

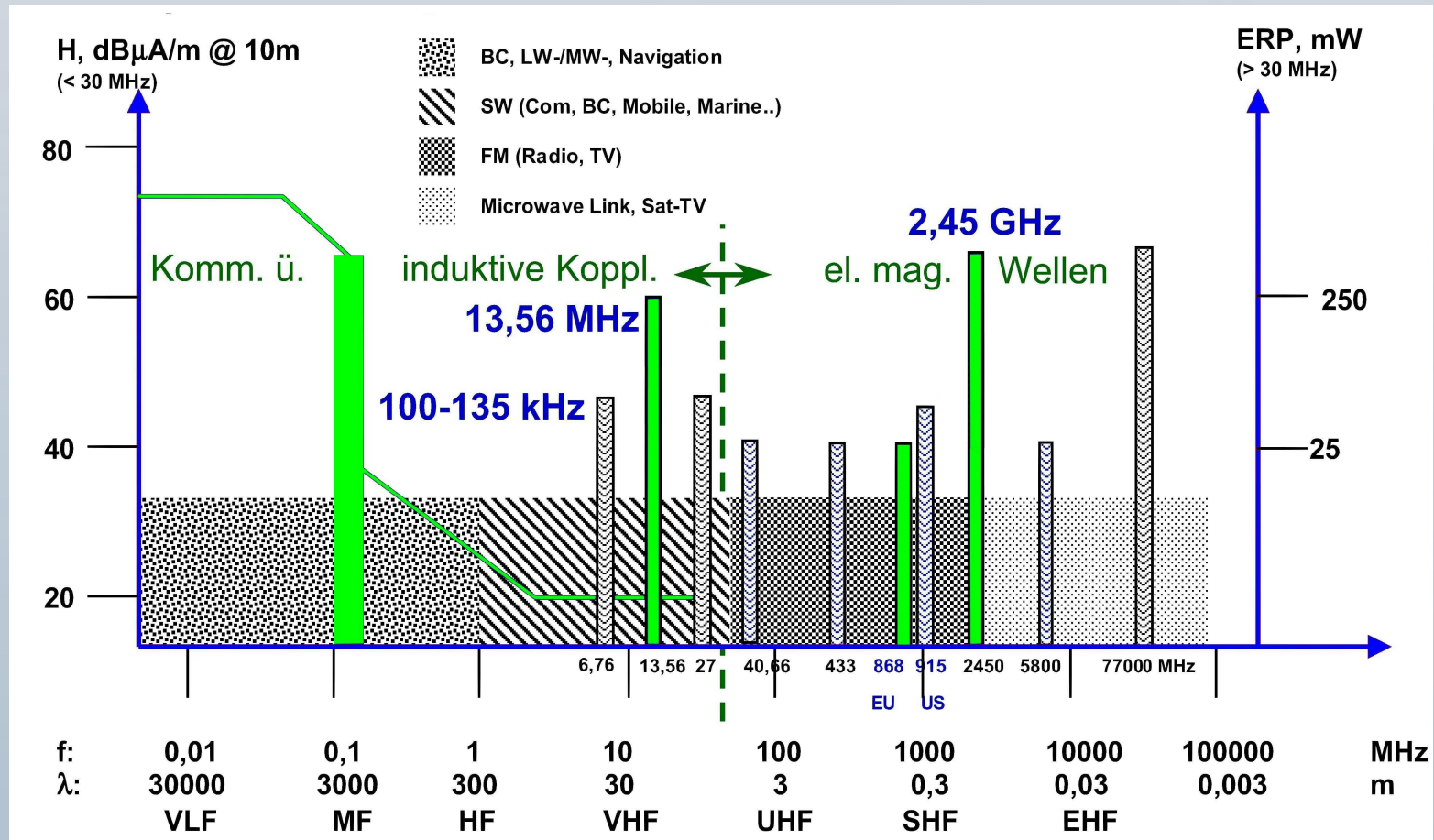
Aktueller Stand der RFID-Normen

Erwin Schmidt, Pepperl + Fuchs GmbH

Aktueller Stand der RFID-Normen

- RFID-Frequenzbereiche
- Europäische Normen, ETSI
- ISO/IEC
- GS1 / EPCglobal
- VDE-Richtlinien
- Literaturhinweise

