The Global Language of Business

GS1 US EPCIS Recommendations for FSMA 204 Critical Tracking Events

Release 2.0, May 15, 2025

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Document Summary

Document Item	Current Value
Document Title	EPCIS Recommendations for FSMA 204 Critical Tracking Events
Date Last Modified	May 15, 2025
Document Description	This document supplements the Retail Grocery and Foodservice Application of GS1 System of Standards to Support FSMA 204 Guideline and seeks to show how the EPCIS standard could be leveraged to capture certain supply chain events and what information from those events can be used to supplement the needed data for FSMA 204 CTEs (Critical Tracking Events) and KDEs (Key Data Elements).

Log of Changes

Release Number – Date	Changes
Release 1.0 – March 2024	Release/publication
Release 2.0 – May 2025	Graphics and descriptions updated in Section 1.2. KDE mapping tables updated to fully reflect EPCIS 2.0 JSON field value types. Cooling CTE event data simplified and updated with new business step value. Additional data examples provided for Shipping and Receiving CTEs. First Land-Based Receiver data updated to include multiple fishing zones and species. Additional link added to resources area for technical implementation files.

1 Introduction

In July 2020, the FDA announced its 10-year plan to improve food safety, *The New Era of Smarter Food Safety*. This is a framework to "respond more rapidly to outbreaks, address new business models, reduce contamination of food, and foster the development of food safety cultures." It encourages the use of technology, improved traceability, and establishes a food safety culture throughout all members of the supply chain. For more information go to: *https://www.fda.gov/food/new-era-smarter-food-safety*.

On November 21, 2022, the United States Food and Drug Administration (FDA) published a Final Rule titled, Requirements for Additional Traceability Records for Certain Foods, which is a key component of the FDA's New Era of Smarter Food Safety Blueprint and implements Section 204(d) of the FDA Food Safety Modernization Act (FSMA), which was signed into law in 2011. This rule is commonly referred to as "FSMA 204". Throughout the remainder of this document, Final Rule' and FSMA 204 will be used interchangeably as shorthand for referring to this regulation.

EPCIS (Electronic Product Code Information Services) is the flagship data capture and sharing standard from GS1 specifically developed for enabling full supply chain visibility both inside organizations and between trading partners. It does so by providing a framework to model events that occur in supply chains as they truly happen, including "what" supply chain objects are involved, "where" and "when" the events take place, and "why" the events occurred, such as the business process, related transaction documents, and more.

This document seeks to show how the EPCIS standard could be leveraged to capture certain supply chain events and what information from those events can be used to supplement the needed data for FSMA 204 CTEs (Critical Tracking Events) and KDEs (Key Data Elements). Each of the FSMA 204 CTEs are represented in this document with links to accompanying EPCIS example data. The FSMA 204 CTEs are the following:

- Harvest
- Cooling
- Initial Packing
- Transformation
- Shipping
- Receiving
- First Land-Based Receiver

1.1 How to Use This Document

When reviewing sections of this document that are directly related to providing example EPCIS event data, these specific sections contain the following information:

- Which FSMA 204 CTE the section covers
- A description of the provided event data and how it models data that can be used to provide the necessary KDEs each CTE requires.
- EPCIS 2.0 JSON format event data examples that represent captured supply chain events related to FSMA 204 CTEs and KDEs

Mapping tables describing each FSMA 204 KDE for each CTE and corresponding EPCIS event fields and field value types.

Note: As with all GS1 Standards and solutions, this guideline is voluntary, not mandatory. It should be noted that the use of the words "must" and "require" throughout this document relate exclusively to technical recommendations for the proper application of the standards to support the integrity of your implementation.

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1.2 Concepts in Example EPCIS Data

The EPCIS standard is designed to capture when and where supply chain objects are involved in many different processes, including when they are created and when they are transferred between trading partners and locations. When reviewing data requirements for FSMA 204 CTEs and KDEs in the context of EPCIS, it is important to understand what KDEs might be captured in a single EPCIS event rather than two or more EPCIS events.

Depending on the CTE, the full list of KDEs required could be associated with multiple supply chain processes, and therefore would best be captured with multiple EPCIS events.

One example of this concept that will be shown here will be the EPCIS example that could support the data requirements for a Harvest CTE. As outlined in the *Final Rule Subpart S – Additional Traceability Records for Certain Foods*, for the Harvest CTE, the following Key Data Elements must be captured:

- Commodity and, if applicable, variety of the food
- Quantity and unit of measure of the food
- Location description for the farm where the food was harvested
- For produce:
  - Name of the field or other growing area from which the food was harvested (must correspond to the name used by the grower), or
  - Other information identifying the harvest location at least as precisely as field or growing area name
- For aquacultured food:
  - Name of the container (e.g., pond, pool, tank, cage) from which the food was harvested (must correspond to the container name used by the aquaculture farmer), or
  - Other information identifying the harvest location at least as precisely as the container name
- Date of harvesting
- Reference document type and reference document number
- Location description for the immediate subsequent recipient (other than a transporter) of the food

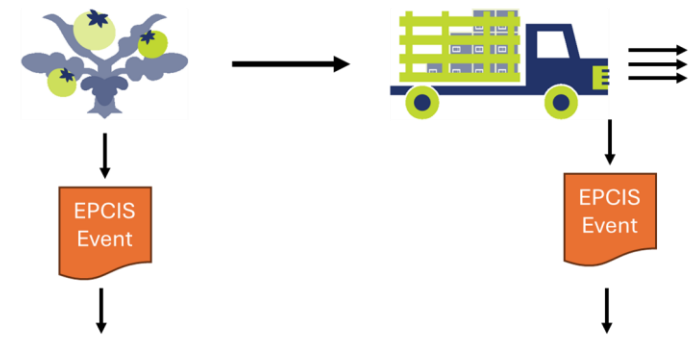
Most of this required information will be captured during the harvesting of new food that will be introduced into the supply chain. However, the final KDE in the list above for detailing the capturing of the next recipient of the food implies a post-harvest transfer of the food to this location. In EPCIS, this would translate to representing this data with one EPCIS event documenting the harvesting of the food,

and an immediate follow-up EPCIS event detailing the transfer of the food to the next recipient per the rule.

