NY Teknik - RFID

Verktyg & Teknik för lönsam Logistik

Göteborg 30 november 2004

Gillis Levander

Auto ID Konsult AB

070 – 343 60 70

RFID

- Myt eller verklighet
- Vad bygger förväntningarna på
- Vad är realistiskt
- Vilka standarder finns
- Hur påverkas dessa
- Hänger vi med

RFID

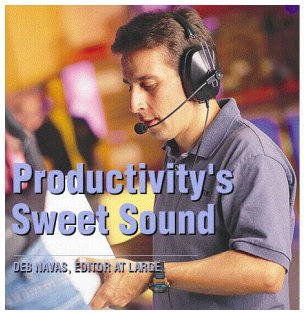
- Ingen ny teknik
- Är som en moppe
- Begränsas av nationella och internationella regler
- Lokalt i kvarteret (slutna system)
- Standardisering som på sikt ger möjlighet att köra utomlands (öppna system)

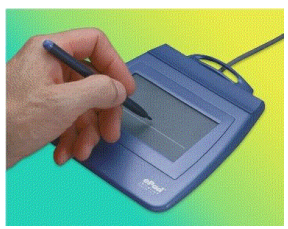
AUTO ID TEKNOLOGIER

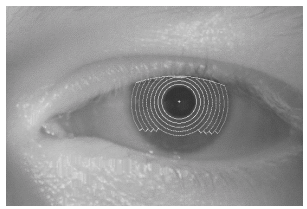
- **Streckkoder**
- **Radiofrekventa System - RFID**
- **Magnetkod**
- **OCR / ICR / OMR - Klartextläsning**
- **Vision - Bildanalys**
- **Radio kommunikation - RFDC**
- **Biometriska metoder**

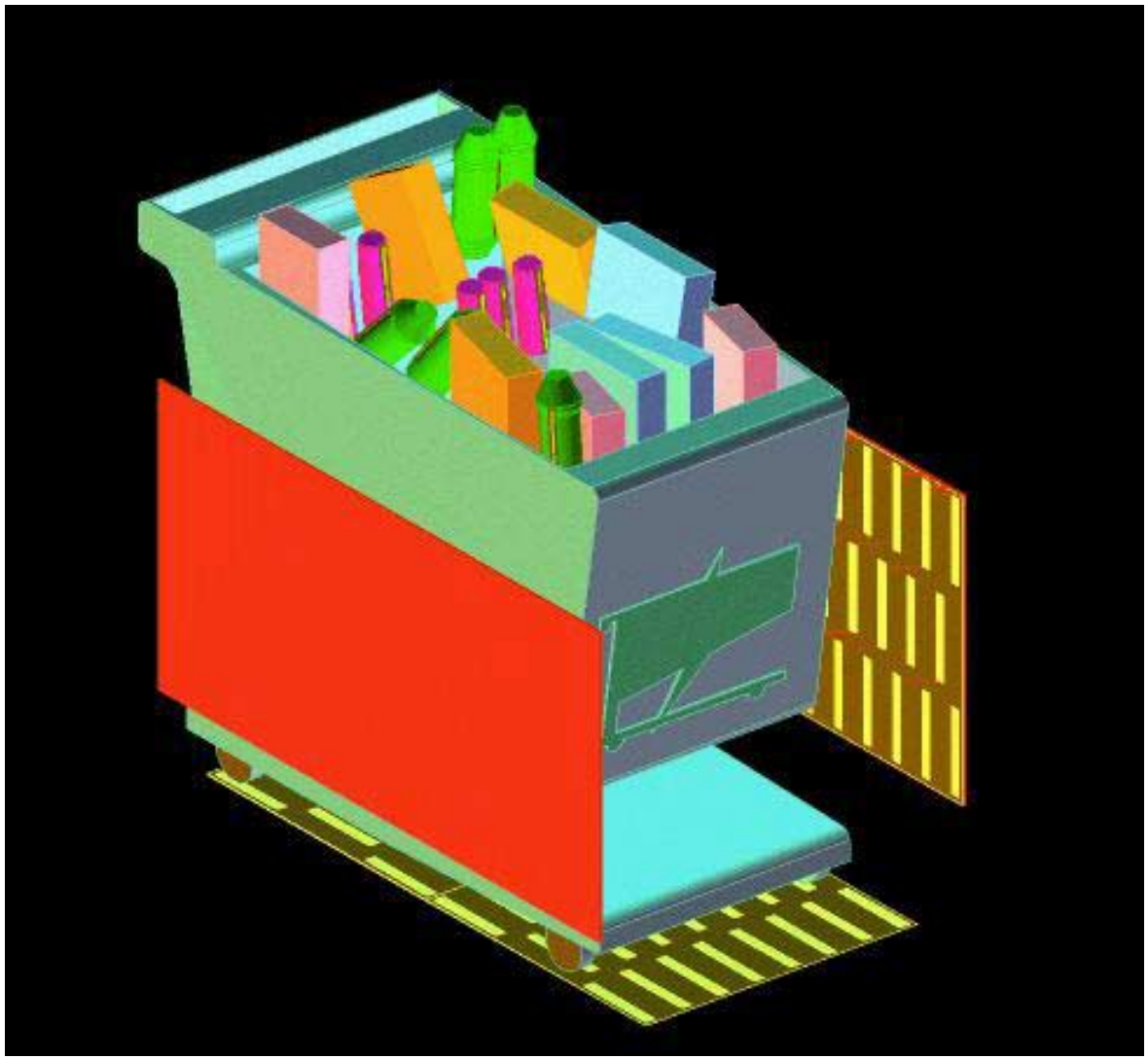
Biometriska metoder - Unika egenskaper hos varje människa

