementation. We have shipped more than 8.5 billion RFID chips – that's more than anyone else in the market – and we offer one of the most comprehensive identification portfolios on the planet. We tailor our solutions to meet your needs for security, operating requirements, and cost, and provide all the support you need to deliver end-to-end systems – even in very large volumes.



Counterfeiting by the numbers

Globalization has created vulnerabilities in the supply chain, and criminals have been quick to exploit these weaknesses. Counterfeiting is an increasingly widespread issue, impacting even responsible companies. What's more, counterfeiting has serious economic and social consequences.

7 to 10%

Estimated percentage of global merchandise trade that is counterfeit

(source: Vandagraf International, 2014)

750%

Increase in U.S. counterfeit seizures from 2000 to 2013

(source: US Department of Homeland Security, 2013)

\$250.000.000.000

Annual losses in the global economy attributable to counterfeit products

(source: Organization for Economic Co-operation and Development, 2014)

1400%

Increase in customs cases in EU from 2000 to 2012

(source: European Commission – Taxation and Customs Union, 2013)



5 to 10%

Estimated percentage of sales impacted by channel diversion, resulting in an average erosion of profitability of 9%

(source: The Alliance for Gray Market and Counterfeit Abatement, 2008)

\$99.000.000.000

Estimated combined annual cost of counterfeiting in the food and personal-care industries

(source: World Customs Organization; Datamonitor Anti-counterfeiting for FMCG report, 2013)

52%

Estimated number of businesses experiencing a product recall that incur costs in excess of \$10 million

(source: Grocery Manufacturers Association, 2011)

6

Number of Chinese infants killed (300,000 injured) from melamine-laced milk powder in 2008

(source: Center for Responsible Enterprise And Trade brochure "Health and Safety risks from counterfeits in the supply chain", 2012)



RFID is the next step in supply-chain protection

Increased complexity in the supply chain, due to internationalization, outsourcing, e-retailing, and other causes, reduces control over the process and introduces opportunities for counterfeit products. Counterfeiting has accelerated rapidly in the past decade, in part because technology is making detection more difficult, but also because the penalties for counterfeiters are minor compared to other crimes. In today's economy, counterfeiting is a low-risk, high-reward activity.

"RFID can give each product its own unique DNA, memory, and ability to communicate."

