Getting Started with RFID —Intelligent Labels

Avery Dennison
Labels and Packaging Materials

September 2019
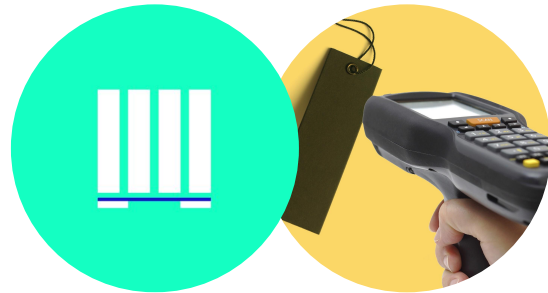

AVERY DENNISON

What is RFID?

RFID vs. Barcode

Solution—Item level UX-enablers

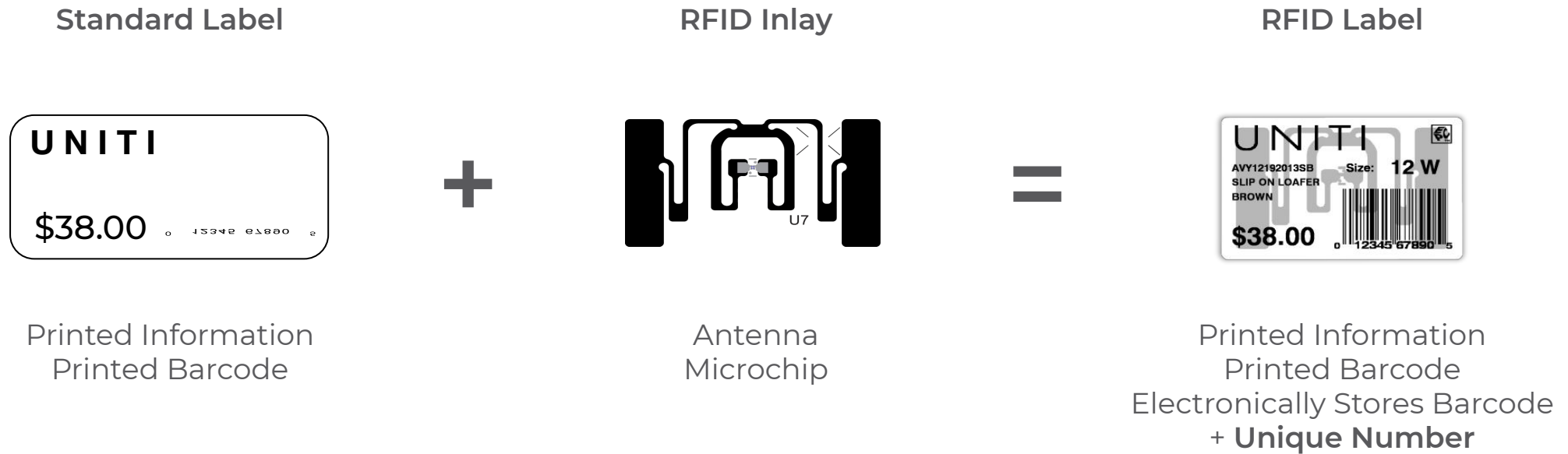|	Ultra High Frequency UHF, 868-915MHz	High Frequency HF(NFC), 13.56MHz
Read Range	3-7m (passive)	10cm-1m (passive)
Cost of Tags	Low	Medium to Low
Applications	Logistics Supply Chain Baggage Tracking Pallet & Case Tracking	Smart Cards Consumer Engagement

Components of Passive RFID

Standard Label   **RFID Inlay**   **RFID Label**

+   **=**

Printed Information
Printed Barcode

Antenna
Microchip

Printed Information
Printed Barcode
Electronically Stores Barcode
+ **Unique Number**

RFID Inlay = IC + Antenna + Carrier
RFID Tag = finished ticket or label encasing the IC and Antenna

What's Encoded in a Retail Tag?