Another example of this concept is the Cooling CTE. In this CTE, the rule asks for the location of the harvest farm, all locations and dates, commodity, unit of measure, and quantities of the cooling process and cooled food, as well as the next recipient of the food after the cooling process is complete. From a process and event perspective, the location of the farm that the food was harvested from would be captured by an event detailing the food arriving at the cooling location as a source location of the food. All details related to the cooling process are captured in an event detailing the actual cooling of the food, and the next recipient would be captured in an event detailing the departure of the food from the cooling location as a destination element.

To summarize, the EPCIS examples shown in this document illustrate a concept of gathering EPCIS event data captured during processes where supply chain objects are either created, handled, or transferred to a new location and assembling them together for data needed in a FSMA 204 CTE. The images on the next page of this document provide a high-level visualization of this concept.

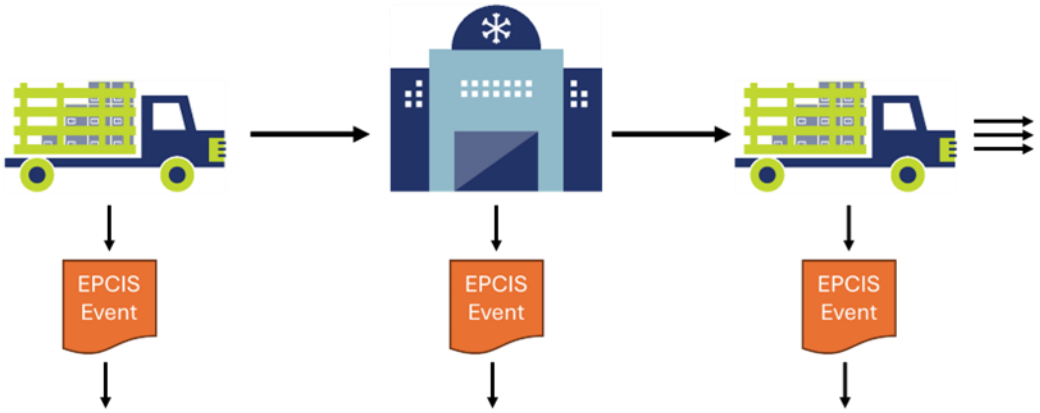
EPCIS Event Flow for Harvest CTE



Date of harvest
Location (field and farm)
Commodity
Reference document number
Reference document type
Quantity
Unit of measure

Immediate subsequent recipient location
Quantity
Unit of Measure
Commodity
Location (farm or field)

EPCIS Event Flow for Cooling CTE



Harvest farm location
Commodity
Quantity
Unit of Measure
Reference document number
Reference document type

Date of cooling
Commodity
Quantity
Unit of Measure
Cooling Location

Immediate subsequent recipient location
Quantity
Unit of Measure
Commodity

2 Harvest CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Harvest CTE for raw agricultural commodities not obtained from a fishing vessel.

The document is constructed with two EPCIS events that provide the traceability data outlined in the Harvest CTE description.

The first of these events describes the harvest process KDEs required by the FSMA 204 rule, such as the location of the harvest, harvest date, reference documents, and commodity identifier, and is indicated by the business step value of 'creating_class_instance'.

The second of these events describes a capturing of the newly harvested food being transferred from the harvest location to an immediate subsequent recipient, which is another KDE required by the U.S. FDA for the Harvest CTE. This is indicated in the event with the business step value of 'transporting'.

All mappings of KDEs required to be gathered for the Harvest CTE to EPCIS event fields are described in the mapping table following the JSON example.

Note: In the EPCIS example for this CTE, the identifiers for the harvested commodities are of a GTIN + Batch/Lot canonical Digital Link. It is noted that the Harvest CTE per FSMA 204 only requires commodity and, if applicable, variety level identification of food in this CTE, but this guidance recommends using an identifier with a trade item and a batch/lot back to the harvest whenever possible to ensure that during a traceability request, food that is initially packed can more thoroughly be associated to a harvest from a particular date and location.

```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2025-04-15T11:26:42-04:00",
    "epcisBody": {
      "eventList": [
        {
          "type": "ObjectEvent",
          "eventTime": "2025-04-15T09:26:42-04:00",
          "recordTime": "2025-04-15T09:26:42-04:00",
          "eventTimeZoneOffset": "-04:00",
          "action": "ADD",
          "bizStep": "creating_class_instance",
          "disposition": "active",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141248964"
          },
          "bizLocation": {
            "id": "https://id.gs1.org/414/0614141012350"
          },
          "bizTransactionList": [
            {
              "type": "prodorder",
              "bizTransaction": "urn:epcglobal:cbv:bt:0614141012350:5555"
            }
          ],
          "quantityList": [
            {
              "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
              "quantity": 1000,
              "uom": "LBR"
            }
          ]
        },
        {
          "type": "ObjectEvent",
          "eventTime": "2025-04-15T11:26:42-04:00",
          "recordTime": "2025-04-15T11:26:42-04:00",
          "eventTimeZoneOffset": "-04:00",
          "action": "OBSERVE",
          "bizStep": "transporting",
```

```
        "disposition": "in_transit",
        "readPoint": {
          "id": "https://id.gs1.org/414/0614141012350"
        },
        "quantityList": [
          {
            "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
            "quantity": 1000,
            "uom": "LBR"
          }
        ],
        "sourceList": [
          {
            "type": "owning_party",
            "source": "https://id.gs1.org/417/0614141012404"
          }
        ],
        "destinationList": [
          {
            "type": "location",
            "destination": "https://id.gs1.org/414/0614141012503"
          }
        ]
      }
    ]
  }
}
```

Harvest KDE Mapping Table

FSMA 204 Harvest KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Location description for the farm where the food was harvested	creating_class_instance	readPoint	URI, Location GLN*
Field or growing area or produce, container for aquaculture seafood	creating_class_instance	bizLocation	URI, Location GLN*
Commodity and, if applicable, variety of the food	creating_class_instance	quantityList, epcClass	URI, GTIN**
Quantity of the food	creating_class_instance	quantityList, quantity	decimal, number type
Unit of Measure	creating_class_instance	quantityList, uom	string, UOM
Date of harvesting	creating_class_instance	eventTime	string type, date-time format
Reference document type	creating_class_instance	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	creating_class_instance	bizTransactionList, bizTransaction	BusinessTransactionID
Location description for the immediate subsequent recipient (other than a transporter) of the food	transporting	destinationList, destination, type = location	URI, Location GLN*
Business Name, Phone Number	transporting	sourceList, source, type = owning_party	URI, Party GLN*

* The location and party GLNs serve as the location and party identifiers for EPCIS event data. Specific location and party details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN serves as the commodity identifier for EPCIS event data. For the Commodity KDE, this guidance recommends utilizing the importClassificationTypeCode and importClassificationValue attributes supplemented by the functionalName attribute. This set of attributes can be further augmented by the gpcCategoryCode which is an attribute for expressing the GS1 Global Product Classification (GPC) code value, a product classification scheme already required by GDSN and GDM. These attributes would be considered the master data of the EPCIS identifier.