RFID-Frequenzbänder

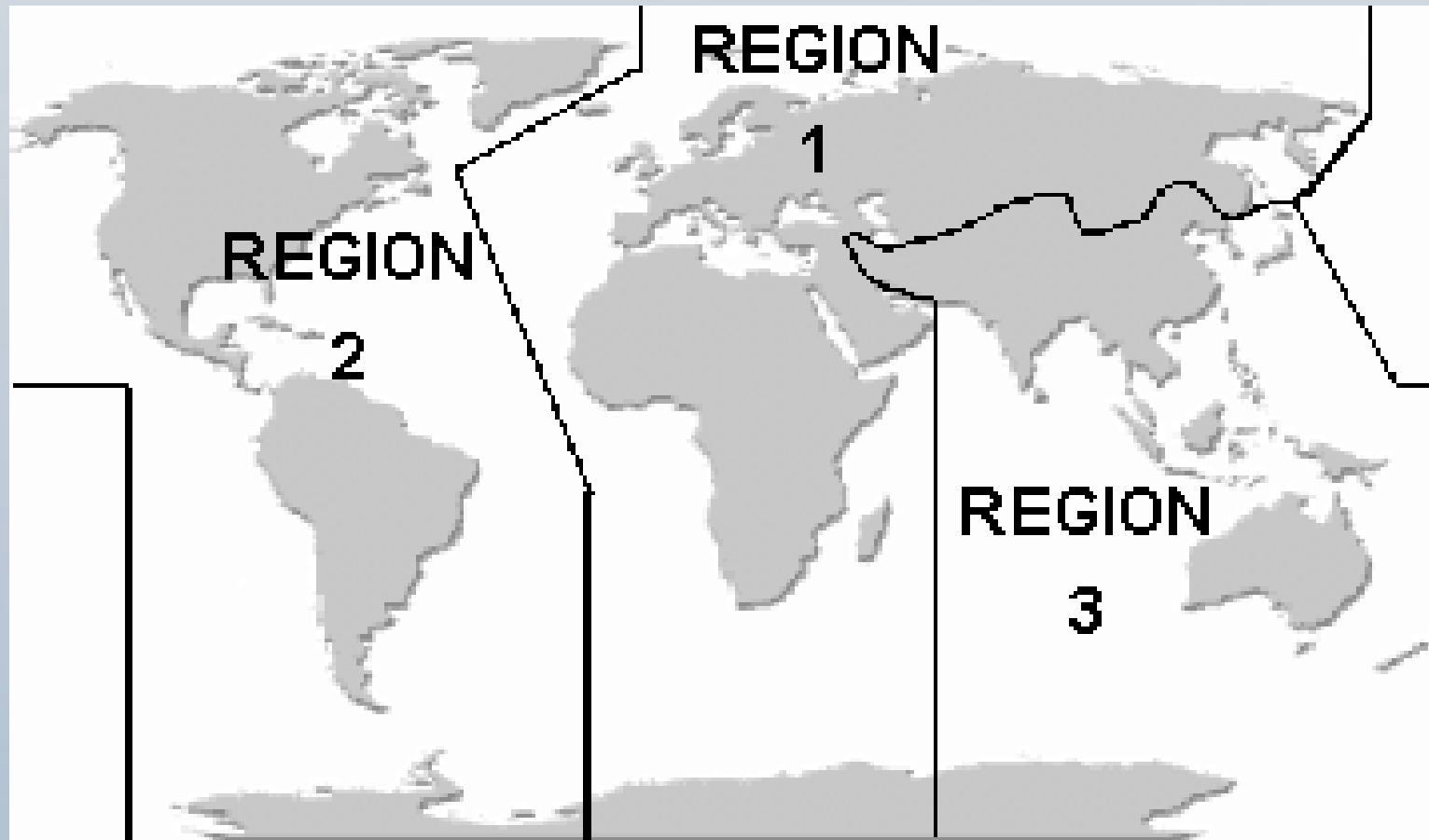


Quelle: Klaus Finkenzeller: RFID-Handbuch

RFID-Frequenzbänder

- LF 119...148,5 kHz
- HF 13,56 MHz
- 433 MHz
- UHF 865...868 MHz (Europa)
UHF 902...928 MHz (USA)
UHF 952...955 MHz (Japan)
- 2,4...2,483 GHz
- 5,8 GHz

ITU (International Communication Union)





