

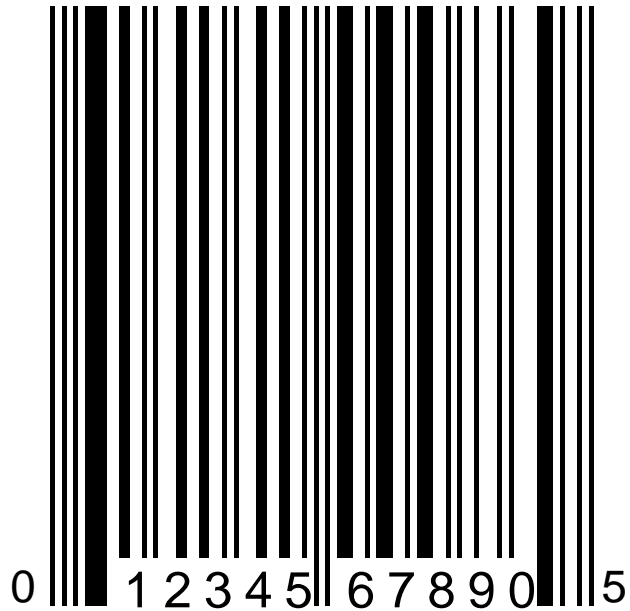


EPC/RFID

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U.P.C. – Universal Product Code



The symbol is comprised of:

Machine-readable bar code (UPC-A)

