INTERNATIONAL STANDARD

ISO 26683-2

First edition
2013-02-15

Intelligent transport systems — Freight land conveyance content identification and communication —

Part 2: Application interface profiles

Systèmes intelligents de transport — Identification et communication du contenu des marchandises transportées par voie terrestre —

Partie 2: Profils d'interface d'application

Reference number
ISO 26683-2:2013(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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The committee responsible for this document is ISO/TC 204, *Intelligent Transport Systems*

This first edition of ISO 26683-2 cancels and replaces ISO/TS 26683-2:2012.

ISO 26683 consists of the following parts, under the general title *Freight land conveyance content identification and communication:*

— *Part 1: Context, architecture and referenced standards*

— *Part 2: Application interface profiles*

The following parts are under preparation:

— *Part 3: Monitoring cargo stress measurement information during road transport* [Technical Specification]

— *Part 4: Security profile* [Technical Specification]

Introduction

In a scenario of land international transport and logistics, it is often difficult for a consignor and a consignee to know the physical real time location of cargo after consigning the cargo to a transport and logistics service provider. Where a cargo is transferred from one haulier (i.e. haulage contractor) to another, obtaining information of the manifest at a detailed level is often difficult. Auditing the actual content of a consignment en route, and monitoring cargo stress measurement information during road transport, is also difficult, especially in the case of sealed containers such as sealed ISO intermodal containers. It is a different task to that of progressing order administration from consignor to consignee.

There is no single organization responsible for standards through the intermodal supply chain. The ISO 26683 series is a co-ordinating standard that builds on, uses and can provide data to instantiations which use ISO/TS 24533, ISO 17687, UN/CEFACT, ISO 7372, EDIFACT, UBL, ISO 17261, ISO 17262, ISO 17263 and other standards.

Even where comprehensive international freight transport systems are in place, they rely on the level of detail that exists within its controlling computer system, and without the ability to monitor the actual contents, there is no possibility to:

a) audit the actual contents of the consignment. This is particularly difficult in the case of a sealed intermodal container (ISO 668 and subsequent related standards for freight containers);

b) monitor the condition of the contents of the consignment (cargo stress measurement information).

The ISO 26683 series of standards are therefore complementary to the context of ISO 24533 and can provide sources of data required by such systems, and an electronic auditing capability. ISO 17687 does not address the means by which its data are collected and 26683 provides several optional means to collect its data.

The ISO 26683 series envisages that a combination of existing technologies can be used to agglomerate/aggregate relevant data and use a tractor/truck mounted communications means to realize real time cargo visibility of land transport, and is thus not dependent on future technologies (although will be suitable for future technical means to deliver its profile data).

Part 1 specifies the context and architecture and provides a list of reference standards for the ISO 26683 series. Further details concerning the complementary nature of the ISO 26683 series of standards to ISO 24533, EFM, ISO 17687, IEEE 1512.3, UN/CEFACT, particularly UN/CEFACT UMM, ISO 7372, OASIS/UBL can be found ISO 26683-1, Clauses 5 and 6.

ISO 26683 is designed to present data concerning end-to-end cargo application systems. It does not provide end to end system (consignor to consignee) system design.

This part of ISO 26683 is the second part of a multi-part series of standards and provides optional application interface profiles for 'Freight land conveyance content identification and communication' (FLC-CIC). It is limited to the land aspects of transport.

This part of ISO 26683 defines application interface profiles to agglomerate/aggregate and transfer land cargo transport data to an interrogator in order to provide improved land cargo transport data and to specify one or more modes of transfer using available ICT technologies.

Part 3 will specify the handling of on-board cargo stress measurement information during road transport

Part 4 will provide a security profile requirements and definitions.

Intelligent transport systems — Freight land conveyance content identification and communication —

Part 2:
Application interface profiles

1 Scope

This part of ISO 26683 provides application interface profiles for land cargo transport data agglomeration and transfer (within the context and architecture described in ISO 26683-1), using one or more of the international standards listed and defined in Annex A of 26683-1.

NOTE ISO 26683 is designed to present information on end-to-end cargo application systems. It does not provide end to end system (consignor to consignee) system design.

This part of ISO 26683 defines a number of application interface profiles for land cargo transport data to provide more land cargo transport visibility by using current technical standards, specifications and technologies related to cargo transport.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE The principal list of normatively referenced standards for this part of ISO 26683 and summary of their content is to be found in ISO 26683-1.

ISO 7372, *Trade data interchange — Trade data elements directory*

ISO 9897, *Freight containers — Container equipment data exchange (CEDEX) — General communication codes*

ISO 10368, *Freight thermal containers — Remote condition monitoring*

ISO 10374, *Freight containers — Automatic identification*

ISO/TS 10891, *Freight containers — Radio frequency identification (RFID) — Licence plate tag*

ISO 15394, *Packaging — Bar code and two-dimensional symbols for shipping, transport and receiving labels*

ISO/IEC 15418, *Information technology — Automatic identification and data capture techniques — GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance*

ISO/IEC 15420, *Information technology — Automatic identification and data capture techniques — EAN/UPC bar code symbology specification*

ISO/IEC 15424, *Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)*

ISO/IEC 15438, *Information technology — Automatic identification and data capture techniques — PDF417 bar code symbology specification*