3 Cooling CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Cooling CTE for raw agricultural commodities not obtained from a fishing vessel.

The document is constructed with three EPCIS events that provide the traceability data outlined in the Cooling CTE description.

The first event describes the harvested food being received at the cooling facility and the farm from which the food came from. This is indicated in the event by the business step value of 'receiving'.

The second event describes the cooling process KDEs required by the FSMA 204 rule. The business step of 'other' is used to indicate that the food is being subjected to a cooling process. As of the publication date for the current version of this document, a specific business step is not available in the Core Business Vocabulary for a cooling process, and the Core Business Vocabulary describes the use of the business step 'other' "for terms that have yet to be added to the CBV from an industry or a user." With EPCIS 2.0, optional sensor-based temperature information could also be provided in these events to detail the temperature of the cooling location at the start and end of the cooling process, as well as provide further context that the event is related to a process where the temperature of the food is a factor for its generation.

The third of these events describes a capturing of the cooled food being transferred from the cooling location to an immediate subsequent recipient. This is indicated in the event with a business step of 'transporting'.

All mappings of KDEs required to be gathered for the Cooling CTE to EPCIS event fields are described in the mapping table following the JSON example.

```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2025-01-14T16:20:07.40Z",
    "epcisBody": {
      "eventList": [
        {
          "type": "ObjectEvent",
          "eventTime": "2025-04-16T09:26:42-04:00",
          "eventTimeZoneOffset": "-05:00",
          "action": "OBSERVE",
          "bizStep": "receiving",
          "disposition": "in_progress",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141012503"
          },
          "bizTransactionList": [
            {
              "type": "recadv",
              "bizTransaction": "urn:epcglobal:cbv:bt:0614141012503:861-100037169"
            }
          ],
          "quantityList": [
            {
              "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
              "quantity": 1000,
              "uom": "LBR"
            }
          ],
          "sourceList": [
            {
              "type": "location",
              "source": "https://id.gs1.org/414/0614141012350"
            }
          ],
          "destinationList": [
            {
              "type": "location",
              "destination": "https://id.gs1.org/414/0614141012503"
            }
          ]
```

```
},
{
  "type": "ObjectEvent",
  "eventTime": "2025-04-16T10:26:42-04:00",
  "eventTimeZoneOffset": "-05:00",
  "action": "OBSERVE",
  "bizStep": "other",
  "disposition": "in_progress",
  "readPoint": {
    "id": "https://id.gs1.org/414/0614141012503"
  },
  "bizLocation": {
    "id": "https://id.gs1.org/414/0614141012503"
  },
  "quantityList": [
    {
      "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
      "quantity": 1000,
      "uom": "LBR"
    }
  ],
  "sensorElementList": [
    {
      "sensorReport": [
        {
          "type": "Temperature",
          "value": 40,
          "deviceID": "https://id.gs1.org/8004/061414112345678",
          "uom": "FAH"
        }
      ]
    }
  ]
},
{
  "type": "ObjectEvent",
  "eventTime": "2025-04-17T10:26:42-04:00",
  "eventTimeZoneOffset": "-05:00",
  "action": "OBSERVE",
  "bizStep": "transporting",
  "disposition": "in_transit",
  "readPoint": {
    "id": "https://id.gs1.org/414/0614141012503"
  },
```

```
        "quantityList": [
          {
            "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
            "quantity": 1000,
            "uom": "LBR"
          }
        ],
        "sourceList": [
          {
            "type": "location",
            "source": "https://id.gs1.org/414/0614141012503"
          }
        ],
        "destinationList": [
          {
            "type": "location",
            "destination": "https://id.gs1.org/414/0614141012756"
          }
        ]
      }
    ]
  }
}
```

Cooling KDE Mapping Table

FSMA 204 Cooling KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Location description for the farm where the food was harvested	receiving	sourceList, source	URI, Location GLN *
Commodity and, if applicable, variety of the food	receiving, other, transporting	quantityList, epcClass	URI, GTIN**
Quantity of the food	receiving, other, transporting	quantityList, quantity	decimal, number type
Unit of Measure	receiving, other, transporting	quantityList, uom	string, UOM
Date of cooling	receiving, other	eventTime	string type, date-time format
Location description for where you cooled the food	receiving, other, transporting	readPoint	URI, Location GLN *
Reference document type	receiving	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	receiving	bizTransactionList, bizTransaction	BusinessTransactionID
Location description for the immediate subsequent recipient (other than a transporter) of the food	transporting	destinationList, destination, type = location	URI, Location GLN *

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of this identifier and exchanged outside the EPCIS event data.

** The GTIN serves as the commodity identifier for EPCIS event data. For the Commodity KDE, this guidance recommends utilizing the importClassificationTypeCode and importClassificationValue attributes supplemented by the functionalName attribute. This set of attributes can be further augmented by the gpcCategoryCode which is an attribute for expressing the GS1 Global Product Classification (GPC) code value, a product classification scheme already required by GDSN and GDM. These attributes would be considered the master data of the EPCIS identifier.

4 Initial Packing CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Initial Packing CTE for raw agricultural commodities not obtained from a fishing vessel.

The document is constructed with all EPCIS events previously described for harvesting and cooling (FSMA 204 requires this data to be provided to the initial packer except for reference documents), as well as a receiving EPCIS event detailing the date the food was received by the initial packer, indicated by the business step value of 'receiving', and a Transformation type event modelling the packing of the raw commodity and the assignment of a Traceability Lot Code, indicated by the business step value of 'creating_class_instance'.