- Röstinmatning
- Ögonscanning
- Fingeravtryck
- Handgeometri
- Signatur





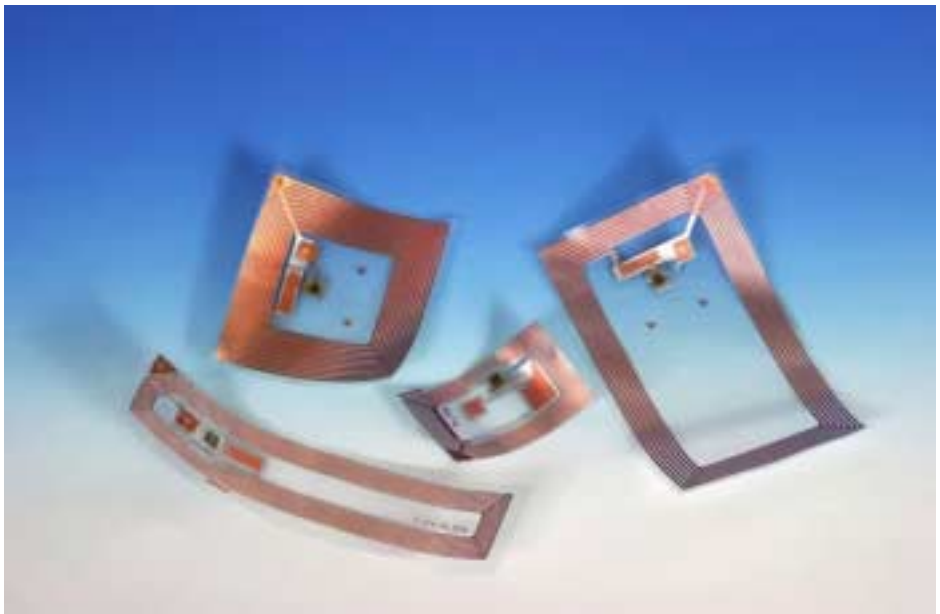




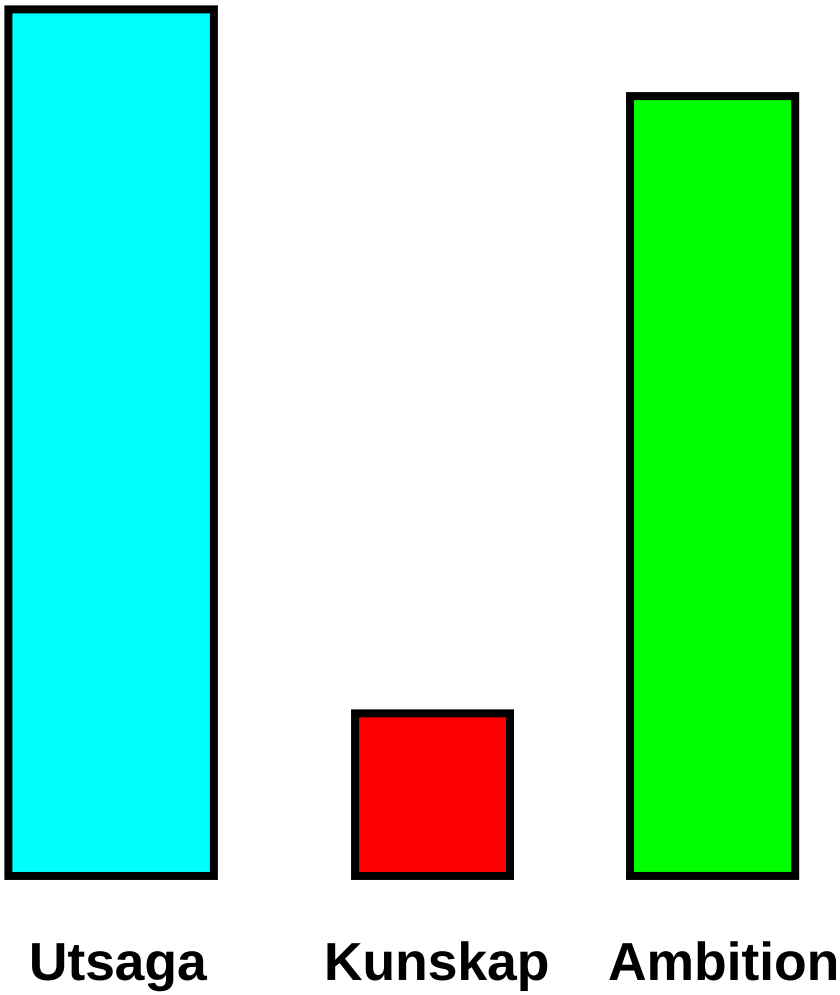
WARNING

8
PKG. 7
CHEVROLET
96196-5
CREATIVE SERVICES
CHEVROLET
PKG. 7
96196-5
BOX-18

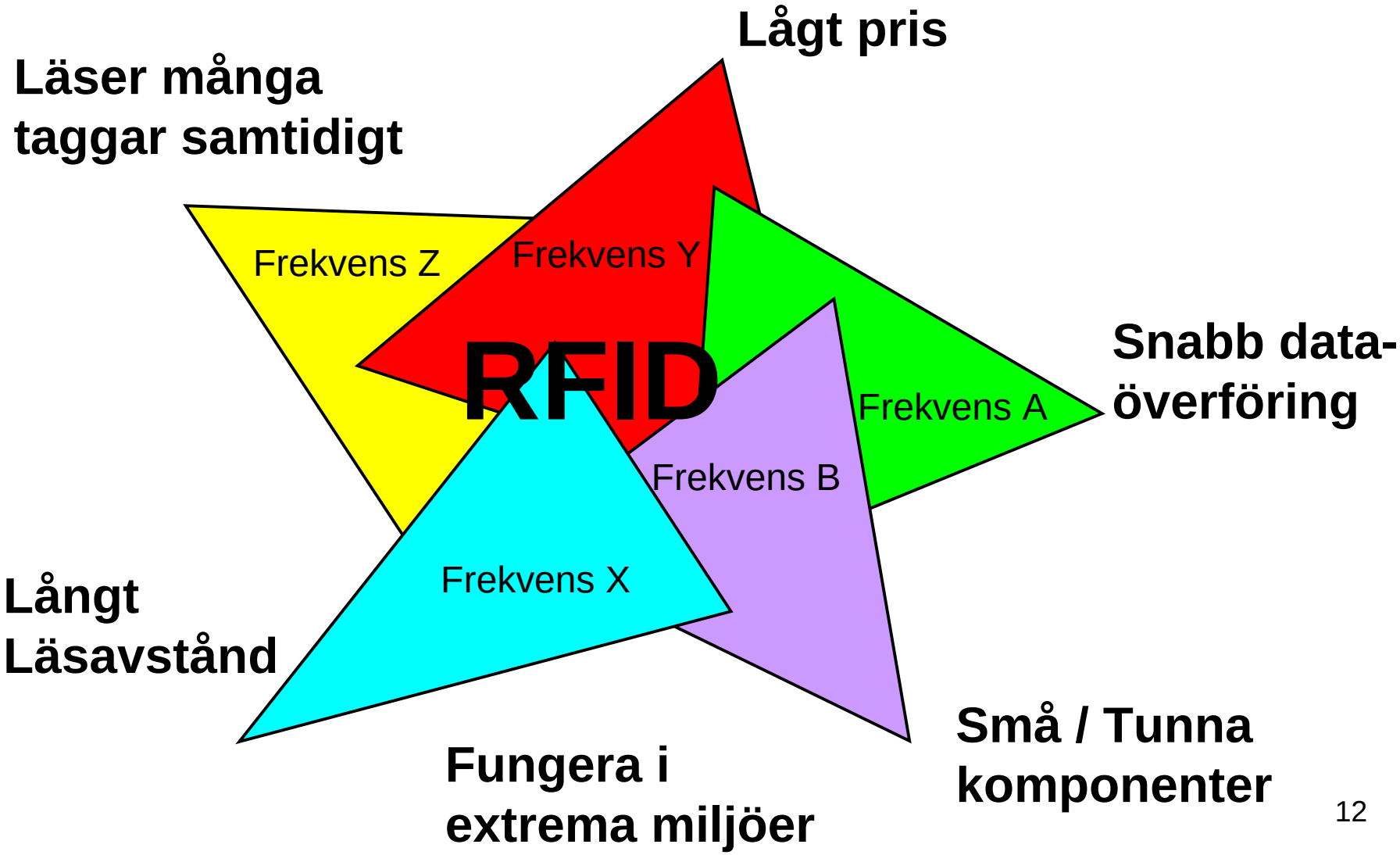
RH
FREIGHT
SERVICES
LIMITED
BOSS
BOSS



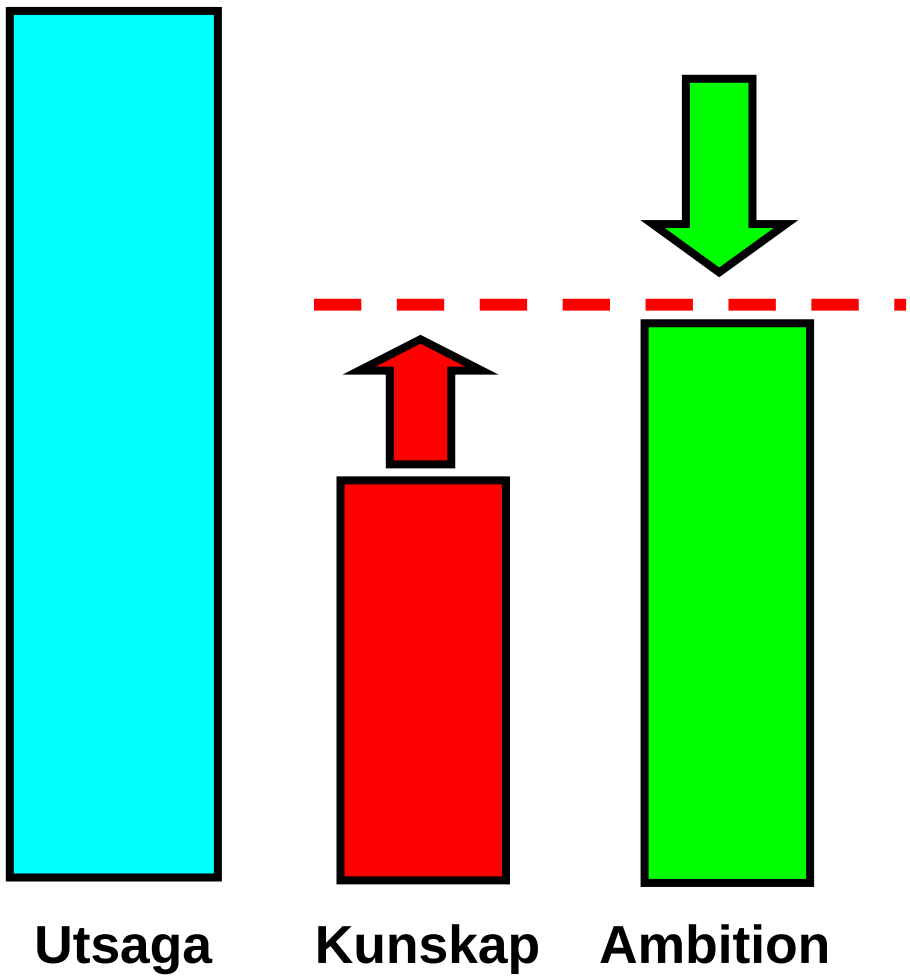
Realistiska förväntningar på **RFID**



Sammantaget är RFID fantastiskt



Realistiska förväntningar på **RFID**

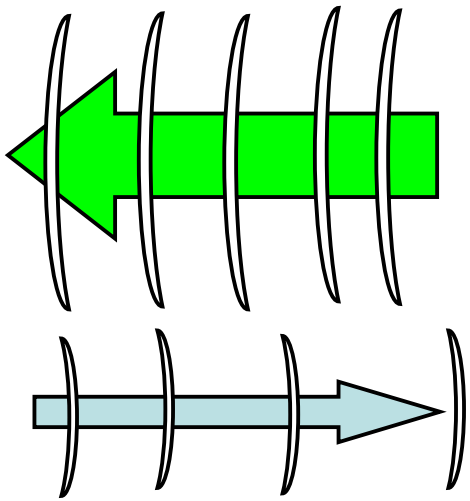


Radiofrekventa System - RFID

SÄNDARE

Tag

RFID-bricka

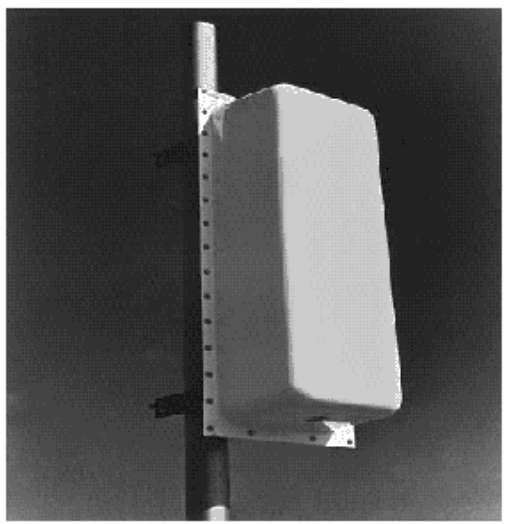


MOTTAGARE

AVKODARE

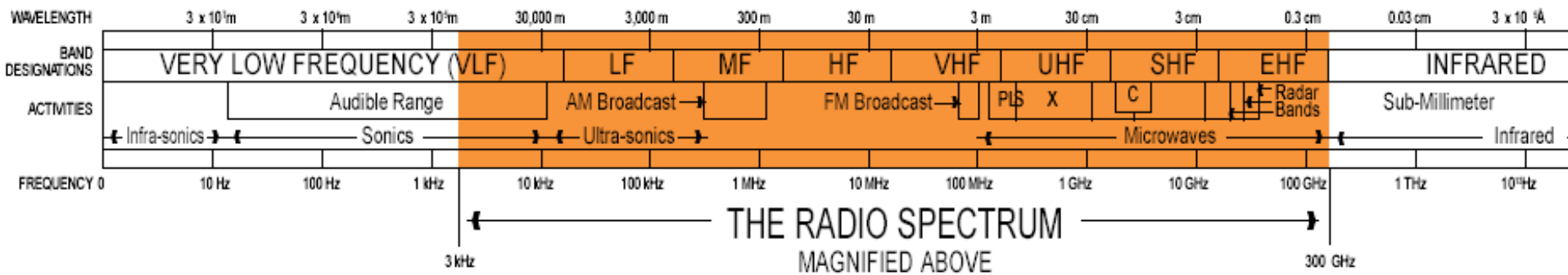
BRICKA NR:

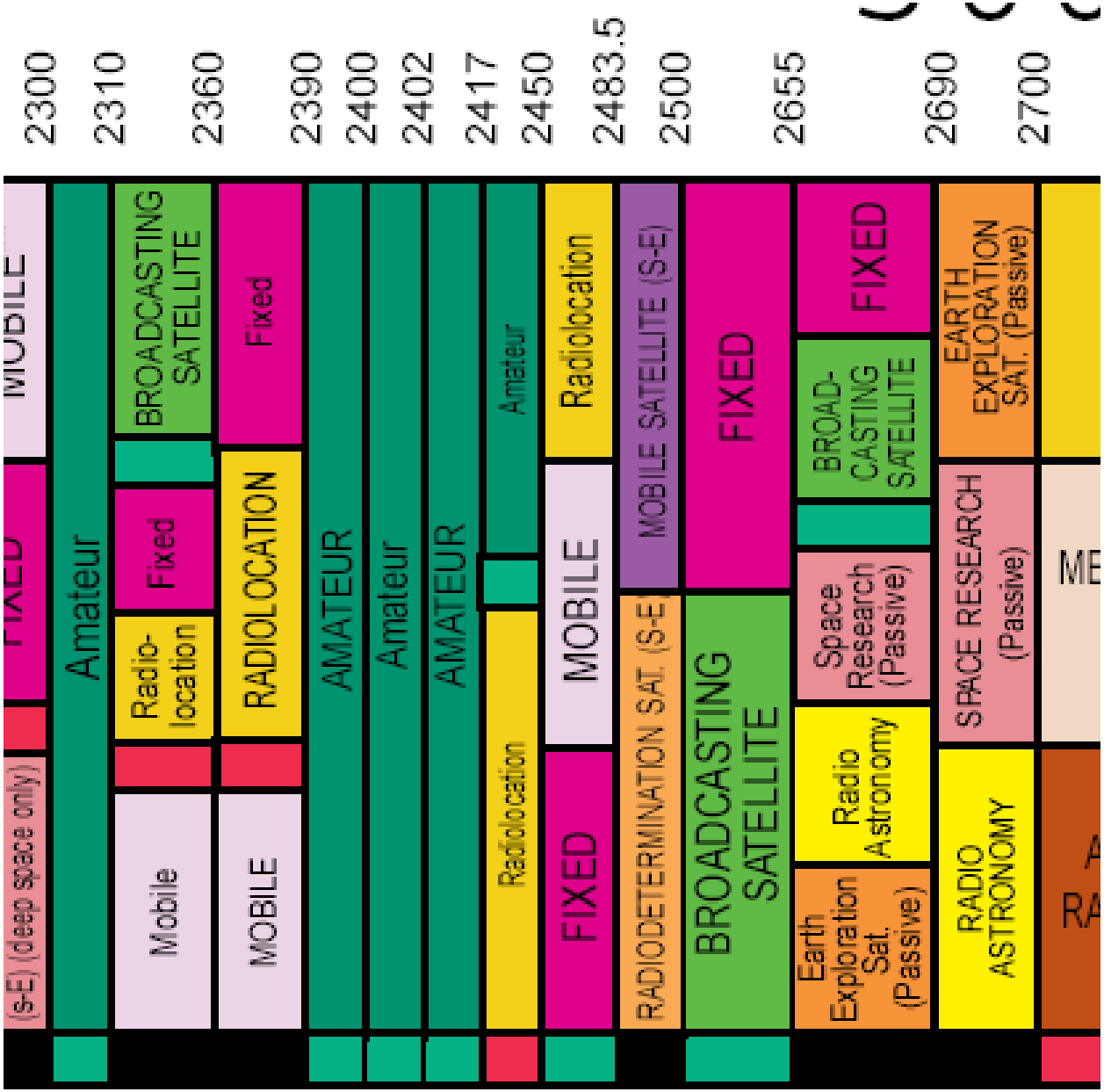
A1265



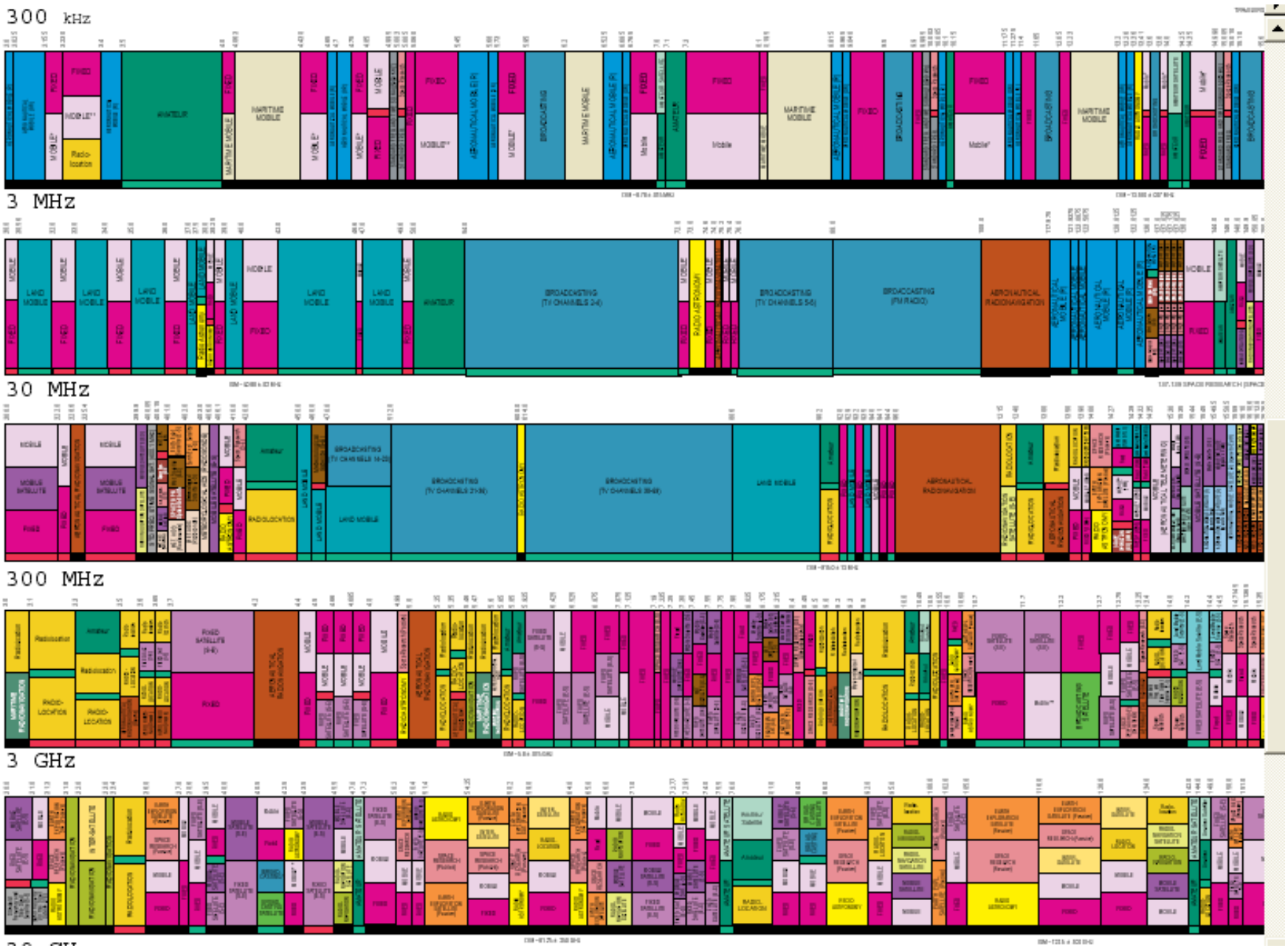
Fundamentala principer för RFID

- **Radioteknik** - sänder elektromagnetiska vågor
- **Följer fysikaliska lagar för utbredning** - konduktiva och icke konduktiva material (luft, betong, metall, vätska)
- **Regleras av frekvensmyndigheter** - frekvens, effekt