ISO/IEC 15459-2, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 2: Registration procedures*

ISO/IEC 15459-1, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 1: Individual transport units*

ISO/IEC 15459-3, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 3: Common rules*

ISO/IEC 15459-4, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 4: Individual products and product packages*

ISO/IEC 15459-5, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 5: Individual returnable transport items (RTIs)*

ISO/IEC 15459-6, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 6: Groupings*

ISO/IEC 15459-8, *Information technology — Unique identifiers — Part 8: Grouping of transport units*

ISO 15628, *Intelligent transport systems — Dedicated short range communication (DSRC) — DSRC application layer*

ISO/IEC 15961, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: application interface*

ISO/IEC 15962, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: data encoding rules and logical memory functions*

ISO/IEC 16022, *Information technology — Automatic identification and data capture techniques — Data Matrix bar code symbology specification*

ISO/IEC 16023, *Information technology — International symbology specification — MaxiCode*

ISO/IEC 16388, *Information technology — Automatic identification and data capture techniques — Code 39 bar code symbology specification*

ISO 17261, *Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*

ISO 17263, *Intelligent transport systems — Automatic vehicle and equipment identification — System parameters*

ISO 17264, *Intelligent transport systems — Automatic vehicle and equipment identification — Interfaces*

ISO 17364, *Supply chain applications of RFID — Returnable transport items (RTIs) and returnable packaging items (RPIs)*

ISO 17365, *Supply chain applications of RFID — Transport units*

ISO 17366, *Supply chain applications of RFID — Product packaging*

ISO 17367, *Supply chain applications of RFID — Product tagging*

ISO 17687, *Transport Information and Control Systems (TICS) — General fleet management and commercial freight operations — Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation*

ISO/IEC 18000-6, *Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communications at 860 MHz to 960 MHz General*

ISO/IEC 18004, *Information technology — Automatic identification and data capture techniques — QR Code bar code symbology specification*

ISO 18185-1, *Freight containers — Electronic seals — Part 1: Communication protocol*

ISO 21212, *Intelligent transport systems — Communications access for land mobiles (CALM) — 2G Cellular systems*

ISO 21213, *Intelligent transport systems — Communications access for land mobiles (CALM) — 3G Cellularsystems*

ISO 21214, *Intelligent transport systems — Communications access for land mobiles (CALM) — Infra-red systems*

ISO 21215, *Intelligent transport systems — Communications access for land mobiles (CALM) — M5*

ISO 21216, *Intelligent transport systems — Communication access for land mobiles (CALM) — Millimetre wave air interface*

ISO/IEC/IEEE 21450, *Information technology — Smart transducer interface for sensors and actuators — Common functions, communication protocols, and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-1, *Information technology — Smart transducer interface for sensors and actuators — Part 1: Network Capable Application Processor (NCAP) information model*

ISO/IEC/IEEE 21451-2, *Information technology — Smart transducer interface for sensors and actuators — Part 2: Transducer to microprocessor communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-4, *Information technology — Smart transducer interface for sensors and actuators — Part 4: Mixed-mode communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO 22742, *Packaging — Linear bar code and two-dimensional symbols for product packaging*

ISO/TS 24533, *Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology*

ISO 25111, *Intelligent transport systems — Communications access for land mobiles (CALM) — General requirements for using public networks*

ISO 26683-1, *Intelligent transport systems — Freight land conveyance content identification and communication — Part 1: Context, architecture and referenced standards*

ISO 28219, *Packaging — Labelling and direct product marking with linear bar code and two-dimensional symbols*

ISO 29282, *Intelligent transport systems — Communications access for land mobiles (CALM) — Satellite networks*

ISO 29283, *ITS CALM Mobile Wireless Broadband applications using Communications in accordance with IEEE 802.20*

CEFACT/TMG/N093 UN/CEFACT Modelling Methodology (UMM)

OASIS Universal Business Language v2[1)]

OASIS UBL Common Library transport library[2)]

OASIS UBL-CommonAggregateComponents-2.1

CEFACT UMM Foundation Module V1.0 (2006)

CEFACT UMM Base Module V1.0 (2006)

CEFACT User Guide UMM 1.0

UN/CEFACT Core Components Library CCL 10B

1) http://docs.oasis-open.org/ubl/os-UBL-2.1.zip

2) http://docs.oasis-open.org/ubl/prd1-UBL-2.1/UBL-2.1.xml

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
application interface
communication point where one part of a system communicates with another in order to service an application

Note 1 to entry: The communication point is typically but not necessarily wireless in the scenarios of ISO 26683.

3.2
application interface profile
series and sequence of behaviour and protocols including, where appropriate, the identification of chosen classes, conforming subsets, options and parameters of those base standards necessary to accomplish a defined function at an interface in a particular way such that it can be used interoperably between two parties

Note 1 to entry: Profiles, which define conforming subsets or combinations of base profiles identify the use of particular options available in the base standards, and provide a basis for the development of uniform, internationally recognized, interoperability and conformance tests.

3.3
audit
methodical examination/verification/evaluation of the information associated with items in a cargo and other relevant data

3.4
base standard
approved international standard used as the basis of an application interface or an application interface profile

3.5
cargo
goods or produce transported, generally for commercial gain, by ship, aircraft, train, van or truck

Note 1 to entry: In modern times, containers are used in most intermodal long-haul cargo transport.