All mappings of KDEs required to be gathered for the Initial Packing CTE to EPCIS event fields are described in the mapping table following the JSON example.

```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2023-10-29T17:02:27.452Z",
    "epcisBody": {
      "eventList": [
        {
          "type": "ObjectEvent",
          "eventTime": "2025-04-15T09:26:42-04:00",
          "recordTime": "2025-04-15T09:26:42-04:00",
          "eventTimeZoneOffset": "-04:00",
          "action": "ADD",
          "bizStep": "creating_class_instance",
          "disposition": "active",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141248964"
          },
          "bizLocation": {
            "id": "https://id.gs1.org/414/0614141012350"
          },
          "quantityList": [
            {
              "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
              "quantity": 1000,
              "uom": "LBR"
            }
          ]
        },
        {
          "type": "ObjectEvent",
          "eventTime": "2025-04-15T11:26:42-04:00",
          "recordTime": "2025-04-15T11:26:42-04:00",
          "eventTimeZoneOffset": "-04:00",
          "action": "OBSERVE",
          "bizStep": "transporting",
          "disposition": "in_transit",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141012350"
          },
          "quantityList": [
            {
```

```
        "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
        "quantity": 1000,
        "uom": "LBR"
      }
    ],
    "sourceList": [
      {
        "type": "owning_party",
        "source": "https://id.gs1.org/417/0614141012404"
      }
    ],
    "destinationList": [
      {
        "type": "location",
        "destination": "https://id.gs1.org/414/0614141012503"
      }
    ]
  },
  {
    "type": "ObjectEvent",
    "eventTime": "2025-04-16T09:26:42-04:00",
    "eventTimeZoneOffset": "-05:00",
    "action": "OBSERVE",
    "bizStep": "receiving",
    "disposition": "in_progress",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012503"
    },
    "quantityList": [
      {
        "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
        "quantity": 1000,
        "uom": "LBR"
      }
    ],
    "sourceList": [
      {
        "type": "location",
        "source": "https://id.gs1.org/414/0614141012350"
      }
    ],
    "destinationList": [
      {
        "type": "location",
```

```
        "destination": "https://id.gs1.org/414/0614141012503"
      }
    ]
  },
  {
    "type": "ObjectEvent",
    "eventTime": "2025-04-16T10:26:42-04:00",
    "eventTimeZoneOffset": "-05:00",
    "action": "OBSERVE",
    "bizStep": "other",
    "disposition": "in_progress",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012503"
    },
    "bizLocation": {
      "id": "https://id.gs1.org/414/0614141012503"
    },
    "quantityList": [
      {
        "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
        "quantity": 1000,
        "uom": "LBR"
      }
    ],
    "sensorElementList": [
      {
        "sensorReport": [
          {
            "type": "Temperature",
            "value": 40,
            "deviceID": "https://id.gs1.org/8004/061414112345678",
            "uom": "FAH"
          }
        ]
      }
    ]
  },
  {
    "type": "ObjectEvent",
    "eventTime": "2025-04-17T10:26:42-04:00",
    "eventTimeZoneOffset": "-05:00",
    "action": "OBSERVE",
    "bizStep": "transporting",
    "disposition": "in_transit",
```

```
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012503"
    },
    "quantityList": [
      {
        "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
        "quantity": 1000,
        "uom": "LBR"
      }
    ],
    "sourceList": [
      {
        "type": "location",
        "source": "https://id.gs1.org/414/0614141012503"
      }
    ],
    "destinationList": [
      {
        "type": "location",
        "destination": "https://id.gs1.org/414/0614141012756"
      }
    ]
  },
  {
    "type": "ObjectEvent",
    "eventTime": "2025-04-18T10:26:42-04:00",
    "recordTime": "2025-04-18T10:26:42-04:00",
    "eventTimeZoneOffset": "-04:00",
    "action": "OBSERVE",
    "bizStep": "receiving",
    "disposition": "in_progress",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012756"
    },
    "bizLocation": {
      "id": "https://id.gs1.org/414/0614141012756"
    },
    "quantityList": [
      {
        "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
        "quantity": 1000,
        "uom": "LBR"
      }
    ],
```

```
    "sourceList": [
      {
        "type": "location",
        "source": "https://id.gs1.org/414/0614141012503"
      }
    ],
    "destinationList": [
      {
        "type": "location",
        "destination": "https://id.gs1.org/414/0614141012756"
      }
    ]
  },
  {
    "type": "TransformationEvent",
    "eventTime": "2025-04-19T10:26:42-04:00",
    "recordTime": "2025-04-19T10:26:42-04:00",
    "eventTimeZoneOffset": "-04:00",
    "inputQuantityList": [
      {
        "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
        "quantity": 1000,
        "uom": "LBR"
      }
    ],
    "outputQuantityList": [
      {
        "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
        "quantity": 500,
        "uom": "CS"
      }
    ],
    "bizStep": "creating_class_instance",
    "disposition": "active",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012756"
    },
    "bizLocation": {
      "id": "https://id.gs1.org/414/0614141012756"
    },
    "bizTransactionList": [
      {
        "type": "prodorder",
        "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:55555"
```

```
            }
          ]
        }
      ]
    }
  }
```

Initial Packing KDE Mapping Table

FSMA 204 Initial Packing KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Harvesting KDEs	See Harvest CTE	See Harvest CTE	See Harvest CTE
Cooling KDEs	See Cooling CTE	See Cooling CTE	See Cooling CTE
Date you received the food	receiving	eventTime	string type, date-time format
Quantity of food received	receiving	quantityList, quantity	decimal, number type
Unit of Measure of food received	receiving	quantityList, uom	string, UOM
Quantity of the packed food	creating_class_instance	inputQuantityList, quantity	decimal, number type
Unit of Measure of the packed food	creating_class_instance	inputQuantityList, uom	string, UOM
Date of initial packing	creating_class_instance	eventTime	string type, date-time format
Location description for where you initially packed the food (i.e., traceability lot code source), and (if applicable), the traceability lot code source reference	creating_class_instance	readPoint	URI, Location GLN *
Commodity and, if applicable, variety of the food received	receiving	quantityList, epcClass	URI, GTIN**
Traceability lot code you assigned	creating_class_instance	outputQuantityList, epcClass	URI, GTIN + Batch/Lot**
Product Description of the packed food	creating_class_instance	outputQuantityList, epcClass	URI, GTIN**

FSMA 204 Initial Packing KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Reference document type	creating_class_instance	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	creating_class_instance	bizTransactionList, bizTransaction	BusinessTransactionID

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of this identifier and exchanged outside the EPCIS event data.

