

Chipotle RFID Program: Supplier Onboarding Guide & Supplier Compliance Program



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1. Executive Summary

This resource serves as an RFID (Radio Frequency Identification) implementation guide for Chipotle Mexican Grill (CMG) suppliers. We have partnered with Mojix, GS1, the Auburn University RFID Lab and Avery Dennison to generate useful information for our supply chain partners. RFIDs will complement and enhance CMG's existing traceability program, which provides supply chain visibility from supplier through to back of restaurant scanning, as well as restaurant inventory visibility. Additionally, this document also contains a supplier compliance program to ensure FSQA parameters for using SGTIN-96 RFID inlays to convey food safety information via serialization.

This document is meant to be a universal playbook for any CMG suppliers beginning their RFID journey and it outlines proven steps to success as well as best practices for each phase of the implementation process. Using this document to define tagging requirements and align expectations will ultimately expedite the RFID implementation process and ensure uniformity amongst suppliers.

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2. Program Overview

The food industry is in the process of digital evolution. Supply chains are becoming complex, and consumers are demanding more visibility to the foods they eat. Quick traceability for food recoveries, inventory management and waste reduction are just some of the challenges the food industry is facing. To drive differentiation and sustainable growth in a competitive and evolving market, the food industry will continue to look for ways to improve inventory management, automate processes and drive new models that are enabled by technology. The adoption of RFID (Radio Frequency Identification) technology will be a key player in solving all these issues.

Chipotle is enabling the supply chain with intelligent RFID technology to drive faster, more accurate, increased visibility and traceability of its inventory as well as enhanced inventory management. RFID is a technology that encompasses a label with an inlay/chip encoded with a unique serialized number to help enable a variety of applications from inventory control, replenishments, food safety, item-level tracking, etc.

The specifications in this document are intended to work seamlessly with other best practices in Automatic Identification and Data Capture (AIDC) and Product Identity Standards, such as those promulgated by AIM and GS1.



RFID USES ALONG THE FOOD SUPPLY CHAIN

3. Benefits of RFID

There are many benefits that come from implementing RFID throughout the supply chain and almost all of them come from improved inventory visibility. Most benefits stretch across multiple stakeholders and create value throughout the supply chain.

Whether it's a supplier settling claims with the restaurants or a restaurant improving on-hand accuracy, it is all dependent on the item-level inventory information enabled by RFID. More advanced benefits can be realized as well, but improved inventory accuracy is the foundation for future use cases.

	RFID Benefits
Farmers	 Efficiency in recalls, speed, and product identification Increases consumer confidence Brand story & customer connection Traceability & authentication at source with unique digital identity
Processors	 Visibility to lot sequence delivered to restaurant Shipping verification Compliance with new government regulations (FSMA204)
	 Expiration Management (FEFO) Labor savings Increased traceability Reduction of Food Waste Margin Protection Efficiency in recalls, speed and product identification

4. RFID 101

RFID (Radio Frequency Identification) is an identification and data capture technology that carries and conveys unique, digital IDs of individual objects and enables those objects to be seen by specialized systems. RFID is used in many different industries, but every deployment has the same core components: an RFID tag applied to a case or item, a reader to capture the information and software to collect the associated data.

The objective is to apply an RFID tag to every single case, giving each product a globally unique identification number. There are many different types of RFID tags, but the food industry is best suited for passive UHF (Ultra High Frequency) tags because of their low per-unit cost, high performance, and their ability to capture data without the need for line of sight. RFID Readers can take several forms: there are handheld readers that can be used in dynamic environments and there are fixed readers that can be installed at strategic checkpoints. Different environments demand different types of readers; for example, a handheld reader might be best for capturing inventory on a sales floor, but a fixed reader might be best for capturing pallets of product moving through an outbound dock door.



5. What is an EPC

An EPC, or Electronic Product Code, is a universal identifier for any physical object. Technically speaking, it is a standardized data structure defined by GS1 that provides guidelines for writing information to an RFID tag.

By adding a serial number to a GTIN and writing that information to an RFID tag, you can identify items of the same product uniquely, as well as capture case level information more efficiently by using radio waves instead of less efficient, optical scanning solutions like barcode that require line of sight.

Because of the complexity of the supply chain and the need for interoperability it is imperative to follow encoding standards defined by GS1 as well as inlay standards set by the Auburn University RFID Lab ARC Program. Both organizations exist to support end users, and their standards have been developed in close collaboration with end users, solution providers, and other industry stakeholders.