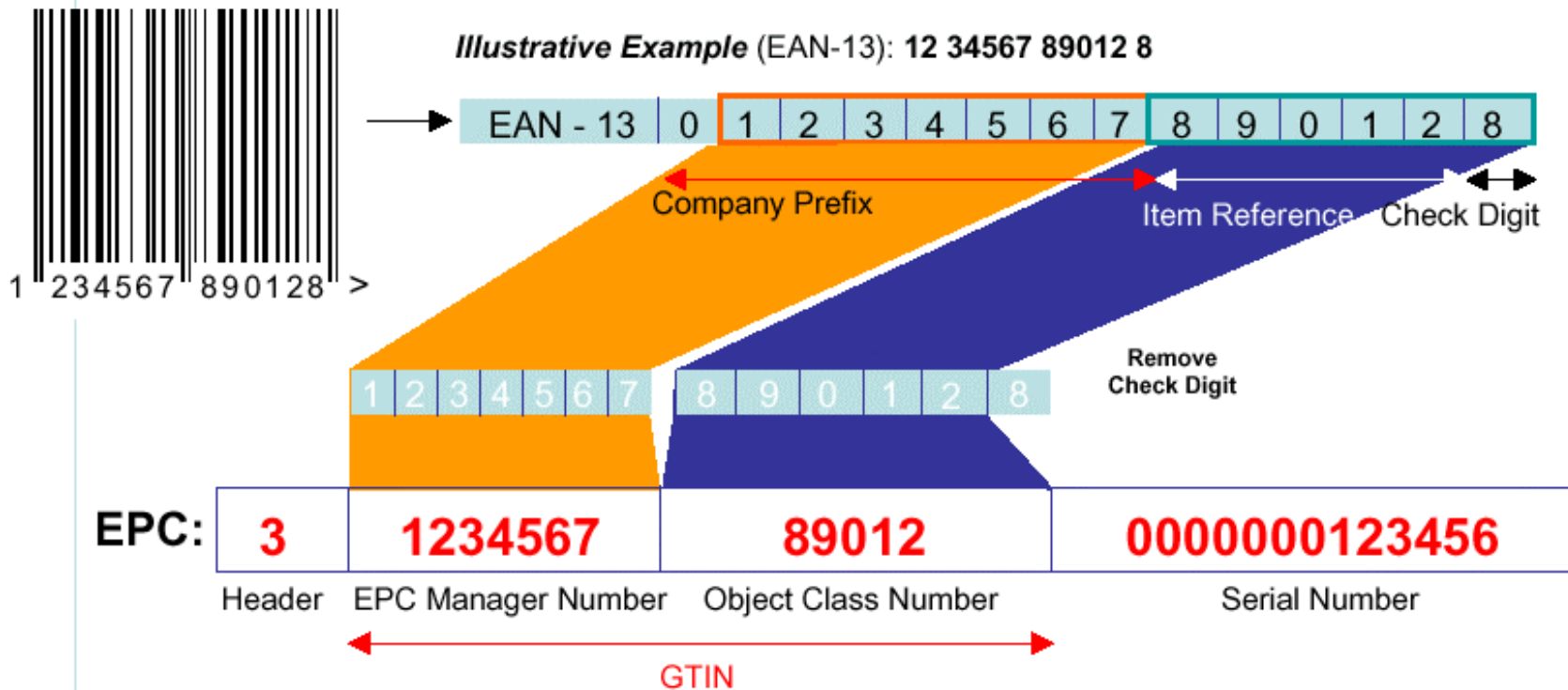


The human readable interpretation of that bar code (GTIN-12)



GS1 Bar Code numbers map into EPC™

An Example of How GTIN Integration Works With the EPC



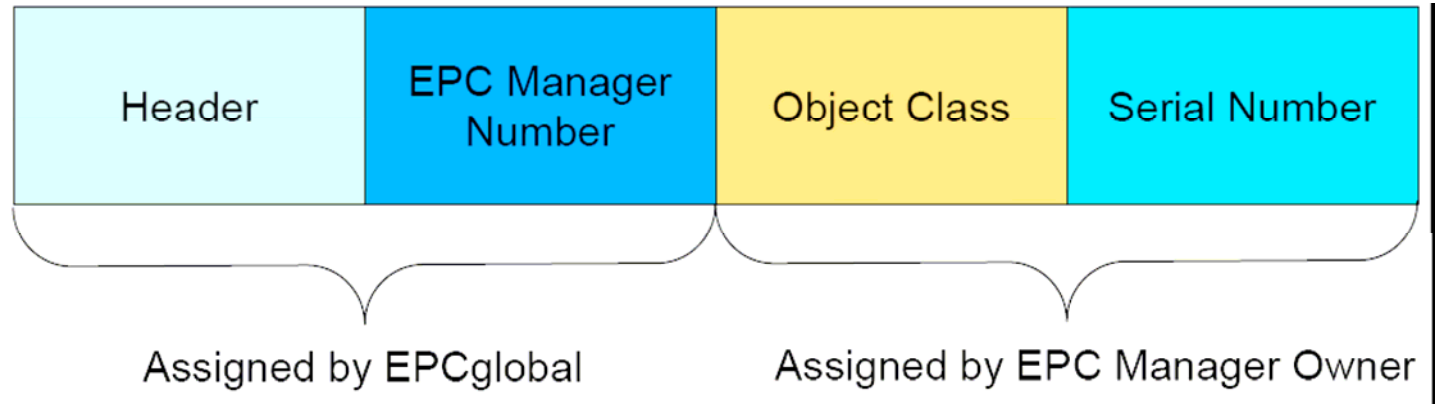
What is EPC™?

EPC – “Electronic Product Code™”

- EPC is a naming scheme for objects
- Unique identifier for every object
- Decouples identity from data
- EPC used as an addressing scheme for data locations (usage similar to IP addresses)



Basic Format



- Header
 - identifies the length, type, structure, version, and generation of the EPC
- EPC Manager Number
 - entity responsible for maintaining the subsequent partitions
- Object Class
 - identifies a class of objects
- Serial Number
 - identifies the instance



96-bit SGTIN Scheme

	Header	Filter Value	Partition	Company Prefix	Item Reference	Serial
96-bit GTIN	8 bits	3 bits	3 bits	20-40 bits	24-4 bits	38 bits
		8 (decimal capacity)	8 (decimal capacity)	999,999 - 999,999,99 9,999 (decimal capacity)	9,999,999- 9 (decimal capacity)	274,877,906 ,943 (decimal capacity)