3.6
cargo stress measurement information
data collected from sensors associated with an item, container or conveyance that provides information about parameters that may affect the condition of the cargo

EXAMPLE Temperature, position/attitude (upright cargo), pressure, shock, dampness, etc.

3.7
carrier
party undertaking or arranging transport of goods between named points

[UN/TDED 3126: UN/CEFACT definition 1001 code CA]

3.8
consignment
separately identifiable amount of goods items (available to be) transported from one consignor to one consignee via one or more than one modes of transport and specified in one single transport document

3.9
consignee
party to which goods are consigned/shipped

[UN/TDED 3132: UN/CEFACT definition 3035 code CN]

3.10
consignor
shipper, sender, party which, by contract with a carrier, consigns or sends goods with the carrier, or has them conveyed by him

[UN/TDED 3336: UN/CEFACT definition 3035 code CZ]

3.11
container
receptacle for the transport of goods, especially one readily transferable from one form of transport to another

[UN/TDED 3336: UN/CEFACT definition 8053 code CN Container]

3.12
conveyance
means of transport

3.13
data carrier
means or function which carries data objects from one point to another point

3.14
freight
goods
any commodity transported

3.15
freight forwarder
party arranging the carriage of goods including connected services and/or associated formalities on behalf of a consignor or consignee

[UN/TDED 3336: UN/CEFACT definition 3035 code FW]

3.16
identifier
unique and unambiguous expression in a written format either by a code, by numbers or by the combination of both to distinguish variations from one to another among a class of substances, items, or objects

3.17
intermodal freight container
large cargo carrying object (of various formats) used for transport or storage that conforms to ISO 6346 and designed and constructed to permit it to be used interchangeably in two or more modes of transport

3.18
ISO intermodal freight container
ISO intermodal container
ISO container
large cargo carrying object used for transport or storage that conforms to ISO 668, Series 1 containers

3.19
international standardized profile
internationally agreed-to, harmonized document which describes one or more profiles

3.20
interoperability
ability of two or more systems to exchange information and to make mutual use of the information that has been exchanged

Note 1 to entry: Sometimes called “open systems”.

3.21
ITS station
communication point for ITS system

3.22
land transport
mode of transport that is effected using roads and railways and may in some cases include use of inland waterways

Note 1 to entry: See *transport*.

3.23
land transport conveyance
transport means to effect the land transport sector(s) of a cargo

3.24
manifest
specification of all cargo on board the transportation means (all modes) containing details of contents, shipper, consignee, and other details that may be required by customs or consular authorities

3.25
rollercage
cage with casters for transporting loose items

3.26
security
protection of information and data against danger, damage, degradation of quality, loss and criminal activity so that unauthorized persons or systems cannot read or modify them and authorized persons or systems are not denied access to them

Note 1 to entry: Security has to be compared to related concepts: Safety, continuity, reliability. The key difference between security and reliability is that security must take into account the actions of people attempting to cause destruction.

3.27
security profile
characterization of security requirements

3.28
shipment
identifiable collection of one or more goods items (available to be) transported together from the original shipper, to the ultimate consignee

Note 1 to entry: A shipment may be transported in one or a multiple number of consignments.

3.29
taxonomy
classification scheme for referencing profiles or sets of profiles unambiguously

3.30
transport
transportation
movement of people and goods from one location to another performed by modes, such as air, rail, road, water, cable, pipeline and space and the field comprises the attributes of infrastructure, vehicles, and operations

3.31
transport means
vehicles, trailers, vessels, aircraft, or combination thereof, used for the transport of goods to perform a journey

3.32
tracking
function of maintaining status information of goods, goods items, consignments or equipment

3.33
visibility
ability to audit the content of a land conveyance while en-route or at strategic points of an overland journey

4 Symbols and abbreviated terms

For the purposes of this document, the following symbols and abbreviated terms apply.

3GPP	3rd generation partnership project
AEI	automatic equipment identification
AVI	automatic vehicle identification
CALM	communication access for land mobiles
CEFACT	See UN/CEFACT
CCL	core component library
DSRC	dedicated short range communication
ebXML	electronic Business eXtensible Mark-up Language
EDIFACT	electronic data interchange for administration, commerce and transport
EFM	electronic freight management
FLC-CIC	freight land conveyance content and communication
GSM	global system mobile
HAZMAT	hazardous materials/dangerous goods
IATA	International Air Transport Association
ITS	intelligent transport systems
JTC1	Joint Technical Committee 1
LTE	(3GPP) long term evolution (sometimes called 4G)
OASIS	Organization for the Advancement of Structured Information Standards
OBE	on-board equipment
OBU	on-board unit
OCR	optical character recognition
PDC	personal digital cellular (Japanese advanced 2G mobile communications standard)
PHS	personal handy-phone system
RFID	radio frequency identification

SSL	secure sockets layer
TDED	trade data elements directory
UBL	universal business language (OASIS)
ULD	unit load device (IATA container)
UMTS	Universal Mobile Telecommunications System
UN	United Nations (Organization)
UN/CEFACT	United Nations, through its Centre for Trade Facilitation and Electronic Business
UN/EDIFACT	United Nations electronic data interchange for administration, commerce and transport
UN/TDED	United Nations trade data elements directory
WCO	World Customs Organization
XML	eXtensible Mark-up Language

5 Context

5.1 General

The context, architecture and list and summary of referenced standards are provided in ISO 26683-1.

