Workshop:

RFID Standards (ISO, EPC)

Are We There Yet?

Moderator:

Lou Smyrlis, Editorial Director CT&L

Speakers:

Sam Aghigh, VP of Technology, R.Moroz Ltd - RFID Canada

Sam Aghigh

VP of Technology

R.Moroz Ltd - RFID Canada

2nd Canadian RFID CONFERENCE

Who will benefit?

- **Demand Side**
  - lower cost of implementation in terms of initial investment, cost of ownership and overall greater Return on Investment
  - More confidence in technology, scalability and migration
  - Not bound to a specific supplier or brand providing for more purchase power

- **Supply Side**
  - Increase in demand and faster growth
  - Better predict market direction and make decisions accordingly
  - Uniform platform for technological advancement

User point of view

- Mandatory Implementation
- Global Trade
- Application specific solutions
- Maximum utilization
- Non-Binding to a specific brand allowing for full utilization of the available technology

Types of Standards

- **Technology**
  - **Air Interface**
  - **Host Interface**
  - **Hardware requirements**
  - **Data syntax, structure and content**
- **Conformance**
  - **Test Procedures and compliance specifications**
- **Application Standards**
  - **Labeling, Product Package, Numbering Schemes, etc.**

Standards Organizations

- International (ITU, ISO, IEC)
- Regional, European Committee for Normalization and Standardization (CEN)
- National (ANSI)
- Industry (AIAG, UCC/EAN)

ISO Structure

- 146 member countries participating through their national bodies
- SCC is the national body representing Canada in ISO
- Canadian Advisory Committee (CAC) is the technical advisory group charge by SCC to represent Canadian position in ISO subcommittees
- CAC members are volunteers from consulting groups, technical experts, members of industry standard and domestic standard organizations

