ISO – RFID STANDARDS

For Item Management

Some of the content and Charts have been provided by “QED Systems”

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Vice President, RF Engineering

Supply Chain Solutions
Benefits of Standardization

- Increases customers’ confidence in new technologies
- Promotes world-wide RFID acceptance and technology advancement
- Broadens markets for manufacturers, encourages global competition, and reduces price for end users
- Facilitates applications development by encouraging interoperability and by reducing customization
- Provides development platform for complementary products (software, translators, hardware accessories)

Standards: Making the most of any new technology
146 countries participate in the ISO process, the real operating membership consists of 85 countries.

The countries select a domestic organization to be their representative to ISO: Some Examples

- SCC - CANADA
- ANSI - United States
- AFNOR - France
- BSI - Great Britain
- JISC – Japan

Each country gets only ONE vote.
Standards Council of Canada (SCC)

- SCC oversees the National Standards System in Canada and accredits organizations that develop standards. These include:
  - Canadian Standards Association (CSA)
  - Canadian General Standards Board (CGSB)
  - Underwriters’ Laboratories of Canada (ULC)
  - Bureau de normalisation du Quebec (BNQ)
SCC – Roles As a National Body

Responsible for coordination of Canadians to the two most prominent voluntary international standards development fora

– the International Organization for Standardization (ISO) and

the International Electrotechnical Commission (IEC)
The Canadian Advisory Committee (CAC)

- Each country’s national body assigns an organization to be the Technical Advisory Group for an ISO Subcommittee (SC)

- SCC has given CAC the administration responsibilities as Technical Advisory Group to the Canadian SC 31 delegation.

- CAC sends a delegation to the ISO SC meetings

- The Head of Delegation (HoD) votes for the CAC
CAC - Makeup

- Volunteers - Includes:
  - Standards Consultant specialists
  - Members of other domestic standards organizations
  - Members of Industry standards organizations
  - Technical experts from industry
### Stages to Develop an International Standard

<table>
<thead>
<tr>
<th>Project stages</th>
<th>New JTC 1 Procedures (1997)</th>
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<tr>
<td>① Proposal stage</td>
<td>Acceptance of the New work item proposal “NP”</td>
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<tr>
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<td>Voting period: 3 months</td>
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<td>② Preparatory stage</td>
<td>Preparation of the Working Draft “WD”</td>
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<td>③ Committee Draft stage</td>
<td>Production and acceptance of the Committee Draft “CD”</td>
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<td>Voting period: 3 to 6 months</td>
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<td>④ Enquiry stage</td>
<td>Acceptance of the Final Committee Draft “FCD”</td>
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<td>Voting period: 4 to 6 months</td>
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<td>⑤ Approval stage</td>
<td>Approval of the Final Draft International Standard “FDIS”</td>
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<td>Voting (Yes/No): 2 months</td>
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<tr>
<td>⑥ Publication stage</td>
<td>Publication of the International Standard “IS”</td>
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<td></td>
<td>ISO/IEC</td>
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JTC 1 Committees

JTC 1 / SC 2 Coded character sets
JTC 1 / SC 6 Telecommunications and information exchange between systems
JTC 1 / SC 7 Software engineering
JTC 1 / SC 11 Flexible magnetic media for digital data interchange
JTC 1 / SC 17 Identification cards and related devices
JTC 1 / SC 22 Programming languages, their environments and system software interfaces
JTC 1 / SC 23 Optical disk cartridges for information interchange
JTC 1 / SC 24 Computer graphics and image processing
JTC 1 / SC 25 Interconnection of information technology equipment
JTC 1 / SC 27 IT Security techniques
JTC 1 / SC 28 Office equipment
JTC 1 / SC 29 Coding of audio, picture, multimedia and hypermedia information
JTC 1 / SC 31 Automatic identification and data capture techniques
JTC 1 / SC 32 Data management and interchange
JTC 1 / SC 34 Document description and processing languages
JTC 1 / SC 35 User interfaces
JTC 1 / SC 36 Learning technology
Joint Technical Committee 1 (JTC 1)