	Decimal	Binary	# of Bits
Filter	1	001	3
Partition	5	101	3
Company Prefix	12345	00000000011000000111001	24
Item Reference	67890	00010000100100110010	20
Serial M	10479832	00000000000000010011111110100011011000	38

EPC SGTIN-96 Binary

Header	Partition Value	Item Reference
0011000000	1010000000001100000011	10010001000100100100100000000000000000
Filter Val	lue Company Prefi:	Serial Number

6. Implementation of RFID: Steps to Success

Every organization is unique, and CMG suggests using the following steps to ensure RFID implementation is tailored to fit your use case or operating environment as well as CMG's requirements.

Step 1: Assembling a Team

Assemble a team that will support your organization's RFID initiative; this includes a cross section of people from both within your company as well as people outside. The following list is not exhaustive, but it outlines recommended representatives for an interdisciplinary RFID team.

- **Case level Packaging Teams**: RFID tags are applied to the outer cartons per current guidelines implemented by Chipotle.
- **Operations**: Operations teams from across the supply chain will be involved in the implementation phase. On-site support may be required at various supply chain nodes and some situations may call for process change at certain facilities.
- Information Technology: IT or technology teams play an important role when it comes to standing up and supporting RFID systems, so it is important to have technical stakeholders engaged in early planning and implementation efforts.
- **Food Safety**: It is imperative that food safety attributes are associated to the unique EPC, particularly production dates and lot codes.

Step 2: Understanding an RFID Tag

Before selecting an RFID tag, it is important to understand the components of a tag and the terminology associated with it. An RFID inlay is a combination of three things: an IC (integrated circuit), an antenna and a substrate. The IC, is where data is stored on the tag (it is also referred to as a "chip"). The IC is connected to an antenna, which energizes when radio waves emitted by RFID readers are in range and relays the data stored on the IC back to the RFID Reader. An inlay is embedded in a paper based or adhesive packaging, creating a complete label that can be applied to products. The combination of an inlay and the packaging is referred to as an RFID tag or an RFID label.



Step 3: Selecting an RFID tag

We have partnered with Auburn University RFID lab to determine the appropriate inlay for CMG cases and their ingredients. They have tested many different inlays on varieties of attributes and finally stated that the below three inlays are best suited for Chipotle ingredients. More information on Auburn University's tag performance verification can be found <u>here</u>. The below inlays also meet <u>UHF EPC Gen2v2</u> standards.



Spec Z inlays are also approved and must be selected from the approved list from Auburn University:

https://rfidarc.auburn.edu/temp/inlays/spec-z.php

Step 4: Applying an RFID Tag (Integrated & Supplemental Tag Placement)

- Chipotle requires integrating the RFID inlay into the same label currently used for the barcode
- If using a wraparound label, the inlay should reside on the short end of the case
- Any use of a Supplemental tag in place of the Integrated tag or other labelling variances require prior approval by Chipotle
- As General Guidance if using <u>Supplemental</u> labels, RFID Label Placement:
 - **Green:** Ideal location of the RFID label placement is on the top-right on the short side of the box.
 - **Yellow:** Caution when applying RFID label near bottom/top of the box.
 - **Red:** Do not tag on either the top of the box or on the bottom of the box.
 - Ensure that the RFID label is on the same side of the box as the existing barcode label.

Step 5: Encoding an RFID Tag

Encoding refers to the process of writing information to an RFID tag. All RFID tags must be SGTIN-96 encoded per the <u>GS1 EPC Tag Data Standard</u>, regardless of the inlay manufacturer or application method. The GTIN associated with each product will be used to create EPCs, so it is imperative to use the correct GTIN for each product type.



7. Mojix ytem[™] Integration

CMG has selected Mojix as its primary SaaS partner to facilitate data capture and housing of RFID-related traceability events. It uses EPCIS (Electronic Product Code Information Services) as the primary means of sending, receiving, and collating discrete supply chain events. Because of their back-end organization and capabilities, the platform is a robust way of handling real-time traceability events.

All suppliers will need to send the serialized commissioning data to the Mojix ytem[™] platform. The data required to be sent includes serialized EPC, GTIN, lot code, expiration date, and Supplier GLN.

Suppliers will need to work with their internal IT & ERP provider to send commissioning data to Mojix ytem[™] to include the EPC serialization of each case.

Mojix will conduct a workshop with the supplier to review the API methods and data requirements.