Europäische Normen (1)

- R&TTE Direktive (1999/5/EC) der Europäischen Kommission
Radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity
- CEPT / ERC Recommendation 70-03
Relating to the use of Short Range Devices (SRD)



- **ETSI EN 300 330:2004**
Electromagnetic compatibility and Radio spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz
- **ETSI EN 300 220:2005**
ERM; SRD; Radio equipment to be used in the 25 MHz to 1000 MHz frequency range



- ETSI EN 300 440:2000
ERM; SRD; Radio equipment to be used in the 1 GHz to 40 GHz frequency range
- ETSI EN 302 208:2003
Electromagnetic compatibility and Radio spectrum Matters (ERM); Radio Frequency Identification Equipment operating in the band 865 MHz to 868 MHz with power levels up to 2 W
- EN 50357
Ermittlung der Exposition von Personen gegenüber elektromagnetischen Feldern von Geräten, die in der elektronischen Artikelüberwachung, Hochfrequenz-Identifizierung und ähnlichen Anwendungen verwendet werden

ISO/IEC-Normen (1)

- Joint Technical Committee ISO/IEC JTC 1
 - Subcommittee SC 17
Cards and Personal Identification
 - Subcommittee SC 31
Automatic Identification and Data Capture Techniques
 - Deutsche Spiegelgremien beim DIN
NI 17K, NI 31, NI 31.4

Identification cards (1)

- ISO/IEC 10536
Close coupled cards
 - Part 1: *Physical characteristics*
 - Part 2: *Dimensions and location of coupling areas*
 - Part 3: *Electronic signals and reset procedures*
 - Part 4: *Answer to reset and transmission protocols*

Identification cards (2)

- ISO/IEC 14443
Proximity cards
 - Part 1: *Physical Characteristics*
 - Part 2: *Radio frequency power and signal interface*
 - Part 3: *Initialization and anticollision*
 - Part 4: *Transmission protocol*



Identification cards (3)

- ISO/IEC 15693
Vicinity cards
 - Part 1: *Physical Characteristics*
 - Part 2: *Radio frequency power and signal interface*
 - Part 3: *Anticollision and transmission protocol*
 - Part 4: *Extended command set and security features*

Identification cards (4)

- ISO/IEC 10373
Identification cards - Test Methods
 - Part 1: *General characteristics*
 - Part 6: *Proximity Cards*
 - Part 7: *Vicinity Cards*

ISO/IEC-Normen (2)

- ISO/IEC 19762:2005
Information technology - Automatic identification and data capture (AIDC) techniques - Harmonized vocabulary
 - Part 1: *General terms relating to AIDC*
 - Part 2: *Optically readable media (ORM)*
 - Part 3: *Radio frequency identification (RFID)*

ISO/IEC-Normen (3)

- ISO/IEC 18000
Information Technology - Radio frequency identification (RFID) for item management - Air interface
 - Part 1:2004 *Generic parameters for air interface Communication for globally accepted frequencies*
 - Part 2:2004 *Parameters for air interface communications below 135 kHz*
 - Part 3:2004 *Parameters for air interface communications at 13.56 MHz*

ISO/IEC-Normen (4)

- ISO/IEC 18000
Information Technology - Radio frequency identification (RFID) for item management - Air interface
 - Part 4:2004 *Parameters for air interface communications at 2.45 GHz*
 - Part 6:2004 *Parameters for air interface communications at 860-960 MHz*
 - Part 7:2004 *Parameters for an active RFID air interface communications at 433 MHz*