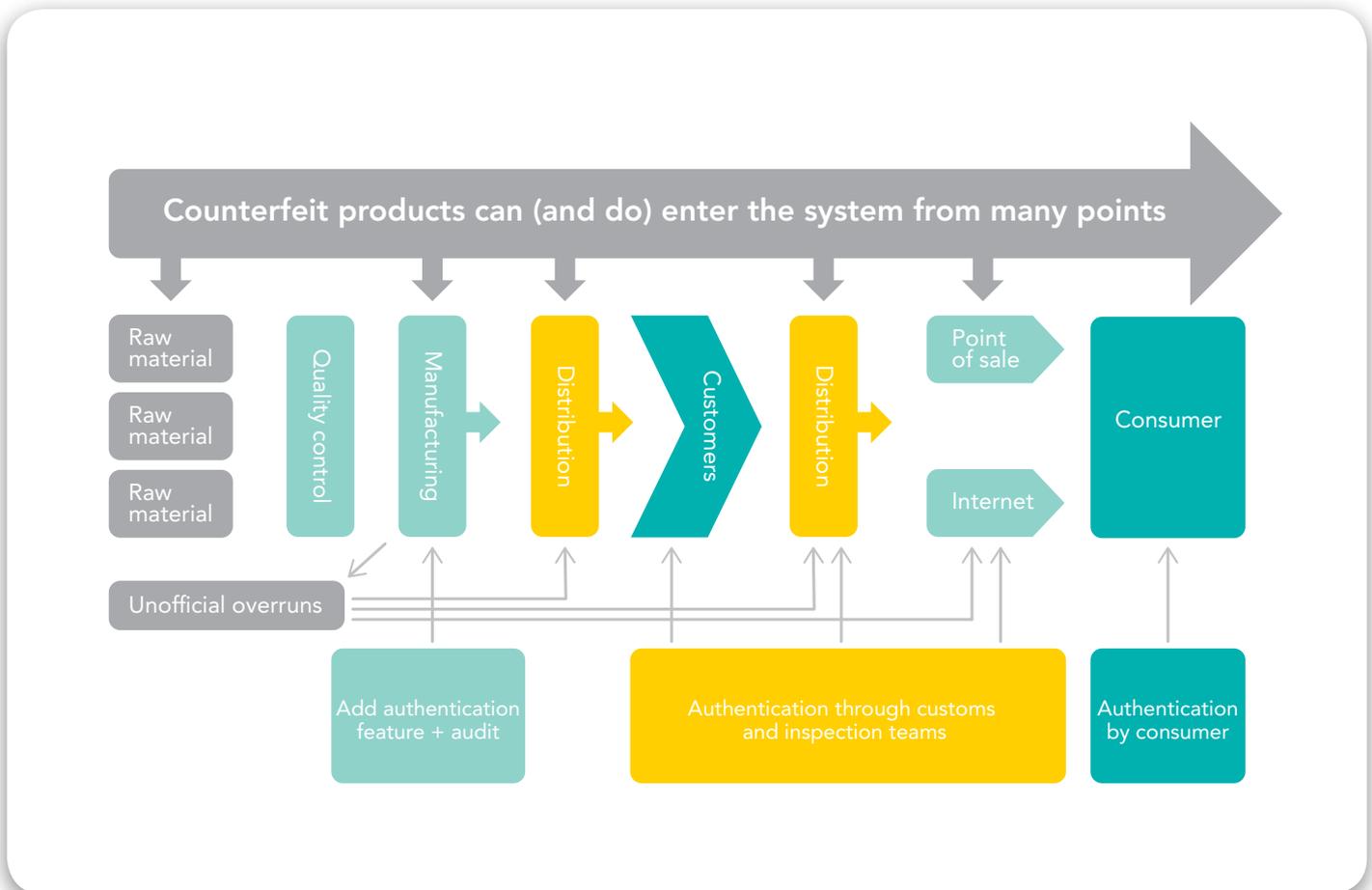


Counterfeiters are getting smarter, using their own complex supply chains, with multiple locations for assembly and distribution, so as to minimize the chances of getting caught. Counterfeiters are also using technology to work around existing anti-counterfeit methods, making it even harder to distinguish between authentic and counterfeit goods. The Internet plays an important role, too, since it gives counterfeiters a relatively safe place to operate, and can keep identifies relatively anonymous.

These trends make it more important than ever to protect the supply chain, since counterfeit products can (and do) enter the system at just about any point. RFID technology is extremely difficult to copy or fake, and provides a multi-layered defense against attacks on the supply chain.

With RFID, you can identify an individual item, determine its location, review its chain of custody (when it was transferred or sold), and monitor its condition. You can count hundreds of items almost simultaneously and automatically, even if the RFID tag is inside the package. You can confirm that quality checks have been performed, or that the item has been stored at the right temperature. Having all this data available makes it easier to manage the supply chain, identify counterfeits, simplify any product recalls, and provide evidence in case of litigation.

Compared to other anti-counterfeiting technologies, RFID does a more comprehensive job, using a multi-pronged approach to prevent forgeries, fakes, and unauthorized items from entering the supply chain. What's more, RFID that operates in the high-frequency range goes beyond anti-counterfeiting to interact directly with consumers.



Authentication

There are a number of ways to indicate authenticity – optical variable devices (OVDs), holograms, color-change inks, watermarks, 2D barcodes – but criminals have already found ways to copy all these things, so these methods aren't as trustworthy as they once were. RFID, with its ability to store vital information and assign unique serial identifiers, makes it easy to identify legitimate goods quickly and with confidence. That means everyone in the supply chain (assembly houses, warehouse managers, shipping companies, customs officials, retailers), and even consumers can verify authenticity.

Track and trace

For track-and-trace functions, 2D barcodes and matrix digital barcodes support a certain amount of monitoring within the supply chain, but using barcodes to assign unique IDs to each unit of product is too complex and too time-consuming to be realistic. RFID tags make it easy to track each individual item separately, and give you the transparency to make smart decisions about the status and handling of a product, throughout the supply chain, using a secure and scalable tracking technology.