SGTIN = GTIN (UPC or EAN 13) + Unique Serial Number

Company Prefix   Item Reference   Serial

EAN
5060204120848

0506020412084**8** + 100000000001

GTIN   Serial Number

3039EE2901926D174876E801

SGTIN-96

urn:epc:id:sgtin:506020.0412084.100000000001

UNITI

RE-TOOL SNAP-T

TAILORED GREY
NICKEL

0 97153 14025 7

SIZE: M

UPC
887187265800

008871872658**0**0 + 100000000001

GTIN   Serial Number

303856A382C58D174876E801

SGTIN-96

urn:epc:id:sgtin:088718.0726580.100000000001

UNITI

RE-TOOL SNAP-T

TAILORED GREY
NICKEL

0 97153 14025 7

SIZE: M

RFID Basics
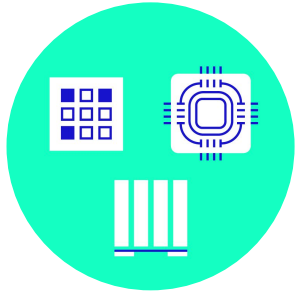
1

**An RFID enabled
tag, ticket or label**

2

**An RFID reader
(fixed or mobile)**

3

**Software,
on premise
or cloud based**

**RFID systems consist
of three components**

Each tag contains a unique identification number
that is then linked to additional product data on
a secure database. RFID tags and tickets can
therefore identify each individual item.

RFID tickets allow you to:

- Read the RFID tag without line of sight
- Read multiple items hanging on a rack
  or stacked on a shelf very quickly
- Read multiple items in a box without
  opening the packaging

RFID Market Growth

RFID Market Growth Forecast

- Expected EU volume market growth 2019 vs 2018: +28%

- Expected EU volume market growth 2023 vs 2018: +143%

Market Growth - Non-Apparel Tags Billions

RFID Market Use Cases
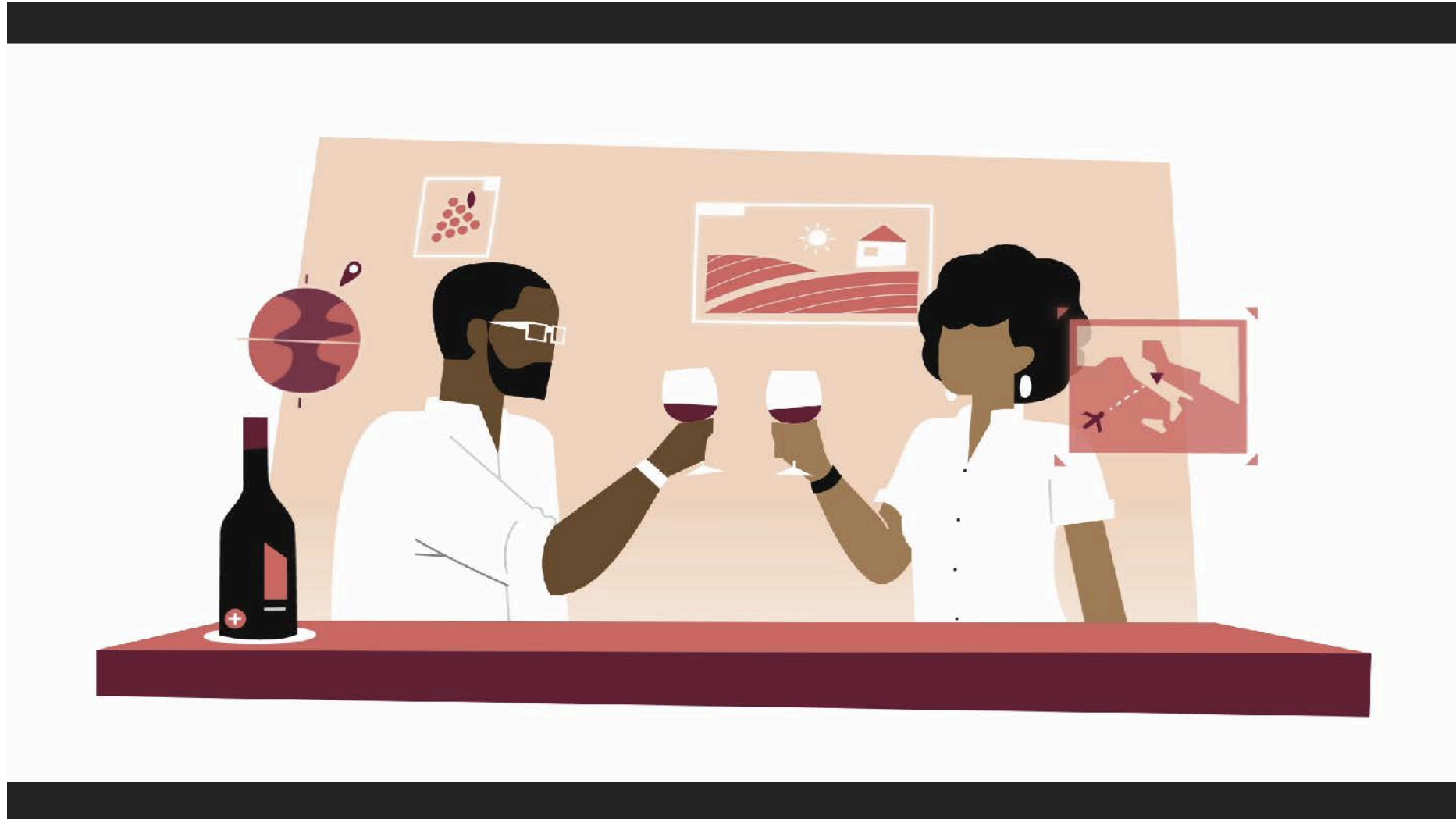
Today
Digital identity means that products have a fingerprint