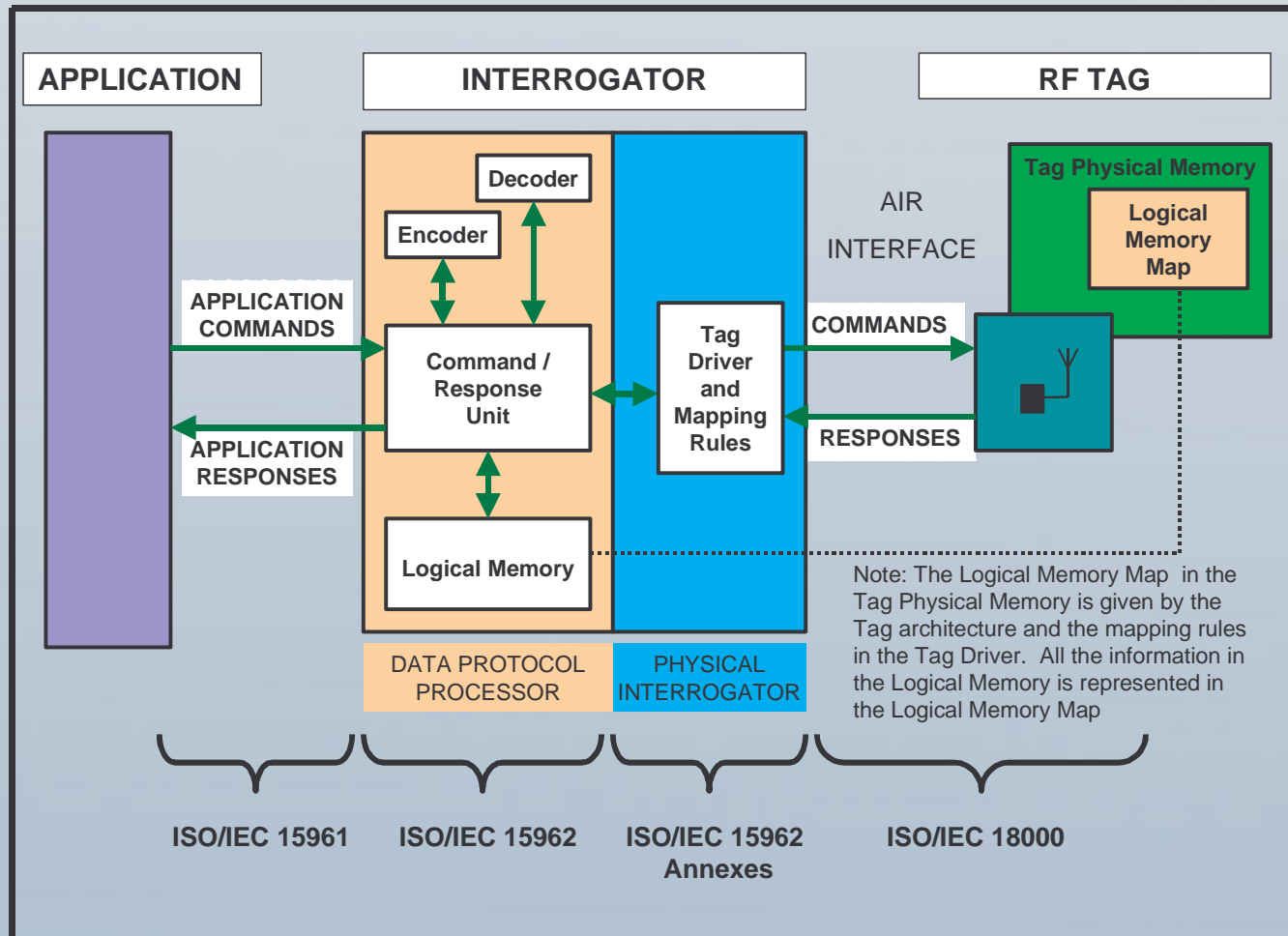
ISO/IEC Test Standards (1)

- ISO/IEC TR 18046
Information Technology, Automatic Identification and Data Capture Techniques – Radio Frequency Identification (RFID) Device Performance Test Methods
 - Part 1: *Test methods for system performance*
 - Part 2: *Test methods for interrogator performance*
 - Part 3: *Test methods for tag performance*

ISO/IEC Test Standards (2)

- ISO/IEC TR 18047
Information technology – Automatic identification and data capture techniques – RFID for item management
 - Part 2:2006 *RFID Conformance Test Methods below 135 kHz*
 - Part 3:2004 *RFID Conformance Test Methods at 13.56 MHz*
 - Part 4:2004 *RFID Conformance Test Methods at 2.45 GHz*
 - Part 6:2006 *RFID Conformance Test Methods at 860 to 960 MHz*
 - Part 7: *RFID Conformance Test Methods at 433 MHz*

