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SEVENTH FRAMEWORK PROGRAMME THEME 7 Transport including Aeronautics



Project acronym: **SMART-CM**
 Project full title: **SMART Container Chain Management**

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Table of Contents

Business Plan for a CEN Workshop Agreement on <i>Container Security & Tracking Devices'</i> (CSD) <i>technical characteristics and Security status messages standardization</i>	3
1. Introduction.....	3
2. Workshop proposers.....	5
3. Workshop Objectives	6
4. CEN Workshop Work Programme	9
4.1 Timetable.....	9
4.2 Workshop Organization	9
4.3 Resources	10
4.4 Related activities.....	10
4.5 Contact points.....	10
ANNEX.....	11
RELATED INFORMATION AND STANDARDIZATION ACTIVITIES	11
A. LIAISON LIST CEN WORKSHOP	11
B. BACKGROUND	12
1. Authorized Economic Operator (AEO).....	12
2. Secure Trade Lanes (STL) / Green Lanes.....	12
C. DEFINITIONS	13
1. Neutrality.....	13
2. Information Gateway	13
3. Interoperability.....	13
4. One-stop-shop	13
C. STANDARDIZATION EFFORTS IN THE FIELD	14
1. AFNOR	14
1.1. Information exchange standards.....	14
1.2. RFID.....	16
2. Bureau International des Containers et du Transport Intermodal (B.I.C.).....	19
2.1. BIC-CODES.....	19
3. CEN - European Committee for Standardization	20
3.1. RFID Support Action Project (EC & CEN)	21
3.2. SECCONDD Project (THALES – SELENIA – COTECNA – HMRC – CEN)	21
4. CENELEC - European Committee for Electrotechnical Standardization	23
4.1. RFID.....	23
5. EIA – European Intermodal Association	24
6. ETSI – European Telecommunications Standard's Institute	25
6.1. RFID.....	25
7. GS1.....	27
7.1. GS1 Traceability standard	27
8. International Standards Organization (ISO)	30
8.1. Information exchange standards.....	30
8.2. RFID.....	31
8.3. E-SEALS	39
9. World Customs Organization (WCO).....	41
9.1. WCO SAFE Framework.....	41
1.1. WCO Data Model.....	41
1.2. WCO Unique Consignment Reference (UCR)	42

Business Plan for a CEN Workshop Agreement on *Container Security & Tracking Devices' (CSD) technical characteristics and Security status messages standardization*

1. Introduction

With millions of containers crossing the globe, carriers have to set up communication with thousands of service providers one by one. There are great differences in the actual circumstances of each actor in the logistics chain, be it transporter, logistic service provider or authorities like the customs. These actors have different processes, network infrastructure, in-house platforms and information technologies. It is nearly impossible for a single enterprise to make (EDI) connections with all relevant actors using thousands of depots and terminals in a short period under limited cost. Moreover, the issue and function of container security compliance is currently performed based on information provided by the actors in the chains, in accordance to the applied rules and regulations.

The time, efforts and failure risks involved of information availability in general and data exchange in specific affect physical transport mode choices and digital data transport. It brings great challenges to clarify the location and contact corresponding trading partners to recover data transport more reliable and in a shorter time. In addition, there exist many kinds of standards concerning data interchange, as well as private formats of EDI message by depots and terminals, as well as any other UN/EDIFACT, ANSI X12, XML and various other standards. Currently, the information system of a carrier has to possess the ability to process different data formats. In order to guarantee a unified enterprise information system, message processing in a carrier system has to add more business logic to deal with different standard parameters from incoming data.

The proposed CEN Workshop is a logical part of [SMART-CM](#) project (SMART Container Chain Management), a research project co-funded by the 7th Framework Programme of the European Commission and partners from freight-related industries with the objective to develop an IT platform that enables neutral, secure and interoperable B2B and B2A data exchange in global door-to-door container transport management.

This CEN workshop Business Plan has been developed following discussions within the research consortium but also with key stakeholders, including representatives of European associations.

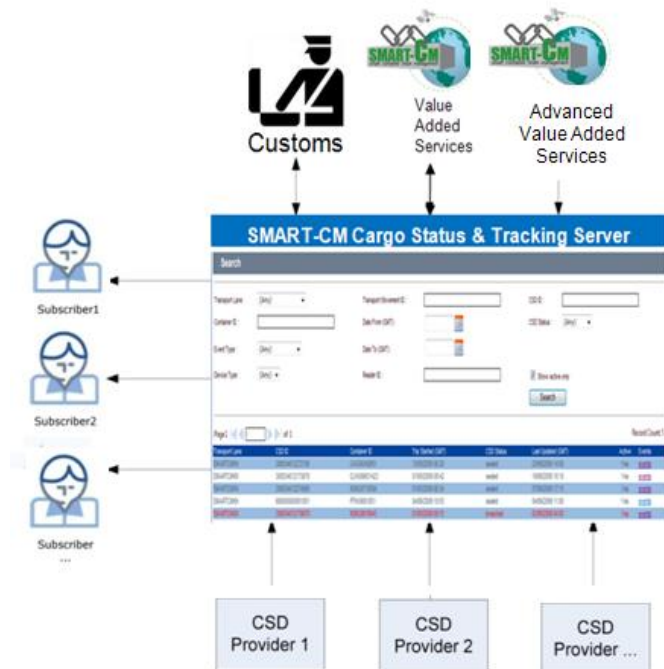
The SMART-CM project has undertaken a comprehensive review of the entire container door-to-door transport chain so that to help make it more efficient, secure, market driven and competitive as well as more environmentally friendly. The benefits of supply chain security realized by the SMART-CM platform could be summarized as an improved legal basis, increased reliability, quick response, improved flexibility, and risk management improvement. More specifically, research within SMART-CM has facilitated the development, demonstration and evaluation of new concepts and processes that will improve the efficiency, user friendliness and quality of service of existing door-to-door container transport chains operating in different environments and conditions and using a range of technologies and organizational blueprints.

A service neutral platform has been developed enabling secure and interoperable B2B and B2A data communications in global door-to-door container transport management, using existing track & trace technologies (GPS, RFID, satellite oriented), while offering a single window for future ICT technologies. The SMART-CM platform enables efficient interfaces in the entire global supply chain providing a channel of communication between Shippers, Logistics Service Providers, Transport Service Providers, Port Authorities with Terminal Operators, AEO agents and Customs together with containers position and condition information from CSD providers.

SMART-CM is a layered platform consisting of a neutral layer for its functioning and at the same time different secure interoperable layers. Customs receive via the SMART-CM platform container security status information throughout its door-to-door trip. What is more, by combining information derived from the Container Security Status Devices and the Entry Summary Declaration on consignment data, through its foreseen ICS-SEAP service, the SMART-CM platform becomes a one-stop shop solution for communicating ENS declarations to EU customs. The customs import control clearance processes are thus accelerated.

Value added services, as a result of (pre) agreements on critical information exchange, built on top of the neutral layer improve the efficiency of the platform by combining different sources of information and providing users with enhanced information. Examples of such services include possible updates on ETA (Estimated Time of Arrival), monitoring of the transport chain and reporting on deviations, exception handling mechanisms to ensure that the proper set of information will reach the responsible stakeholder. Visibility components developed on top of the other two layers increase user friendliness and provide a common means for user interaction with the platform.

Regarding the geo-political context, we stress that Art. 35 of the Treaty of Rome emphasize the importance of standardization in freight transport to ensure the interoperability of networks and freight systems.



2. Workshop proposers

The Workshop is proposed by the SMART-CM consortium.

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3. Workshop Objectives

By reducing the complexity while increasing visibility of supply chains through standardization and integration of information systems, organizations can achieve better cross-border trade services and increase productivity. Within SMART-CM subtask 1.2.2, it is stressed that further standardization regarding information exchange is a key. Management and process point of view, current administrative processes regarding information exchange and improvement of “interoperability” between authorities (customs) and market players (transport & logistics) need to be further streamlined and therefore standardized. An added-value of the SMART-CM project is its standardization proposals for global container supply chain management, covering both process and message standardization as summarized in the table below.