Tomorrow
Products will have more than a fingerprint, they'll have a birth certificate and a digital life!

Tomorrow

Beyond Apparel—Converter Segment Opportunities

RFID is profoundly transforming the industries that we serve and is opening up a whole realm of emerging segment opportunities for intelligent labels.

In Avery Dennison we have a vertical segment approach, offering specialized solutions, designed for maximum performance in the key market applications.
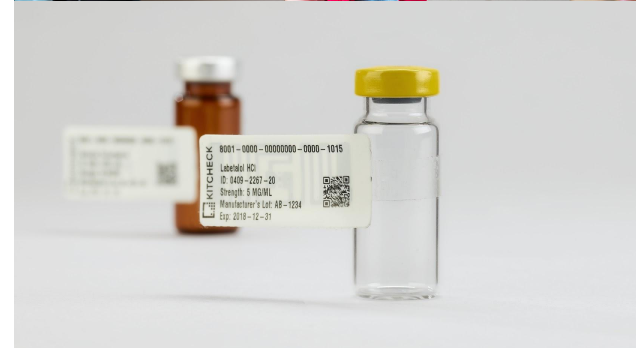
RFID Application Cases in Fresh Food

Food Supplier Reynolds Increases Sustainability by Enabling UHF RFID

The Challenge

- **60,000 disposable cardboard cartons** each week to customers around 4,000 different sites
- Retailers requesting deliveries in plastic returnable trays to **lower environmental impact** and reduce costs
- **£190,000 worth of crates lost** in yr prior to implementation of RFID
- **Prove ownership of trays** that get diverted into other organizations

The Results

- **£46k annual labour cost saving** on assembling and managing cardboard boxes vs reusable trays
- **40% reduction of storage space** when storing nested plastic crates versus stacked cardboard
- **Early 6 months Initial payout** in the first year of full deployment
- **92% return rates** in the first year of RFID deployment
- Swiftly **resolves delivery disputes** and ensures accurate payments