Logical Functions and Interfaces



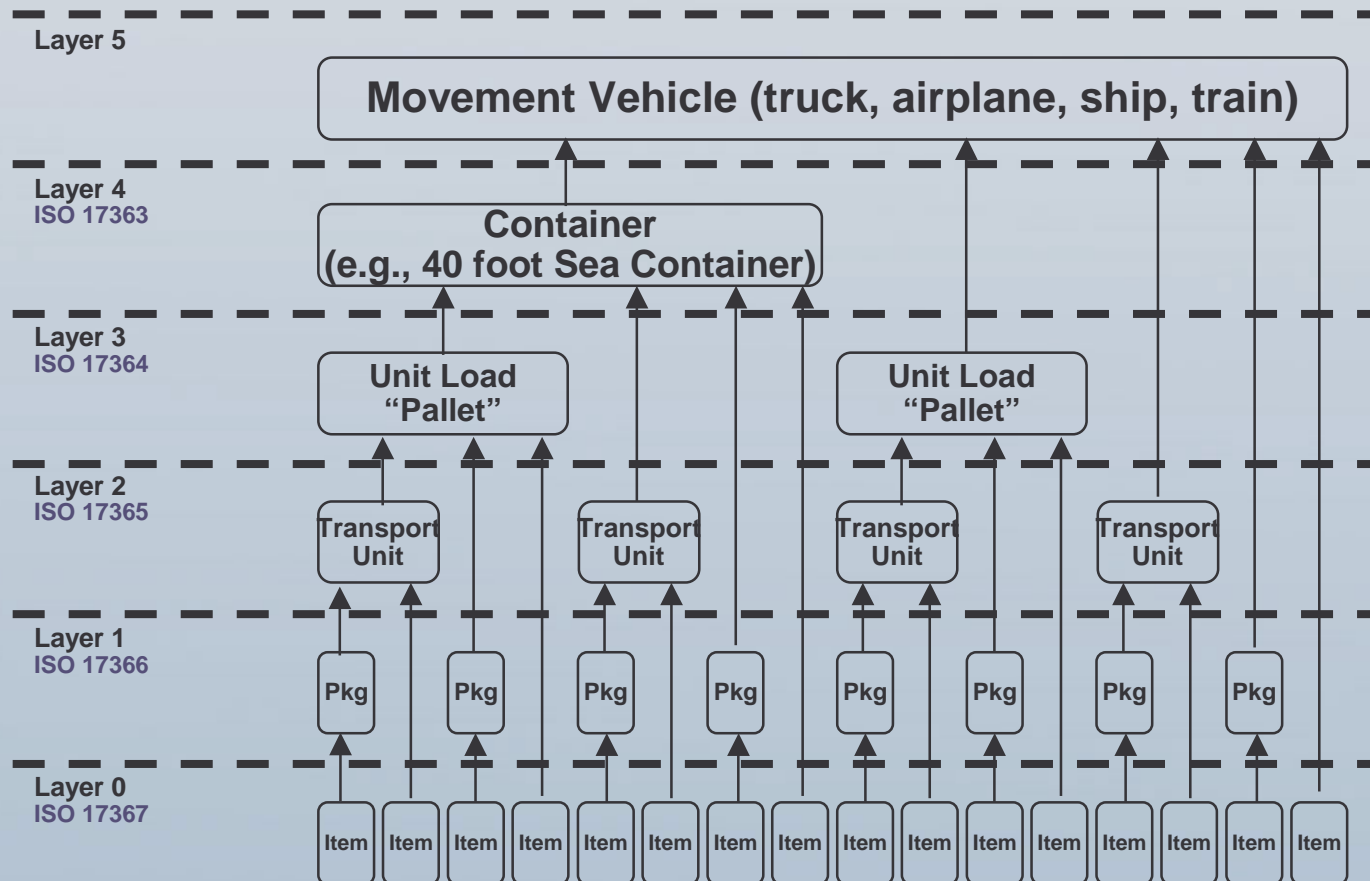
ISO/IEC Datenstrukturen (1)

- **ISO/IEC 15961:2004**
RFID for Item Management – Data Protocol: Data encoding Rules and logical Memory functions
 - Part 1: *Application interface*
 - Part 2: *Registration of RFID data constructs*
 - Part 3: *RFID data constructs*
- **ISO/IEC 15962:2004**
RFID for Item Management – Data Protocol: Application Interface
- **ISO/IEC 15963:2004**
RFID for Item Management – Unique Identification of RF Tag

ISO/IEC Datenstrukturen (2)