Identified Bottlenecks	SMART-CM Objective
Container Devices Technical Characteristics	<ul style="list-style-type: none"> Major CSDs KPIs for fulfilling security requirements e.g.: <ul style="list-style-type: none"> Ease of use (method and place of attachment) Durability Battery duration and recharging potential Reliability in terms of <ul style="list-style-type: none"> % of CSD messages and alerts captured % of time CSD is working in total trip Location accuracy signal % false alerts Average difference event time-message or alert capture time
Information exchange standards on container security status	<ul style="list-style-type: none"> Standardize status messages by e-seals (CSD or RFID) for: <ul style="list-style-type: none"> Authorized Opening Authorized Closing Intermediate customs authorized opening Safe- Activation Safe-update Safe-open Safe-close Safe-deactivation Intruded- breach Intruded-close Intruded-update
Information exchange standards with existing platforms	<ul style="list-style-type: none"> Implement a dialogue with the industry focusing on getting input: <ul style="list-style-type: none"> Enhanced platform interconnectivity Value added Service external communications

The SMART-CM project, through the real life testing of the applications it has developed, concluded on lack of standardization on two major subjects:

- Key Performance Indicators for Container Tracking & Security devices in fulfilling security requirements, and
- Messages for communicating the container security status by these devices.

In the context of the CEN standardization workshop, the SMART-CM consortium also wishes to start a dialogue with the industry in order to achieve interconnectivity with existing internal to industry information systems in order to acquire input information and to output information that relates to SMART-CM developed value added services.

The objective is not to replicate other standards - there are sufficient base documents available or en route such as (GHG) Protocols or the CEN/ISO efforts. Issues are or should be

(a) a *consistent interpretation* of the base standards (that are generic to all industries) into sector specific 'operating manuals' - much has been done on this already but at least as much still remains to be done. (b) There is a critical need for a mechanism to ensure qualified exchange of data across shared working environments with multiple stakeholders/suppliers/clients; ensuring data are dependable/validated while protecting the commercial confidentiality interests of the actors.

Taking the above into account, the SMART-CM project has applied the following strategies in its implementation:

Architecture point of view, neutrality in information provision is identified as a major component for processes easiness and good level of acceptance from the authorities. Neutrality will allow pursuing a certain common standard in data/information quality. As explained in the Smart DoW document; neutrality implies the possibility of applying the "umbrella" architecture envisioned by the SMART-CM consortium.

Conceptual point of view, the CWA should cover the requirements for harmonization of interfaces between CSD (Container Security Devices) and a "common neutral layer" for quick communication to relevant stakeholders (container owners, CSD equipment suppliers; insurance companies, customs authorities). The CWA should permit a quasi-holistic approach for container equipment and facilities (but not working procedures at this stage). Consensus is required regarding the features of container-related data. Major pursuit is to facilitate standardization and neutrality, calling for investigation of the relation between user needs and SMART-CM architecture.

Protocol point of view, consensus should be reached on the content of Container Security Device (CSD) messages in case of:

- ✓ Authorized Closing
- ✓ Authorized Opening
- ✓ Breach (Real or False Alarm)
- ✓ Customs check during a container trip
- ✓ Service oriented and security oriented information (shock, temperature, humidity, nuclear, etc)

The discussions should also take into account any possible need for standard message format (fields), which has been stressed during a SMART-CM expert review meeting (noting WCO regulations). While the neutral part of the (visibility) infrastructure provides a unified, interface for the transmission of the neutral security status information, the *business* component provides a broader range of available status information. These are potentially suitable for applications that do not share the stringent security requirements of customs operations.

The objectives proposed will have to:

- provide stakeholders with a preliminary standard to be used in setting requirements for relevant installations in the international supply chain;
- facilitate international exchange and collaboration;
- implement, maintain and continually improve goods data devices and their use;
- ensure correct interface, protection and authentication, using set formats;
- demonstrate conformity between clients and authorities;
- specification of standardized vis-à-vis neutral security related information;
- establish a management system to minimize risk to goods carried by containers and to enhance security;
- carry out a self-assessment of the required conformity;

- improve performance through the adoption of recognized good practice, product requirements and testing methods;
- Increase awareness and adoption of best system approaches within the sector;
Promote training and learning.

It is envisaged to widely use the CWA and collect useful feedback during 2 or 3 years, which will then help later on to draft a more detailed and more definitive standard of worldwide impact. The proposed CEN Workshop Agreement (CWA) is foreseen in this case a first step prior to international standardization in ISO.

Symbolic visualization of Smart-CM objectives:



4. CEN Workshop Work Programme

The Kick-Off Meeting of the CEN Workshop will be held at the CEN premises in Brussels. Though it will be open to any interested party, a list of relevant stakeholders to be invited will be prepared by the Chairman (annex).

Following approval of the Business Plan at the Workshop kick-off meeting, interested parties will need to register at the CEN Workshop Secretariat. Participation in the CEN Workshop will remain open to additional interested parties until the end of the public consultation phase.

4.1 Timetable

The following timetable may have to be adjusted due to potential progress deviations.

- Kick-off Meeting: September 2010
- First CEN Workshop Plenary: September 2010
- Second CEN Workshop Plenary Meeting: .. 2010
- Draft Agreement published for comments: .. 2010
- Final Workshop Plenary: .. 2011
- CWA approved by Workshop participants electronically; published: .. 2010

The language of the CEN workshop and its documentation will be English.

4.2 Workshop Organization

The EIA, with assistance from other companies and national and international organizations, will provide expertise and will seek consensus on the precise scope and content of the document. A Chair and Vice-Chair are proposed to be appointed, subject to the approval of the Kick-Off meeting:

Proposed Chair: Mr Jörg Bebie, ICM AG, Switzerland (www.icm-ag.com/en)

Proposed Vice-Chair: Mr. Peter Wolters, EIA, Brussels (www.eia-ngo.com)

Main responsibilities of the Workshop Chair:

- ☐ To preside at the Workshop plenary meetings
- ☐ To manage the consensus building process

The responsibility of the Workshop Vice-Chair is the following:

- ☐ The Vice-Chair will support and assist in all responsibilities outlined for the chair. In the absence of the Chair, the Vice-Chair will represent the CEN Workshop at outside meetings

in cooperation with CEN Management Centre and will interface with CEN/CMC regarding strategic directions, problems arising, external relationships, etc.]

SNV (Swiss CEN Member) will play the role of the Secretariat of the Workshop subject to the endorsement of the Kick-Off meeting.

The following activities will be carried out by the Workshop Secretariat:

- ☐ registration of WS participants
- ☐ organizing WS plenary meetings (electronically)
- ☐ producing WS meeting reports and action lists
- ☐ administrative contact point for WS
- ☐ managing WS membership lists
- ☐ managing WS document registers
- ☐ follow-up of action lists.
- ☐ consolidate the comments received on the draft during the enquiries and send them to the participants for discussion and resolution.
- ☐ send comments resolution reports to participants and people who have made them.
- ☐ checking conformity of draft to CEN rules

4.3 Resources

The main funding for the “fixed cost” of this Workshop will be provided by the budget of the FP7 SMART-CM project and sub-contracted by CEN to SNV. A general overview of costs and requested EC contribution is available (project coordinator CERTH).

Additional resources are proposed to be derived from fees paid by registered participants. A possible fee for the whole duration of the CEN Workshop would be reasonable at this stage. Normally this is one fee per company or organization, while there is no restriction on numbers attending.

4.4 Related activities

This CEN Workshop will ensure liaisons on ad hoc basis, with the relevant CEN committees and ongoing initiatives (read annex).

4.5 Contact points

Proposed Chair:

- ICM AG (former Swiss CEN stakeholder active within automatic identification technology areas – member EIA). Email j.bebie@icm-ag.com
- Proposed Vice-Chair: peter.wolters@eia-ngo.com

CEN representative: Alain.Dechamps@cen.eu

CEN Workshop Secretariat: rolf.widmer@snv.ch

ANNEX

RELATED INFORMATION AND STANDARDIZATION ACTIVITIES

A. LIAISON LIST CEN WORKSHOP

The Smart-CM / CEN Workshop will ensure liaisons on an ad-hoc basis with the following entities, for which the Workshop is open as well:

- ✓ CEN TC225
- ✓ CEN TC278
- ✓ ISO (exact TC's e.g. 204 to be decided in later stage)
- ✓ UN/CEFACT TBG3
- ✓ RFID / GRIFS (coordinated by GS1, ETSI and CEN)
- ✓ ETSI TISPAN

An invitation will be forwarded to the following participants (list is non-exhaustive)

- ✓ Smart-CM project partners
- ✓ Selection EIA members (specifically port-hinterland)
- ✓ Selection members UIRR (operators), CLECAT (LSP) and other relevant EU federations
- ✓ Technical Committee of the Common Framework for ICT Initiative (Freightwise; Euridice, Integrity; SmartFreight). Participants are key partners of the projects that are responsible for architecture design in these EU projects. This T-Committee will release a document on the feasibility and the technical content of a Common Framework based on the work already done in each one of the projects.
- ✓ CSD / T&T application suppliers.
- ✓ ...