RFID Application Cases in Healthcare

Kitcheck RFID Implementation in Hospitals and Pharmacies

The Challenge

- Low inventory accuracy of kits and emergency boxes in Hospitals
- Handwritten paperwork and long processing time
- High risks of medical error
- Hospital pharmacy kits contain 10–20% expired or incorrect medications
- Outdated/Recalled medications (Labour intensive/Manual)

The Results

- Nearly 100% read rates
- Reduce Medical Error – 99.9% accuracy (Hospital pharmacy kits contain 10 – 20% expired or incorrect medications)
- Verification of kits and emergency boxes time reduced from 30 min to 3 min
- Eliminates handwritten paperwork and reduce processing time

Healthcare

RFID Application Cases in Aviation

Delta Airline Application Case

The Challenge

- Globally tracking over 180 million bags annually
- Trace across 344 airports (in the US)
- The cost of a mishandled bag is $100 (in 2020, lost baggage may cost $2.7B)
- Mishandling of baggage for the past 5 years, it is still ranked either as the 1st or 2nd main complaint
- Per IATA, 81% of passengers want to track bags in real time

The Results

- Nearly 100% read rates
- Reduce the likelihood of lost baggage
- Enhance security
- Improve on-time departures and customer satisfaction
- Fulfills IATA Resolution 753*
- Improve bag throughput by 16%

Aviation

Segment Specific Examples

| Type	Key Use Cases	ROI Drivers
	• In-store inventory accuracy • Omni-channel fulfillment (SFS, BOPIS)	• Sales uplift , increased NPS • Fewer markdowns, labor savings
	• Traceability – Food supply chain safety • Authenticity of product	• Reduced food waste • Labor productivity
	• Baggage tracking	• Fewer lost bags • Increased baggage fees • Increase in customer satisfaction
	• Medication and supply tracking	• Staff productivity • Chargebacks • Fewer expired products • Safety!
	• RTI Management • Parts tracking	• Better usage of existing RTI's • Improved information management lifecycle

Why Partner With Us

RAIN RFID is Becoming Mature

| Chips	Inlays / Tags	Printers	Readers / Infrastructure	Software
Impinj	Avery Dennison	Zebra Technologies	Zebra Technologies	Sensormatic by Johnson Controls
NXP		Avery Dennison	Impinj	Detego
		SATO	nordic id	nedap
			Bluebird	mojix
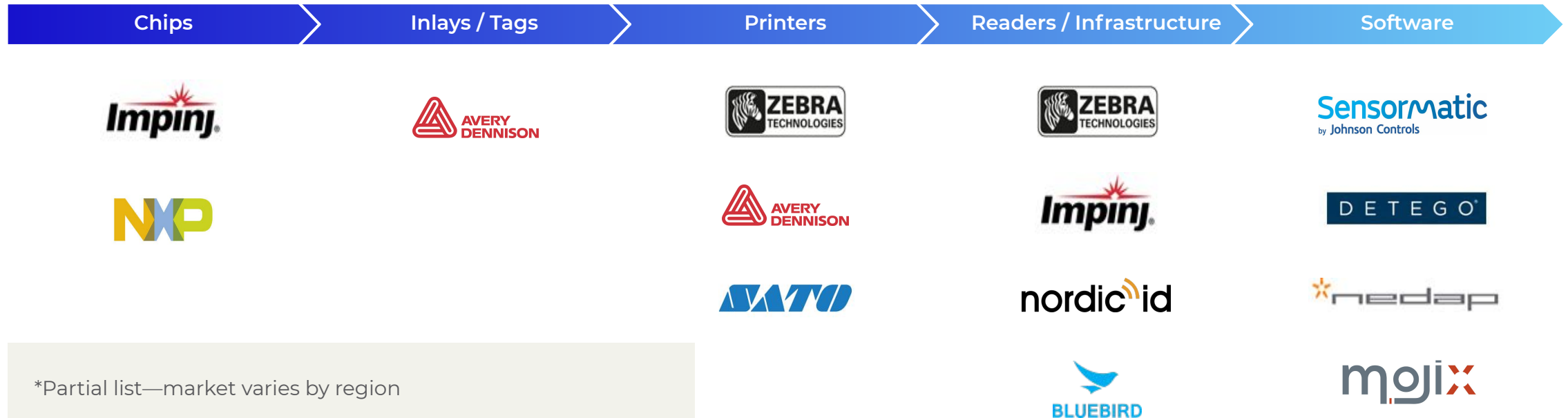
*Partial list—market varies by region

