ISO Supply Chain RFID Standards

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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 c 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!)*

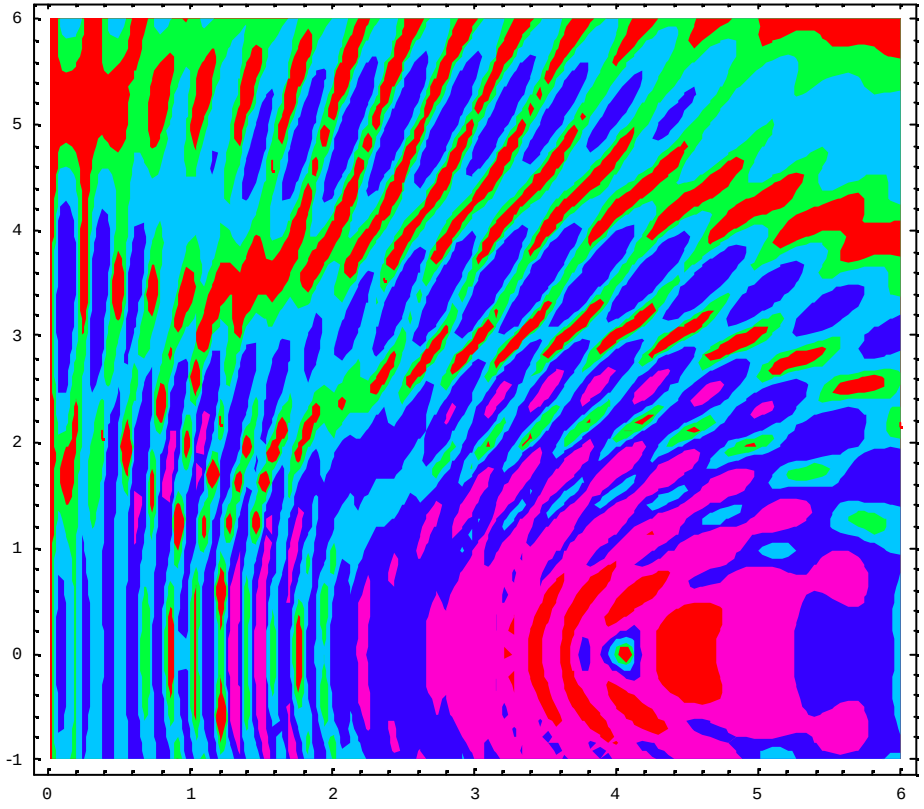
ISO RFID Standards

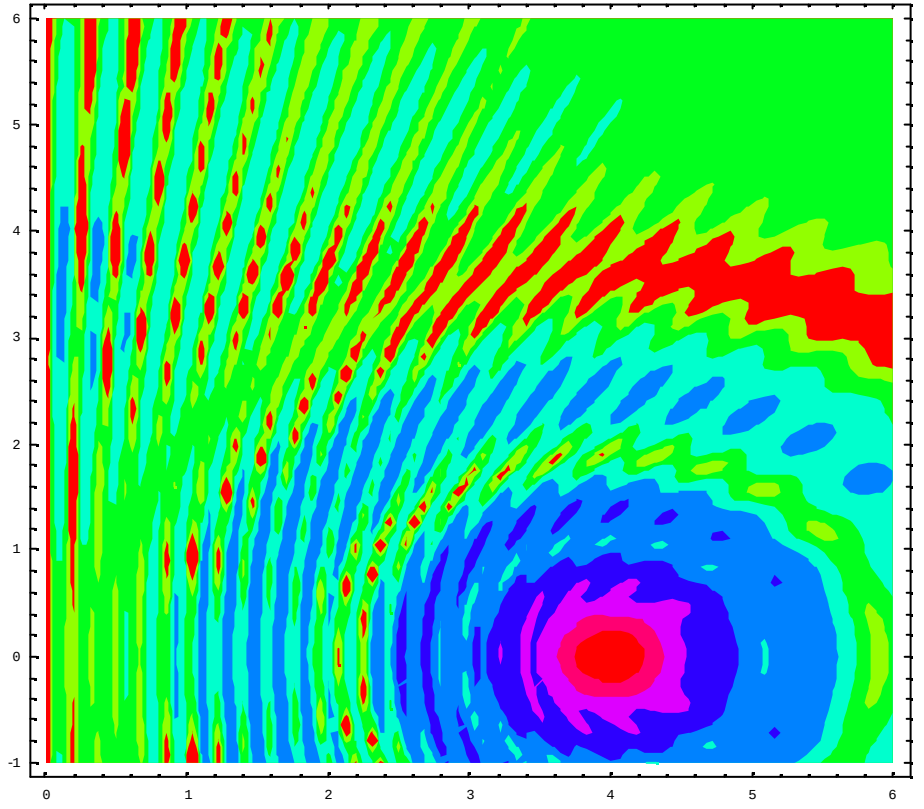
RFID – Hype, Misunderstanding and Reality