B. BACKGROUND

1. Authorized Economic Operator (AEO)

There are three types of AEO, namely the “Customs simplifications” and “Security & safety” type, as well as their combination in a “full” version. The comparison serves as a basis for further development of reciprocal standards and systems for securing and facilitating legitimate trade on both sides of the Atlantic, building on similarities in business partner requirements. This AOA concept offers significant time savings. Companies with AEO status are considered trustworthy partners for customs authorities. This due to the fact that the AEO certificate holders are audited on compliance with security and other customs relevant standards. It is the intention of European customs authorities to grow in *system based controls* instead of transaction based controls.

2. Secure Trade Lanes (STL) / Green Lanes

Secure operators shall enjoy preferential treatment through facilitation and simplification of security control measures during inspections. The SMART-CM neutral layer component collects container-tracking information and generates a single “standardized” message structure that can be provided to the customs with the aim of facilitating the implementation of the Secure Trade Lane (STL) concept. Customs need to know if there has been a breach. We need to have the possibility to organize our controls to counter the breach. The next port of call (or hub) has to be warned that there is a breach within the shortest delays technically possible so that necessary action can be taken. We need the assurance that there is no breach: we need a *status update* that the container is not tampered with. This is necessary to have the guarantees for our Smart Green Lane.

C. DEFINITIONS

1. Neutrality

Neutrality in information provision is identified as a major component of supply chain processes' simplification and achieving of acceptability by customs authorities. Neutrality will allow pursuing a certain common standard in data/information quality. As explained in the SMART-CM project's Description of Work document, neutrality implies the possibility of applying the "umbrella" architecture envisioned by the SMART-CM consortium. The SMART-CM Neutral Layer has two main characteristics that make it neutral:

- i. It has no bias towards specific CSD technology provider,
- ii. It has a neutral implementation, i.e. testing of data integrity along the whole process of security related container info gathering.

2. Information Gateway

An important element within STL is an 'Information Gateway': it provides an entry point for status information from a variety of available sources, including container security devices/e-seals and RFID infrastructure, as well as Port MIS or fleet management systems. The core of this information is provided by the container security devices (CSDs) or e-seals that are attached on containers and are aggregated through the respective vendors. The neutral layer component of the information gateway collects this information and generates a single message structure that can be provided to customs with the aim of facilitating STL implementation. **Movements Reference Number (MRN)**: as the container reference will be the main correlation between cargo information and security information, the SMART-CM platform accommodates for the appropriate actions that need to be taken to assure data quality of this reference, i.e.:

- container number should be validated according to the ISO 6346 coding standard
- truncation
- Structure of the container reference: four letters; six digits; check Digit.

3. Interoperability

Security is approached around two major axes, namely standardization and neutrality. The neutral character of the SMART-CM platform also implies interoperability as requirement. The number of parties connected to the information gateway could and should be unlimited. Therefore the integration effort (technical thresholds) with other systems should be kept low. The provision of standardized and neutral security-related information along the whole container route has certain prerequisites. The very first one is to take into account the major recorded up-to-date trends, namely horizontal supervision and inter-governmental information exchange.

4. One-stop-shop

The value added services are built on the information provided from the gateway and the mapping infrastructure provided by the visibility layer to develop additional functionality of interest to the industrial partners. Examples of value-added services include event handling, ETA estimation, deviation from expected (route or time of arrival alerts) and effective management and utilization of resources.

C. STANDARDIZATION EFFORTS IN THE FIELD

The most relevant standardization in the field, are listed below in alphabetical order of the relevant organization.

1. AFNOR

AFNOR is an international services delivery network that revolves around 4 core competency areas: standardization, certification, industry press, and training.

The AFNOR has the unique stance of carrying out its standardization mission as a public-benefit organization while conducting some of its business in the competitive arena.

Considering the SMART-CM standardization objectives, potential interesting standards are listed below.

1.1. Information exchange standards

1.1.1. European and French standards

NF X50-600

March 2006

Logistics management - Logistic approach and supply chain management.

ID number: X50-600 **Status:** Approved Standard

XP PR EN 9134

August 2005

Aerospace series - Quality systems - Supply chain risk management guideline

ID number: L00-106 **Status:** Experimental standard

1.1.2. International Standards

ISO 17363:2007

July 2007

Supply chain applications of RFID - Freight containers

ISO 17364:2009

November 2009

Supply chain applications of RFID - Returnable transport items (RTIs)

Status: International Standard

ISO 17365:2009

November 2009

Supply chain applications of RFID - Transport units

Status: International Standard

ISO 17366:2009

November 2009

Supply chain applications of RFID - Packaging

Status: International Standard

ISO 17367:2009

November 2009

Supply chain applications of RFID - Labeling

Status: International Standard

ISO 28000:2007

September 2007

Specification for security management systems for the supply chain

Status: International Standard

ISO 28001:2007

October 2007

Security management systems for the supply chain - Best practices for implementing supply chain security, assessments and plans - Requirements and guidance

Status: International Standard

ISO 28003:2007

August 2007

Security management systems for the supply chain - Requirements for bodies providing audit and certification of supply chain security management systems

Status: International Standard

ISO 28004:2007

October 2007

Security management systems for the supply chain - Guidelines for the implementation of ISO 28000

Status: International Standard

ISO/PAS 28005-2:2009

October 2009

Security management systems for the supply chain - Electronic port clearance (EPC) - Part 2: Core data elements

Status: Public Specification

1.1.3. Pending ISO standard

ISO/DIS 28005-2

May 2010

Security management systems for the supply chain - Electronic port clearance (EPC) - Part 2: Core data elements

Status: Pending

1.1.4. Publications EFQM

5236642FN

PST for supply chain management

1.1.5. Foreign Standards

ASTM F 2725

2008

Title: Standard Guide for European Union's Registration, Evaluation, and Authorization of Chemicals (REACH) Supply Chain Information Exchange

SAE ARP 9134

March 2004

Title: Supply Chain Risk Management Guidelines

TS Q 0011

June 2009

Title: Requirement of organization for supply chain system standards formulation and maintenance.

VDI 4472/F1

April 2006

Title: Requirements to be met by transponder systems for use in the supply chain - General

VDI 4472/F12

January 2010

Title: Requirements to be met by transponder systems (RFID) for use in the supply chain - Use of transponder systems to support traceability in the automotive supply chain.

1.2.RFID

1.2.1. European and French Standards

NF EN 50357

November 2002

Evaluation of human exposure to electromagnetic fields from devices used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications

ID number: C99-102 **Status:** Approved Standard

NF EN 50364

November 2002

Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications

ID number : C99-110 **Status:** Approved Standard

NF ISO 24631-1

November 2009

Radiofrequency identification of animals - Part 1 : evaluation of conformance of RFID transponders with ISO 11784 and ISO 11785 (including granting and use of a manufacturer code)

ID number: U05-004-1 **Status:** Approved Standard

NF ISO 24631-2

November 2009

Radiofrequency identification of animals - Part 2 : evaluation of conformance of RFID transceivers with ISO 11784 and ISO 11785

ID number: U05-004-2 **Status:** Approved Standard

NF ISO 24631-3

November 2009

Radiofrequency identification of animals - Part 3 : evaluation of performance of RFID transponders conforming with ISO 11784 and ISO 11785

ID number: U05-004-3 **Status:** Approved Standard

NF ISO 24631-4

November 2009

Radiofrequency identification of animals - Part 2 : evaluation of conformance of RFID transceivers with ISO 11784 and ISO 11785

ID number: U05-004-4 **Status:** Approved Standard

FD Z63-500

December 2006

Automatic identification techniques - Identification by radiofrequency - Principle and applications

ID number: Z63-500 **Status:** Documentation

NF EN 302208-1

January 2010

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 - Part 1 : technical requirements and methods of measurement (V1.2.1)

ID number: Z84-208-1 **Status:** Approved Standard

NF EN 302208-2

February 2005

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 - Part 2 : harmonised EN under article 3.2 of the R&TTE Directive (V1.1.1)

ID number: Z84-208-2 **Status:** Approved Standard

NF EN 62369-1

August 2009

Evaluation of human exposure to electromagnetic fields from short range devices (SRDs) in various applications over the frequency range 0 GHz to 300 GHz - Part 1: Fields produced by devices used for electronic article surveillance, radio frequency identification and similar systems

ID number: C99-102 **Status:** Approved Standard

NF ISO 11784

June 1997

Radio-frequency identification of animals - Code structure.