- Large public companies play across the value chain and are driving growth
- Industry organizations (GS1, Auburn, RAIN RFID) promote standards and adoption
- Mature, scalable deployment processes and methodologies

Why Partner With Avery Dennison?
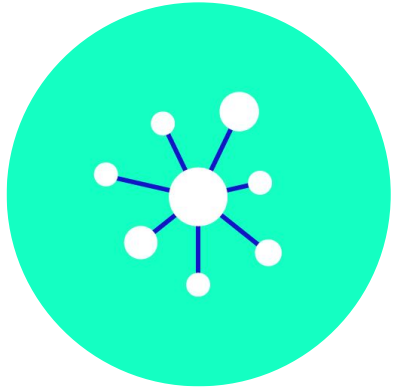
Strategic Commitment

- Strategic investment in RFID capacity, business case capabilities and innovation focus
- The World's Largest UHF RFID partner
- Industry thought leadership with groups like GS1, RAIN RFID, Auburn University
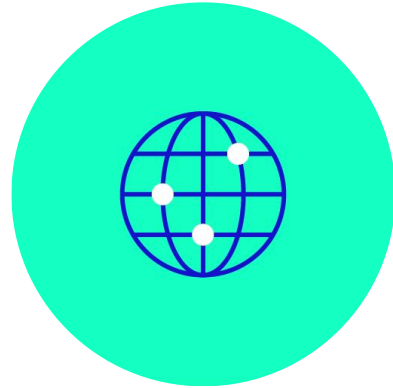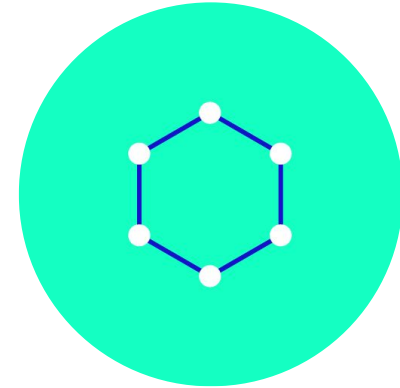
Capabilities Overview

- (20+) billion tags shipped to date
- 1000+ patents worldwide
- Proven 5-step pilot process to validate ROI
- Leading new adoption
- Enabled > 100 engagements across 5,000 factories

Market Support

- Train your sales staff
- Technical support
- Knowledge on standards like GS1, VDA, NFC
- Free sample support
- Order shipment within 24h.

Be a part of a global ecosystem

- Support from leading system integrators to accelerate your RFID projects
- Connect with RFID inserting machine manufacturers
- Technical support from RFID hardware suppliers