Tamper evidence

Tamper-resistant labels and closures are good up to a point, but, unlike RFID tags, can be repaired and made to work again. Adding an RFID tag to tamper-evident closures, seals, and labels lets you check if the product has been mishandled. The RFID tag stops transmitting if it's been abused, so you can know with certainty if there's been any grazing, product removal, or fraudulent returns.

Consumer authentication and interaction

Unlike other anti-counterfeiting technologies, high-frequency RFID lets you interact, in a meaningful and engaging way, with your customers. That's because RFID can connect with the rapidly increasing number of NFC-enabled smartphones in use worldwide. Your customers authenticate items in real time, at the point of sale, and you have a new way to enhance experiences, engage in deeper dialogs, and increase confidence.

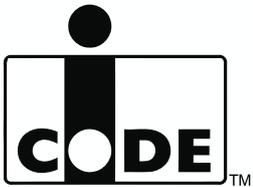
RFID's three weapons against counterfeiting	
RFID function	What the RFID tag can tell you
1. Authentication	I am who I say I am.
2. Track & trace	This is where I am now, this is where I've been, and this is where I'm going.
3. Tamper evidence	I have (or have not) been handled properly.

RFID's wow factor	
RFID function	What the RFID tag can tell you
Customer interaction	I'm here to help. Let me tell you more.

What is RFID?

RFID is a contactless technology that lets you identify and track items, without line of sight, over a range of distances. RFID tags combine a tiny microchip with an antenna that picks up electromagnetic energy beamed at it from an RFID reader. When the RFID tag senses the energy, it sends back its unique identification number to the reader device. This makes it possible to identify, authenticate, track, and trace each individual unit. Support for cryptography adds varying levels of security to each RFID tag.

The NXP advantage in RFID



Having shipped more than 8.5 billion RFID ICs to our customers, NXP is the identification industry's #1 semiconductor supplier. We hold the top position in eGovernment, bank cards, smart mobility cards, tags and authentication, RFID/NFC readers, and NFC-enabled smartphones.

Our leadership is due, in part, to our deep commitment to RFID innovation, and to our extensive patent portfolio, which covers key technologies in RFID. We build on more than 20 years of success with MIFARE, the world's first contactless ISO/IEC 14443 memory IC with cryptography. We also co-invented NFC more than a decade ago, and have guided its development ever since.

We use the latest techniques for protecting privacy, support a range of form factors, and enable smart, secure devices that offer the fastest transaction times. We're known for our ability to drive technology, and consistently introduce new solutions that share the vision of our key partners across the value chain. Our commitment to RFID for the long term leads us to invest significantly in R&D, and drives us to be an active leading participant in standardization and regulation activities, like those of the GS1, ISO, and IEC.

When you partner with NXP for RFID, you can be certain that you're getting a trusted technology, since we've been the choice of governments and the banking industry for decades. We regularly work with multi-national clients across many industries, and have no trouble scaling our supply to guarantee a secure source at competitive pricing.

What NXP RFID can do for you

▶ **Unique identifiers**

NXP's RFID makes it easy to give every product you make its own personal identity. The unique serial identifiers (UIDs/TIDs) embedded in RFID tags let you verify that the product associated with the tag is genuine and has been supplied through legitimate, authorized supply channels. UIDs/TIDs also make the product fully traceable, so you can identify it in transit, document the ownership trail, or monitor its condition.

▶ **Proven security**

NXP's RFID tags support secure cryptography, a form of data encryption that is extremely difficult to clone or fake, so they provide a very high level of assurance for authenticity. NXP RFID is already the technology of choice in some of the world's most sensitive applications, including ePassports, bank cards, and access cards for high-security locations.

▶ **Flexible implementation**

NXP's RFID technology lets you tailor the protection so you create the system that's right for you. You can use RFID tags just for brand authentication, if that's all you need, or you can add more comprehensive features, like track-and-trace, tamper evidence, product history, and customer interactions. Either way, RFID is a cost-effective, easy-to-implement solution that helps you build an integrated, end-to-end system.

▶ **Overt or covert operation**

With NXP RFID, there's no line-of-sight requirement for reading the tag, so you have more choices about how the tag is applied to your product. Our RFID tags can be made very small, and can even be embedded into products, so they're hidden from view. That means adding RFID capabilities won't detract from your product's appearance, and you can decide if you want people to see the tag or not.