** The GTIN and GTIN + Batch/Lot serve as the commodity identifier and Traceability Lot Code identifier of packed food for EPCIS event data. For the Commodity KDE, this guidance recommends utilizing the importClassificationTypeCode and importClassificationValue attributes supplemented by the functionalName attribute. This set of attributes can be further augmented by the gpcCategoryCode which is an attribute for expressing the GS1 Global Product Classification (GPC) code value, a product classification scheme already required by GDSN and GDM. The product description of the packed food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code.

5 Transformation CTE

The EPCIS document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 Transformation CTE.

The document models the transformation of food used as ingredients into newly produced food from those ingredients. It is comprised of a single EPCIS event, which details the date and location of the transformation, the traceability lot codes of each of the ingredient foods, the traceability lot code of the new food, and the quantities and unit of measures of all ingredients and the new food.

All mappings of KDEs required to be gathered for the Transformation CTE to EPCIS event fields are described in the mapping table following the JSON example.

```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2023-09-14T11:30:47.022Z",
    "epcisBody": {
      "eventList": [
        {
          "type": "TransformationEvent",
          "eventTime": "2023-10-31T00:00:00-04:00",
          "recordTime": "2023-10-31T00:00:00-04:00",
          "eventTimeZoneOffset": "-04:00",
          "inputQuantityList": [
            {
              "epcClass": "https://id.gs1.org/01/10614141005557/10/ABC1234",
              "quantity": 100,
              "uom": "CS"
            },
            {
              "epcClass": "https://id.gs1.org/01/10614141005564/10/ABC1234",
              "quantity": 100,
              "uom": "CS"
            },
            {
              "epcClass": "https://id.gs1.org/01/10614141005571/10/ABC1234",
              "quantity": 100,
              "uom": "CS"
            }
          ],
          "outputQuantityList": [
            {
              "epcClass": "https://id.gs1.org/01/10614141005601/10/ABC1234",
              "quantity": 100,
              "uom": "CS"
            }
          ],
          "bizStep": "creating_class_instance",
          "disposition": "active",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141012756"
          },
          "bizLocation": {
```

```
          "id": "https://id.gs1.org/414/0614141012756"
        },
        "bizTransactionList": [
          {
            "type": "prodorder",
            "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:55555"
          }
        ],
        "ilmd": {
          "gs1:bestBeforeDate": "2025-09-10"
        }
      }
    ]
  }
}
```

Transformation KDE Mapping Table

FSMA 204 Transformation KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
KDEs for food used as ingredients			
Traceability lot code for the food	creating_class_instance	inputQuantityList, epcClass	URI, GTIN + Batch/Lot**
Product description for the food to which the traceability lot code applies	creating_class_instance	inputQuantityList, epcClass	GTIN**
For each traceability lot used, the quantity and unit of measure of the food used from that lot	creating_class_instance	quantityList, quantity, uom	decimal, number type, UOM
KDEs for new food produced			
New traceability lot code for the food	creating_class_instance	outputQuantityList, epcClass	GTIN + Batch/Lot**
Location description for where you transformed the food (i.e., the traceability lot code source), and (if applicable) the traceability lot code source reference	creating_class_instance	readPoint	URI, Location GLN *
Date transformation was completed	creating_class_instance	eventTime	string type, date-time format
Product description for the food	creating_class_instance	outputQuantityList, epcClass	URI, GTIN + Batch/Lot**
Quantity and unit of measure of the food	creating_class_instance	outputQuantityList, quantity, uom	decimal, number type, UOM
Reference document type	creating_class_instance	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	creating_class_instance	bizTransactionList, bizTransaction	BusinessTransactionID

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of this identifier and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier of ingredient and transformed foods for EPCIS event data. The product description of the food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the *Traceability Lot Code* KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.

6 Shipping CTE

The EPCIS documents below provide example EPCIS visibility event data that could be captured in support of a FSMA 204 Shipping CTE.

Each document models the shipping of three distinct Traceability Lot Codes to a downstream recipient. Two of the Traceability Lot Codes share the same GTIN but are of different Batch/Lots. The third Traceability Lot Code is of a different GTIN and Batch/Lot than the first two. In each document, the first EPCIS event provides previously captured details of the origins of one of three shipped Traceability Lot Codes, covering the requirement of including the Traceability Lot Code Source Reference for the Shipping CTE. For brevity, only one of the three Traceability Lot Code creation events is included.

The first EPCIS document contains an additional two EPCIS events modeling the packing of the shipped food onto a specific pallet identified by an SSCC number and the subsequent physical shipping of the pallet to the intended recipient. The event modeling the construction of the pallet is an Aggregation event with action ADD, and the event modeling the shipping of the pallet is an Object event with Action Observe.

The second EPCIS document contains only one additional EPCIS modeling the shipping of the pallet to the intended recipient, but rather than including just the identifier of the pallet, it also includes the known child units that were previously packed onto it. In EPCIS, this form of observing a parent-child supply chain relationship that was previously established is achieved by using the Aggregation event type with Action Observe. This method is an alternative to the one previously listed and allows for only needing to query for events with business steps of shipping to understand what has been shipped, rather than needing to query for what was packed as well. However, this guideline assumes that prior to the Aggregation event with Action Observe, the parent child relationship was also documented by an EPCIS event. Section 4.5 of the *EPCIS & CBV Implementation Guideline* provides additional insights into this concept.

All mappings of KDEs required to be gathered for the Shipping CTE to EPCIS event fields are described in the mapping table following the JSON example.