For integration, data services and support pricing please contact:

Email: chipotle.onboarding@mojix.com

For ongoing technical support after integration please contact: Email: support@mojix.com

7.1. Integration Examples

Following are API examples used to commission data into the Mojix ytem[™] platform.



co v ytem[™] API 2. Commissioning mojix Request URL Sandbox environment: https://chipotle.sandbox.mojixretail.io/statemachine-epcis-events-input-rest/rest/events/publish/amqp Production environment: https://chipotle.mojixretail.io/statemachine-epcis-events-input-rest/rest/events/publish/amqp Production ... Body: {"events": [{ "type": "ObjectEvent", "eventTime": "2021-05-07117:05:05.7142", "bizStep": "urn:epcglobal:cbv:bizstep:commissioning", "disposition": "urn:epcglobal:cbv:displenttive", "readPoint": "Commissioning Read Point", "birLocation": "urn:epc:id:sgln:DOXOXX.XX, "ilmd": { "bestBeforeDate": "2021-12-07", "reaurryOfOrigin": "US", ""messurement": 33.1 Method: POST Authorization: Api_key, token, clientId, basic authorization "bestBeforeDate": "2021-12-07", "country(forigin": "US", "drainedWeight": { "measurement": 33.12, "measurementUnitCode": "H55" }, "arcssNeight": { "measurement": 33.12, "measurementUnitCode": "H55" }, "harvestEisartDate": "2021-12-07", "harvestEidDate": "2021-12-07", "hervestEidDate": "2021-12-07", "hervestEidDate": "2021-12-07", "netWeight": { "measurement": 33.12, "measurementUnitCode": "H55" }, "lotHumber": "LotDemo", "sellByDate": "2021-12-07", "gackagingDate": "2021-12-07", Define precisely : eventTime: Time when the EPC is encoded \rightarrow Format of date for the encoding event YYYY-MM-DDTHH:MM:SS.MSZ (Sent as UTC Time) packaginguate": ' }, "extension": { "mjx_suppliername": "GLN", "mjx_source": "SUPPLIERNAME" urn:epc:id:sgln: GS1 ID location following SGTIN standard readPoint: Optional attribute to identify production order line }, "epcList": [epcList: An json array of EPCs in hexadecimal format (24 characters) "hexa": "305436080C933300000133C3" }, { "hexa": "305436080C933300000133C4" }], "action": "OBSERVE" }]}

ytem[™] API 3. Optional: Serialization API

Request URL

Sandbox environment: https://chipotle.sandbox.mojixretail.io/serialization-api/rest/serialization/hexas/sgtin96/gtin/<GTIN>?quantity=2&bizLocation=<Location_SGLN>

Production environment: https://chipotle.mojixretail.io/serialization-api/rest/serialization/hexas/sgtin96/gtin/<GTIN>?quantity=2&bizLocation=<Location_SGLN> Response: Method: GET

Define:

- GTIN: GTIN valid
- Location_SGLN: Refers to the SGLN of the location to virtually assign the premise

Authorization: Api key, token, clientId, basic authorization

C UPDATE 🗢 🗸

mojix

HTTP Code	Response Description
200	Successful creation
400	Invalid query, a parameter is missing or incorrect
503	Service unavailable
404	No category found for categoryld

["3030311ED3000D86FC23AC06", "3030311ED3000D86FC23AC07"

1

7.2. Serialization Requirements

EPCs are intended to be encoded sequentially and serials should not contain product or other identifiers. Suppliers are required to use the EPC-enabled RFID Serialization Management for SGTIN-96 standard promulgated by GS1.¹ Deviations or variances from this approach MUST be brought forward to CMG prior to the design and implementation of RFID.

Because CMG uses SGTIN-96 tags, the only means of mapping a logistical unit's attribute data to its case identity is through proper serialization. Serialization in the context of SGTIN-96 tags is defined by GS1 thusly, "[..] when 96-bit RFID tags are used, serial numbers are restricted to be all numeric (i.e., the only characters permitted are the digits 0 through 9), and between 1-12 digits in length. (More precisely, the serial number must be all numeric, the first digit must not be a "0", and the value when read as a decimal numeral must be less than or equal to 274877906943."

Mojix can provide an API to generate serial numbers.

8. Avery Dennison Partnership

Chipotle has partnered with Avery Dennison to support the onboarding of our suppliers. The following will provide guidance to the adoption of RFID technology and label solutions, and integration to current production and labeling processes.

Avery Dennison supplier onboarding includes:

- RFID Label Options
- RFID Solution Options
 - o Printer Hardware
 - Applicator Hardware
 - Software Application
- On-boarding Process-Flow & Support

¹ GS1 US Guideline



8.1. **RFID Avery Dennison Labels**

Standard supplemental labels can be applied to every case, but must be approved by Chipotle if it will be used in place of an integrated label that incorporates RFID tags into your existing bar code label. Other size options are available if required.