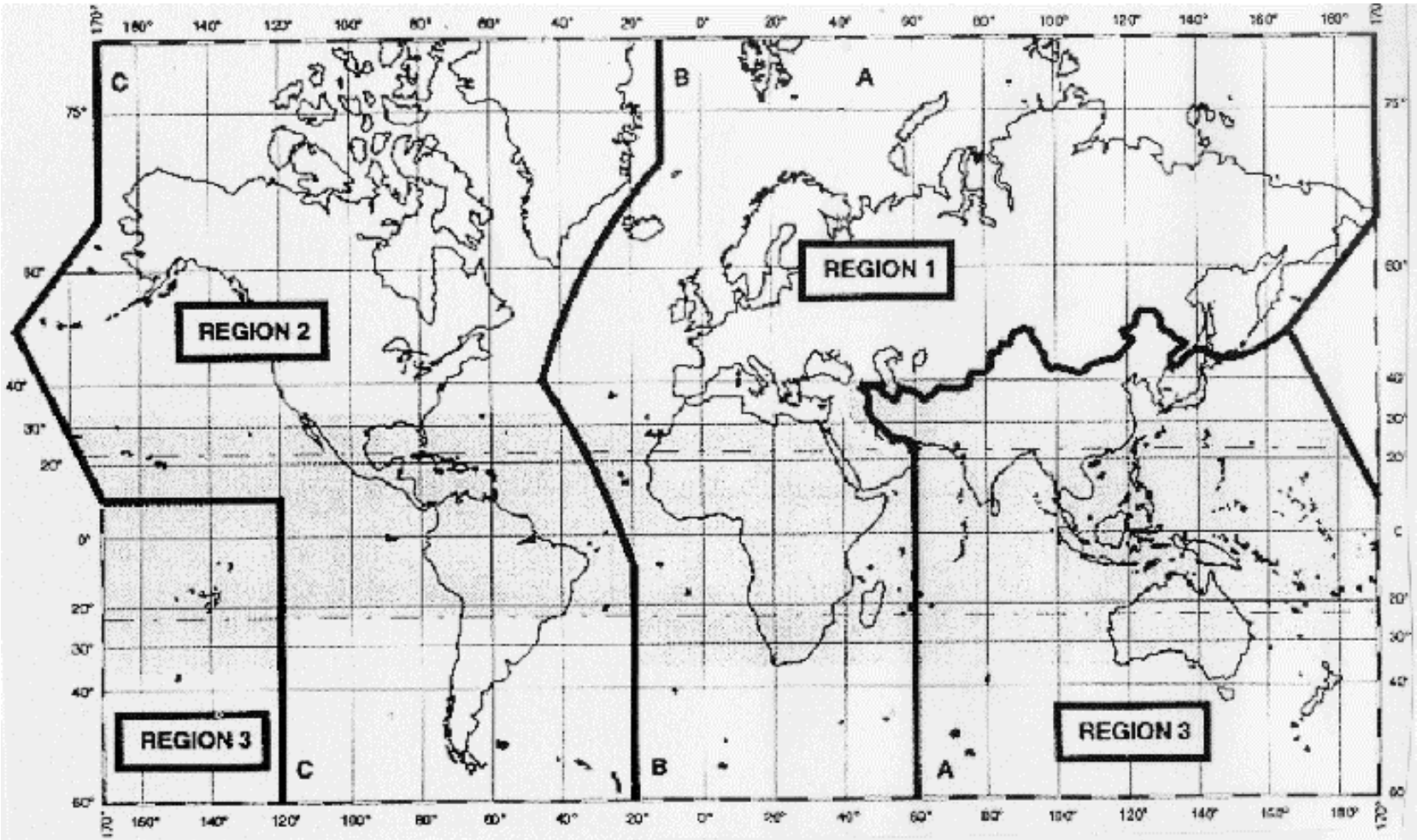

WAVELENGTH
30,000 m
3,000 m
300 m
30 m
3 m
30 cm
3 cm
0.3 cm
0.03 cm
BAND DESIGNATIONS
VERY LOW FREQUENCY (VLF)
LF
MF
HF
VHF
UHF
SHF
EHF
INFRARED
ACTIVITIES
Audible Range
AM Broadcast
FM Broadcast
PLS
X
C
Radar Bands
Sub-Millimeter
Infra-sonics
Sonics
Ultra-sonics
Microwaves
Infrared
FREQUENCY 0
10 Hz
100 Hz
1 kHz
10 kHz
100 kHz
1 MHz
10 MHz
100 MHz
1 GHz
10 GHz
100 GHz
1 THz
THE RADIO SPECTRUM
MAGNIFIED ABOVE
3 kHz
300 GHz



ISM – 2450.0 ± 50 MHz


300 kHz
3 MHz
30 MHz
300 MHz
3 GHz

STANDARDS


REGION 1
REGION 2
REGION 3
REGION 3
A
B
C
A
B
C

2. Current status of Radio Law for RFID in Japan

2-1 General radio law

Frequency	Under discussion		Europe (ERC/REC70-03)	United States (FCC Part 15)	Current status of Japan (Japan radio law by MPHPT)	
	ISO/IEC18000 RFID for Item management	ISO18185 Freight Containers - electronic seal				
Below 135kHz	FCD 18000-2		119-135kHz 66dBμA/m @ 10m 135-140kHz 42dB 140-148.5kHz 37.7dB	Same level as Europe (FCC 15.209)	Yes	"Extremely low power radio station" shown in page 3
13.56MHz	FCD 18000-3		±7kHz 42 dBμA/m @ 10m ±150kHz 9 dBμA/m @ 10m	±7kHz 10000μV/m @ 30m Outside±7kHz 30μV/m @ 30m	Yes	Same level as Europe, revised in September 2002 ±7kHz . 47544μV/m @ 10m .42dBμA/m. ±150kHz .1061μV/m .9dBμA/m. ±450kHz . 316μV/m .-1.5dBμA/m.
315MHz		Active Narrowband		200μV/m @ 3m (FCC 15.209)	No	500μV/m @ 3m is allowed without any license under the regulation "Extremely low power radio station" shown in page 3. More power is not allowed, because Public office and Flight control radio occupy 288-322 MHz.
433MHz	CD18000-7 433MHz	Active Narrowband 433.92MHz	433.05-434.79MHz 10mW e.r.p.	4400μV/m @ 3m under Periodic operation (FCC 15.231)	No	35μV/m @ 3m is allowed without any license under "Extremely low power radio station". More power is not allowed now, because Amateur radio stations occupy 430-440 MHz.
860-930MHz	CD18000-6 860-930MHz	FHSS Passive/ Active Narrowband 862-928MHz 915MHz	869.4-869.65MHz 500mW e.r.p.	FHSS & DSSS 902-928MHz 1W+Antenna gain 6dBi = 4W e.r.p. (FCC 15.247) Narrowband 902-928MHz 50mV/m@3m (FCC 15.249)	No	35μV/m @ 3m is allowed without any license under "Extremely low power radio station". More power is not allowed now, because Mobile phones and MCA (Multi-Channels Access system) occupy 800-1000MHz.

RFID

<135 kHz | 13,56 MHz | UHF | 2,45 GHz | 5,8 GHz

Application Requirements Profile

Slutet

Öppet

Standard

SC31: Home - Microsoft Internet Explorer

Arkiv Redigera Visa Favoriter Verktyg Hjälp

Bakåt Sök Favoriter

Adress http://usnet03.uc-council.org/sc31/ Gå til

SC 31 ISO/IEC JTC 1/ AIDC

Automatic Identification and Data Capture Techniques

SC 31 is a Subcommittee of Joint Technical Committee 1 (*JTC 1*) on Information Technology. JTC 1 is jointly sponsored by the International Organization for Standardization (*ISO*) and the International Electrotechnical Commission (*IEC*). Access to other JTC 1 Subcommittee Sites may be obtained via the JTC 1 site. Some Liaison Members of SC 31 may be accessed directly from the *MEMBERS* page of this site.

This site (http://www.uc-council.org/sc31/home.htm) is managed by Uniform Code Council (*UCC*) which acts as Secretariat to SC 31under the auspices of the American National Standards Institute (*ANSI*), the United States of America National Standards Body.

Click here for meeting details → Working Group 4 *30-31 March 2004* California, US

Who We Are	*Projects*	*Calendar*	*Members*	*Directory*
Documents	*Secretariat*	*Ballots*	*Site Map*	*WG Details*

Working Group Details

WG 1
Working Group on Data Carrier

WG 2
Working Group on Data Structure

WG 3
Working Group on Conformance

WG 4
Working Group on RFID for Item Management

WG 5

SC 31 ISO/IEC JTC 1/ AIDC

Automatic Identification and Data Capture Techniques

WG 4

Area of Work | *Members* | *Meetings*

Program of Work | *Document Register* | *Structure*

Title: **Radio-frequency Identification for Item Management**

Area of Work: To provide standards for interoperability of wireless, non-contact omnidirectional radio frequency identification devices capable of receiving, storing, and transmitting data while operating at power levels that are in freely available international frequency bands in the area of item level identification

Home - Microsoft Internet Explorer

Arkiv Redigera Visa Favoriter Verktyg Hjälp

Bakåt Sök Favoriter

Adress http://www.autoid.org/ Gå till Län

autoid.org™

• Home • Site Map • Feedback • Contacts • Search •

- Home
- ANSI MH10
- Direct Part Marking
- Fun Stuff
- Glossary
- GM 1724
- GTL Login

New Documents and News!

- Truth in Technologies 2004: RFID & Bar Codes - This full day, tightly focused, unbiased forum will be held on October 20, 2004 at Stony Brook University in Stony Brook, New York.
- RFID Class Warfare (Revised) - The Battle for an Internationally-Accepted Passive Tag Standard by Thomas A. Polizzi, Executive

Documents and News Archives

- 2002 Part Marking presentation here.
- January 2002 ANSI MH10 SC8 documents are here.
- ISO TC 122 WG7 files are here.
- Find the TC104 SC4 WG2 files here.
- A new DoD safety guide for ADC equipment is posted on the useful info page.
- GM1724 - Shipping Parts Identification Label Standard

SC 31 WG 4 - Microsoft Internet Explorer

Arkiv Redigera Visa Favoriter Verktyg Hjälp

Bakåt Sök Favoriter

Adress http://www.autoid.org/SC31/sc_31_wg4.htm

- Home
- Up
- SC 31/WG 4/SG 1
- SC 31/WG 4/SG 2
- SC 31/WG 4/SG 3
- ULTRA WIDE BAND
- SC 31/WG 4/archives
- BPL