This part of ISO 26683 provides definitions of profiles that may be used to provide interoperable movement of data from items to OBE and from OBE to an interrogating station.

All profiles defined in this part of ISO 26683 are OPTIONAL. That is to say that there is no requirement to use these profiles, but where selected and used in conformance, they provide a declared basis for interoperability.

5.2 Transfer of data from tags to interrogators (Profile level 3)

To be in accordance with the referenced standard(s) (See ISO 26683-1, 6.6/Normative Annex A) specified in the application interface profile used.

5.3 Transfer of data from trailers to OBE (Profile level 2)

For closed fleets to be at the determination of the fleet operator.

For open fleets where interrogation is to occur outside of the closed system, to be in accordance with the referenced standard(s) (See ISO 26683-1, 6.6/Normative Annex A) specified in the application interface profile used.

5.4 Transfer of data from OBE to infrastructure (Profile level 1)

Level 1 profiles shall be in accordance with ISO 17261, ISO 17262, ISO 17263, ISO 17264 and/or the standards referenced in the appropriate application interface profile defined in this part of ISO 26683.

6 Freight land conveyance content and communication - Application interface profiles

6.1 General

There is no single communication application interface profile defined in ISO 26683. Rather, ISO 26683 provides interoperability where the communication medium has been selected and is in compliance to one or more of the communications standards referenced in 6.6/Annex A of ISO 26683-1. Where appropriate, the nature of the application interface exchanges are defined in the profiles.

The profiles defined in this clause respect the high level profile format defined in ISO 10000-1.

6.2 Taxonomy of Freight land conveyance content and communication application interface profiles

The taxonomy of the ISO 26683 profiles provide 'Profiles' at three complementary levels in respect of communication profiles. In addition, there is a data layer profile which is portable in respect of where they occur.

Level 1: (L1): OBE to infrastructure (roadside)

Level 2: (L2): Trailer(s) to OBE/ or items directly to OBE

Level 3: (L3): Item to OBE trailer interrogator

Level D1: Data presentation - representation formatted to client requirements

Figure 1 provides a visual representation.

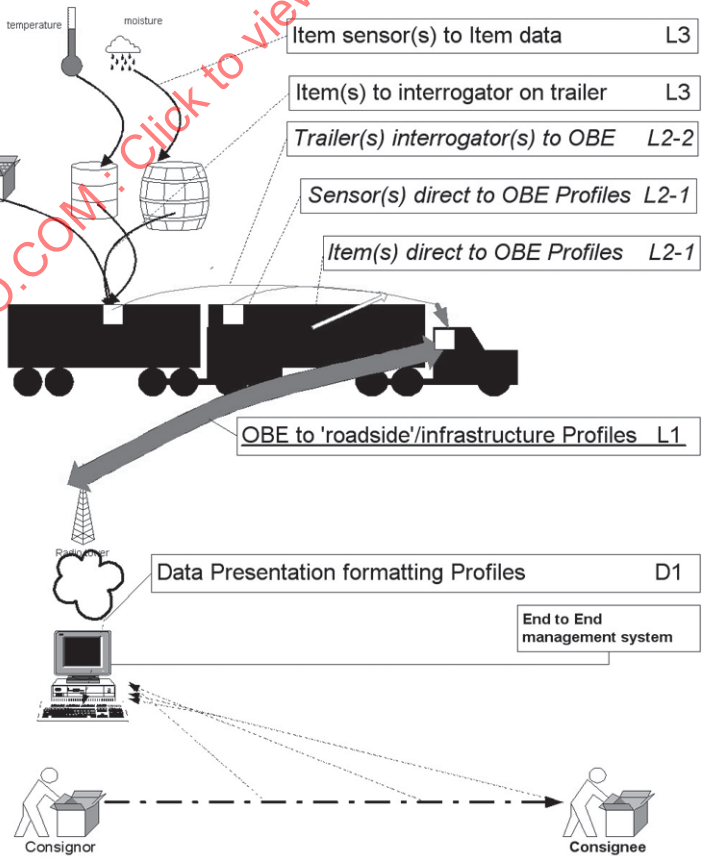

Figure 1 — Taxonomy of ISO 26683-2 data presentation and transfer profiles

Explanation of Figure 1:

Level 1: (L1): OBE to infrastructure (roadside)

This is the wireless link from the vehicle to the infrastructure.

Level 2: (L2): Trailer(s) to OBE/ or items directly to OBE.

In the case of a rigid body truck this is the data harvesting concerning the items and sensors in the truck to the OBE (L2-1 item(s) direct to OBE Profiles, and sensor(s) direct to OBE Profiles).

In the case of a prime mover/trailer(s) combination, this is the link from the trailer(s) to the OBE in the prime mover (L2-2).

Level 3: (L3): Item to OBE trailer interrogator, is the harvesting of data regarding the content of the trailer, or its sensors within the trailer (prior to the harvesting of the trailer data to the OBE).