- ***Reliability, Reliability, Reliability!***
- ***Range – it's not a linear measure!***

ISO RFID Standards

UHF RFID – the reliability issue





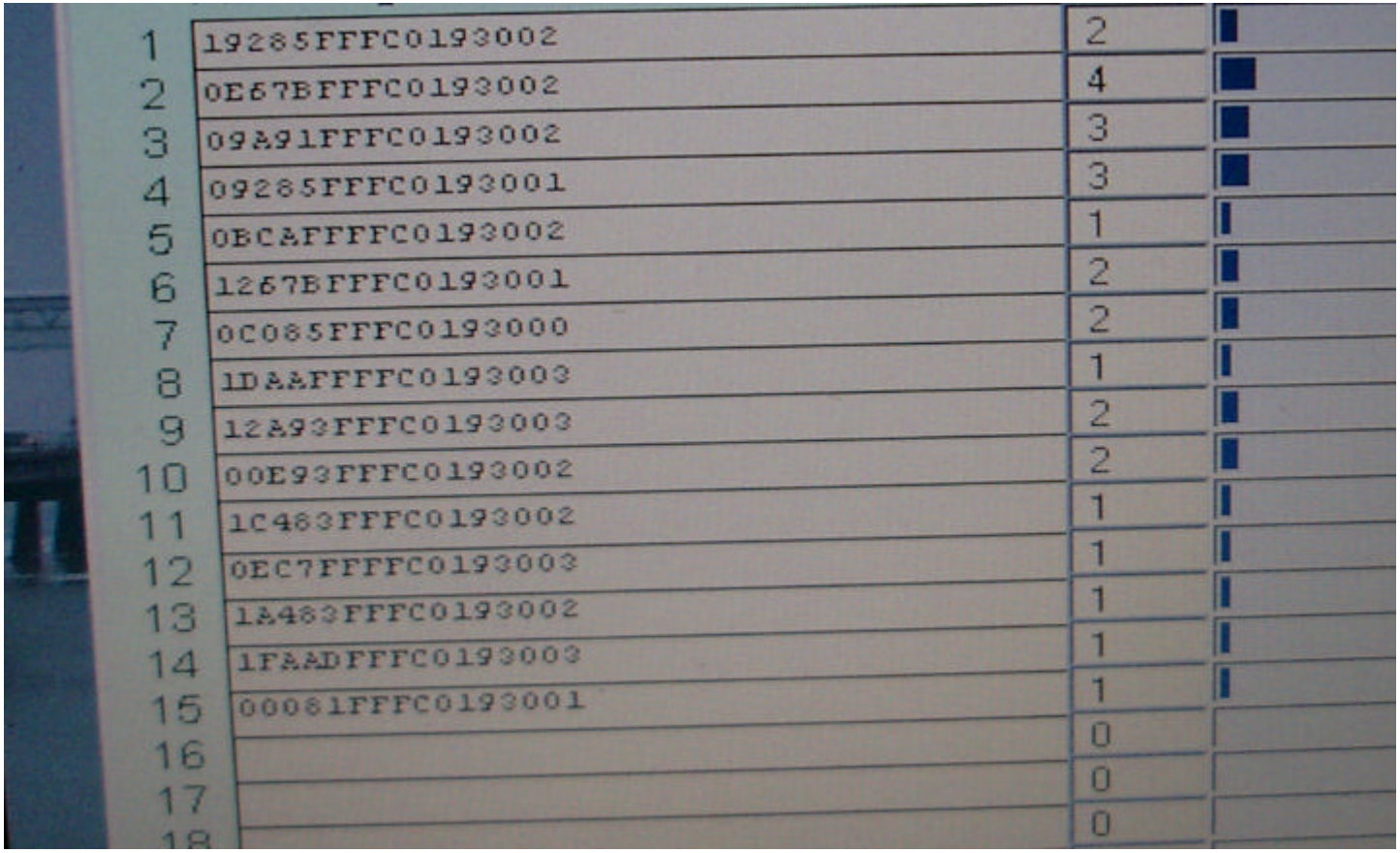
ISO RFID Standards

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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2	0E67BFFFC0193002	4