SC31 WG4

The WG 4 ftp site can be found at ftp://sc31wg4:standard@ftp.nen.nl

(Can't find what you're looking for? Try looking in the SC 31/ WG 4

Documents 751 to 860

NEW 858_SG1_3_Log_Info_Boca.doc
REV 857R_adhocVen_SysMngt.doc
NEW 857_AdHocVenue_SysMgmt_SG1.doc
NEW 856_UWB_TG1_8-ChRpt-BOS.doc
NEW 855_CEPT_ITUR_RecSm1538-1.doc
NEW 854_LS_ITUReport_09_2004.doc
NEW 853_liaison_TC104.ppt
NEW 852_liaison_TC20-SC13.doc
NEW 851_liaison_sc37.ppt

sc31n1506_FDIS18000-7.zip" is the copy sent to ISO for final ISO editor edit of *Information technology, Automatic identification and data capture techniques -- Radio-frequency identification for item management, Part 7: Parameters for active RFID air interface communications at 433 MHz.* It is believed that there MAY be changes between the document submitted and the final International Standard

sc31n15294_FDIS18000-6.pdf (1.3MB)

sc31n1529_FDIS18000-6.pdf" is the copy sent to ISO for final ISO editor edit of *Information technology, Automatic identification and data capture techniques -- Radio-frequency identification for item management, Part 6: Parameters for air interface communications at 860 - 930 MHz.* It is believed that there MAY be changes between the document submitted and the final International Standard

sc31n1457_FDIS18000-4.zip (1.6MB)

sc31n1457_FDIS18000-4.zip" is the copy sent to ISO for final ISO editor edit of *Information technology, Automatic identification and data capture techniques -- Radio-frequency identification for item management, Part 4: Parameters for air interface communications at 2,45 GHz.* It is believed that there MAY be changes between the document submitted and the final International Standard

sc31n1456_FDIS18000-3.zip (1.5MB)

sc31n1456_FDIS18000-3.zip" is the copy sent to ISO for final ISO editor edit of *Information technology, Automatic identification and data capture techniques -- Radio-frequency identification for item management, Part 3: Parameters for air interface communications at 13,56 MHz.* It is believed that there MAY be substantial changes between the document submitted and the final International Standard

sc31n1526_FDIS18000-2.zip (1.6MB)

sc31n1526_FDIS18000-2.zip" is the copy sent to ISO for final ISO editor edit of *Information technology, Automatic identification and data capture techniques -- Radio-frequency identification for item management, Part 2: Parameters for air interface communications below 135 kHz.* It is believed that there MAY be substantial changes between the document submitted and the final International Standard

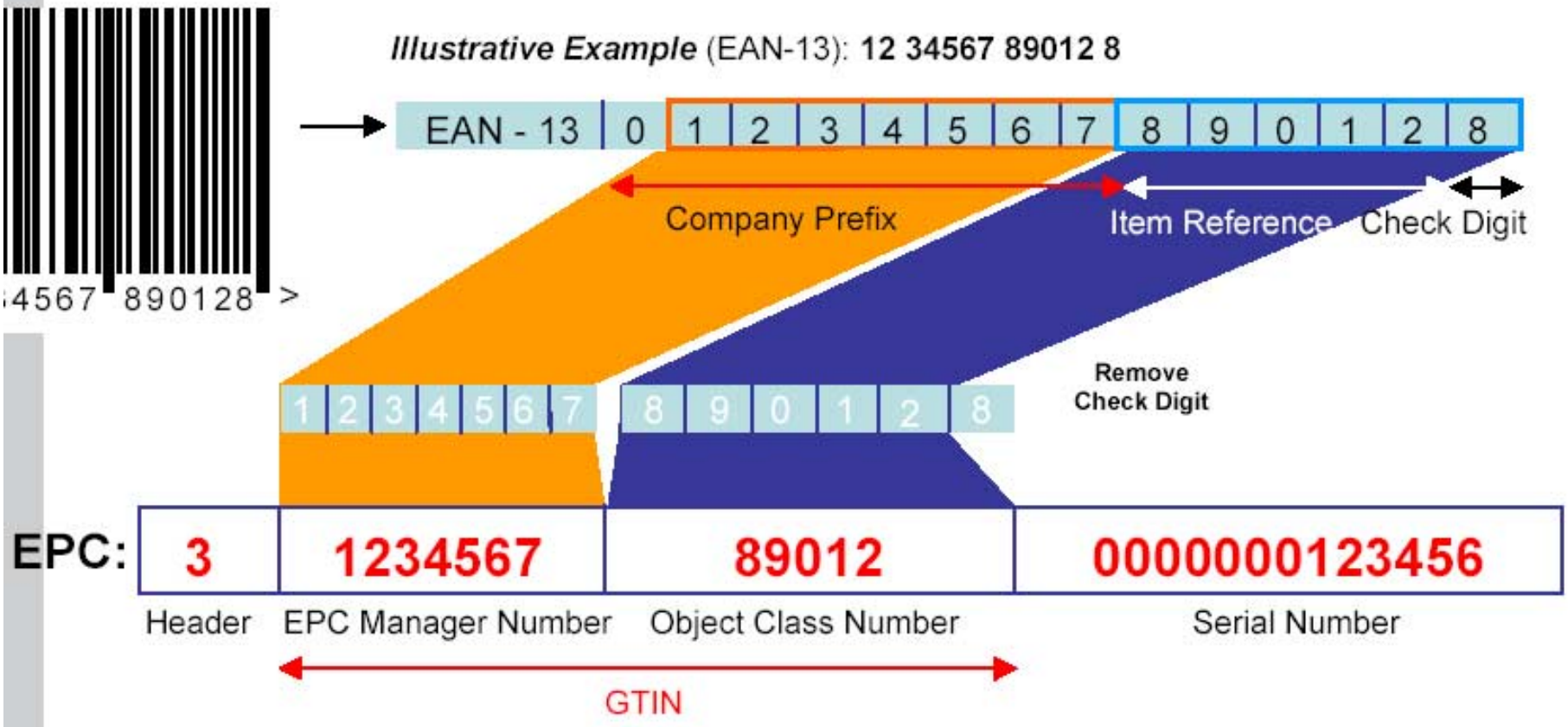
sc31n1455_FDIS18000-1.zip (1.1MB)

sc31n1455_FDIS18000-1.zip" is the copy sent to ISO for final ISO editor edit of *Information technology, Automatic identification and data capture techniques -- Radio-frequency identification for item management, Part 1: Reference architecture and definition of parameters to*

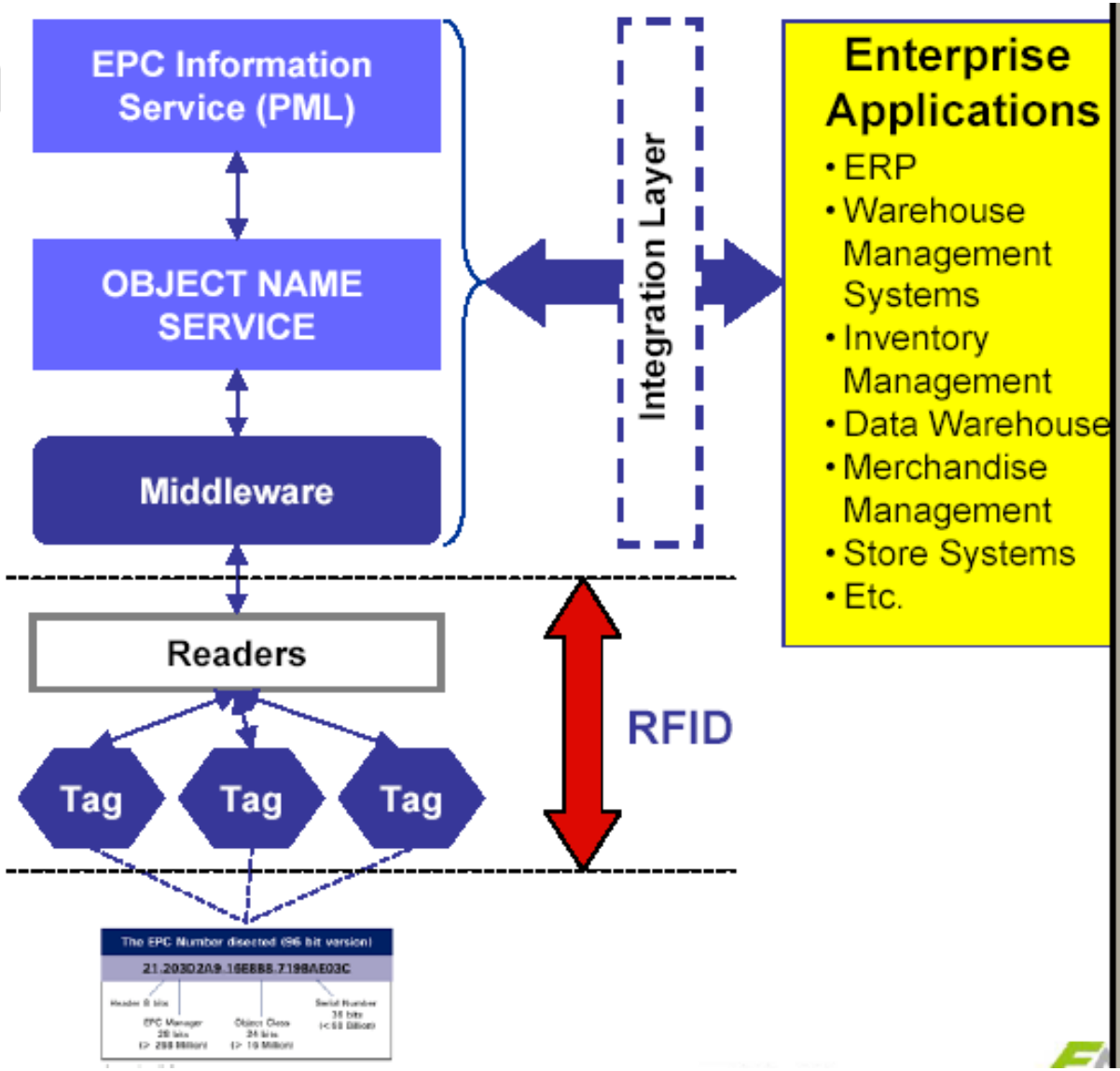
Int

EPCglobal

An Example of How GTIN Integration Works With the EPC



- EPC IS = distributed databases
- ONS enables access to data
- Middleware = Software between readers and applications
- RFID tags
- EPC data



Intressekonflikt

The WCCN Letter
Wireless Communications, Computing & Networking

Reprint | Covering Interactive Enterprise Automation with a Wireless Perspective | 8-page Monthly

WCCN Publishing, Inc. grants blanket permission to print and/or copy this article in its entirety and without modification.

