ISO Supply Chain RFID Standards

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TC IST 34
Automatic ID Techniques
ISO RFID Standards

Objectives for this session -

- Scope of the ISO RFID standards
- How will RFID really be deployed in supply chains?
- The Big Picture - ISO in context with ETSI and EPC Global
- Bring perception into line with reality
ISO RFID Standards

Richard Rees

- President of Scanology - #1 EPCGlobal member in NL
- Chair of BSI IST/34 Automatic ID Techniques
- UK HoD to ISO IEC JTC1 SC31
- Smart Active Labels Standards program advisor
- Past member of EAN UK Supervisory Board
- Early advocate of passive UHF RFID

- 30 years as maker and user of auto ID standards
ISO RFID Standards

“There are too many ISO RFID standards!”

- Animals
- Road Transport Telematics
- Application and conformance standards
- Financial/transport cards – people related – SC17
- Item Identification

- Only one ISO item RFID tag standard – ISO 18000
ISO RFID Standards

ISO 18000 air interface frequencies

- <135 KHz
- 13.56 MHz
- 2.45 GHz
- 860-960 MHz
- 433 MHz (active)

Why so many?
– Laws of Physics = different functionality
ISO RFID Standards

ISO 18000-2 >135 KHz.

- Inductive
- Unaffected by presence of water
- Short range, few cms
- Fairly costly because of coil in transponder
- It works and you can buy it
- Underestimated
ISO RFID Standards

ISO 18000-3 13.56 MHz

- Inductive
- Lower cost (~35 cents)
- Thin flexible form factor (smart label)
- Read / write capable
- Unaffected by water (but has to be tuned to item)
- Mid range, 70 – 125 cms
- Two flavours: Mode 1 (“15693”26 kb/s) and Mode 2 (PJM 848 kb/s)
ISO RFID Standards

ISO 18000-4 2.45 GHz

- Propagating
- Long range in active version (100 m+)
- Affected by water
- Read / write capable
- Moderate cost
- Passive tag currently out of fashion
- Small antenna
- Bluetooth, etc.
ISO RFID Standards

ISO 18000-6 A/B  860 - 960 MHz

- Propagating
- Long range  2-5 meters ..... but
- Low cost ( but not 5 cents!!!!!! ) – but net benefit is issue
- High data rates
- “Frequency agile”
- Read / write capable
- Relatively large antenna
- The future for mass application RFID
ISO RFID Standards

ISO 18000-7 433 MHz

- Active
- Long range - many meters
- High cost
- High data rates
- Read / write capable
- Manifest tags - DoD
ISO RFID Standards

ISO Data Content Structures

- ISO 15963 - Unique Tag Id
- ISO 15961/62 – Data protocols and encoding
- Multiple data objects – EPC – RTI problem
- Complex data - sensors

- Data is the payload - timeless in nature
ISO RFID Standards

ISO RFID Performance/Conformance

- ISO/IEC 18046 - RFID tag and interrogator performance test methods
- ISO/IEC 18047 - RFID device conformance test methods

- These procedures will be used by EPCGlobal
ISO RFID Standards

Supply Chain Applications of RFID

- ISO 17358 - Application Requirements, including Hierarchical Data Mapping
- ISO 17363 - Freight Containers
- ISO 17364 - Returnable Transport Items
- ISO 17365 - Transport Units
- ISO 17366 - Product Packaging
- ISO 17367 - Product Tagging (DoD)
- ISO 10374.2 - RFID Freight Container Identification
ISO RFID Standards

Too many ISO RFID standards?

*From user perspective,*

*there is only one ISO RFID tag standard for items*

– ISO 18000

And it does exist!
ISO RFID Standards

ISO and EPC – what is the relationship?

- ISO building blocks – Air Interface – Data Structure
- EPC a data content/access system – passive UHF carrier
- EPC started by MIT Auto ID Center – re-run of barcode
- Class 0 (RO) and Class 1 (WORM) developed under FCC rules
- EAN/UCC developed GTAG – adopted ISO 18000-6 (full function)
- EPCGlobal formed by EAN/UCC – HAG, SAG, BAG
- HAG developing UHF G2 – will lead to 18000-6 G2 (licence plate vs. full function)
- EPC data fits into ISO data carriers - complementary
- DoD and WTO demand ISO – 8000 lb Gorillas
- ISO RAND – EPC IP free (but user licence!)
RFID – Hype, Misunderstanding and Reality

- Reliability, Reliability, Reliability!
- Range – it’s not a linear measure!
ISO RFID Standards

UHF RFID – the reliability issue
RFID – Hype, Misunderstanding and Reality

- Reliability, Reliability, Reliability!
- Range – it’s not a linear measure! It’s a probability function
- Long range creates problems as well as solutions
- Speed – 500 tags/sec! It’s about reliability not speed
ISO RFID Standards
# ISO RFID Standards

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ISO RFID Standards

[Image of a data sheet with parsed tag data]

RFID and Telecommunication Services
25th May 2004
ISO RFID Standards

No of tag reads

Read zone x2

P@ walking speed
E @ walking speed
E @ running speed
RFID – Reality

- In general you cannot read cases on a pallet using UHF! (you have to read the cases on to the pallet)
- Will we need to read 500 tags in a short period?
- Will we operate at lower ranges – and with less power?
- Renewed interest in inductive (DHL) – and now dual frequency
ISO RFID Standards
ISO RFID Standards

RFID – The user responsibility at UHF

- ETSI has been imaginative in developing LBT as a pragmatic equivalent to duty cycle
- Spectrum remains precious - must be used wisely for your own and the common good
- Only 10 sub bands – likely to be many more readers than that in same radio ‘space’ (and not just in your patch). Real risk of system degradation and data loss if these sub-bands are not used responsibly.
ISO RFID Standards

RFID – Golden rules for UHF

- UHF reader default is standby – use a motion sensor for ON
- Operate at lowest power possible – dock door problem
- Avoid aiming energy towards open-air
- Minimise reader-on time by fast systems, limited data.
ISO RFID Standards

RFID for Item Identification – some predictions

- At UHF, power levels used will reduce
  - better chips, better tag/antenna/product matching
  - General pressure about RF power levels
- Frequency diversity. No one size fits all solution available.
- Hardware standards will evolve – VHS v Betamax v DVD
  Standards are what people use.
- Data standards will be licence plate +
ISO RFID Standards

“Think function not technology – select your RFID technique on basis of fitness for purpose.”

Thank you
ISO Supply Chain RFID Standards

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