Example

Start with a UPC

- 614141 is the UPC Company Prefix
- 00734 is the Item Reference
- 9 is the Check Digit

614141 00734 9



Example

Turn it into a Global Trade Item Number (GTIN)

- Add “0” indicator and “0” number system carrier to build out full 14 digit format

614141 00734 9

0 0614141 00734 9



Example

Encode into 96-bit EPC Tag

- Select header for SGTIN-96 (48)
- Filter Value (3 – shipping unit)
- Company Prefix (0614141)
- Item Reference Number (000734)
- Add the Serial Number (203886)

Decimal representation:

48 3 5 0614141 000734 203886



Partition	Value	Binary Number
Header	48	0011 0000
Filter Value	3	011
Partition	5	101
Company Prefix	0614141	000010010101111011111101
Item Reference	000734	00000000001011011110
Serial Number	203886	000000000000000000000000110001110001101110

Tag data in bits – encode/decode won't be by hand!

0011 0000 000 101 000010010101111011111101
 00000000001011011110
 000000000000000000000000110001110001101110



What is RFID?

RFID - “Radio Frequency Identification”

- It is a technology that has existed for decades
- At a simple level, it is a technology that involves tags that emit radio signals and devices called readers that pick up the signal
- RFID technology is a fundamental element of the EPCglobal Network