Label Attributes	Image (w/Format-Data) For Reference Only	
 Size - 3" x 0.8" Label Inlay - AD238u8 or Belt Adhesive - Freezer Grade Face-Stock - Direct Thermal 8-inch OD 	Chicken Marinated GTIN: 08406621000023 3BF00000000000000000000000000000000000	

• Use-Case / Use of Item:

 Print / Apply applications (with or without Auto solution) in addition to current label application

Service Bureau Option - Avery Dennison Pre-Printed/Pre-Encoded labels can be supported if needed (reach out to Avery Dennison onboarding representative)



• Use-Case / Use of Item:

o Print / Apply Application (with or without Auto solution) this takes the place of current carton labels, as a fully "integrated" label.

Service Bureau Option - Avery Dennison Pre-Printed/Pre-Encoded labels can be supported if needed (reach out to Avery Dennison onboarding representative)

8.2. **RFID Printers**

Supplier will be required to have an RFID enabled printer to print/encode the RFID tag. Options include:

- a. Tabletop RFID Printer
 - i. Avery Dennison ADTP1 RFID Printer
 - ii. Avery Dennison ADTP2 RFID Printer
 - iii. Zebra Technologies ZT61X
 - iv. Zebra Technologies ZT41X

8.3. Avery Dennison Value Added Options

Based on site assessment and other potential supplier requirements, additional items may be needed. Options include:

Freshmarx Connect

Freshmarx Connect is an out of the box solution that allows suppliers to fulfill the requirement of EPC serialization without any additional IT integration. Freshmarx Connect supports Google Chrome.

Freshmarx Connect annual subscription

ltem Number	Description	Comments
SUBFMC2	Freshmarx Connect Software Annual Subscription	Single User Account to FMC Website.

Application Supports following Printers: ADTP1, ADPT2, ZT41X, ZT61X

Freshmarx Connect Onboarding Services (One-time Setup)

Item number: FMCOBBA- Contact Avery Dennison for pricing

Basic Onboarding Assistance includes account setup and walkthrough training of FMC operation. Option includes setup of suppliers' GTIN's, GLN's, and other pertinent information, including account creation. Includes FMC training (train the trainer). Prerequisite Supplier already has familiarity with GS1 standards and has established GTINs, GLNs, etc

Automated Solutions: Automated print and apply applicators & Read point

Avery Dennison can provide as needed onsite assessment for automated labeling needs and recommend and provide install support as a service.

Avery Dennison also has the technical footprint, resources, and solution packages that can help you (as a Chipotle Supplier) from a design and support perspective. Additional solutions that Avery Dennison will support range from Auto-Applicators, RFID Read-points, and additional Software support. The Design and Deployment Team can assist you in building out the right model of equipment that fits with your current needs in support of this program.

Suppliers wanting a supplemental label application can source preprinted and encoded labels through Avery Dennison service bureau.

Suppliers wanting to use existing case label and existing applicator, source pre-encoded RFID labels and require an RFID read and software to capture serialized data.

Suppliers can also consider installing / upgrading current applicators to print, encode and applyRFID labels

Additional advanced solutions* include:

- Automated Label Applicator and Printer Application Solutions
- RFID Fixed Read-Point Solution
- RFID Hand Held Read-Point Solution
- RFID Software Solution

*All solutions to be reviewed upon request.

To get started, please reach out to your Avery Dennison On-boarding Support contact in order to drive an Advanced Solution that meets your needs. They will be able to facilitate, and coordinate the right design & deployment teams to build a custom solution at your facility.

8.4. Avery Dennison Additional Service & Support Packages

Software supported by Avery Dennison, the following is available (Onsite Hardware Service & Support purchased through Avery Dennison)

- Tier 1 24/7, Toll Free: (800) 543-6650, press 2
- 24hr support for critical system issues
- Off hour non-critical issues will be addressed the following business day
- Extra training / SI services available (standard or custom as quote)

Avery Dennison has partnered with Zebra Technologies to offer a variety of options for hardware service and support that will allow suppliers to comply with CMG SLA requirements.

8.5. Avery Dennison Onboarding Support

Avery Dennison has an Onboarding Support team that will aid with identifying, ordering and installing the right RFID solution package for your organization.

For **Onboarding Support**, please reach out to following: Contact: Matt Krietemeyer E-mail: matthew.krietemeyer@averydennison.com

Phone: (937) 405-5368 Avery Dennison Technical Support Phone #: (800) 543-6650 ext. #2

Fax #: (937) 865-6605 11

8.6. General Label Information

- **RFID Label Application:**
 - Remove the backing liner from the label and apply the RFID label to the flat surface free of dust, dirt, & debris, frost and moisture using pressure evenly across the entire label to ensure adhesion (especially the perimeter)
- RFID Label Storage Requirements:
 - RFID labels should be stored at temperature range:
 - 59°F 77°F, humidity 75% +/-10%



8.7. RFID FAQ's

RFID technology has been around for a long time and has seen limited use within the food industry, why now?