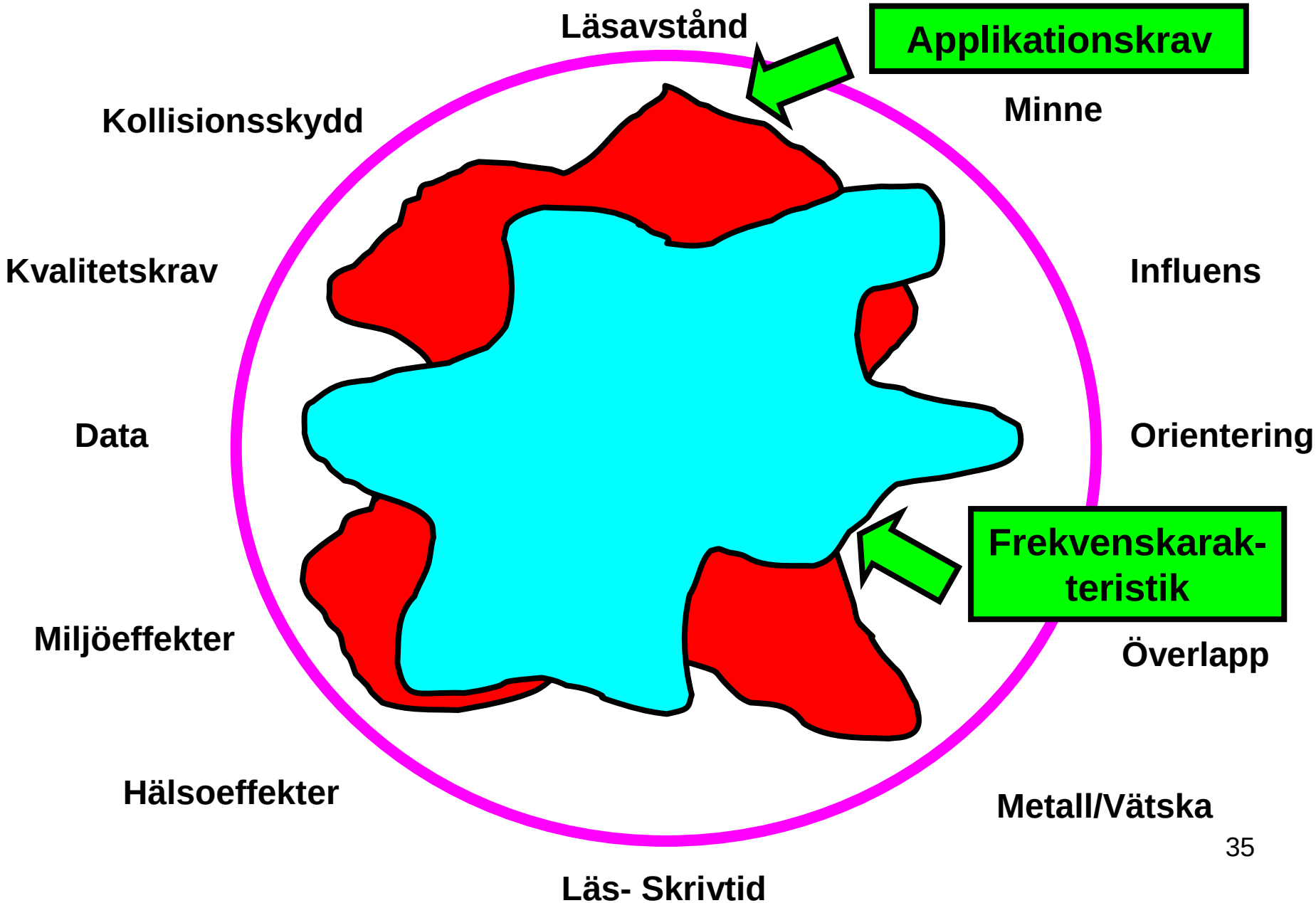
RFID Class Warfare

The Battle for an Internationally-Accepted Passive Tag Standard

EPCglobal either joins in an alliance with the free-world's only super standards-making power, or chooses to wage war against it. We will soon know.

Funktioner

- Frekvenser
- Aktiva / Passiva
- Skriv och Läs
- Minne
- Antikollision
- Läsavstånd
- Läshastighet
- Kostnad


Läsavstånd
Applikationskrav
Minne
Kollisionsskydd
Kvalitetskrav
Influens
Data
Orientering
Frekvenskarak-
teristik
Miljöeffekter
Överlapp
Hälsoeffekter
Metall/Vätska
Läs- Skrivtid

JEIDA - Japan Electronic Industry Development Association

Singel - tag operation

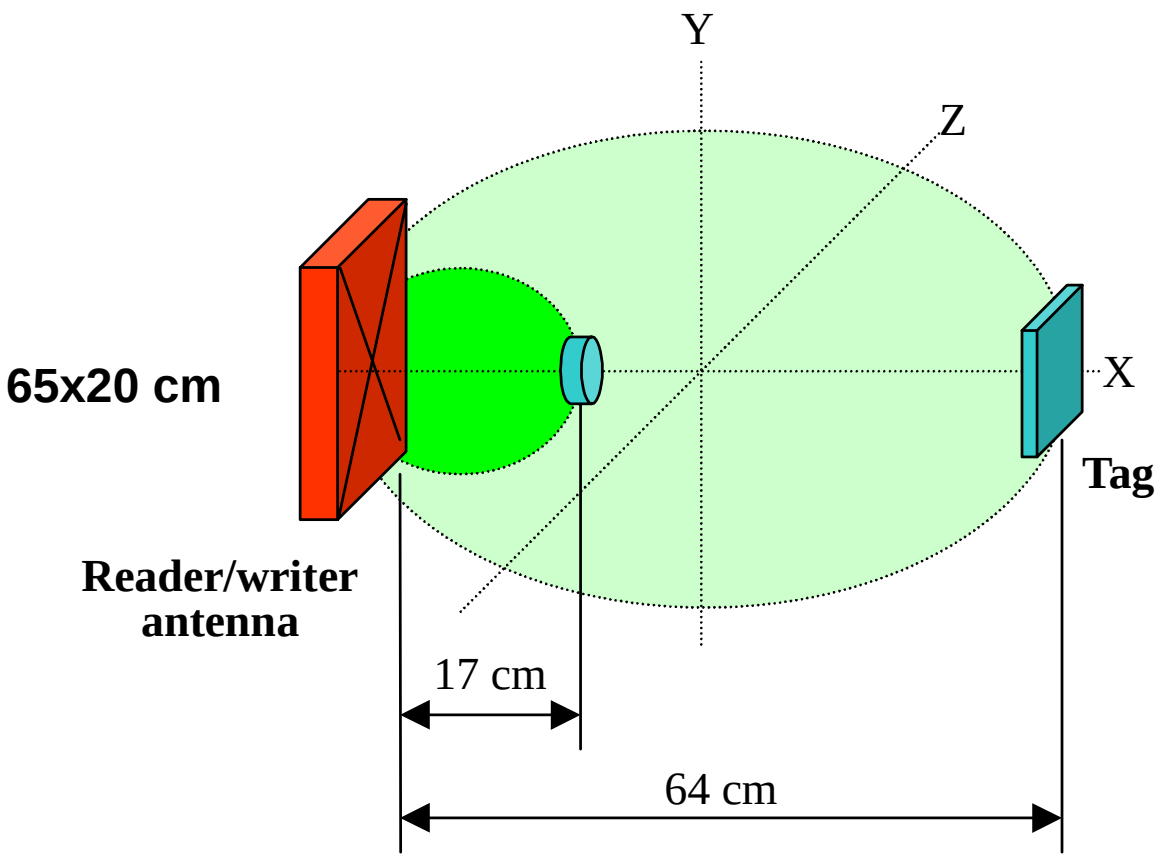
- Läsavstånd
- Läsområde
- Orientering
- Läshastighet
- Metall - effekt

Multi - tag operation

- Läshastighet
- Överlappning

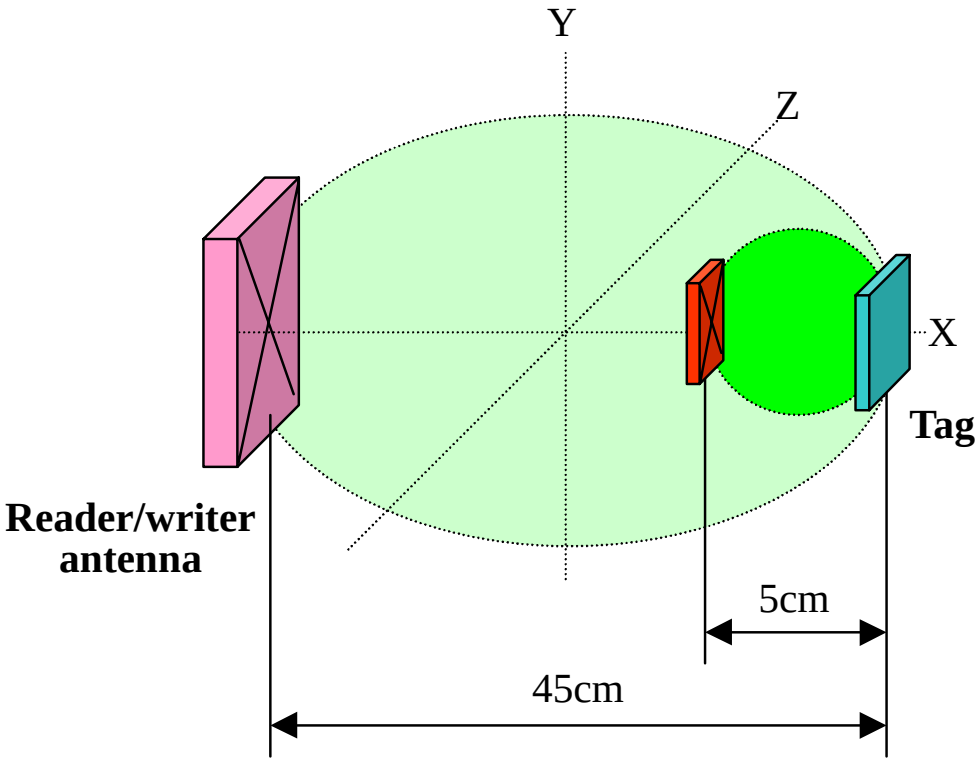
TOSHIBA

Läsavstånd stor/liten tag - 125KHz



Tag dimensions	ϕ 2 cm	11 $\times$ 11 cm
Tag surface area	3.14 cm^2	121 cm^2
Operating range (x)	17 cm	64 cm