- Sponsored by both ISO and IEC
- Charted to work on technical specification related to “INFORMATION TECHNOLOGY”
- 17 Current Sub-committees of which
  - SC31 is charted to work on automatic data capture technical specifications with respect to the:

  “Identification of Things”
SC 31: Current Standards Activities:

- ISO SC 31 is chartered to:
  - Write the ISO 1D and 2D symbology standards
  - Develop the international standards for both linear and 2D print quality
  - Write the ISO data structure standards
  - Develop conformance standards for scanners, printers, verifiers, and print quality
  - Develop RFID item identification technical standards
Excluded from SC31 Responsibility

- ISO TC 104/SC 4/WG 2 in the area of work on Automatic Electronic Identification for containers and container related applications.
- ISO TC 23/SC 19/WG 3 in the area of work on identification of animals.
- ISO TC 204 in the area of work on RFID for Transportation and Control Systems.
- ISO/IEC JTC 1/SC 17 in the area of work on Cards and Personal Identification.
- ISO TC 68/SC 6 in the area of work on Financial Transaction Cards, Related Media, and Operations.
- ISO TC 122/Ad Hoc Group in the area of work on Packaging Bar code Labels.
AIDC – Focused Standards

International Organization for Standardization (ISO)

Technical Committee (TC) 122 (Packaging)

WG 4 (Transport Labels)  
WG 7 (Package Labels)

International Electrotechnical Commission (IEC)

ISO/IEC Joint Technical Committee 1 (JTC 1) - IT

ISO/IEC JTC 1 Subcommittee 31

WG 1 Data Carrier  
WG 2 Data Structure  
WG 3 Conformance  
WG 4 RF Tags  
WG 5 RTLS

Technical Committee (TC) 104 (Freight Containers)

Secretariat  
Uniform Code Council (UCC)

U.S. TAG Administrator  
MHI

Shipping Labels  
Product Package Marking  
Dimensions & Layout  
Symbology Use (Linear & 2D)  
Print Quality Level  
Label Materials  
License Plate Recommendations  
Database / EDI Issues  
Supply Chain Applications of RFID

Convener  
S. Ackley (US)  
E. Boonet (BE)  
C. Swindin (UK)  
H. Barthel  
M. Harmon}

Convener

- Code 39  
- ITF  
- MaxiCode  
- Data Matrix  
- EAN/U.P.C.  
- Code 128  
- PDF417  
- QR Code  
- Symbology Identifiers

- DAI  
- Data Syntax  
- Unique ID

- Linear Print Quality  
- 2D Print Quality  
- Printing Specs  
- Test Specs BC Printers  
- Test Specs BC Readers  
- Test Specs BC Verifiers  
- RFID Performance  
- RFID Conformance

- Air Interface  
- Unique RF Tag ID  
- Defs. Logical Mem Map  
- Application Interface  
- Encoding Rules

- API  
- 2450 MHz  
- 433 MHz  
- GLS  
- Near Field

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SC31 – Working Groups Focus

ISO/IEC Joint Technical Committee 1 (JTC 1) - IT

ISO/IEC JTC 1 Subcommittee 31

Secretariat Uniform Code Council (UCC)

WG 1 Data Carrier
- Convener S. Ackley (US)
  - Code 39
  - ITF
  - MaxiCode
  - Data Matrix
  - EAN/U.P.C.
  - Code 128
  - PDF417
  - QR Code
  - Symbology Identifiers

WG 2 Data Structure
- Convener E. Boonet (BE)
  - DAI
  - Data Syntax
  - Unique ID

WG 3 Conformance
- Convener C. Swindin (UK)
  - Linear Print Quality
  - 2D Print Quality
  - Printing Specs
  - Test Specs BC Printers
  - Test Specs BC Readers
  - Test Specs BC Verifiers
  - RFID Performance
  - RFID Conformance

WG 4 RF Tags
- Convener H. Barthel
  - AIR Interface
  - Unique RF Tag ID
  - Defs. Logical Mem Map
  - Application Interface
  - Encoding Rules

WG 5 RTLS
- Convener M. Harmon
  - API
  - 2450 MHz
  - 433 MHz
  - GLS
  - Near Field
Working Group Focus