6.3 FLC-CIC Profile No.L1-1: ISO 15628 DSRC (OPTIONAL)

6.3.1 FLC-CIC - Profile No.L1-1: scenario illustration

The scenario for this profile is that freight land conveyance data are collected from an en-route cargo via on-board dedicated short-range communications (DSRC) equipment using an ISO 15628 DSRC application layer.

See Figures 4 to 10 of ISO 26683-1 for illustrations of different views of the scenario.

6.3.2 FLC-CIC - Profile No.L1-1: Interchange reference points

The interchange reference points may occur at any point of the cargo journey where:

a) there is installed DSRC equipment capable of supporting the ISO 15628 application layer;

b) there is on-board DSRC equipment capable of supporting the ISO 15628 application layer;

c) there are means provided to collect and store the freight land conveyance content identifications, and related data, in the on-board equipment (OBE).

6.3.3 FLC-CIC - Profile No.L1-1: Scope

To provide an application interface profile to enable freight land conveyance data shall be collected from an en-route cargo with interoperable comportment using on-board dedicated short-range communications (DSRC) equipment that supports an ISO 15628 DSRC application layer interface.

NOTE This is an enabling profile for vehicles/interrogation stations that are equipped with an ISO 15628 application layer capability. This profile does not require that vehicles and interrogation stations are so equipped.

The means by which on-board equipment collects and audits data concerning the content identification of the cargo is not defined in this profile (ISO 26683 Profile No 1), and is a commercial decision. Other profiles in this part of ISO 26683 may provide standard profiles to achieve this function, but the use of such profiles is optional and is not required in order shall conform to ISO 26683 Profile No.L1-1.

Profile No.L1-1 may also be suitable to transfer 'Dangerous Goods'/HAZMAT data (ISO 17687).

6.3.4 FLC-CIC - Profile No.L1-1: Referenced standards

Profile L1-1 shall use data defined in one or more of the following referenced standards:

ISO 15628, *Transport information and control systems (ITS) — Dedicated short range communication (DSRC) — DSRC application layer*.

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*, and especially the CS10 data definition (7.4 in current version at the time of the publication of this part of ISO 26683).

6.3.5 FLC-CIC - Profile No.L1-1: Requirements

6.3.5.1 The on board equipment shall collate and audit identification data of items in the freight land conveyance cargo and data associated with it. The means by which this is achieved is not standardised in this Profile.

6.3.5.2 The wireless communications medium, both at the interrogation point of interrogation (commonly known as roadside), and on board equipment shall use an appropriate wireless communications interface and to support and be in compliance with ISO 15628.

6.3.5.3 The data concept(s) for the freight land conveyance shall conform to ISO 17262, CS10.

6.3.6 FLC-CIC - Profile No.L1-1: Conformance provisions

In order to claim conformance to ISO 26683, Profile No.L1-1 shall comply with all of the standards referenced in ISO 26683 FLC-CIC - Profile No.L1-1 as listed in 6.3.4 above and this shall be achieved by self declaration.

There are no specific conformance tests designed to test compliance at the date of publication of this part of ISO 26683.

6.4 FLC-CIC Profile No.L1-2: ISO 21215 CALM M5Hz DSRC (OPTIONAL)

6.4.1 FLC-CIC - Profile No.L1-2: Scenario illustration

The scenario for this profile is that freight land conveyance data are collected from an en-route cargo via on-board DSRC equipment using 5 GHz communications stations as determined in ISO 21215.

See Figures 4 to 10 of ISO 26683-1 for illustrations of different views of the scenario.

6.4.2 FLC-CIC - Profile No.L1-2: Interchange reference points

The interchange reference points may occur at any point of the cargo journey where:

a) there is/are installed 5 GHz communications station(s) as determined in ISO 21215.

b) there is an on-board 5 GHz communications station as determined in ISO 21215.

c) there are means provided to collect and store the freight land conveyance content identifications and related data in the on-board equipment.

6.4.3 FLC-CIC - Profile No.L1-2: Scope

To provide an application interface profile to enable freight land conveyance data shall be collected from an en-route cargo with interoperable comportment using on-board dedicated 5 GHz equipment that supports ISO 21215, *Intelligent transport systems – Communications for land mobiles (CALM) – M5*.

NOTE This is an enabling profile for vehicles/interrogation stations that are equipped with ISO 21215 compliant equipment. This profile does not require that vehicles and interrogation stations are so equipped.

The means by which on-board equipment collects and audits data concerning the content identification of the cargo is not defined in this profile (ISO 26683 Profile No. 2) and is a commercial decision. Other profiles in this part of ISO 26683 may provide standard profiles to achieve this function, but the use of such profiles is not required in order shall conform to ISO 26683 Profile No.L1-2.

Profile No.L1-2 may also be suitable to transfer 'Dangerous Goods'/HAZMAT data (ISO 17687).

6.4.4 FLC-CIC - Profile No.L1-2: Referenced standards

Profile L1-2 shall use data defined in one or more of the following referenced standards:

ISO 21215, *Intelligent transport systems — Communications access for land mobiles (CALM) — M5*

ISO 15628, *Transport information and control systems (ITS) — Dedicated short range communication (DSRC) — DSRC application layer*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*, and especially the CS10 data definition (7.4 in current version at the time of the publication of this part of ISO 26683).