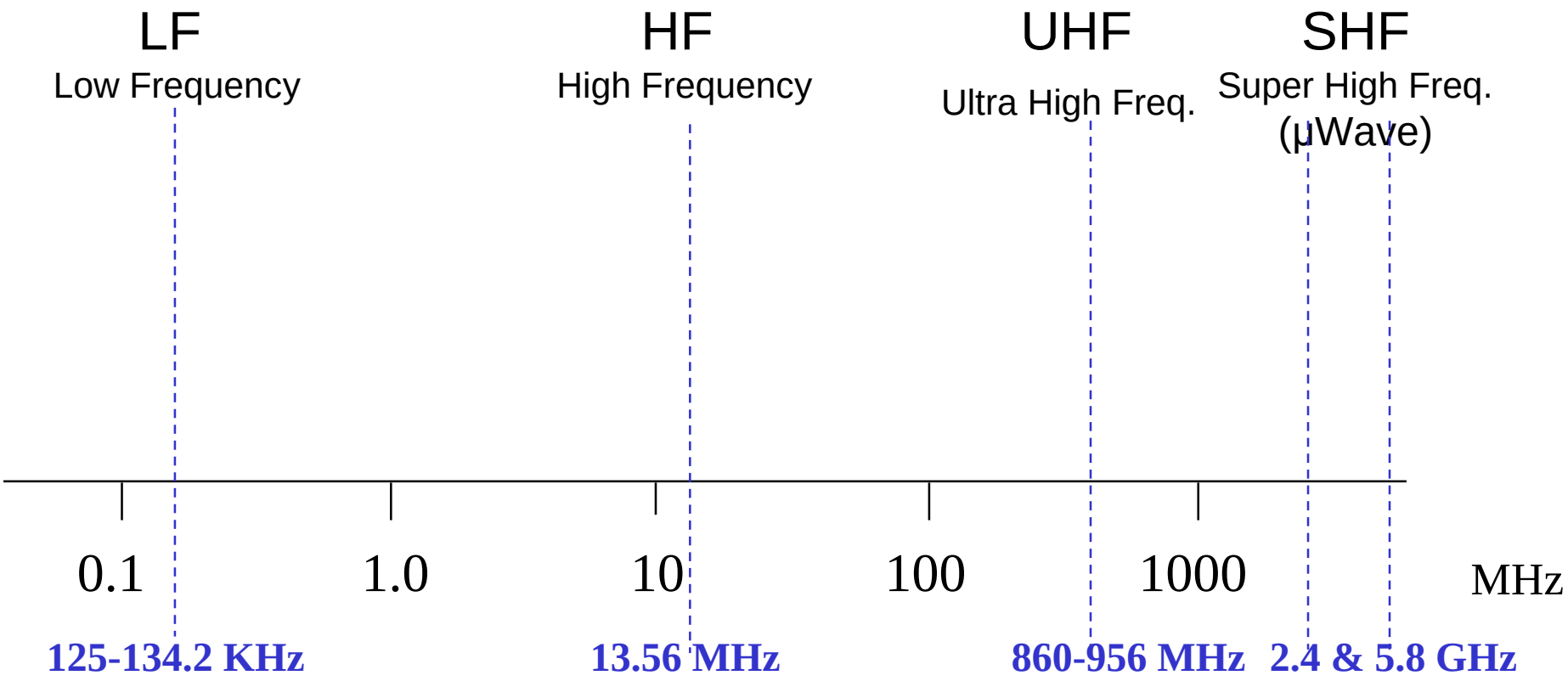
ISO Standardization Process

Project stages	New JTC 1 Procedures (1997)
À Proposal stage	Acceptance of the New work item proposal **"NP"**
	Voting period: 3 months
Á Prepatory stage	Preparation of the Working Draft **"WD"**
Â Committee Draft stage	Production and acceptance of the Committee Draft **"CD"**
	Voting period: 3 to 6 months
Ã Enquiry stage	Acceptance of the Final Committee Draft "**FCD"**
	Voting period: 4 to 6 months
Ä Approval stage	Approval of the Final Draft International Standard **"FDIS"**
	Voting (Yes/No): 2 months
Å Publication stage	Publication of the International Standard **"IS"** ISO/IEC

ISO RFID Groups

- **ISO/IEC JTC1/SC31/WG4**
  Automatic Identification and Data Capture Techniques, RFID for item management
- **ISO/IEC JTC1/SC17/WG8**
  Card and personal identification
- **ISO TC 104/SC4/WG2**
  Electronic Identification for containers and container related applications.
- **ISO TC 23/SC19/WG3**
  Animal identification
- **ISO TC204**
  Transportation and Control Systems

RFID Frequency Ranges



ISO 18000
RFID Standards - Air Interface

- 18000-1: Generic parameters for the air interface for globally accepted frequencies
- 18000-2: Parameters for air interface below 135 kHz
- 18000-3: Parameters for air interface at 13.56MHz
- 18000-4: Parameters for air interface at 2.45GHz
- 18000-6: Parameters for air interface at 860 to 960 MHz
- 18000-7: Parameters for air interface at 433 MHz

18000-2
Parameters for air interface below 135 kHz

- Two types of tags: Type A (FDX) and Type B (HDX)
- These two types differ only by their physical layer. Both types support the same anti-collision and protocol
- Interrogator supports both types A and B
- Anti collision feature is optional

ISO/IEC 18000-3
Air interface at 13.56 MHz

- Specifications for physical layer, anti collision and communication protocol at 13.56 MHz
- 2 non-interfering, non-interoperable modes of operation, addressing different applications
- Mode 1 is compatible with ISO 15693 while mode 2 allows for higher speed and memory

18000-6 Parameters for air interface at 860 to 960 MHz

- Allows for use of different frequencies in different regions
- Random and non-discriminatory IP policy
- Versions A and B to accommodate for a wide range of applications
- Version C?

Data Content Standards

- **ISO 15961 - Host Interrogator-Tag Functional Commands & Other Syntax Features**
- **ISO 15962 - Transfer Syntax**
- **ISO 15963 - Unique ID of RF Tag**
- **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**

EPC Global

Components of EPC Network

- Electronic Product Code (EPC)
- ID System (EPC tags, readers and interface protocols)
- EPC Middleware
- Discovery Services
- EPC Information Services (EPCIS)
- EPCglobal Network Reference Architecture

EPC Global Structure

- **IP Policy**

  Create and share intellectual property

- **Hardware Action Group**

  Define the interfaces between hardware components

- **Software Action Group**

  Definition of software interface

- **Business Action Group**

  Identify End-User business requirements. Fast Moving Consumer Good (FMCG) and Healthcare and Life Sciences are active business action groups

Hardware Action Group (HAG)

- **UHF Generation 2 Protocol Maintenance**
  Manage enhancement requests and create business case
- **Testing and certification**
  Set certification test procedures
- **Item level tagging**
  Gathering information for future item level tagging
- **EPC Class 2**
  Assess the need for additional tag features in the UHF protocol