ID number: U05-001 **Status:** Approved Standard

Modified Document: NF ISO 11784/A1:March 2006 (U05-001/A1)

1.2.2. Pending Standards**PR NF EN 50364**

January 2009

Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications

ID number: C99-110PR **Status:** Pending

1.2.3. International CEI standards**CEI/TR 62540:2009**

November 2009

Radio frequency identification (RFID) of stationary lead acid cells and monoblocs -

Tentative requirements

1.2.4. International Standards

ISO 17363:2007

July 2007

Supply chain applications of RFID - Freight containers

Status: International Standards

ISO 17364:2009

November 2009

Supply chain applications of RFID - Returnable transport items (RTIs)

Status: International Standards

ISO 17365:2009

November 2009

Supply chain applications of RFID - Transport units

Status: International Standards

ISO 17366:2009

November 2009

Supply chain applications of RFID - Packaging

Status: International Standards

ISO 17367:2009

November 2009

Supply chain applications of RFID - Labeling

Status: International Standards

ISO 24631-1:2009

September 2009

Radiofrequency identification of animals - Part 1: evaluation of conformance of RFID transponders with ISO 11784 and ISO 11785 (including granting and use of a manufacturer code)

Status: International Standards

French ID number: NF ISO 24631-1

ISO 24631-2:2009

September 2009

Radiofrequency identification of animals - Part 2 : evaluation of conformance of RFID transceivers with ISO 11784 and ISO 11785

Status: International Standards

French ID number: NF ISO 24631-2

2. Bureau International des Containers et du Transport Intermodal (B.I.C.)

The 'Bureau International des Containers et du Transport Intermodal' (B.I.C.) was established in 1933 as 'Bureau International des Containers' by the International Chamber of Commerce (I.C.C.) in order to make business people sensitive to the development of international -and thus intermodal- transport and its practical aspects.

It has played a major role in the organization of maritime transportation with containers since the early 60's in the last century, mainly dealing with the following matters: technical control, strength, coding, identification and marking of containers and more generally the facilitation of commercial exchanges.

B.I.C. originated as early as 1970 the marking of containers with an alphanumeric, well structured and reliable owner's code, the 'BIC-CODE' system. In 1972, the International Organization for Standardization (ISO) adopted it and handed over to B.I.C. the exclusive management of the allocation of BIC-CODES for international container transport and the updating of its official Register of owners' codes.

Since the mid 80's, B.I.C. noted both in North America and in Europe the progressive development of the combined transport (rail-road then barge-road) for inland transportation. Since then, it has shifted its efforts in contributing to its harmonised development at regional and international level.

2.1.BIC-CODES

BIC-CODES, also called ISO Alpha Codes, are international identification codes for container owners. The international identification code of containers proposed by the Bureau International des Containers (B.I.C) since 1969 has been standardized by the International Organization for Standardization ([ISO](#)) in 1972. It forms an essential part of the [ISO 6346 standard](#) : « **Freight Containers - Coding, Identification and Marking** ». (This standard describes otherwise some technical complementary markings such as size and type code, country code and various operational marks).

Only ISO Alpha-codes for identification of container owners registered with B.I..C. may be used as unique identity marking of containers in all international transport and customs declaration documents.

Each BIC-CODE comprises:

- an owner/operator code of 3 letters,
- a fourth letter used as equipment identifier [\(1\)](#)
- a serial number of 6 Arabic numerals [\(2\)](#)
- a seventh digit (check digit) providing a means of validating the recording and/or transmission accuracy of the data. *Example (theoretical- for a container): **BICU** 123456*
5

3. CEN - European Committee for Standardization

CEN is a business facilitator in Europe, serving as a major provider of European Standards and technical specifications. It is the only recognized European organization according to Directive 98/34/EC for the planning, drafting and adoption of European Standards in all areas of economic activity with the exception of electro-technology (CENELEC) and telecommunication (ETSI). CEN's 31 National Members work together to develop voluntary European Standards (ENs).

The European Board for EDI/EC Standardisation (EBES) was created in July 1995 under the auspices of the European Commission's Programming Mandate on Standardisation related to Electronic Data Interchange (EDI), i.e. standards for the computer-to-computer exchange of business messages (DG III M040). As a collaborative and co-ordination structure of standardisation of EDI in Europe hosted and supported by CEN, EBES took over the responsibilities of the former Western European EDIFACT Board, providing a European focal point for the standardization of EDI messages. At the same time, EBES gradually broadened its activities into Electronic Commerce, in collaboration with and through the input of delivery mechanisms such as CEN Technical Committees (TCs) and the EWOS (European Workshop for Open Systems) Expert Group on EDI.

In 1997, CEN created the Information Society Standardization System (ISSS) as the focus for its information and communications technology activities. CEN/ISSS has initially focused on the development of EDI-based standards in the area of eBusiness. However, after the introduction of the ebXML framework, its focus shifted towards the development of XML-based standards. Initiatives launched over time include the Electronic Commerce Workshop that involved over 120 registered participants, promoting the eXtensible Markup Language (XML) for EDI, placing focus on voluntary electronic commerce standardisation in Europe.

CEN organized in 1999 a workshop on Intermodal and Interoperable Transport hosted and supported by the European Commission, Transport Directorate General. The scope of the workshop was to consider the future needs for standardization in order to operate a seamless intermodal transport system for freight in Europe. Topics discussed:

- Freight transport and future needs for harmonization of standardization
- Transport logistics
- Information systems
- Terminals

Conclusion: the workshop identified a number of practical and legal problems for both EDIFACT and CEN/TC 278. The workshop recommended that interested parties take more part in and ensure the coherent ongoing standardization of freight transport IT. In the debate it became clear that a number of public and private research projects were performed without contact to the ongoing standardization process.

<http://www.cen.eu/cenorm/sectors/sectors/transportandpackaging/intermodal+and+interoperable/index.asp>

In terms of its involvement in eBusiness, CEN has formed the "eBusiness Board for European Standardisation" (eBES). The respective Workshop (WS/eBES) has been initiated with the objective of defining the guidelines for the implementation of electronic business through the use of modelling and XML, based on the work of ebXML and taking into account the work

done in UN/CEFACT. Specific Work Groups are formed to deal with specific standards issues and produce/review DMRs within their field, including WG EEG2/TBG3 Europe in Transport.

Another relevant CEN Technical Committee is CEN/TC 320 “Logistics”.

3.1.RFID Support Action Project (EC & CEN)

The Global RFID Interoperability Forum for Standards (GRIFS) is a Support Action Project funded by the European Commission with the aim to improve collaboration and thereby to maximise the global interoperability of RFID standards. The GRIFS is a two-year-project coordinated by GS1, ETSI (European Telecommunications Standards Institute) and CEN (European Committee for Standardization). It started in January 2008. The GRIFS project will initiate a forum that will continue to work constructively and grow after the end of the project through a Memorandum of Understanding (MoU) between key global standard organisations active in RFID. www.grifs-project.eu

The scope of this MoU is to establish a framework to promote global cooperation between those Organisations by early 2010, so that synergy is achieved. GRIFS developed and implemented a comprehensive online database providing short descriptions and status information of RFID related standards. This interactive “wiki-style” database is expected to yield significant savings in research time for many involved parties, as it chronicles existing standards at global level. CEN is currently completing this, intending to proceed to an extended version of MoU on global standards collaboration.

Furthermore, always in the RFID context, work is done on mandate M/436, with contractual funding pending. M/436 was received by CEN, CENELEC, and ETSI (ESOs) in December 2008 on Information and Communication Technologies applied to RFID systems. The mandate addresses data protection, privacy and information security aspects of RFID. It complements the existing legal framework. Furthermore, the mandate invites the ESOs to develop sector-specific RFID implementation guidelines, as complementary documents.