6.4.5 FLC-CIC - Profile No.L1-2: Requirements

6.4.5.1 The on board equipment shall collate and audit identification data of items in the freight land conveyance cargo and data associated with it. The means by which this is achieved is not standardised in this Profile.

6.4.5.2 The wireless communications medium, both at the interrogation point of interrogation (commonly known as roadside), and on board equipment shall use an appropriate wireless communications interface and to support and be in compliance with ISO 21215.

6.4.5.3 The wireless communications medium, both at the interrogation point of interrogation (commonly known as roadside), and on board equipment shall support and be in compliance with ISO 15628.

6.4.5.4 The data concept(s) for the freight land conveyance shall conform to ISO 17262, CS10.

6.4.6 FLC-CIC - Profile No.L1-2: Conformance provisions

In order to claim conformance to ISO 26683, Profile No.L1-2 shall comply with all of the standards referenced in ISO 26683 FLC-CIC - Profile No.L1-2 as listed in 6.4.4 above and this shall be achieved by self declaration.

There are no specific conformance tests designed to test compliance at the date of publication of this part of ISO 26683.

6.5 FLC-CIC Profile No.L1-3: ISO 10374 (OPTIONAL)

6.5.1 FLC-CIC - Profile No.L1-3: Scenario illustration

The scenario for this profile is that freight land conveyance data are collected from an en-route cargo via on-board equipment using communications as determined in ISO 10374.

See Figures 4 to 10 of ISO 26683-1 for illustrations of different views of the scenario.

6.5.2 FLC-CIC - Profile No.L1-3: Interchange reference points

The interchange reference points may occur at any point of the cargo journey where:

a) there is/are installed interrogator(s) as determined in ISO 10374.

b) there is an on-board transponder as determined in ISO 10374.

6.5.3 FLC-CIC - Profile No.L1-3: Scope

To provide an application interface profile to enable freight land conveyance data shall be collected from an en-route cargo with interoperable comportment using on-board transponder that is compliant to ISO 10374 and has been programmed to act as a data repository for on-board freight land conveyance content identification.

NOTE This is an enabling profile for vehicles/interrogation stations that are equipped with ISO 10374 compliant equipment. This profile does not require that vehicles and interrogation stations are so equipped.

The means by which on-board equipment collects and audits data concerning the content identification of the cargo is not defined in this profile (ISO 26683 Profile No. 3) and is a commercial decision. Other profiles in this part of ISO 26683 may provide standard profiles to achieve this function, but the use of such profiles is not required in order shall conform to ISO 26683 Profile No.L1-3.

Profile No.L1-3 may also be suitable to transfer some 'Dangerous Goods'/HAZMAT data (ISO 17687) if this is built into the revision of ISO 10374.

6.5.4 FLC-CIC - Profile No.L1-3: Referenced standards

Profile L1-3 shall use data defined in one or more of the following referenced standards:

ISO 10374, Freight containers — Automatic identification

6.5.5 FLC-CIC - Profile No.L1-3: Requirements

6.5.5.1 The on board equipment shall collate and audit identification data of items in the freight land conveyance cargo and/or data associated with it. The means by which this is achieved is not standardised in this Profile.

6.5.5.2 The wireless communications medium, both at the interrogation point of interrogation (commonly known as roadside), and on board equipment shall use an appropriate wireless communications interface and to support and be in compliance with ISO 10374.

6.5.6 FLC-CIC - Profile No.L1-3: Conformance provisions

In order to claim conformance to ISO 26683, Profile No.L1-3 shall comply with all of the standards referenced in ISO 26683 FLC-CIC - Profile No.L1-3 as listed in 6.5.4 above and this shall be achieved by self declaration.

There are no specific conformance tests designed to test compliance at the date of publication of this part of ISO 26683.

6.6 FLC-CIC Profile No.L1-4: GSM/UMTS/LTE/IMS/PDC/PHS (OPTIONAL)

6.6.1 FLC-CIC - Profile No.L1-4: Scenario illustration

The scenario for this profile is that freight land conveyance data are collected from an en-route cargo via on-board wireless communications equipment using communications as determined by 3GPP.

NOTE 3GPP (3rd Generation Partnership project) produces Technical Specifications and Technical Reports for 3G Mobile System based on evolved GSM core networks and the radio access technologies that they support (i.e. Universal Terrestrial Radio Access (UTRA) both Frequency Division Duplex (FDD) and Time Division Duplex (TDD) modes). The scope was subsequently amended to include the maintenance and development of the Global System for Mobile communication (GSM) Technical Specifications and Technical Reports including evolved radio access technologies [e.g. General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE)].

See Figures 4 to 10 of ISO 26683-1 for illustrations of different views of the scenario.

6.6.2 FLC-CIC - Profile No.L1-4: Interchange reference points

The interchange reference points may occur at any point of the cargo journey where:

a) there is/are installed GSM/UMTS/LTE/IMS/PDC/PHS communications station(s) as determined in 3GPP standards and technical specifications pertaining in the location of the operation.

b) there is an on-board UMTS or GSM or LTE or PDC or PHS or similar communications station as determined in 3GPP standards and technical specifications pertaining in the location of the operation.

c) there are means provided to collect and store the freight land conveyance content identifications and related data in the on-board equipment.