Shipping CTE Example, Aggregation Add and Object Observe


```
{
  "@context": [
    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
  ],
  "type": "EPCISDocument",
  "schemaVersion": "2.0",
  "creationDate": "2025-01-14T18:46:03.65Z",
  "epcisBody": {
    "eventList": [
      {
        "type": "TransformationEvent",
        "eventTime": "2023-11-01T00:00:00-04:00",
        "recordTime": "2023-11-01T00:00:00-04:00",
        "eventTimeZoneOffset": "-04:00",
        "eventID": "urn:uuid:4898a223-216a-4f46-9e18-338ccf6fa3ba",
        "inputQuantityList": [
          {
            "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
            "quantity": 250,
            "uom": "LBR"
          }
        ],
        "outputQuantityList": [
          {
            "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
            "quantity": 25,
            "uom": "CS"
          }
        ],
        "bizStep": "creating_class_instance",
        "disposition": "active",
        "readPoint": {
          "id": "https://id.gs1.org/414/0614141012756"
        },
        "bizLocation": {
          "id": "https://id.gs1.org/414/0614141012756"
        }
      },
      {
        "type": "AggregationEvent",
        "eventTime": "2025-01-14T13:35:18-05:00",
        "eventTimeZoneOffset": "-05:00",
```

```
    "parentID": "https://id.gs1.org/00/006141415874587485",
    "action": "ADD",
    "bizStep": "packing",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012756"
    },
    "bizTransactionList": [
      {
        "type": "po",
        "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:850-100037169"
      }
    ],
    "childQuantityList": [
      {
        "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
        "quantity": 25,
        "uom": "CS"
      },
      {
        "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC5678",
        "quantity": 25,
        "uom": "CS"
      },
      {
        "epcClass": "https://id.gs1.org/01/10614141005571/10/ABC1234",
        "quantity": 25,
        "uom": "CS"
      }
    ]
  },
  {
    "type": "ObjectEvent",
    "eventTime": "2025-01-14T13:35:18-05:00",
    "eventTimeZoneOffset": "-05:00",
    "epcList": [
      "https://id.gs1.org/00/006141415874587485"
    ],
    "action": "OBSERVE",
    "bizStep": "shipping",
    "disposition": "in_transit",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141012756"
    },
    "bizTransactionList": [
```

```
          {
            "type": "desadv",
            "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:856-100037169"
          },
          {
            "type": "bol",
            "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:211-101037170"
          }
        ],
        "sourceList": [
          {
            "type": "location",
            "source": "https://id.gs1.org/414/0614141012756"
          }
        ],
        "destinationList": [
          {
            "type": "location",
            "destination": "https://id.gs1.org/414/0614141013005"
          }
        ]
      }
    ]
  }
}
```

Shipping CTE Example, Aggregation Observe


```
{
  "@context": [
    "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
  ],
  "type": "EPCISDocument",
  "schemaVersion": "2.0",
  "creationDate": "2023-11-02T20:36:49.005Z",
  "epcisBody": {
    "eventList": [
      {
        "type": "TransformationEvent",
        "eventTime": "2023-11-01T00:00:00-04:00",
        "recordTime": "2023-11-01T00:00:00-04:00",
        "eventTimeZoneOffset": "-04:00",
        "inputQuantityList": [
          {
            "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
            "quantity": 250,
            "uom": "LBR"
          }
        ],
        "outputQuantityList": [
          {
            "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
            "quantity": 25,
            "uom": "CS"
          }
        ],
        "bizStep": "creating_class_instance",
        "disposition": "active",
        "readPoint": {
          "id": "https://id.gs1.org/414/0614141012756"
        },
        "bizLocation": {
          "id": "https://id.gs1.org/414/0614141012756"
        }
      },
      {
        "type": "AggregationEvent",
        "eventTime": "2023-11-02T00:00:00-04:00",
        "recordTime": "2023-11-02T00:00:00-04:00",
        "eventTimeZoneOffset": "-04:00",
```

```
"parentID": "https://id.gs1.org/00/006141415874587485",
"action": "OBSERVE",
"bizStep": "shipping",
"disposition": "in_transit",
"readPoint": {
  "id": "https://id.gs1.org/414/0614141012756"
},
"bizTransactionList": [
  {
    "type": "desadv",
    "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:856-100037169"
  },
  {
    "type": "bol",
    "bizTransaction": "urn:epcglobal:cbv:bt:0614141012756:211-101037170"
  }
],
"childQuantityList": [
  {
    "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC5678",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/10614141005571/10/ABC1234",
    "quantity": 25,
    "uom": "CS"
  }
],
"sourceList": [
  {
    "type": "location",
    "source": "https://id.gs1.org/414/0614141012756"
  }
],
"destinationList": [
  {
    "type": "location",
    "destination": "https://id.gs1.org/414/0614141013005"
```

```
          }
        ]
      }
    ]
  }
}
```

Shipping KDE Mapping Table

FSMA 204 Shipping KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Location description for the location from which you shipped the food	shipping	readPoint	URI, Location GLN *
Traceability lot code for the food	shipping	childQuantityList, epcClass	URI, GTIN + Batch/Lot**
Quantity and unit of measure of the food	shipping	childQuantityList, quantity, uom	decimal, number type, UOM
Product description for the food	shipping	childQuantityList, epcClass	URI, GTIN + Batch/Lot**
Location description for the immediate subsequent recipient (other than a transporter) of the food	shipping	destinationList, destination, type = location	URI, Location GLN *
Date you shipped the food	shipping	eventTime	string type, date-time format
Location description for the traceability lot code source or the traceability lot code source reference	creating_class_instance	readPoint	URI, Location GLN *
Reference document type	shipping	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	shipping	bizTransactionList, bizTransaction	BusinessTransactionID

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier of packed food for EPCIS event data. The product description of the packed food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the *Traceability Lot Code* KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.

7 Receiving CTE

The EPCIS documents below provide example EPCIS visibility event data that could be captured in support of a FSMA 204 Receiving CTE.

Each document models the receiving of three distinct Traceability Lot Codes by a downstream recipient. Two of the Traceability Lot Codes share the same GTIN but are of different Batch/Lots. The third Traceability Lot Code is of a different GTIN and Batch/Lot than the first two. In each document, the first EPCIS event provides previously captured details of the origins of one of three shipped Traceability Lot Codes, covering the requirement of including the Traceability Lot Code Source Reference for the Shipping CTE. For brevity, only one of the three Traceability Lot Code creation events is included.

The first EPCIS document contains an additional two EPCIS events modeling the receiving of a pallet labeled by an SSCC number and the deconstruction of the pallet, where the received quantities are documented. The event modeling the receiving of the pallet is an Object event with Action Observe, and the event modeling the deconstruction of the pallet and noting the quantities is an Aggregation event with action Delete.

The second EPCIS document contains only one additional EPCIS modeling the receiving of the pallet by the intended recipient, but rather than including just the identifier of the pallet, also includes the known child units that were previously packed onto it. In EPCIS, this form of observing a parent-child supply chain relationship that was previously established is achieved by using the Aggregation event type with Action Observe. This method is an alternative to the one previously listed and allows for only needing to query for events with business steps of receiving to understand what has been received, rather than needing to query for what was unpacked as well. Section 4.5 of the *EPCIS & CBV Implementation Guideline* provides additional insights into this concept.