Software Action Group (SAG)

- **EPC Information Services (EPCIS)**
  Create technical specifications that will facilitate the development of interoperable EPCIS systems
- **Filtering and Collection**
  Specification for a software application programming interface (API), associated data specifications, and reporting mechanisms
- **ONS**
  Object Name Service
- **Reader Protocol**
  Protocol specification for exchanging data and commands between hosts and readers, supporting functions such as reading tags, writing to tags, and killing tags
- **Reader Management**
  Define a set of standard functions that enable configuration, provisioning, monitoring, and alarm notification of individual RFID readers
- **Security**
  Security framework to ensure different levels of consumer information privacy, data authentication, integrity for both wireless and wired data transmissions, and mutual business confidence for collaborative business trading networks
- **Tag Data Translation**
  Develop the necessary specifications to express the current Tag Data Standards encoding and decoding rules

Fast Moving Consumer Good (FMCG)

- To identify end user business requirements through its work groups by providing a forum for interaction between users and solution providers, information sharing and recognition of global challenges. It represents the user community and has the following work groups:
  - Asian Adoption Program
  - European Adoption Program
  - Data Exchange
  - Pilot and Implementation
  - Reusable Transport Items
  - Pilot and Implementation
  - Strategic Planning
  - Tag data standards
  - Tag and label standards
  - Applied Tag performance (joint FMCG and HLS)

Healthcare and Life Sciences Action Group (HLS BAG)

- **HLS working groups**
  - Information
  - Policy
  - Process
  - Research and Development
  - Strategic Planning
  - Technology

EPC Tag Standards

- EPC Tag Data Specifications
- 900 MHz Class 0 Tag Specifications
- UHF class 1
- HF Class 1

EPC Tag Data Specifications

- Specific coding schemes include:
  - General Identifier (GID),
  - Global Trade Item Number (GTIN)
  - Serial Shipping Container Code (SSCC)
  - Global Location Number (GLN)
  - Global Returnable Asset Identifier (GRAI)
  - Global Individual Asset Identifier (GIAI)

EPC Tag Data Standards

- Uniform Resource Identifier (URI)
- Four categories of URI
  - URIs for pure identities containing the unique information that identifies a specific physical object, independent of tag encoding
  - URIs that represent specific tag encoding used in software applications
  - URIs that represent patterns, or sets of EPCs, used when instructing software how to filter tag data
  - URIs that represent raw tag information, generally used only for error reporting

Guidelines on EPC for Consumer Products

EPC Global has established the following guidelines to address consumer privacy concerns:

- Consumer Notice
- Consumer Choice
- Consumer Education
- Use, Retention and Security of information

ISO/IEC SC 17 Standards
Card and personal Identification

- **Proximity Systems:**
  - lSO 14443A & 14443B
  - Cryptographic authentication

- **Vicinity Systems:**
  - ISO15693
  - General purpose applications

HF RFID Standards
ISO / IEC 15693 &14443 Standards

- **PART 1: Physical Characteristics**
  Size, exposure to elements, physical stress
- **PART 2: Radio frequency power and signal Interface**
  Optimal settings for power and frequency,limited by regulatory bodies
- **PART 3: Initialization and anti collision**
  -Efficient Reader - Tag communication
  -Bulk Reading
- **PART 4:Transmission protocol**
  Reader - Host communication

Agricultural Electronics
RF identification of animals
ISO TC23 / SC19

- RFID for animal tractability ensuring the safety of food supply
- ISO 11784: Code structure
- ISO 11785: Technical concept
- ISO 14223: Advanced transponders, air interface

Safety Standard

- IEEE std. C95.1 : Safety standard for human exposure to RF Signal, 3 kHz to 300 GHz
- Limitation on electromagnetic field strength
- SAR: Specific Absorption Rate


BARCODING RFID AND BEYOND
R MOROZ LTD

Thank You


2nd Canadian
RFID
CONFERENCE


2nd Canadian RFID Conference
SHARING THE FACTS; DISPELLING THE MYTHS.
RFID
RADIO FREQUENCY IDENTIFICATION
"Tracking the Evolution of RFID Technology and its Applications"
Two Day Conference ◆ April 19-20, 2005
◆ Le Parc, Markham Ontario

Questions?