6.6.3 FLC-CIC - Profile No.L1-4: Scope

To provide an application interface profile to enable freight land conveyance data shall be collected from an en-route cargo with interoperable comportment using a public land mobile network using GSM/UMTS/LTE/IMS/PDC/PHS (or similar) mobile network communications in accordance with Standards 3GPP standards and technical specifications (or similar) pertaining in the location of the operation.

NOTE This is an enabling profile for vehicles/interrogation stations that are equipped with GSM/UMTS/LTE/IMS/PDC/PHS (or similar) compliant equipment. This profile does not require that vehicles and interrogation stations are so equipped.

The means by which on-board equipment collects and audits data concerning the content identification of the cargo is not defined in this profile (ISO 26683 Profile No. 4) and is a commercial decision. Other profiles in this part of ISO 26683 may provide standard profiles to achieve this function, but the use of such profiles is not required in order shall conform to ISO 26683 Profile No.L1-4.

Profile No.L1-4 may also be suitable to transfer 'Dangerous Goods'/HAZMAT data (ISO 17687).

6.6.4 FLC-CIC - Profile No.L1-4: Referenced standards

Profile L1-4 shall use data defined in one or more of the following referenced standards:

GSM/UMTS/LTE/IMS/PDC/PHS (or similar) public land mobile equipment and networks shall operate in accordance with 3GPP standards pertaining at the time of operation of the system. Particularly, reference is drawn to:

ETSI TS 151 010, Digital cellular telecommunications system (Phase 2+);Mobile Station (MS) conformance specification, Part 1: Conformance specification (3GPP TS 51.010-1 version 8.1.0 [Release 8 or later]

ETSI TS 124 123, Universal Mobile Telecommunications System (UMTS);User Equipment (UE) conformance specification, Part 1: Protocol conformance specification (3GPP TS 34.123-1 version 8.6.0 [Release 8 or later]

ETSI TS 121 133, Universal Mobile Telecommunications System (UMTS); 3G security; Security threats and requirements; (3GPP TS 21.133 version 4.1.0 [Release 4]

ISO 25111, *Intelligent transport systems — Communications for land mobiles (CALM) — ITS using public wireless networks — General provisions*

ISO 21212, *Intelligent transport systems — Communications access for land mobiles (CALM) — 2G Cellular systems*

ISO 21213, *Intelligent transport systems — Communications access for land mobiles (CALM) — 3G Cellular systems*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*, and especially the CS10 data definition (7.4 in current version at the time of the publication of this part of ISO 26683)

ISO 7372, *Trade data interchange — Trade data elements directory — 2005*

UN/CEFACT Core Components Library CCL 10A

UBL – CommonLibrary 2 0 (OASIS)

UBL- transport library – 2(1) 0 20051117

6.6.5 FLC-CIC - Profile No.L1-4: Requirements

6.6.5.1 The on board equipment shall collate and audit identification data of items in the freight land conveyance cargo and data associated with it. The means by which this is achieved is not standardised in this Profile but may use one of the other Profiles of ISO 26683 specified in this part of ISO 26683, although this is not a requirement.

6.6.5.2 The wireless communications medium, both at the interrogation point of interrogation (commonly known as roadside), and on board equipment shall use an appropriate wireless communications interface and to support and be in compliance with using GSM/UMTS/LTE/IMS/PDC/PHS (or similar) mobile network communications in accordance with 3GPP standards and technical specifications pertaining in the location of the operation.

6.6.5.3 ISO 26683 Profile No. 4 may present data in one of two ways:

Profile No.L1-4A: UBL format

Profile No.L1-4B: ISO 17262 format

6.6.5.4 Profile No.L1-4A: UBL format

Data shall be presented in accordance with ISO 17262, CS11.

6.6.5.5 Profile No.L1-4B: ISO 17262 format

The data concept(s) for the freight land conveyance shall conform to ISO 17262, CS10.

6.6.6 FLC-CIC - Profile No.L1-4: Conformance provisions

In order to claim conformance to ISO 26683, Profile No.L1-4 shall comply with all of the standards referenced in ISO 26683 FLC-CIC - Profile No.L1-4, either Profile No.L1-4A OR Profile No.L1-4B as listed in 6.6.4 above and this shall be achieved by self declaration.

There are no specific conformance tests designed to test compliance at the date of publication of this part of ISO 26683.

6.7 FLC-CIC Profile No.L1-5: ISO 18000 (OPTIONAL)

6.7.1 FLC-CIC - Profile No.L1-5: Scenario illustration

The scenario for this profile is that freight land conveyance data are collected from an en-route cargo via on-board equipment using communications as determined in ISO/IEC 18000-6 Type B or Type C.

See Figures 4 to 10 of ISO 26683-1 for illustrations of different views of the scenario.

6.7.2 FLC-CIC - Profile No.L1-5: Interchange reference points

The interchange reference points may occur at any point of the cargo journey where:

a) there is/are installed interrogator(s) as determined in ISO/IEC 18000-6, Type B or Type C.

b) there is an on-board transponder as determined in ISO/IEC 18000-6, of the same Type as 6.7.2. a) (either Type B or Type C).