The mandate asks the ESOs to execute the work in two phases:

- Phase 1: the development of a detailed standardization work programme of RFID standards;
- Phase 2: the implementation of the standardization work programme as defined and agreed upon in Phase 1.

As of March 2009, ESOs were discussing the creation of a Coordination Group to prepare Phase 1 work programme comprising representatives of a number of TCs.

3.2.SECONDD Project (THALES – SELENIA – COTECNA – HMRC – CEN)

The SECure Container Data Device standardisation Project (SECONDD), co-financed by the EC in the framework of PASR (the Preliminary Action on Security Research), represents an integrated effort aimed at the initiation of international standardisation of the *technical interface* between:

- A secure container or vehicle;
- A data reader at a port or border crossing

This interface is viewed as the enabler of law enforcement in practice, with trade officials reading security data, including stored information from internal security / location sensors.

Beyond the context of safety inspections, this interface is intended to be applied in a cargo tracking system, providing data for automated cargo handling systems.

Entailed technology is expected to increase protection against smuggling and theft, through the use of “internal” security, i.e. placing a number of sensors within lorries / containers (e.g. door opening, positioning, temperature, humidity, light, movement etc) and utilising data storage / communication facilities. This functionality will mainly reside in a so-called “Goods Data Device” (GDD), in great resemblance to the CSD applied in terms of SMART-CM. The GDD is to hold containers’ security status and security history, as well as consignment data.

Similarly to the MRN concept of SMART-CM, in this case a so-called “Goods Identity Number (GIN)” is generated when data are loaded on the GDD (container ready for dispatch). GDD is viewed as part of a comprehensive supply chain security approach. Its proposed design reflects requirements over environmental and other conditions, apart from speed in response. In terms of communication range:

- Short-range communication involves GDD interrogators, ports/border stations
- Long-range communication links to a control centre via GSM/GPRS

The interfaces between the GDD and its interrogator or a control centre are being standardised by SECCONDD. The Project initially worked with CEN with a view to work subsequently with ISO to develop at worldwide level, resulting to the ISO/TC 104 Technical Committee on freight containers. Three sub-committees have been distinguished to this end, namely SC 1, 2 & 4 on general/specific purpose containers and identification & communication respectively.

The Project’s Final Report (produced in July 2007) is accompanied by 3 Annexes, with the 1st one including an analysis of the specific recommended interface standard per major prescribed component (layer), i.e.

- Application layer (flexible data format & message sequence to/from the GDD)
- Protection & Authentication layer (check that GDD is original & data status)
- Intermediate layer (handle protocols on combined data link/network/transport)
- Physical layer (two cases of communication, short/long range links, based on IEEE 802.15.4 as lower ZigBee std layers and use of GSM/GPRS respectively)

4. CENELEC - European Committee for Electrotechnical Standardization

CENELEC's mission is to prepare voluntary electrotechnical standards that help develop the Single European Market/European Economic Area for electrical and electronic goods and services removing barriers to trade, creating new markets and cutting compliance costs.

For doing this, CENELEC is strongly committed to:

- ✓ Satisfy the needs of the European industry and other stakeholders in the market place in the areas of standardisation and conformity assessment in the fields of electricity, electronics and associated technologies.
- ✓ Lead the improvement of all aspects of product quality, product safety, service quality and service safety in the fields of electricity, electronics and associated technologies, including protection of the environment, accessibility and innovation, and so to contribute to the well-fare of society.
- ✓ Support IEC, the International Electrotechnical Commission, in achieving its mission: "To be globally recognised as the provider of standards and conformity assessment and related services needed to facilitate international trade in the fields of electricity, electronics and associated technologies.

Considering the SMART-CM standardization objectives, in the following potential interesting standards are listed.

4.1.RFID

Reference	Technical Body	Title (English)
CLC/TR 50489:2006	CLC/TC 111X	Smart tracker chips - Feasibility study on the inclusion of RFID in Electrical and Electronic Equipment for WEEE management
EN 50364:2010	CLC/TC 106X	Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 300 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications
EN 50364:2001	CLC/TC 106X	Limitation of human exposure to electromagnetic fields from devices operating in the frequency range 0 Hz to 10 GHz, used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID) and similar applications
EN 50357:2001	CLC/TC 106X	Evaluation of human exposure to electromagnetic fields from devices used in Electronic Article Surveillance (EAS), Radio Frequency Identification (RFID)

5. EIA – European Intermodal Association

The EIA organized a working group "Automatic Equipment Identification/Automatic Vehicle Identification (AEI/AVI_1996), of which some elements are still valid and relevant to standardisation. Moreover, the advice of the first JAB (March 18, 2009) was to include the (intermodal) landside more intensively in Smart-CM. The general objective of the EIA working group was threefold:

- Defining state-of-the-art Telematics in the area of transport and logistics;
- Analysing current status & identifying problems/bottlenecks;
- Defining advantages and saving potential for actors in Intermodal industry.

Main handicaps in the application process of new technologies can be summarised as follows:

- International (port-hinterland / cross-border) character of intermodal transport
- Recommendations but no real decisions
- Existing situation in global standards
- No real coherence & co-operation within the supplier industry
- Mentality of European member states

Technically seen, there are a lot of solutions/systems available on the market - but only a few of them are useful for all the different Intermodal applications. To summarise the reasons:

- The systems are not in accordance with the real needs
- Insufficient performance
- No (reliable) power supply
- Not useful for harsh environment-conditions

Conclusions: the advantages gained by Telematics in intermodal transport is an increase of quality (service), decrease of costs and the replacement of paper/printed matter by EDI which makes transport information transparent and manageable. However, regarding tracking & tracing between (inland) terminals, intermodal operators and container owners, a difficulty often witnessed is the non-willingness of the before mentioned parties to invest in facilities enabling to track & trace (responders; tags in containers etc..). Open standards have to be supported.

Saving potential related to different investigated terminals and mode is available (EIA/ICM AG). An EIA recommendation at that time was to create a collaborative consortium for tracking & tracing / standardisation, where the cost of such a system would have to be covered by savings in productivity which may not be added to the rates of transports.

References

- CEN_EIA meeting, Brussels, 29/01/09
- Plenary meeting Thessaloniki 25/06/09
- CEN_EIA meeting, Brussels, 09/09/09
(Invitees: Sequoyah, ICM AG)
- General input Deutsche Post DHL

6. ETSI – European Telecommunications Standard’s Institute

The European Telecommunications Standards Institute (ETSI) produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, converged, broadcast and internet technologies.

They are officially recognized by the European Union as a European Standards Organization. The high quality of our work and our open approach to standardization has helped us evolve into a European roots - global branches operation with a solid reputation for technical excellence.

6.1.RFID

TITLE (Formal & Working)	STATUS
Doc. Nb. EN 387 018 _Ver. 0.1.0 Ref. DEN/TISPAN-07042-NGN Technical Body: TISPAN 07 Details and Download	Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); RFID Security and Privacy RFID; Security
Doc. Nb. EN 302 208-1 _Ver. 1.3.1 Ref. REN/ERM-TG34-005-1 Technical Body: ERM TG34 Details and Download	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; Part 1: Technical requirements and methods of measurement Product Standard for 2 W RFID at UHF
Doc. Nb. EN 302 208-1 _Ver. 1.2.1 Ref. REN/ERM-TG34-004-1 Technical Body: ERM TG34 Details and Download	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; Part 1: Technical requirements and methods of measurement Product Standard for 2 W RFID at UHF
Doc. Nb. EN 302 208-1 _Ver. 1.1.2 Ref. REN/ERM-TG34-003-1 Technical Body: ERM TG34 Details and Download	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; Part 1: Technical requirements and methods of measurement Product Standard for 2 W RFID at UHF
Doc. Nb. EN 302 208-1 _Ver. 1.1.1 Ref. DEN/ERM-TG34-001-1 Technical Body: ERM TG34 Details and Download	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; Part 1: Technical requirements and methods of measurement Product Standard for 2 W RFID at UHF