Technology evolves and market landscapes change over time. With the digital transformation of groceries at the intersection of mature RFID technology, we believe the time is right.

Isn't RFID expensive and cost prohibitive in the food industry?

With the wide adoption of RFID in the apparel space and billions of tags manufactured on a yearly basis, economies of scale have helped to drive down costs. RFID tags now cost as low as a few cents.



Where can I find RFID now in stores?

RFID tags can be found in many industry verticals including retail, aviation, logistics, transportation, manufacturing and healthcare segments. Some examples include Walmart, Macy's, lululemon, Target, Marks & Spencer's, Reynolds, Delta Airlines, Ralph Lauren, etc.

How accurate is RFID technology?

Avery Dennison read rate accuracy is greater than 99.9%, making it more accurate than manual line of sight barcode scanning.

RFID can't be used on food products or liquid products, right?

Wrong. Avery Dennison has over 1,000 patents in the RFID space and has developed inlays that work on food products including on-liquid, and on-metal.

9. CMG RFID Supplier Compliance Program Overview

The CMG RFID program is a forward-thinking supply chain implementation which comprises of several GS1 standards and protocols, advanced hardware, and innovative digital compliance mechanisms. To help suppliers understand the end-to-end process, CMG has briefly detailed here the overall program components and documented RFID implementation challenges which are addressed through the supplier compliance program.

CMG has selected Mojix as its primary SaaS partner to facilitate data capture and housing of RFIDrelated traceability events. It uses EPCIS (Electronic Product Code Information Services) as the primary means of sending, receiving, and collating discrete supply chain events. Because of their back-end organization and capabilities, the platform is a robust way of handling real-time traceability events. For the purposes of suppliers in the CMG RFID program, the events of interest are commissioning and packaging events, with the possibility of adding shipping events in the future or in CCP steps. See example JSON payloads in section 16.

CMG uses the data in Mojix, combined with DC ASN data, to facilitate restaurant scanning of products for receiving, inventory, and food safety traceability. Because of these use cases, supplier provided data has downstream dependencies for multiple CMG systems, necessitating robust compliance mechanisms at RFID tagging facilities.

CMG's deployment of RFID is unique to all other implementations of SGTIN-96 tags due to its usage of serialization to map mission critical food safety information, namely lot codes and use thru dates (UTDs). In order to assure the veracity, accuracy, and fidelity of these data, and to ensure that tags are properly encoded and commissioned into the Mojix platform, CMG has devised a supplier compliance program based on the third wave of pilots. In reviewing initial data, five distinct possibilities exist so far:



RFID Integrity Issue	Explanation	Cause
Uncommissioned Tags	EPCs corresponding to individual case identities are not commissioned into Mojix, which results in CMG not having lot codes and/or UTDs.	Uncommissioned tags can come from mechanical issues (i.e. related to the production line) or data issues (i.e. the transmission process for sending data to Mojix).
Miscommissioned Tags - EPC	EPCs containing the wrong GTIN for the product	Using pre-encoded RFID inlays can be inadvertently put on the wrong production line or an error in encoding can result in the wrong GTIN being used.
Miscommissioned Tags – Nonsense EPCs	Encoding errors introduce EPCs that will not be readable by Mojix	Multiple possibilities including driver issues, improper settings, etc.
Miscommissioned Tags – Wrong Attribute Data	Tags have correct EPCs and are commissioned into Mojix, but they have wrong attribute data (e.g. lot codes or UTDs)	Mapping issues between the encoded EPC and attribute data. Discrepancy between printed label and EPC mapped data
Non-RFID Tagged Item	Products being shipped to CMG restaurants do not have RFID inlays on them, resulting in missed scans.	Suppliers may not be applying supplemental tags consistently or if they are manufacturing products with non-RFID tagged cases, the non-RFID items enter CMG supply chains.

The supplier compliance program is designed to mitigate risks associated with these issues using concepts in FSQA management, in a process called Digital Integrity by Critical Control Points. Because of the varied nature of RFID implementations and the emphasis on mapping physical processes to digital recordkeeping, the program documentation needs to be as technology agnostic as possible. The DICCP process will be detailed in a separate supplier requirements document from the Playbook and will only apply to products requiring lot codes for food traceability.