Läsavstånd stor/liten antenn - 125 KHz



9 x 7 cm

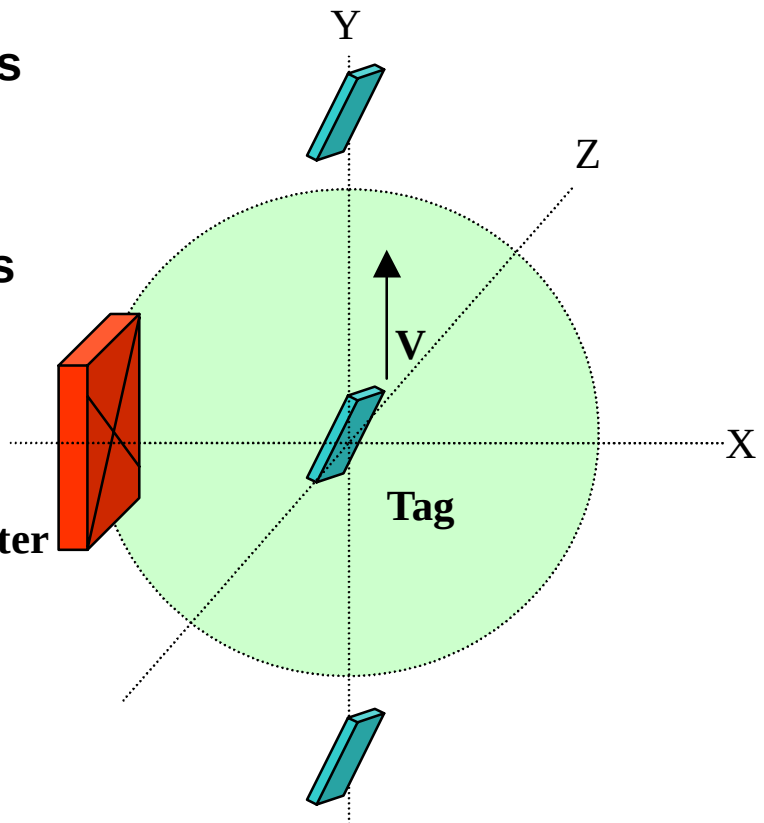
Antenna dimensions	7 × 5 cm	30 × 30 cm	70 × 50 cm
Antenna surface area	35 cm^2	900 cm^2	3500 cm^2
Operating range (x)	5 cm	30 cm	45 cm

Läshastighet - 13.56 MHz

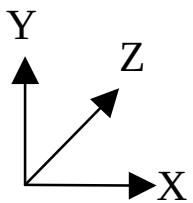
72 m/min = 1,21 m/s ger 0,1 sec för detektering

48 byte / 1,65 kbps

40 x 30 cm

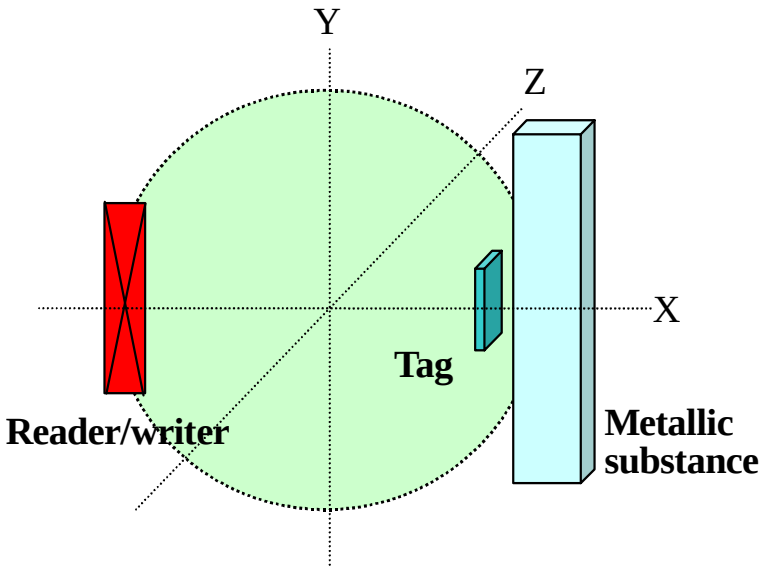


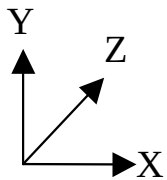
7 x 4,5 cm

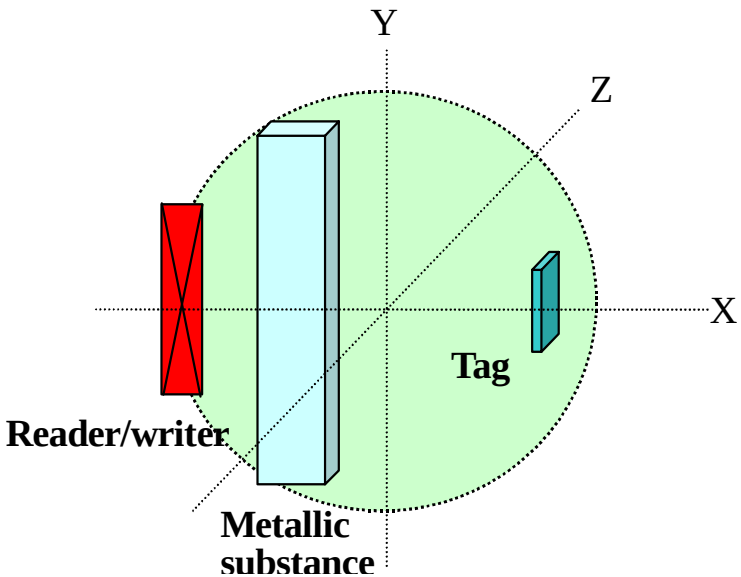


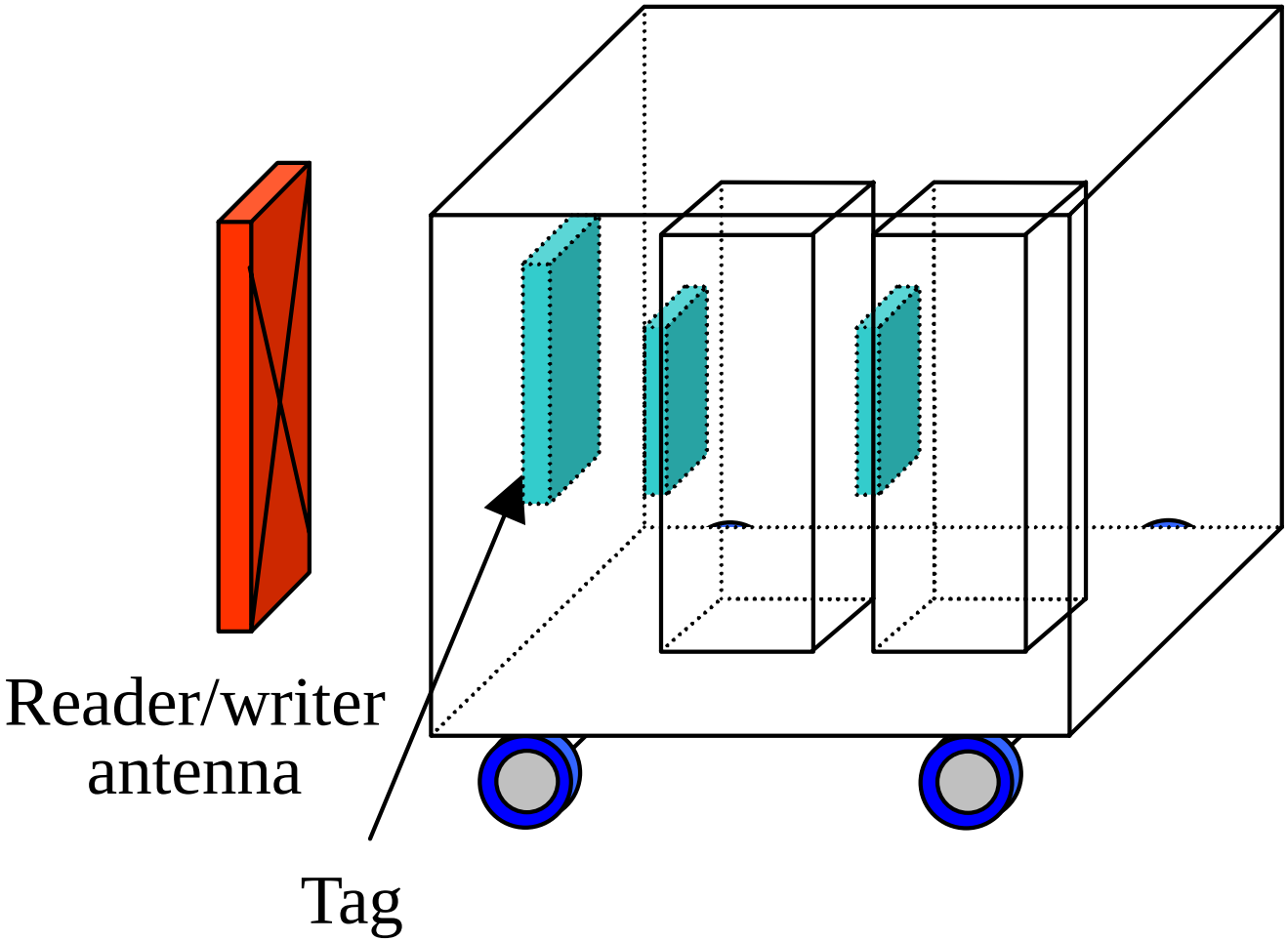
Tag movement velocity (V)	10 m/minute	20 m/minute	30 m/minute	40 m/minute
Operating success rate	100%	100%	100%	100%