All mappings of KDEs required to be gathered for the Receiving CTE to EPCIS event fields are described in the mapping table following the JSON examples.

Receiving CTE Example, Object Observe and Aggregation Delete


```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2023-11-02T20:36:49.005Z",
    "epcisBody": {
      "eventList": [
        {
          "type": "TransformationEvent",
          "eventTime": "2023-11-01T00:00:00-04:00",
          "recordTime": "2023-11-01T00:00:00-04:00",
          "eventTimeZoneOffset": "-04:00",
          "eventID": "urn:uuid:4898a223-216a-4f46-9e18-338ccf6fa3ba",
          "inputQuantityList": [
            {
              "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
              "quantity": 250,
              "uom": "LBR"
            }
          ],
          "outputQuantityList": [
            {
              "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
              "quantity": 25,
              "uom": "CS"
            }
          ],
          "bizStep": "creating_class_instance",
          "disposition": "active",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141012756"
          },
          "bizLocation": {
            "id": "https://id.gs1.org/414/0614141012756"
          }
        },
        {
          "type": "ObjectEvent",
          "eventTime": "2025-02-11T09:39:37-05:00",
          "eventTimeZoneOffset": "-05:00",
```

```
    "epcList": [
      "https://id.gs1.org/00/006141415874587485"
    ],
    "action": "OBSERVE",
    "bizStep": "receiving",
    "disposition": "in_progress",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141013005"
    },
    "bizTransactionList": [
      {
        "type": "recadv",
        "bizTransaction": "urn:epcglobal:cbv:bt:0614141013005:861-100037169"
      }
    ],
    "sourceList": [
      {
        "type": "location",
        "source": "https://id.gs1.org/414/0614141012756"
      }
    ],
    "destinationList": [
      {
        "type": "location",
        "destination": "https://id.gs1.org/414/0614141013005"
      }
    ]
  },
  {
    "type": "AggregationEvent",
    "eventTime": "2025-02-11T09:39:37-05:00",
    "eventTimeZoneOffset": "-05:00",
    "parentID": "https://id.gs1.org/00/006141415874587485",
    "action": "DELETE",
    "bizStep": "unpacking",
    "disposition": "in_progress",
    "readPoint": {
      "id": "https://id.gs1.org/414/0614141013005"
    },
    "childQuantityList": [
      {
        "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
        "quantity": 25,
        "uom": "CS"
```

```
          },
          {
            "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC5678",
            "quantity": 25,
            "uom": "CS"
          },
          {
            "epcClass": "https://id.gs1.org/01/10614141005571/10/ABC1234",
            "quantity": 25,
            "uom": "CS"
          }
        ]
      }
    ]
  }
}
```

Receiving CTE Example, Aggregation Observe


```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2023-11-02T20:36:49.005Z",
    "epcisBody": {
      "eventList": [
        {
          "type": "TransformationEvent",
          "eventTime": "2023-11-01T00:00:00-04:00",
          "recordTime": "2023-11-01T00:00:00-04:00",
          "eventTimeZoneOffset": "-04:00",
          "eventID": "urn:uuid:4898a223-216a-4f46-9e18-338ccf6fa3ba",
          "inputQuantityList": [
            {
              "epcClass": "https://id.gs1.org/01/00614141000012/10/ABC1234",
              "quantity": 250,
              "uom": "LBR"
            }
          ],
          "outputQuantityList": [
            {
              "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
              "quantity": 25,
              "uom": "CS"
            }
          ],
          "bizStep": "creating_class_instance",
          "disposition": "active",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141012756"
          },
          "bizLocation": {
            "id": "https://id.gs1.org/414/0614141012756"
          }
        },
        {
          "type": "AggregationEvent",
          "eventTime": "2023-11-02T00:00:00-04:00",
          "recordTime": "2023-11-02T00:00:00-04:00",
```

```
"eventTimeZoneOffset": "-04:00",
"eventID": "urn:uuid:49afe832-5171-432d-99c4-6dc003255ee1",
"parentID": "https://id.gs1.org/00/006141415874587485",
"action": "OBSERVE",
"bizStep": "receiving",
"disposition": "in_progress",
"readPoint": {
  "id": "https://id.gs1.org/414/0614141013005"
},
"bizLocation": {
  "id": "https://id.gs1.org/414/0614141013005"
},
"bizTransactionList": [
  {
    "type": "recadv",
    "bizTransaction": "urn:epcglobal:cbv:bt:0614141013005:861-100037169"
  }
],
"childQuantityList": [
  {
    "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC1234",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/10614141000019/10/ABC5678",
    "quantity": 25,
    "uom": "CS"
  },
  {
    "epcClass": "https://id.gs1.org/01/10614141005571/10/ABC1234",
    "quantity": 25,
    "uom": "CS"
  }
],
"sourceList": [
  {
    "type": "location",
    "source": "https://id.gs1.org/414/0614141012756"
  }
],
"destinationList": [
  {
    "type": "location",
```

```
            "destination": "https://id.gs1.org/414/0614141013005"
          }
        ]
      }
    ]
  }
}
```

Receiving KDE Mapping Table

FSMA 204 Receiving KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Location description for where the food was received	receiving	readPoint	URI, Location GLN *
Date you received the food	receiving	eventTime	string type, date-time format
Location description for the immediate previous source (other than a transporter) for the food	receiving	sourceList, source, type = location	URI, Location GLN *
Traceability lot code for the food	receiving	childQuantityList, epcClass	URI, GTIN + Batch/Lot**
Quantity and unit of measure of the food	receiving	childQuantityList, quantity, uom	decimal, number type, UOM
Product description for the food	receiving	childQuantityList, epcClass	URI, GTIN + Batch/Lot**
Location description for the traceability lot code source or the traceability lot code source reference	creating_class_instance	readPoint	URI, Location GLN *
Reference document type	receiving	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	receiving	bizTransactionList, bizTransaction	BusinessTransactionID

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier of packed food for EPCIS event data. The product description of the packed food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the *Traceability Lot Code* KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.

8 First Land-Based Receiver CTE

The EPCIS JSON document below provides example EPCIS visibility event data that could be captured in support of a FSMA 204 First Land-Based Receiver CTE.