<p>Doc. Nb. EN 302 208-2_Ver. 1.3.1 Ref. REN/ERM-TG34-005-2 Technical Body: ERM TG34 Directives: 99/5/EC Details and Download</p>	<p>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; Part 2: Harmonized EN covering essential requirements of article 3.2 of the R&TTE Directive Product Standard for 2 W RFID at UHF</p>
<p>Doc. Nb. EN 302 208-2_Ver. 1.2.1 Ref. REN/ERM-TG34-004-2 Technical Body: ERM TG34 Directives: 99/5/EC Details and Download</p>	<p>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; Part 2: Harmonized EN covering essential requirements of Article 3.2 of the R&TTE Directive Product Standard for 2 W RFID at UHF</p>
<p>Doc. Nb. EN 302 208-2_Ver. 1.1.1 Ref. DEN/ERM-TG34-001-2 Technical Body: ERM TG34 Directives: 99/5/EC Details and Download</p>	<p>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; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive Product Standard for 2 W RFID at UHF</p>
<p>Doc. Nb. TR 187 020 Ref. DTR/TISPAN-07044 Technical Body: TISPAN 07 Details and Download</p>	<p>RFID; Coordinated ESO response to Phase 1 of EU Mandate M436</p> <p>RFID system and network security and privacy protection</p>
<p>Doc. Nb. TR 103 055 Ref. DTR/ERM-TG28-0430 Technical Body: ERM TG28 Details and Download</p>	<p>Electromagnetic compatibility and Radio spectrum Matters (ERM); Technical characteristics of Short Range Devices (SRD) and RFID in the UHF Band; System Reference document (SRdoc): Spectrum Requirements for Short Range Device, Metropolitan Mesh Machine Networks (M3N) and Smart Metering (SM) applications. SRdoc_M3N_&_SM</p>

7. GS1

GS1 is a leading global organisation dedicated to the design and implementation of global standards and solutions to improve the efficiency and visibility of supply and demand chains globally and across sectors. The GS1 system of standards is the most widely used supply chain standards system in the world.

Some of their products can be interesting for the SMART-CM standardization objectives, in particular:

- ✓ GS1 BarCodes: global standards for rapid and automatic identification of items and assets, or their location
- ✓ GS1 eCom, global standards for electronic business messaging and the rapid and accurate exchange of data between businesses
- ✓ GS1 GDSN, a standardised global environment for data synchronization between business partners
- ✓ GS1 EPCglobal, global standards for RFID-based identification of items and assets.

7.1.GS1 Traceability standard

GS1 Traceability combine GS1 products, for tracking and tracing items through the supply chain.

The GS1 Traceability defines two main categories inside the Traceability Process:

- **Traceability Partners (TP)**: entities that are part of the shipment process and that respect some rules
- **Traceability items (TI)**: a physical object where there may be a need to retrieve information about its history, application, or location. All traceable items must carry identification and be labelled, marked or tagged at the source.

The GS1 standard recommends the use of a Global Trade Item Number (**GTIN**) or Serial Shipping Container Code (**SSCC**) for this.

We can divide the traceability in two main areas:

- Internal traceability which concern TP internal processes on TI (movement, storage, destruction, etc.).
- External traceability which takes place when a TI is physically handed over from one TP to another.

In the GS1 system, the External traceability can be seen also as the communication between different platforms.

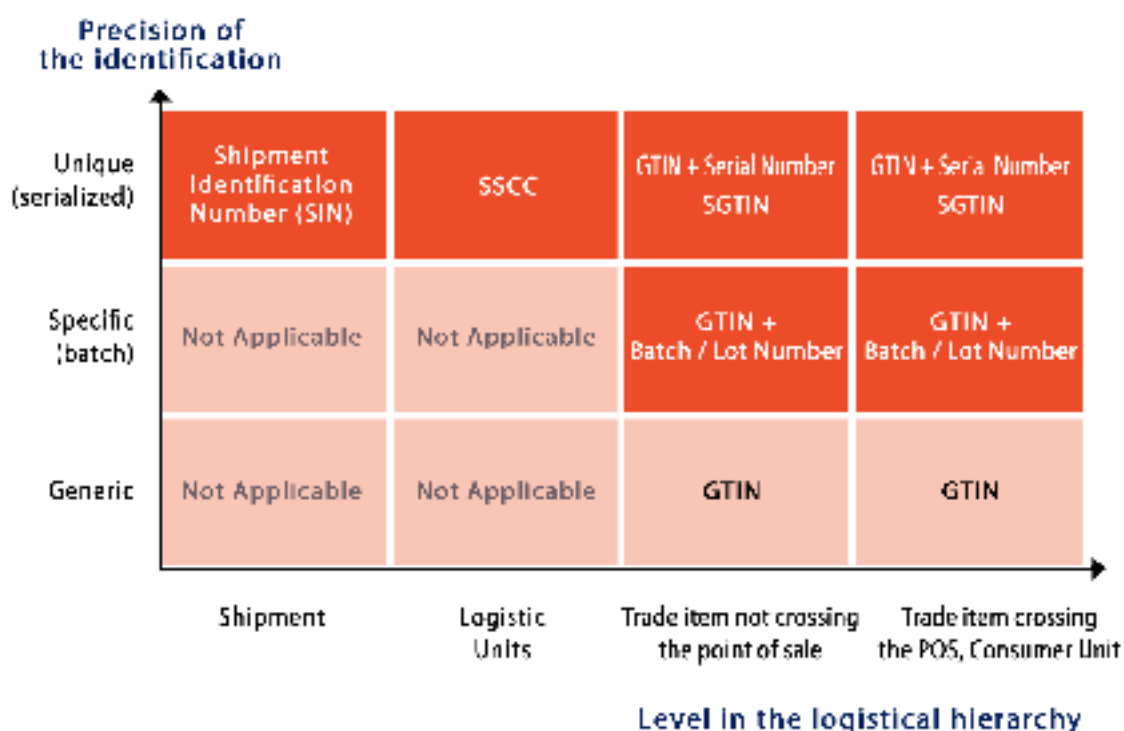
So each Traceability Partner should be able to trace back to the direct source and be able to identify the direct recipient of the traceable item: This is the "**one step up, one step down**" principle.

Traceability does not mean that every Traceability Partner must hold and publish all traceability information: however, the Traceable Item Source and Traceable Item Recipient must communicate and record the identification of at least one common level of traceable item within their respective systems. This ensures efficient information flow of data when tracing back or tracking forward.

The most relevant parts of this solution are the topics concerning information exchange standards to enhance the interconnectivity with existing platforms. In particular the GS1 XML provides a standardised and predictable structure for electronic business messages, enabling business partners to communicate business data rapidly, efficiently and accurately, irrespective of their internal hardware or software types.

The identification carrier (mark, tag, label, accompanying document) must remain on the traceable item or attached to it until the traceable item is consumed or destroyed.

The GTIN is the basis for product identification, which serves as a reference to the full body of product information. For the purpose of traceability, this may not be sufficient, requiring additional information to uniquely identify a product or grouping of products. (See Figure 1.)



- ✓ When the traceable item is a trade item:
 - The trade item identification MUST at a minimum be identified with a GTIN. For the purpose of traceability, this may not be sufficient, requiring additional information to uniquely identify a product or grouping of products such as a batch/ lot number or where appropriate, a serial number.
 - The corresponding GS1 Standards are GTIN, GTIN + Batch/Lot Number and GTIN + Serial Number/SGTIN.
- ✓ When the traceable item is a logistic unit: It MUST be uniquely identified. The corresponding GS1 Standard is the SSCC.

The GS1 standard traceability process is composed of five main sub-processes:

1. Sub-process 1: Plan and Organise

This sub-process determines how to assign, collect, share, and keep traceability data. Furthermore, it determines how to manage links between inputs, internal processes, and outputs.

2. Sub-process 2: Align Master Data

Determines how to assign identifications to the parties and physical locations, trade items and if appropriate to assets. It also determines how to exchange master data with trading partners.

3. Sub-process 3: Record Traceability Data

Determines how to assign, apply and capture traceable items identification and how to collect, share and store traceability data during the physical flow

4. Sub-process 4: Request Trace

Determines how to initiate and respond to a traceability request.

5. Sub-process 5: Use Information

enables the use of the previous processes to take appropriate action as required by legal and business requirements.

8. International Standards Organization (ISO)

The International Organization for Standardization is an international-standards-setting body composed of representatives from various national standard organizations.

ISO's main products are the International Standards. ISO also publishes Technical Reports, Technical Specifications, Publicly Available Specifications, Technical Corrigenda, and Guides. ISO has developed over 18.000 International Standards on a variety of subjects and some 1.100 new ISO standards are published every year.