- **ISO/IEC 19789**
RFID for Item Management – Application Programmer Interface
- **ISO/IEC 24752**
Information technology – Automatic Identification and Data Capture Techniques– Radio Frequency Identification (RFID) for Item Management – System Management Protocol

The Layers of Logistic Units



ISO/IEC-Normen (5)

- ISO/IEC 17363
Supply chain Applications of RFID – Freight containers
- ISO/IEC 17364
... – Returnable transport items
- ISO/IEC 17365
... – Transport units
- ISO/IEC 17366
... – Product packaging
- ISO/IEC 17367
... – Product tagging

ISO/IEC-Normen (6)

- ISO 10374 :1991
Freight containers – Automatic Identification
- ISO/IEC TR 18001:2004
Information technology - RFID for Item Management - Application Requirements Profiles

ISO/IEC-Normen (7)

- **ISO/IEC TR 24710**
Information technology, automatic identification and data capture techniques – Radio frequency identification for item management – Elementary tag license plate functionality for ISO/IEC 18000 air interface definitions
- **ISO/IEC TR 24729**
Information technology — Radio frequency identification for item management — Implementation guidelines
 - Part 1: *RFID-enabled labels*
 - Part 2: *Recyclability of RF tags*
 - Part 3: *RFID interrogator/antenna installation*

Werkzeugidentifikation

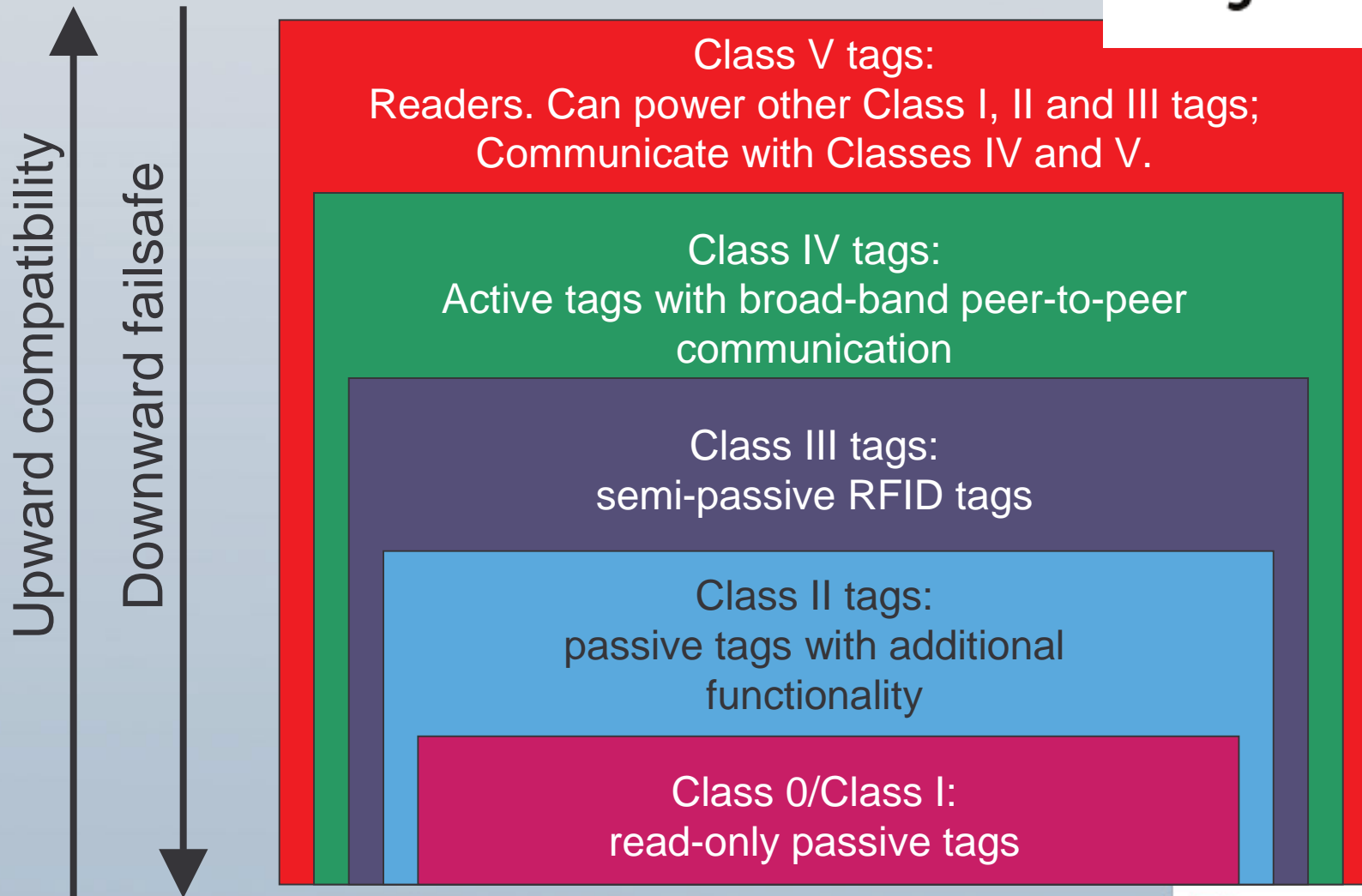
- ISO 69873
Werkzeuge und Spannzeuge mit Datenträgern – Maße für Datenträger und deren Einbauraum