▶ **Effective tamper-protection**

NXP RFID gives the clearest possible indication of improper handling. Tampering with the product or unauthorized opening of the package destroys the tag's ability to transmit. A "dead" tag means there's been mishandling, even if the culprit did their best to go undetected.

▶ **Faster processing**

NXP's RFID technology doesn't slow things down, since the anti-collision feature makes it possible to count multiple items automatically. The process is remarkably fast and reliable, and lets you identify hundreds of items almost simultaneously, through the packaging. The radio waves from one tag don't interfere with those from another, so all the tags can "talk" at once, and each one is heard, loud and clear.

▶ **Increased consumer confidence**

NXP's RFID technology is compatible with the rapidly growing number of NFC-enabled smartphones worldwide. That means consumers can use their phones to authenticate products themselves, before they buy. They can check provenance and verify quality in real time – all by simply tapping their smartphone to the product package or label.

▶ **Smarter marketing**

NXP's RFID tags go beyond anti-counterfeiting to let you interact directly with your customers. Products equipped with our RFID tags can link consumers to further information, provide access to loyalty programs, cross-sell by giving recommendations for complementary merchandise, provide location-sensitive information and offers, or let people connect to social media. RFID tags also make you a smarter retailer and brand owner, because they let you capture valuable consumer data and generate new insights into consumer behavior.



Onsite authentication and deeper customer engagement

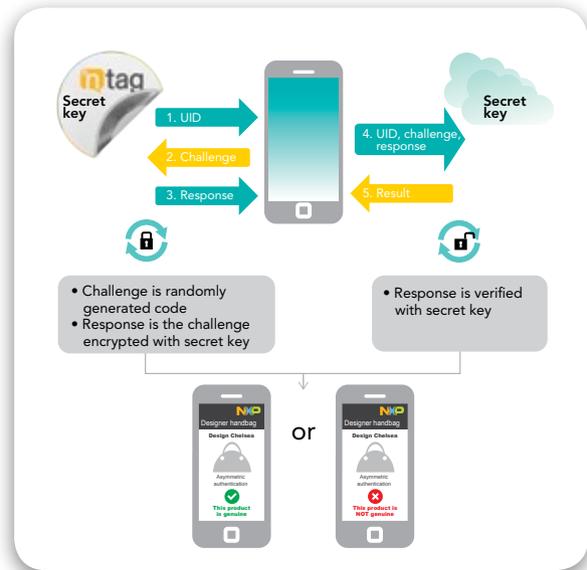
“When consumers can verify authenticity on their own, they become partners in your fight against counterfeits.”

With RFID, your customers can join the fight against fakes and help you win the war on counterfeiting. That’s because they can check authenticity – in real time and anywhere in the world – before making a purchase. Simply tap an RFID reader or an NFC-enabled smartphone to the product’s RFID tag, and an authentication app does the rest. Authentication can be configured to work on its own, without an Internet connection, or the app can use a cloud-based service. Either way, the consumer has a quick, effective way to know whether a product is genuine or not. For added levels of assurance, the RFID tag can be equipped with cryptography that supports “strong” or “stronger” levels of security.

Real-time authentication at the point of sale



Asymmetric authentication (example)



Symmetric authentication (example)

Asymmetric authentication with RFID: standalone operation

The RFID reader or NFC-enabled phone acts as a standalone authentication terminal, using standards-based private or public key cryptography. In this example, a digital signature is stored securely on an NFC tag. The key is downloaded into the phone or pre-loaded into the app. The key is then used to authenticate information in the tag. There's no need to access the cloud for authentication, so strength of a cellular signal isn't an issue, and there's no additional usage on the phone's data plan.

Symmetric authentication with RFID: a cloud-based solution

The RFID reader or NFC-enabled phone acts as a communication terminal that transfers secret information on an RFID tag to a secure server in the cloud, where authentication takes place. The cloud application checks the secret key in the tag, to verify its accuracy, and then returns the authentication result to the phone for display to the user. Embedded cryptography provides higher levels of security and protection against counterfeiting.