ISO

JTC 1

IEC

SC 31

WG 1
Data Carrier

WG 2
Data Structure

WG 3
Conformance

WG 4
RFID
Types of Standards

- **Technology** (Symbology, RFID, I.C. Card)
- **Data Content** (DIs, AlS, Syntax)
- **Conformance** (Print Quality, Test Specifications)
- **Application Standards** (Ship Label, Product Package)
ISO 19762 - Information Technology AIDC Techniques - Harmonized Vocabulary
Data Content Standards
ISO/IEC JTC 1/SC 31/WG 2 & WG 4/SG 1

- ISO 15424 - Data Carrier/Symbology Identifiers
- ISO 15418 - EAN.UCC Application Identifiers and FACT Data Identifiers and Maintenance
- ISO 15434 - Syntax for High Capacity ADC Media
- ISO 15459 - Unique ID for Transport Units; Part 1: Technical Standard; Part 2: Procedural Standard
- ISO 15961 - Host Interrogator-Tag Functional Commands & Other Syntax Features
- ISO 15962 - Transfer Syntax
- ISO 15963 - Unique ID of RF Tag
Data Structure

ISO 15434  Enveloping Structure

Message Header

Format Header

Formatted Data

Format Trailer

Format Header

Formatted Data

Format Trailer

Message Trailer
Technical Standards
Radio Frequency Identification (RFID)
ISO/IEC JTC 1/SC 31/WG 4

- ISO/IEC JTC 1/SC 31/WG 4/SG 3

- RFID for Item Management Air Interface (ISO 18000)
  - ISO 18000-1 - Generic Parameters - Air Interface
  - ISO 18000-2 - Parameters for Air Interface <135 kHz
  - ISO 18000-3 - Parameters for Air Interface at 13.56 MHz
  - ISO 18000-4 - Parameters for Air Interface at 2.45 GHz

- ISO 18000-6 - Parameters for Air Interface at 860-930 MHz*
- ISO 18000-7 - Parameters for Air Interface at 433.92 MHz**
Conformance Standards
Radio Frequency Identification (RFID)
ISO/IEC JTC 1/SC 31/WG 3/SG 1

- ISO 18046 - RFID Device Performance Test Methods
- ISO 18047 - RFID Device Conformance Test Methods
RFID for Item Management
Target Frequencies

- 125 kHz, 133 kHz
- 13.56 MHz
- 2.45 GHz
- 6.8 MHz
- 915 MHz
- 433 MHz
- 10 kHz, 100 kHz, 1 MHz, 10 MHz, 100 MHz, 1 GHz, 10 GHz
RFID Primer…Frequencies

- Low Freq. EAS
  - Data Modem
  - Radio Toys
  - AM
  - CB

- Mid. Freq. EAS
  - TV
  - Garage Door

- RFID: Access Control
  - Animal ID

- RFID & I.C. Cards

- RFID: Toll Roads & Item Management
  - Shipping Container
  - Postal: AMQM
  - Data Terminal

- RFID: Item Management
  - Microwave EAS
  - Cell Phone

- 2.45 GHz

- 300 GHz
RFID Standards - Summary

Technology Standards

- ISO/IEC 18000 - RFID for Item Management
  - Part 2 - 125 - 150 KHz
  - Part 3 - 13.56 MHz
  - Part 4 - 2450 MHz
  - Part 6 - 860 - 960 MHz
  - Part 7 - 433.92 MHz (active)

Data Standards

- ISO/IEC 15418 - Application Identifiers & Data Identifiers
- ISO/IEC 15434 - Syntax
- ISO/IEC 15459 - Transport License Plate
- ISO/IEC 24721 - Unique Identification
- ISO/IEC 15961 - Data Protocol: Application Interface
- ISO/IEC 15962 - Data Protocol: Data Encoding Rules and Logical Memory Functions

Conformance Standards

- ISO/IEC 18047 - RFID device conformance test methods (at)
  - Part 2 - 125 - 150 KHz
  - Part 3 - 13.56 MHz
  - Part 4 - 2450 MHz
  - Part 6 - 860 - 960 MHz
  - Part 7 - 433.92 MHz (active)
Thanks

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