Considering the SMART-CM standardization objectives, in the following, potential interesting standards are listed.

8.1.Information exchange standards

Standards
ISO 28000:2007 Specification for security management systems for the supply chain Edition: 1 Stage: 60.60 TC 8 ICS: 47.020.99 Document available as of: 2007-09-21
ISO 28004:2007 Security management systems for the supply chain -- Guidelines for the implementation of ISO 28000 Edition: 1 Stage: 60.60 TC 8 ICS: 47.020.99 Document available as of: 2007-10-12
ISO 28003:2007 Security management systems for the supply chain -- Requirements for bodies providing audit and certification of supply chain security management systems Edition: 1 Stage: 60.60 TC 8 ICS: 47.020.99 Document available as of: 2007-08-02
ISO 28001:2007 Security management systems for the supply chain -- Best practices for implementing supply chain security, assessments and plans -- Requirements and guidance Edition: 1 Stage: 60.60 TC 8/SC 11 ICS: 47.020.99 Document available as of: 2007-10-23
ISO/PAS 28005-2:2009

Security management systems for the supply chain -- Electronic port clearance (EPC) -- Part 2: Core data elements

Edition: 1 | Stage: [60.60](#) | [TC 8](#)

ICS: [35.240.60](#); [47.020.99](#)

Document available as of: 2009-10-14

[ISO/TS 22002-1:2009](#)

Prerequisite programmes on food safety -- Part 1: Food manufacturing

Edition: 1 | Stage: [90.20](#) | [TC 34/SC 17](#)

ICS: [67.020](#)

Document available as of: 2009-12-14

[ISO 17363:2007](#)

Supply chain applications of RFID -- Freight containers

Edition: 1 | Stage: [90.20](#) | [TC 122](#)

ICS: [55.020](#)

Document available as of: 2007-06-19

[ISO 22006:2009](#)

Quality management systems -- Guidelines for the application of ISO 9001:2008 to crop production

Edition: 1 | Stage: [60.60](#) | [TC 34](#)

ICS: [67.020](#); [03.120.10](#)

Document available as of: 2009-12-03

[ISO/IEC 20000-1:2005](#)

Information technology -- Service management -- Part 1: Specification

Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 7](#)

ICS: [03.080.99](#); [35.020](#)

Document available as of: 2005-12-14

8.2.RFID

[ISO/IEC 15459-2:2006](#)

Information technology -- Unique identifiers -- Part 2: Registration procedures

Edition: 2 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2006-03-06

[ISO/IEC 15459-5:2007](#)**Information technology -- Unique identifiers -- Part 5: Unique identifier for returnable transport items (RTIs)**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2007-06-15

[ISO/IEC 15459-1:2006](#)**Information technology -- Unique identifiers -- Part 1: Unique identifiers for transport units**Edition: 2 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2006-03-06

[ISO/IEC 15459-3:2006](#)**Information technology -- Unique identifiers -- Part 3: Common rules for unique identifiers**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2006-03-06

[ISO/IEC Guide 77-1:2008](#)**Guide for specification of product properties and classes -- Part 1: Fundamental benefits**Edition: 1 | Stage: [60.60](#) | [TMB](#)ICS: [25.040.40](#); [35.240.50](#)

Document available as of: 2008-01-15

[ISO/IEC 18046-3:2007](#)**Information technology -- Radio frequency identification device performance test methods -- Part 3: Test methods for tag performance**Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2007-09-13

[ISO/IEC TR 20000-3:2009](#)**Information technology -- Service management -- Part 3: Guidance on scope definition and applicability of ISO/IEC 20000-1**Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 7](#)ICS: [03.080.99](#); [35.020](#)

Document available as of: 2009-10-14

[ISO/IEC 15459-4:2008](#)**Information technology -- Unique identifiers -- Part 4: Individual items**Edition: 2 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2008-07-02

[ISO/IEC 15459-8:2009](#)**Information technology -- Unique identifiers -- Part 8: Grouping of transport units**Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2009-08-31

[ISO/IEC 18046:2006](#)**Information technology -- Automatic identification and data capture techniques -- Radio frequency identification device performance test methods**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2006-10-17

[ISO/IEC 15962:2004](#)**Information technology -- Radio frequency identification (RFID) for item management -- Data protocol: data encoding rules and logical memory functions**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2004-10-18

[ISO/IEC 15961:2004](#)**Information technology -- Radio frequency identification (RFID) for item management -- Data protocol: application interface**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2004-10-18

[ISO 17363:2007](#)**Supply chain applications of RFID -- Freight containers**Edition: 1 | Stage: [90.20](#) | [TC 122](#)ICS: [55.020](#)

Document available as of: 2007-06-19

[ISO 17364:2009](#)**Supply chain applications of RFID -- Returnable transport items (RTIs)**

Edition: 1 | Stage: [90.92](#) | [TC 122](#)

ICS: [55.020](#)

Document available as of: 2009-11-04

[ISO 17365:2009](#)

Supply chain applications of RFID -- Transport units

Edition: 1 | Stage: [90.92](#) | [TC 122](#)

ICS: [55.020](#)

Document available as of: 2009-11-04

[ISO 17367:2009](#)

Supply chain applications of RFID -- Product tagging

Edition: 1 | Stage: [90.92](#) | [TC 122](#)

ICS: [55.020](#)

Document available as of: 2009-11-04

[ISO/IEC TR 24729-2:2008](#)

Information technology -- Radio frequency identification for item management -- Implementation guidelines -- Part 2: Recycling and RFID tags

Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2008-04-08

[ISO/IEC TR 24729-3:2009](#)

Information technology -- Radio frequency identification for item management -- Implementation guidelines -- Part 3: Implementation and operation of UHF RFID Interrogator systems in logistics applications

Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2009-05-18

[ISO/IEC TR 24729-1:2008](#)

Information technology -- Radio frequency identification for item management -- Implementation guidelines -- Part 1: RFID-enabled labels and packaging supporting ISO/IEC 18000-6C

Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2008-04-08

[ISO 24631-1:2009](#)

Radiofrequency identification of animals -- Part 1: Evaluation of conformance of RFID transponders with ISO 11784 and ISO 11785 (including granting and use of a

manufacturer code)Edition: 1 | Stage: [60.60](#) | [TC 23/SC 19](#)ICS: [65.040.99](#)

Document available as of: 2009-08-21

[ISO 24631-2:2009](#)**Radiofrequency identification of animals -- Part 2: Evaluation of conformance of RFID transceivers with ISO 11784 and ISO 11785**Edition: 1 | Stage: [60.60](#) | [TC 23/SC 19](#)ICS: [65.040.99](#)

Document available as of: 2009-08-21

[ISO 24631-4:2009](#)**Radiofrequency identification of animals -- Part 4: Evaluation of performance of RFID transceivers conforming with ISO 11784 and ISO 11785**Edition: 1 | Stage: [60.60](#) | [TC 23/SC 19](#)ICS: [65.040.99](#)

Document available as of: 2009-08-21

[ISO 24631-3:2009](#)**Radiofrequency identification of animals -- Part 3: Evaluation of performance of RFID transponders conforming with ISO 11784 and ISO 11785**Edition: 1 | Stage: [60.60](#) | [TC 23/SC 19](#)ICS: [65.040.99](#)

Document available as of: 2009-08-21

[ISO/IEC 19762-3:2008](#)**Information technology -- Automatic identification and data capture (AIDC) techniques -- Harmonized vocabulary -- Part 3: Radio frequency identification (RFID)**Edition: 2 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#); [01.040.35](#)

Document available as of: 2008-06-11

[ISO 17366:2009](#)**Supply chain applications of RFID -- Product packaging**Edition: 1 | Stage: [90.92](#) | [TC 122](#)ICS: [55.020](#)

Document available as of: 2009-11-04

[ISO/TS 10891:2009](#)**Freight containers -- Radio frequency identification (RFID) -- Licence plate tag**

Edition: 1 | Stage: [60.60](#) | [TC 104/SC 4](#)

ICS: [55.180.10](#)

Document available as of: 2009-01-30

[ISO/IEC TR 18047-2:2006](#)

Information technology -- Radio frequency identification device conformance test methods -- Part 2: Test methods for air interface communications below 135 kHz

Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2006-06-01

[ISO/IEC 18000-6:2004](#)