A special case: consumables

RFID tags can help ensure that consumers use only authentic, branded consumables, such as disposable ink cartridges for desktop printers or replacement filters for water purifiers. A quick tap of an NFC-enabled smartphone lets consumers verify authenticity, to be certain they're buying an "authorized" item that will work as expected. RFID tags can supply other kinds of helpful information, too, like expiration date or links to operating instructions, warranty details, re-order forms, and more.

With a printer, for example, when the user inserts an RFID-tagged ink cartridge, the printer's embedded RFID reader can instantly verify cartridge authenticity, log its use, and retrieve optimal printer settings.

From the manufacturer's standpoint, RFID tags make it easier to track individual consumables throughout the supply chain, to reduce counterfeiting and increase responsiveness. Individual items can be isolated and attended to quickly should problems arise or if there are concerns about quality. RFID tags also make it easier to deal with warranty issues, since the unique ID number, supplied by each RFID tag, can be logged into the appliance's microcontroller. Absence of an ID number can indicate that a non-RFID-tagged consumable was used, and thereby void any warranty claims.



Want to see NFC in action?
Tap your NFC-enabled
smartphone here.

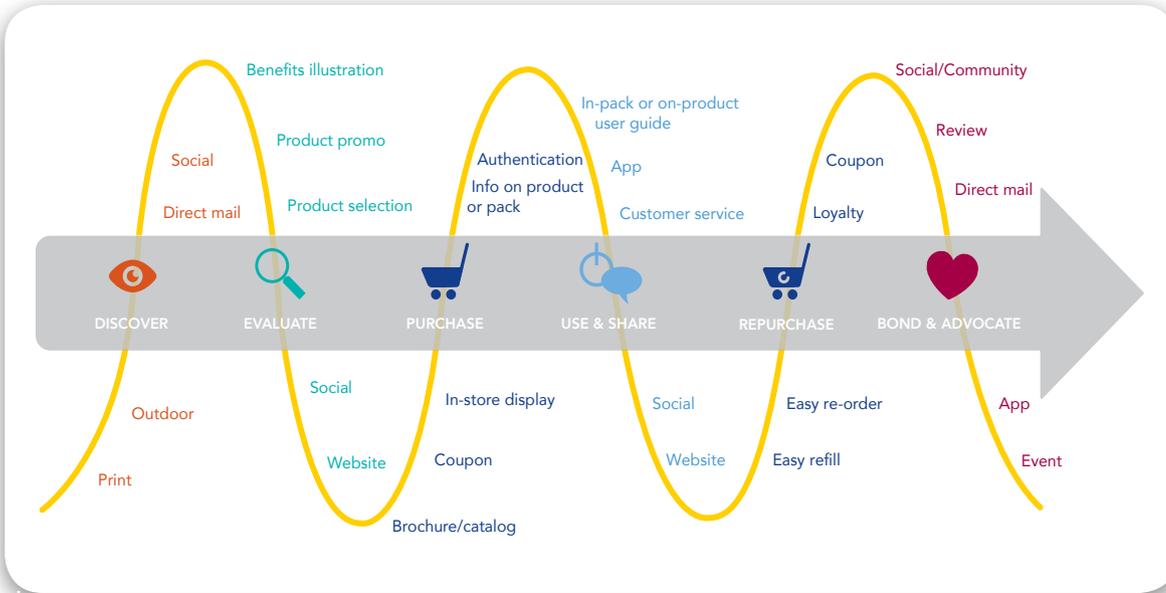
10% off wines!

More meaningful relationships

The added advantage of RFID is that it goes beyond anti-counterfeiting functions to create deeper, more meaningful customer relationships. With RFID, you can interact with customers at every stage in their purchase journey.

Using RFID is completely intuitive – a simple tap of a smartphone is all it takes to initiate all kinds of interactions.





RFID lets you support consumers throughout their purchase journey

- 
Discover – Tap a printed promotion (a magazine ad, a poster, a mailer, or a postcard) to learn more about the product
- 
Evaluate – Tap the shelf, the package, or the product itself to view product details, watch product demos, or access online reviews
- 
Purchase – Tap the product or its package at the point of sale to access coupons, verify authenticity, redeem loyalty points, receive personalized recommendations, or sign up for exclusive offers
- 
Use & share – Tap the package or label to access social media, share experiences, view user manuals, or contact customer service
- 
Repurchase – Tap the product or its package to find nearby stores or place an online order
- 
Bond & advocate – Tap the product or its package to view exclusive content, interact with others, submit reviews, or register to receive personalized offers and invites to special events

Create a tighter bond with NFC

Because NFC lets you gather data about each transaction – and lets you receive information from individual phone users – it's a valuable source of insights into consumer behavior. NFC brings you closer to your customer, lets you add value to your brand, and increases consumer loyalty.