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4	09285FFFC0193001	3
5	0BCAFFFFC0193002	1
6	1267BFFFC0193001	2
7	0C085FFFC0193000	2
8	1DAAFFFFC0193003	1
9	12A93FFFC0193003	2
10	00E93FFFC0193002	2
11	1C463FFFC0193002	1
12	0EC7FFFFC0193003	1
13	1A463FFFC0193002	1
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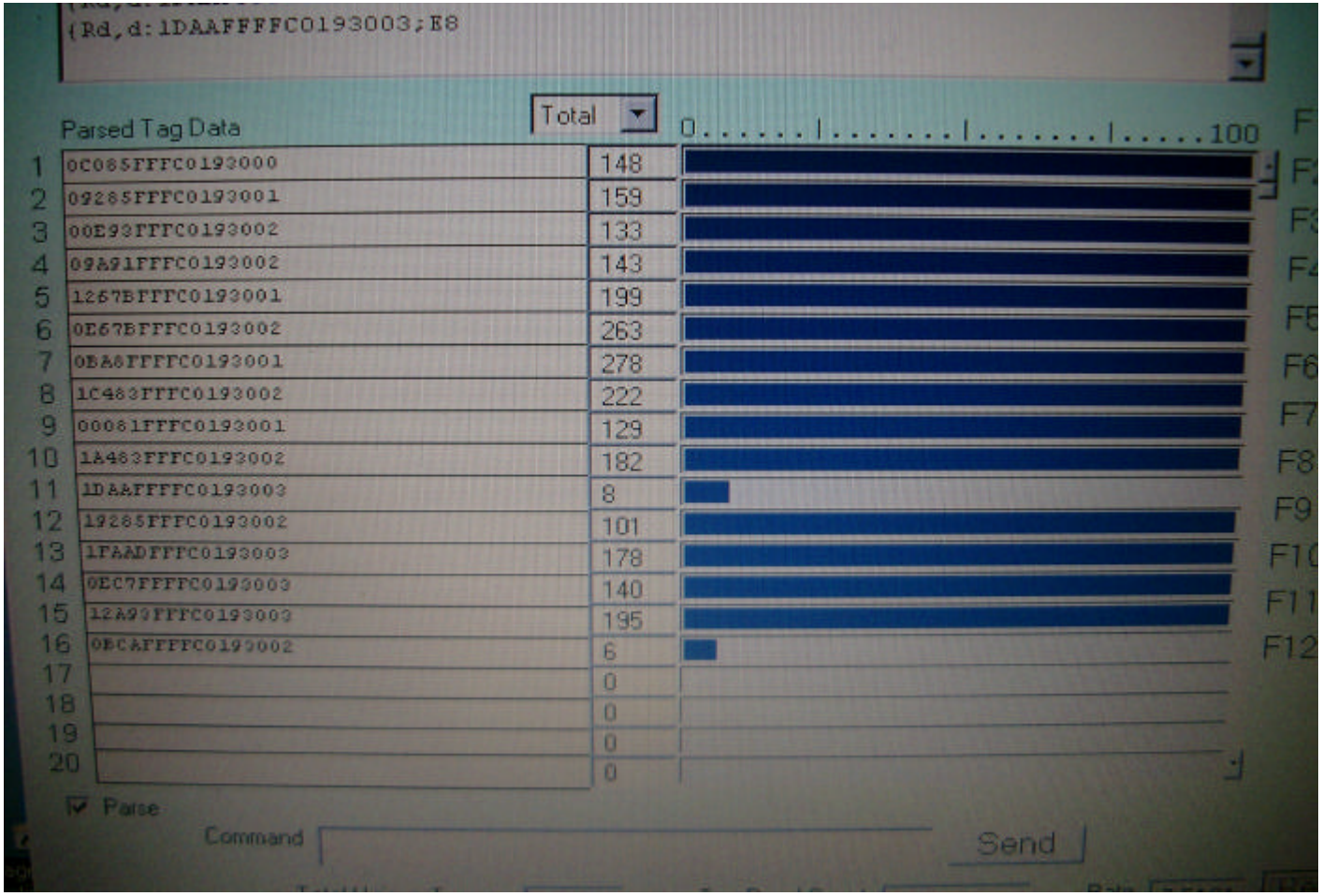
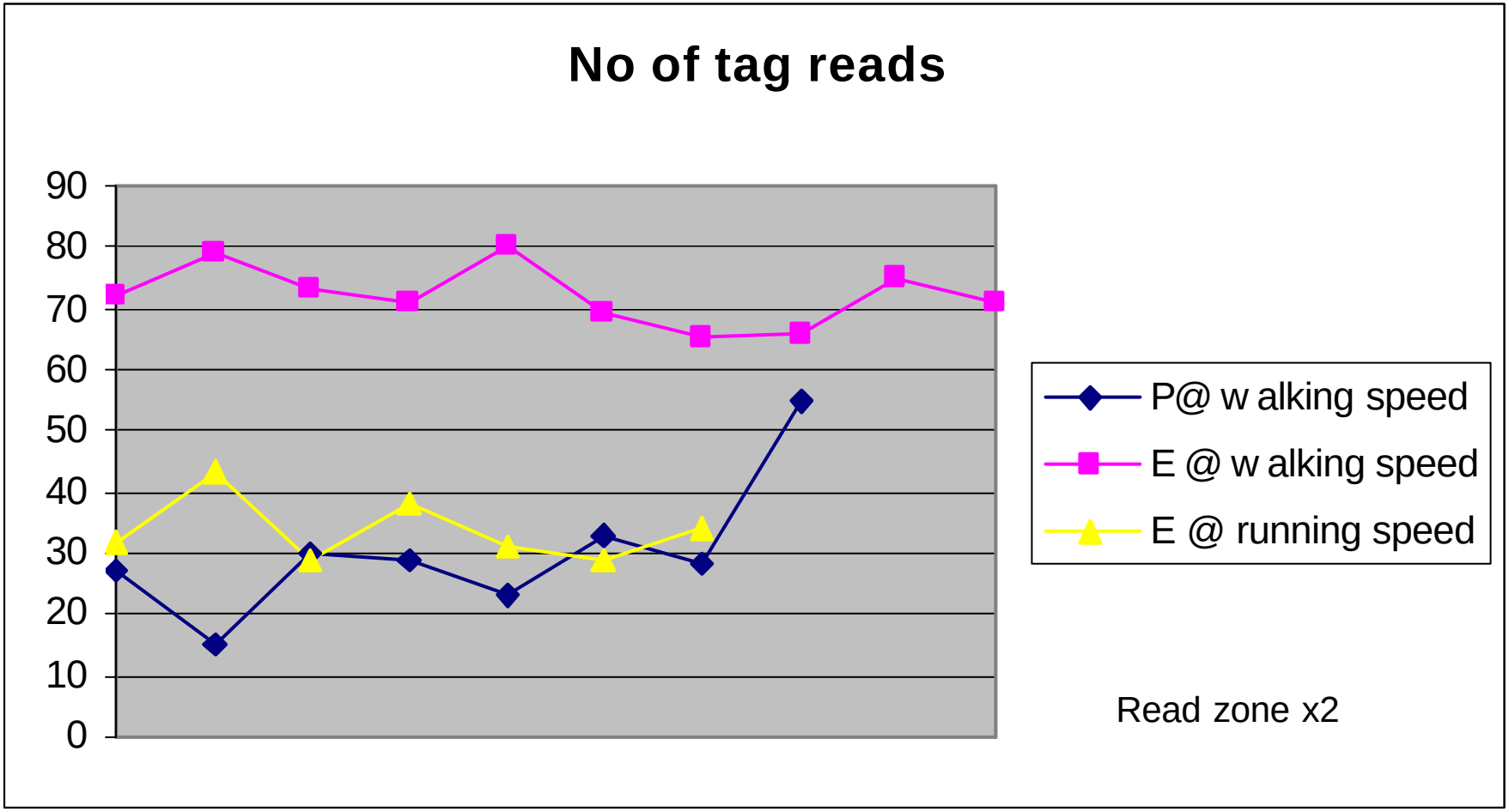
17		0
18		0

ISO RFID Standards



ISO RFID Standards



ISO RFID Standards

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

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