Tieridentifikation

- ISO 11784:1996
Radio-frequency identification of animals - Code structure - Retagging and User Information
- ISO 11785:1996
... - Technical concept
- ISO 14223
... - Advanced transponders
 - Part 1: *Air Interface*
 - Part 2: *Code and command structure*

EPC global (1)



EPC global (2)



- EPC Tag Data Spec. Ver. 1.1
- UHF Class 0 Ver. 1 – ro
- UHF Class 1 Ver. 1 – worm
- HF Class 1 Ver. 1 – 13,56 MHz, worm
- UHF Class 1 Gen. 2 – r/w
- Reader Protocol Ver. 1
- Reader Management
- Tag Data Translation Ver. 1.0
- Application Level Events (ALE) Spec. Ver. 1.0
- Object Naming Service (ONS) Spec. Ver. 1.0

EPC global (3)



- Filtering and Collection
- EPC Information Services (EPCIS)
- Class 1 Gen. 2 → ISO/IEC 18000-6C (publiziert als 18000-6 AM1 am 19. 06. 2006)

VDI-Richtlinien (1)

- VDI 2515-2
Identträger für Stückfördersysteme
- VDI 3964
Mobile Datenspeicher für Großladungsträger

VDI-Richtlinien (2)

- VDI-Richtlinie 4472
Anforderungen an Transpondersysteme zum Einsatz in der Supply Chain
 - Blatt 1: *Einsatz der Transpondertechnologie in der textilen Kette (Allgemeiner Teil)*
 - Blatt 2: *Einsatz der Transpondertechnologie in der textilen Kette (HF-Systeme)*
 - Blatt 3: *Einsatz der Transpondertechnologie in der textilen Kette (UHF-Systeme)*
 - Blatt 4: *Kostenbewertung von RFID-Systemen*
 - Blatt 5: *Einsatz der Transpondertechnologie in der Mehrweglogistik*

VDI-Richtlinien (3)

- VDI-Richtlinie 4472
Anforderungen an Transpondersysteme zum Einsatz in der Supply Chain
 - Blatt 6: *Einsatz der Transpondertechnologie in der Kühlkette*
 - Blatt 7: *Einsatz der Transpondertechnologie in der Entsorgungslogistik*
 - Blatt 8: *Leitfaden für das Management von RFID-Projekten*
 - Blatt 9: *Einsatz der Transpondertechnologie in der Getränkelogistik*
 - Blatt 10: *Abnahmeverfahren zur Überprüfung der Leistungsfähigkeit von RFID-Systemen*
 - Blatt 11: *Leitfaden zur Transpondertechnologie unter Sicherheitsaspekten*

Literaturhinweise

- Eldor Walk:
RFID Standards 2006
 - Ident Jahrbuch 2006, S. 54-61
 - www.ident.de



- Klaus Finkenzeller:
RFID-Handbuch
Grundlagen und praktische Anwendungen
induktiver Funkanlagen, Transponder und
kontaktloser Chipkarten
 - 3. Auflage, Carl-Hanser-Verlag, München,
ISBN 3-446-22071-2
 - www.rfid-handbook.de



Literaturhinweise

- AIM Kompetenzzentrum AutoID
 - www.kompetenzzentrum-autoid.de
 - www.aim-d.de



Vielen Dank!