NXP RFID in action

Brand protection

Duclot Export, France

Protecting fine wine and educating connoisseurs

The wine bottle is your sommelier

For more than 125 years, wine connoisseurs around the world have trusted the French company Duclot Export, an exclusive wine-shipping company based in Bordeaux, to deliver some of the world's most precious vintages. Reputation is everything in this business, and customer satisfaction is always the first priority. Duclot's luxurious Collection Cases – handcrafted wooden cases containing a bottle each of the top nine wines in Bordeaux – are now equipped with NXP's RFID tags. The unique serial identifier on each tag makes it easy to verify authenticity, and offers integrated traceability, all the way from the vines to the point of sale. Tapping a smartphone to the bottle's label lets the wine speak for itself, linking wine enthusiasts to extra information, like cellar location, serving tips, and more.

Apex Snowboards, Austria

Creating communities for snowboard enthusiasts

Join an elite team of superstar athletes

Founded by champion snowboarders who are committed to delivering "only the best for the best," Apex Snowboards, in Austria, creates handcrafted sporting equipment known for its quality, style, and performance. Using NXP's NFC tags, and a custom-developed cloud solution, Apex lets customers use their smartphones to authenticate their purchases and register their boards. The NFC tags also provide a gateway to a number of value-added services, including local weather forecasts, avalanche reports, emergency-rescue numbers, and Facebook links. Through these services, Apex's customers satisfy their craving for insider information, and become an extended part of the team that created the company.



Duclot
Export,
France



Apex
Snowboards,
Austria

Consumer interaction

Linea Murano Art Gallery, Italy

Enhancing the experience of owning art

Participate in the creation of a masterpiece

On the Venetian island of Murano, where specially trained artisans use centuries-old techniques to create hand-blown glassware, the Linea Murano Art gallery produces one-of-a-kind pieces for clients around the world. The gallery uses NXP's NFC tags as part of a specially designed archiving system. Each piece of glass has an NFC tag with a unique ID number that's linked to details on the gallery's server. Tapping a smartphone to the NFC tag lets owners access a certificate of authenticity, for use with insurance or resale. The server also houses photos and videos of the artist and the work's creation, so the gallery can create a closer connection between the owner and the artist, and so people who admire the work can share in the experience of its creation.

Aki Choklat Bags, London

Personalized ownership of designer bags

Digital records create personal memories and protect against theft

Designed in London and manufactured in Italy, Aki Choklat bags are highly sought after accessories that have a loyal following. The company now offers a unisex clutch bag, equipped with an NXP NFC tag in the lining, which works with a specially designed smartphone app and a cloud-based service to generate digital records for the bag. Tap the phone near the bag's handle, and the smartphone app verifies authenticity, displaying where and when the bag was made. The app also works with GPS data, creating a digital diary that logs the bag's whereabouts, complete with updates to social media. And, since GPS data can also be used to track the bag if it's ever lost or stolen, the NFC tag not only makes ownership more fun and more personal, but can also help deter thieves.



Linea Murano
Art Gallery,
Italy



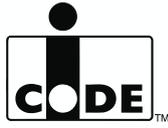
Aki Choklat Bags,
London

The NXP portfolio for RFID

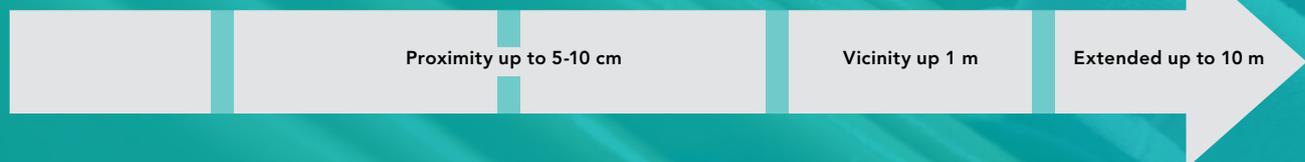
At NXP, we offer a full suite of high-performance contactless solutions across the full RFID frequency range, so we meet the needs of brand protection across every security level and every operating range.