Global Manufacturing Capabilities

▲ **I.Lab**

- Oegstgeest, Netherlands
- Mentor, USA
- Pune, India
- Kunshan, China

▲ **RFID Inlay Manufacturing**

- Timisoara, Romania
- Juarez, Mexico
- Nansha, China
- Panyu, China
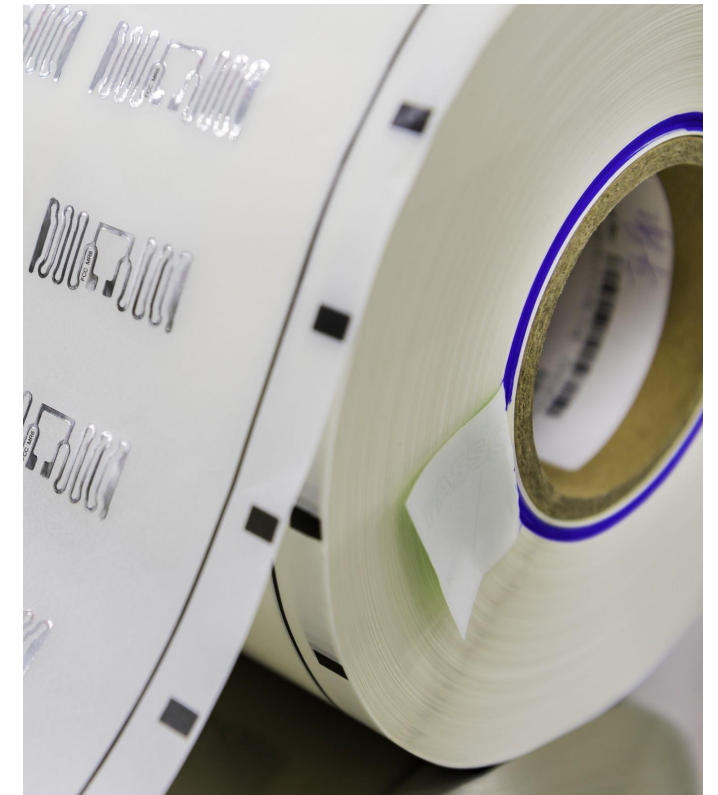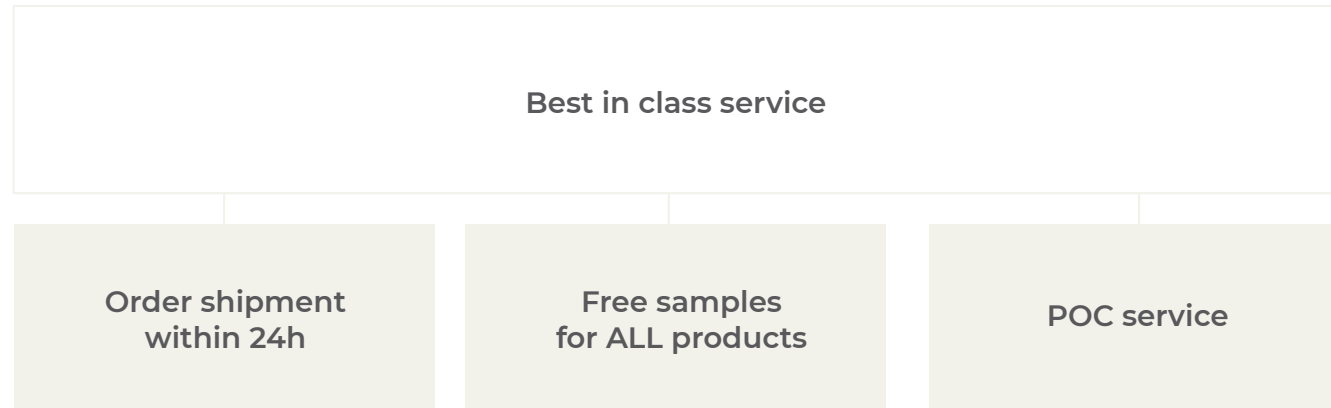
▲ **Customer Design + Innovation Centers**

- Miamisburg, USA
- Los Angeles, USA
- New York City, USA
- Baddow, UK

▲ **RFID Service Bureaus**

RFID Testing, Sampling and Delivery Service in EU

- 29 SKUs stocked in Lux

- Samples in 3 formats: mixed sample bags, 25 pcs. sample bag and rolls.

- Testing facilities at your disposal in the US and UK

Best in class service

| Order shipment within 24h | Free samples for ALL products | POC service |

Q&A?

Thank You

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