The document models the assigning of a Traceability Lot Code of food by a first land-based receiver. It consists of a single EPCIS event, and for the Traceability Lot Code assigned, it details required data for the FSMA 204 rule, including the date range of the food harvest and the Food and Agriculture Organization of the United Nations defined areas where the food was caught.

All mappings of KDEs required to be gathered for the First Land-Based Receiver CTE to EPCIS event fields are described in the mapping table following the JSON example.

```
{
    "@context": [
      "https://ref.gs1.org/standards/epcis/2.0.0/epcis-context.jsonld"
    ],
    "type": "EPCISDocument",
    "schemaVersion": "2.0",
    "creationDate": "2025-02-23T16:55:26.92Z",
    "epcisBody": {
      "eventList": [
        {
          "type": "ObjectEvent",
          "eventTime": "2025-02-23T11:51:08-05:00",
          "eventTimeZoneOffset": "-05:00",
          "action": "ADD",
          "bizStep": "creating_class_instance",
          "disposition": "active",
          "readPoint": {
            "id": "https://id.gs1.org/414/0614141012350"
          },
          "bizTransactionList": [
            {
              "type": "cert",
              "bizTransaction": "urn:epcglobal:cbv:bt:0614141012350:cert-100037169"
            },
            {
              "type": "recadv",
              "bizTransaction": "urn:epcglobal:cbv:bt:0614141012350:861-100037169"
            },
            {
              "type": "po",
              "bizTransaction": "urn:epcglobal:cbv:bt:0614141012350:850-100037169"
            }
          ],
          "quantityList": [
            {
              "epcClass": "https://id.gs1.org/01/00614141005871/10/ABC1234",
              "quantity": 1000,
              "uom": "LBR"
            }
          ],
          "ilmd": {
            "gs1:catchZone": [
              "21.4R",
              "27.14.a"
```

```
          ],
          "gs1:harvestDateStart": "2025-02-16",
          "gs1:harvestDateEnd": "2025-02-18",
          "gs1:fishType": "SWORDFISH"
        }
      }
    ]
  }
}
```

First Land-Based Receiver KDE Mapping Table

FSMA 204 First Land-Based Receiver KDE	EPCIS Event Business Step	EPCIS Event Field	EPCIS Event Field Value Type
Location description for the first land-based receiver (i.e., traceability lot code source), and (if applicable) traceability lot code source reference	creating_class_instance	readPoint	URI, Location GLN *
Locations for the trip during which the food was caught	creating_class_instance	ILMD, catchZone	FAO Code, rdf:langString type
Harvest date range	creating_class_instance	ILMD, harvestDateStart, harvestDateEnd	string type, date-time format
Date the food was landed	creating_class_instance	eventTime	string type, date-time format
Quantity and unit of measure of the food	creating_class_instance	childQuantityList, quantity, uom	decimal, number type, UOM
Traceability lot code you assigned	creating_class_instance	childQuantityList, epcClass	URI, GTIN + Batch/Lot**
Species and/or acceptable market name for unpackaged food, or the product description for packaged food	creating_class_instance	ILMD, fishType	rdf:langString type
Reference document type	creating_class_instance	bizTransactionList, type	BusinessTransactionTypeID
Reference document number	creating_class_instance	bizTransactionList, bizTransaction	BusinessTransactionID

* The location GLN serves as the location identifier for EPCIS event data. Specific location details would be considered master data of these identifiers and exchanged outside the EPCIS event data.

** The GTIN + Batch/Lot serves as the Traceability Lot Code identifier assigned by the first land-based receiver in EPCIS event data. The product description of the food can be accessed by a lookup of the GTIN component of the GTIN + Batch/Lot identifier used for the Traceability Lot Code. By utilizing the GTIN as a part of the *Traceability Lot Code* KDE, companies can link to the other channels they are already utilizing for exchanging attributes with trading partners which describe food products. The GTIN can act as the bridge between the two different data sets when pulling together for an U.S. FDA request under the Final Rule.

9 Alternative EPCIS Data Formats

The EPCIS document examples provided in sections 2 through 8 are constructed in the JSON data format and conform to EPCIS 2.0. Support for JSON/JSON-LD is a significant addition to the EPCIS standard and was added to provide a more lightweight data format more familiar to the current generation of software development professionals as well as to enable easier integration of EPCIS data with data from other systems. EPCIS 2.0 also provides additional standard fields to include sensor-based information in a new 'How' dimension, such as temperature data that can be included in cold storage applications.

It is noted that existing implementations of EPCIS may currently use the XML data format as well as EPCIS 1.2 for use cases such as capturing data related to the DSCSA (Drug Supply Chain Security Act). All EPCIS examples listed above can be represented in XML rather than JSON. Additionally, all object and location/party identifiers in these examples leverage GS1 Digital Link URIs that are natively interoperable with GS1 element strings in barcodes. These can be used in place of traditional EPC URNs in EPCIS 2.0 format events.

The GS1 EPCIS Sandbox online utility can be used to convert example EPCIS data between versions and data formats, as well as build EPCIS event examples in a user interface. This resource is reachable in this link: [EPCIS Sandbox | Home (gs1.org)]

10 Additional Resources

- EPCIS and CBV Standards, Technical Implementation Files - *https://www.gs1.org/standards/epcis*
  - The EPCIS Standard in its entirety can be found here, as well as the accompanying CBV standard, containing all information and vocabulary for populating/formatting EPCIS fields. Additionally, context, OpenAPI, and schema files can be found here: *EPCIS / CBV 2.0.0*
- Additional EPCIS Examples - *https://ref.gs1.org/docs/epcis/examples*
  - Additional general EPCIS examples can be found here, in JSON format as well as XML format.
- EPCIS and CBV Implementation Guideline - *https://ref.gs1.org/guidelines/epcis-cbv/2.0.0/*
  - Guideline on all concepts of implementing the EPCIS and CBV standards, including EPCIS event modelling considerations, querying EPCIS event data, and sharing EPCIS event data between trading partners.
- EPCIS Sandbox - *https://ref.gs1.org/tools/epcis-sandbox/*
  - The EPCIS Sandbox is a tool that can be used to generate example EPCIS 2.0 JSON or XML event data from field values entered in an intuitive user interface, as well as a format converter to take EPCIS 1.2 or 2.0 in JSON or XML and convert between combinations of those standard versions and data structures.
- EPCIS Example JSON Files from this Document
  - *Click here* to download a zip file containing individual JSON files for each CTE.

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