Information technology -- Radio frequency identification for item management -- Part 6: Parameters for air interface communications at 860 MHz to 960 MHz

Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2004-08-31

[ISO 21007-1:2005](#)

Gas cylinders -- Identification and marking using radio frequency identification technology -- Part 1: Reference architecture and terminology

Edition: 1 | Stage: [90.93](#) | [TC 58/SC 4](#)

ICS: [23.020.30](#)

Document available as of: 2005-07-26

[ISO/IEC TR 24710:2005](#)

Information technology -- Radio frequency identification for item management -- Elementary tag licence plate functionality for ISO/IEC 18000 air interface definitions

Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2005-10-27

[ISO/IEC 24730-1:2006](#)

Information technology -- Real-time locating systems (RTLS) -- Part 1: Application program interface (API)

Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2006-02-15

[ISO/IEC TR 18047-4:2004](#)

Information technology -- Radio frequency identification device conformance test

methods -- Part 4: Test methods for air interface communications at 2,45 GHzEdition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2004-11-23

[ISO/IEC TR 18047-7:2005](#)**Information technology -- Radio frequency identification device conformance test methods -- Part 7: Test methods for active air interface communications at 433 MHz**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2005-10-27

[ISO/IEC 24730-2:2006](#)**Information technology -- Real-time locating systems (RTLS) -- Part 2: 2,4 GHz air interface protocol**Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2006-12-07

[ISO/IEC TR 18001:2004](#)**Information technology -- Radio frequency identification for item management -- Application requirements profiles**Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2004-10-18

[ISO 18185-3:2006](#)**Freight containers -- Electronic seals -- Part 3: Environmental characteristics**Edition: 1 | Stage: [90.60](#) | [TC 104/SC 4](#)ICS: [55.180.10](#)

Document available as of: 2006-05-22

[ISO 18185-5:2007](#)**Freight containers -- Electronic seals -- Part 5: Physical layer**Edition: 1 | Stage: [90.20](#) | [TC 104/SC 4](#)ICS: [55.180.10](#)

Document available as of: 2007-05-04

[ISO/IEC 18046:2006](#)**Information technology -- Automatic identification and data capture techniques -- Radio frequency identification device performance test methods**

Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2006-10-17

[ISO/IEC 15459-5:2007](#)

Information technology -- Unique identifiers -- Part 5: Unique identifier for returnable transport items (RTIs)

Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2007-06-15

[ISO/IEC 15434:2006](#)

Information technology -- Automatic identification and data capture techniques -- Syntax for high-capacity ADC media

Edition: 3 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2006-10-04

[ISO/IEC 15459-6:2007](#)

Information technology -- Unique identifiers -- Part 6: Unique identifier for product groupings

Edition: 1 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2007-06-15

[ISO/IEC TR 18047-6:2008](#)

Information technology -- Radio frequency identification device conformance test methods -- Part 6: Test methods for air interface communications at 860 MHz to 960 MHz

Edition: 2 | Stage: [90.92](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2008-11-26

[ISO/IEC 18046-3:2007](#)

Information technology -- Radio frequency identification device performance test methods -- Part 3: Test methods for tag performance

Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)

ICS: [35.040](#)

Document available as of: 2007-09-13

[ISO/IEC 18000-1:2008](#)

Information technology -- Radio frequency identification for item management --

Part 1: Reference architecture and definition of parameters to be standardizedEdition: 2 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2008-06-23

[ISO/IEC 18000-2:2009](#)**Information technology -- Radio frequency identification for item management --****Part 2: Parameters for air interface communications below 135 kHz**Edition: 2 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2009-09-30

[ISO/IEC 18000-3:2008](#)**Information technology -- Radio frequency identification for item management --****Part 3: Parameters for air interface communications at 13,56 MHz**Edition: 2 | Stage: [90.92](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2008-08-29

[ISO/IEC 18000-4:2008](#)**Information technology -- Radio frequency identification for item management --****Part 4: Parameters for air interface communications at 2,45 GHz**Edition: 2 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2008-08-29

[ISO/IEC 18000-7:2009](#)**Information technology -- Radio frequency identification for item management --****Part 7: Parameters for active air interface communications at 433 MHz**Edition: 3 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2009-07-23

[ISO/IEC TR 24729-4:2009](#)**Information technology -- Radio frequency identification for item management --****Implementation guidelines -- Part 4: Tag data security**Edition: 1 | Stage: [60.60](#) | [JTC 1/SC 31](#)ICS: [35.040](#)

Document available as of: 2009-03-11

8.3.E-SEALS

Standards

[ISO 18185-2:2007](#)

Freight containers -- Electronic seals -- Part 2: Application requirements

Edition: 1 | Stage: [90.20](#) | [TC 104/SC 4](#)

ICS: [55.180.10](#)

Document available as of: 2007-04-16

[ISO 18185-1:2007](#)

Freight containers -- Electronic seals -- Part 1: Communication protocol

Edition: 1 | Stage: [90.20](#) | [TC 104/SC 4](#)

ICS: [55.180.10](#)

Document available as of: 2007-04-26

9. World Customs Organization (WCO)

9.1.WCO SAFE Framework

In the light of increasing threats of global terrorism, the issue of security of global trade has attracted considerable attention in the international community. It is often pointed out that Customs should play a vital role to secure and facilitate global trade, because of its unique authority and expertise to inspect cargo shipped in, through, and out of a country. In response, the WCO, as the sole global organization in charge of Customs matters, has developed the Framework of Standards to secure and facilitate global trade.

The primary objective of the Framework is to establish a set of standards that provide supply chain security and facilitation at a global level to promote certainty and predictability. The aim is to move from a set of security-related guidelines to standards that WCO Members are able to implement in a pragmatic and flexible manner. Most security-enhancing measures in the Framework have been developed based on modern Customs procedures in relevant WCO guidelines, recommendations, and instruments. At the same time, those measures will facilitate the legitimate trade as well as promote Customs reform and modernisation. The framework's objectives are outlined below:

- Establish standards that provide supply chain security and facilitation at a global level to promote certainty and predictability.
- Enable integrated supply chain management for all modes of transport.
- Enhance the role, functions and capabilities of Customs to meet the challenges and opportunities of the 21st Century.
- Strengthen co-operation between Customs administrations to improve their capability to detect high-risk consignments.
- Strengthen Customs/Business co-operation.
- Promote the seamless movement of goods through secure international trade supply chains."

With respect to seals, the WCO's SAFE Framework mentions that "*Customs should facilitate the voluntary use of technologies to assist in ensuring the integrity of the container along the supply chain.*"

1.1.WCO Data Model

The WCO Customs Data Model will establish a standard, international, harmonized data set that will meet governments' requirements for international cross-border trade and is geared exclusively to the requirements of an automated environment.

Information and documentation are key elements in the control of international cross-border trade. In today's interconnected electronic environment these controls will increasingly include information exchange prior to the arrival of the goods in order to provide the necessary level of security as well as acceptable release times.

Standardized and harmonized information requirements and procedures are essential to establish the common understanding which allows for an effective and efficient exchange of information between all parties involved in the international cross-border movement. The WCO Customs Data Model provides this common understanding on Customs information requirements.

The Data Model will also provide Contracting Parties to the revised Kyoto Convention with a global Customs standard to implement provisions dealing with reduced data requirements and electronic submission of declarations and supporting documents.

1.2. WCO Unique Consignment Reference (UCR)

One leading international trade organization has explained the Unique Consignment Reference as "Like an electronic staple designed for e-commerce, a UCR binds information together - all the bits of data about a trade transaction, from initial order and consignment of goods by a supplier, to the movement of those goods and arrival at the border, through to their final delivery to the importer."

The main objective of the UCR is to define a generic mechanism that has sufficient flexibility to cope with the most common scenarios that occur in international trade. The basis of the UCR is to maximise use of existing supplier, customer and transport references.

It is also a reference number, primarily for Customs use and may in future be required to be reported to Customs at any point during a Customs procedure. The UCR should be:

- applied to all international goods movements for which Customs control is required;
- used only as an access key for audit, consignment tracking and information, reconciliation purposes;
- unique at both national and international level;
- applied at consignment level;
- issued as early as possible in the international transaction.

Underpinning the UCR concept is the fundamental need for Customs authorities to facilitate legitimate international trade, while, at the same time, providing effective controls. In this respect the UCR would provide Customs with an efficient tool to exchange information between enforcement agencies.