Metall-effekt





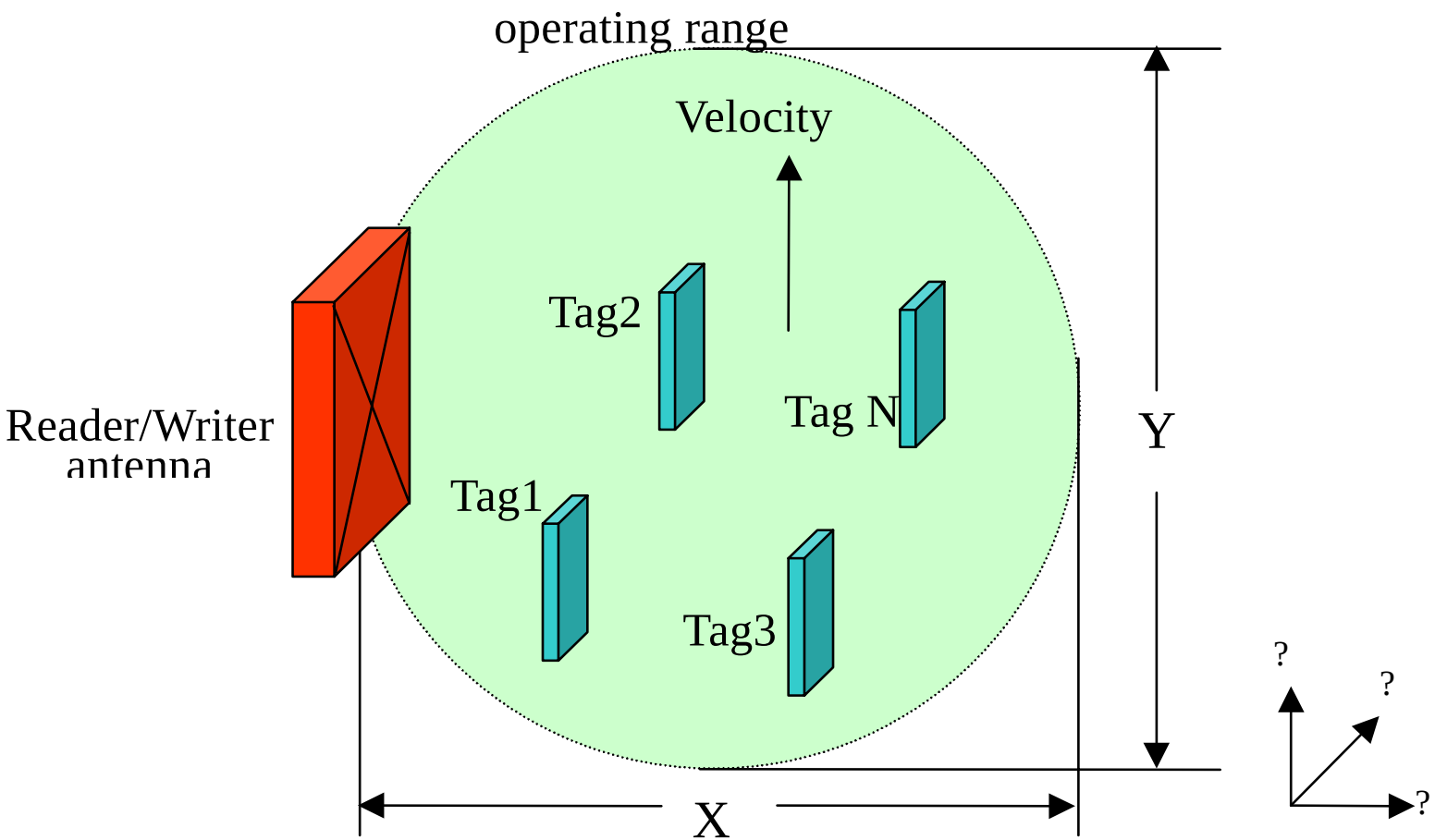




20 - 30 %

Intill det omöjliga

Multiread - 13,56 MHz



Number of tags	5	10	15	20
Operating success rate	100%	99%	91%	88%

Överlappning 125 KHz

ID-No.	Product	Type	Tag orientation	Operating success rate
13	Knife sharpener		Left	100%
19	Portable radio	Metal case	Rear	100%
6	Power eraser	Plastic	Right	100%
14	Pencil sharpener	Plastic	Rear, overlapped	80%
17	MD player	Metal case	Front, overlapped	100%
4	DVC tape	Magnetic	Front	100%
5	Lighting fixture		Front	100%
9	Ear thermometer	Plastic	Rear	100%
8	Disk cleaner	Plastic	Right, overlapped	0%
16	APS camera	Metal case	Left, overlapped	0%

Överlappning 13,56 MHz

ID No.	Contents	Attachment position	Operating success rate
21	Cardboard	Top, overlapped	0%
22	Cardboard	Rear	40%
23	Cardboard	Front	100%
24	Cardboard	Right, overlapped	0%
25	Cardboard	Left, overlapped	0%
26	Cardboard	Bottom, overlapped	0%
27	Cardboard	Front	100%
28	Cardboard	Rear	70%
29	Cardboard	Left	10%
30	Cardboard	Right	0%

BRAVO
BRAVO
BRAVO
BRAVO
BRAVO
BRAVO

Så här kan det låta

Finns det 60 eller 120 tusen ?

Var försvinner lastbärarna egentligen?

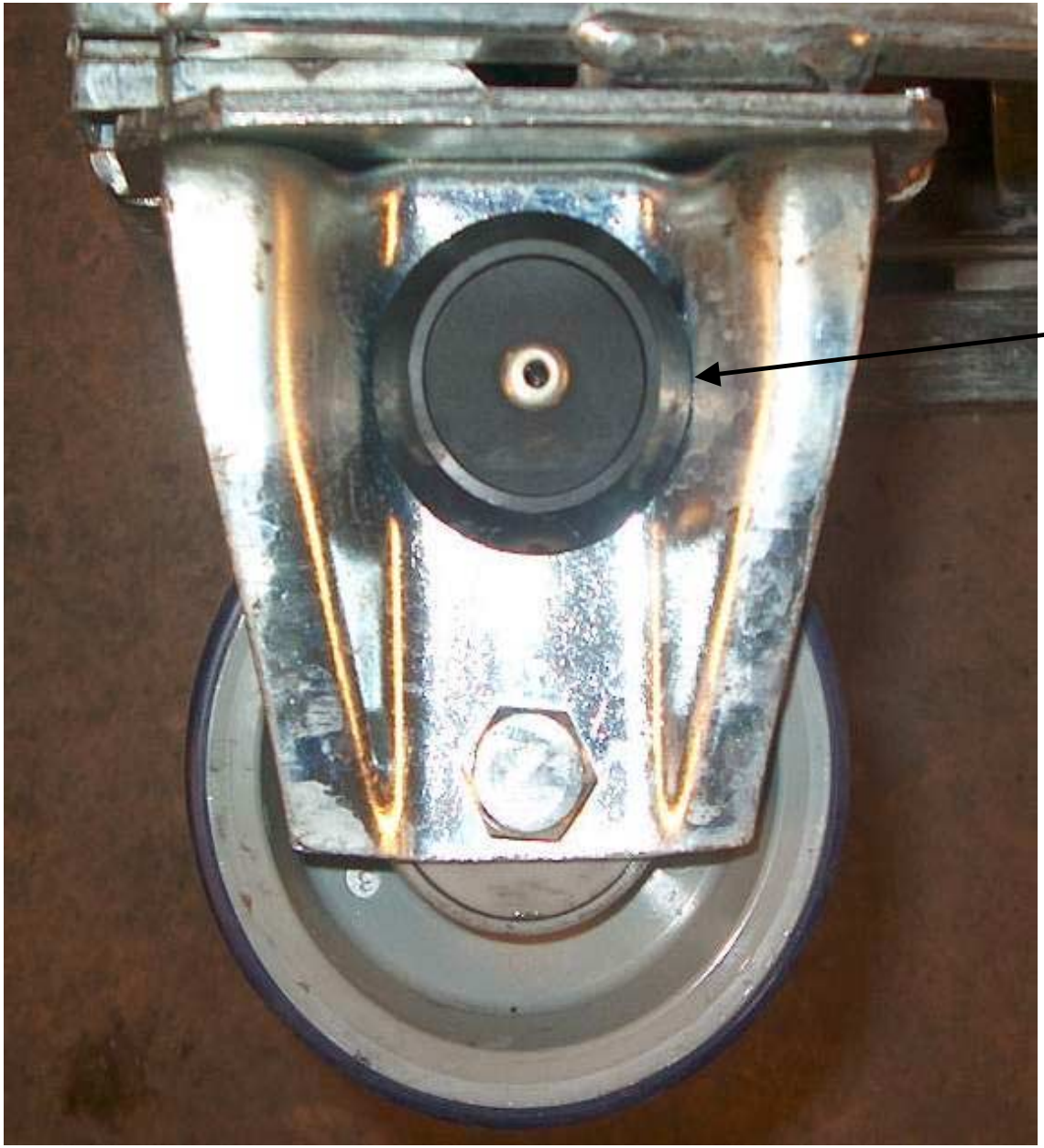
Hur många har vi inne / ute ?

Tar Stockholm våra lastbärare?

Hur många behöver vi köpa ?

Räcker antalet lastbärare över helgen ?

Står det en massa lagrade någonstans ?



RFID tag placerad på hjulhuset med en distans på 8 mm som lyfter taggen från metallen

Utdata

- Varningslista
- Cykeltider
- Produktionsplanering
- Reparationsstatus
- Driftstatistik

Grundläggande idéer för effektiv hantering av returlastbärare

- Utgångspunkt - varje lastbärare är en egen individ
- Få avläsningspunkter
- Så automatiskt som möjligt
- Integrerad på rätt nivå med befintliga system
- Utdata en del av arbetsprocessen
- Hög tillförlitlighet
- Lösningen skall kunna skalas upp till nya uppgifter
- Kort återbetalningstid