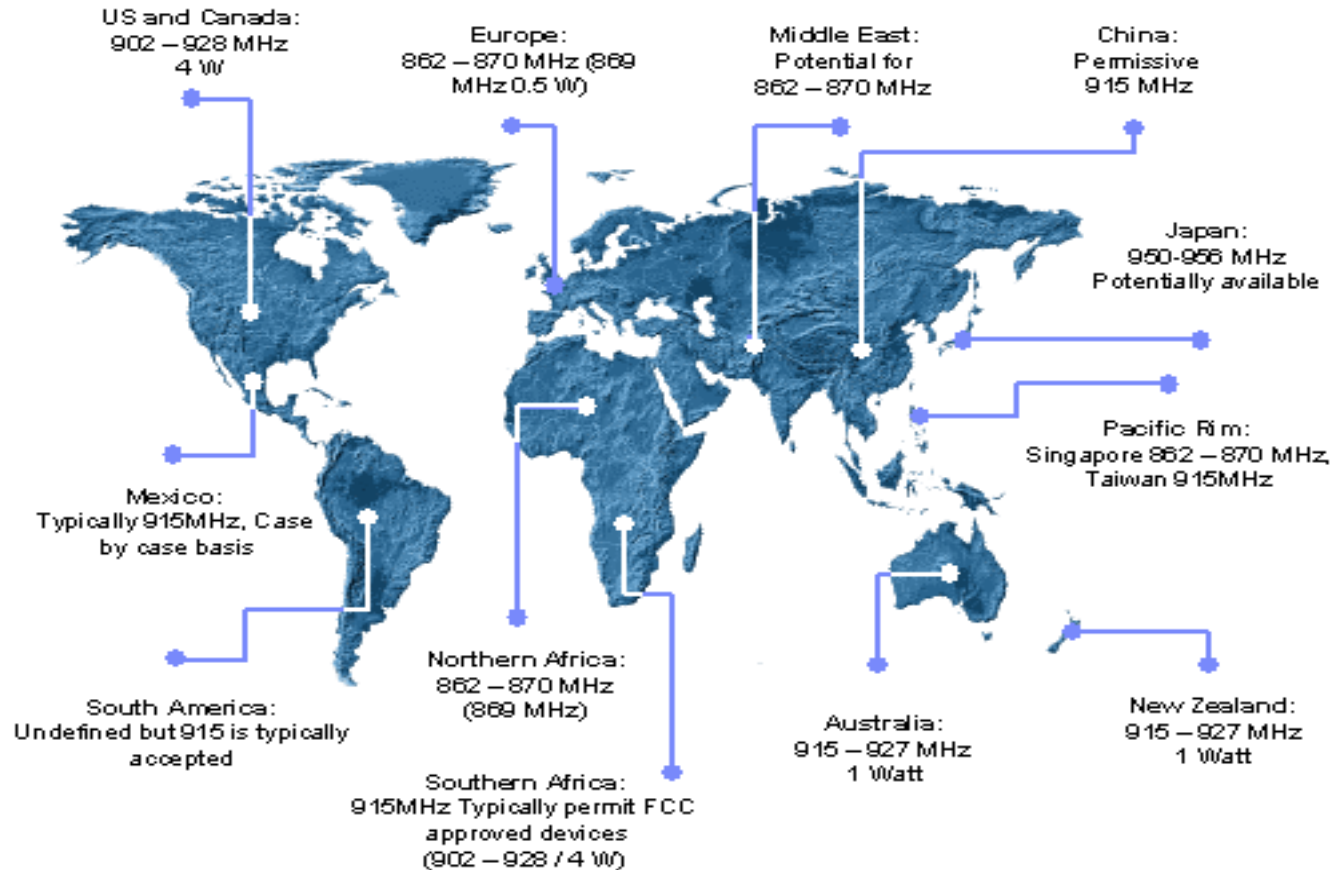
RFID vs. Bar Codes

Feature	Bar Code	RFID
Standards?	UPC	EPC
Uniquely Identifies Items?	No	Yes
Room for Growth?	No	Yes
Automated Operation?	Not Easy	Yes
Mode of Read?	Optical (Line of Sight Required)	Wireless (Not Line of Sight)
Read many object at a time?	No (reads sequentially)	Yes



Currently RFID Frequencies & Power Levels Differ Across the World

The Importance of Global Standards



A single standard, such as EPC Gen 2, will enable RFID to reach its full potential in our global economy





UHF Gen 2 – why the excitement?

- Gen 2 is the first unified protocol
 - From C0, C1, ISO 18000-6A, ISO 18000-6B to Gen 2/ISO 18000-6C
- Better use of RF spectrum
 - In many applications, the number of readers can exceed the number of channels
 - Gen 2 has modes optimized for better spectrum use
- More data capacity specified in the standard, higher data rate, better security





UHF Gen 2 – why the excitement?

- Variety of ways to create logical sub-sets from all the tags in the read field.
 - E.g write to a single tag without affecting the others
- Significantly reduces/eliminates ghost reads
- Better singulation: tag-data separated from locator-data
- Bottom-line: Significant read and write performance improvements





Key features to look for in Gen 2

- Support for all mandatory features
 - Is the reader truly Gen 2 compliant?
 - EPCglobal Gen 2 certified?
- Support for dense-reader mode
 - Especially in fixed readers used in distributions centers, airports etc.
- Maximum data rate
 - Especially when tags/sec is high. E.g. dock doors moving item-tagged pharma, conveyer applications etc.
 - Maximum data rate is not applicable in Dense Reader Mode





Concerns About Privacy

Challenge

Solution

2005

The California State Legislature and other states were working on bills to ban RFID.

- **GS1 worked with an industry coalition to derail the bill for this year.**
- **The coalition is developing an alternative bill to head off this problem next year.**
- **Symbol actively engaged the media and placed op-eds.**

2006

Privacy will be a front-burner issue in Congress, as the House and Senate plan privacy hearings and work on data broker legislation.

Separate RFID from identity theft in lawmakers minds.

- **GS1 is proactively educating key lawmakers on the benefits of RFID and the realities about privacy concerns.**
- **A workgroup with SAP, IBM, Oracle and others was created to lobby Congress and the international community.**

Myth:

RFID enables...

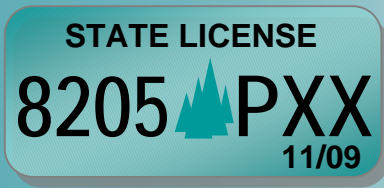
- Identity theft
- Tracking of personal movements everywhere

Reality:

Passive tags are nothing more than a talking barcode



Analogy:



Without access to the database the information is meaningless and once the item leaves the store or warehouse it will be come out of range