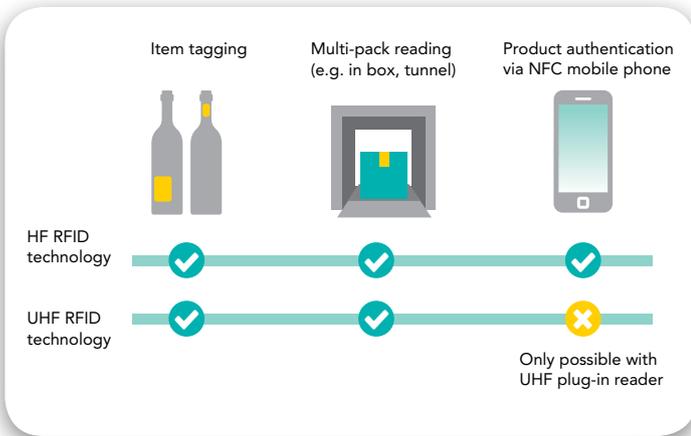
We offer dedicated access to our application and system support centers, so you can reduce your time-to-market, and we're always ready for long-term engagements.

NXP offers you a full suite of RFID solutions to meet your specific brand-protection needs

Platform				
Operating freq. & technology	13.56 MHz NFC	13.56 MHz High Frequency	13.56 MHz High Frequency	840-960 MHz Ultra High Frequency
Standard	NFC Forum	ISO/IEC 14443 ISO/IEC 7816 NFC compatible	ISO/IEC 18000-3 ISO/IEC 15693 NFC compatible	ISO/IEC 18000-6 UHF EPC G2
Applications	<ul style="list-style-type: none"> • Consumer authentication • Consumer interaction • Analytics 	<ul style="list-style-type: none"> • Secure access control • High-value goods protection • Consumer authentication 	<ul style="list-style-type: none"> • Inventory management • Retail • Supply-chain control • Consumer authentication 	<ul style="list-style-type: none"> • Inventory management • Retail • Supply-chain control
How to read a tag	<ul style="list-style-type: none"> • NFC-enabled mobile phone 	<ul style="list-style-type: none"> • NFC-enabled mobile phone • Stationary/handheld reader 	<ul style="list-style-type: none"> • Stationary, handheld, or industrial reader (tunnel) • NFC-enabled mobile phone 	<ul style="list-style-type: none"> • Stationary, handheld, or industrial reader (tunnel) • Mobile phone with UHF plug-in

Operating range





RFID read range and applications

NTAG

Building on our long-standing leadership in NFC, our connected NFC tag solutions (NTAG) work seamlessly with our NFC reader ICs, which are used in more than 90 percent of all NFC-equipped mobile handset models. NTAG solutions are capable of storing NDEF-formatted data, so they're compatible with every NFC-enabled phone and the entire ISO/IEC 14443 infrastructure for contactless smartcards. NTAG uses nonvolatile memory (EEPROM), offers options for Field Detect, and uses the serial I²C-bus for easy communication with a host microcontroller.

ICODE & UCODE

Our ICODE and UCODE RFID tagging solutions lead the industry, providing next-generation security and enhanced privacy. They deliver robust track-and-trace functions and can be used for authentication, too. The ICODE and UCODE families work over short- and long-range distances, so you can track and trace at the multi-pack level, and consumers can check at the item level.

MIFARE

NXP's MIFARE is the world's leading application development platform for contactless smartcards, smartphones, wristbands and other form factors. In total, more than 1.2 billion people have access to MIFARE-based systems in over 70 countries. Our current portfolio includes all the building blocks for complete MIFARE applications, from cards to readers, and we support every transaction with the most advanced security functions available today.

NXP is a recognized leader in key areas of identification

- ▶ Tagging and authentication of goods and services
- ▶ Secure transactions in banking, mobile, public transport, and the corresponding infrastructure
- ▶ Secure identity in eGovernment applications and PayTV
- ▶ Tap-and-go convenience with NFC in smartphones



Have a question?
Tap your NFC-enabled
smartphone here to
contact us.



www.nxp.com
www.nxp-rfid.com

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