6.7.3 FLC-CIC - Profile No.L1-5: Scope

To provide an application interface profile to enable freight land conveyance data shall be collected from an en-route cargo with interoperable comportment using on-board transponder that is compliant to ISO/IEC 18000-6 Type B or Type C and has been programmed to act as a data repository for on-board freight land conveyance content identification.

NOTE This is an enabling profile for vehicles/interrogation stations that are equipped with ISO/IEC 18000-6 Type B or Type C compliant equipment. This profile does not require that vehicles and interrogation stations are so equipped.

The means by which on-board equipment collects and audits data concerning the content identification of the cargo is not defined in this profile (ISO 26683 Profile No. 5) and is a commercial decision. Other profiles in this part of ISO 26683 may provide standard profiles to achieve this function, but the use of such profiles is not required in order shall conform to ISO 26683 Profile No.L1-5.

Profile No.L1-5 may also be suitable to transfer a limited amount of 'Dangerous Goods'/HAZMAT data (ISO 17687) if the transponders are so programmed.

6.7.4 FLC-CIC - Profile No.L1-5: Referenced standards

Profile L1-5 shall use data defined in one or more of the following referenced standards:

ISO/IEC 18000-6, *Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communication at 860 MHz — 960 MHz*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*, and especially the CS10 data definition (7.4 in current version at the time of the publication of this part of ISO 26683)

6.7.5 FLC-CIC - Profile No.L1-5: Requirements

6.7.5.1 The on board equipment shall collate and audit identification data of items in the freight land conveyance cargo and data associated with it. The means by which this is achieved is not standardised in this Profile.

6.7.5.2 The wireless communications medium, both at the interrogation point of interrogation (commonly known as roadside), and on board equipment shall use an appropriate wireless communications interface and to support and be in compliance with ISO/IEC 18000-6 Type B or Type C.

6.7.5.3 The data concept(s) for the freight land conveyance shall conform to ISO 17262, CS10.

6.7.6 FLC-CIC - Profile No.L1-5: Conformance provisions

In order to claim conformance to ISO 26683, Profile No.L1-5 shall comply with all of the standards referenced in ISO 26683 FLC-CIC - Profile No.L1-5 as listed in 6.7.4 above and this shall be achieved by self declaration.

There are no specific conformance tests designed to test compliance at the date of publication of this part of ISO 26683.

6.8 FLC-CIC Profile No.L2-1: Item data agglomeration direct to vehicle OBE using RFID (OPTIONAL)

6.8.1 FLC-CIC - Profile No.L2-1: Scenario illustration

In this scenario, items are identified using an RFID tag attached to them that is capable to transmit its data directly to an interrogator mounted onto/in the land conveyance vehicle OBE for example in the case of a single body truck (for example, but not necessarily using ISO/IEC 18000-6C, or other medium or longer range RFID technologies). Figure 2 shows a truck loaded with an ISO container.

The RFID technology is not specified within this profile and is a matter of commercial decision, but it is recommended to use a system that complies with one of the RFID Standards referenced in Annex A of ISO 26683-1.

NOTE Instantiation varies according to the particular commercial scenario, so technology choice is not standardised.

Figure 2 — Truck loaded with ISO container

Figures 3 and 4 below show typical schematic examples for this scenario.

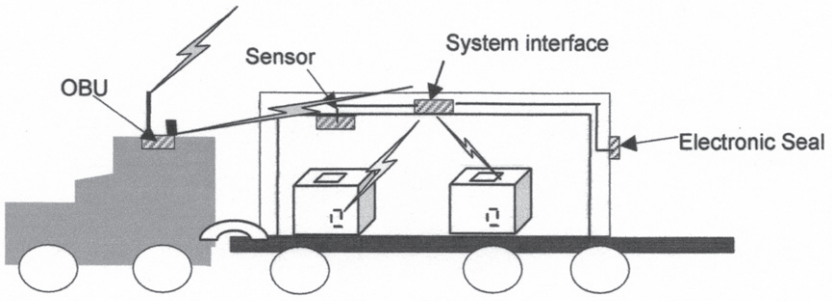

Figure 3 — Tractor with one trailer with cargo on it

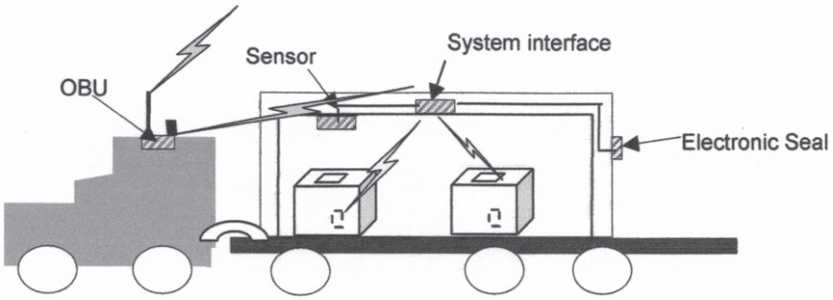

Figure 4 — Tractor with one trailer with container and electronic seal

6.8.2 FLC-CIC - Profile No.L2-1: Interchange reference points

Item identification tag to OBE interrogator.

6.8.3 FLC-CIC - Profile No.L2-1: Scope

This profile specifies the methodology by which this data are collected, and specifies which data formats are acceptable.

6.8.4 FLC-CIC - Profile No.L2-1: Referenced standards

Profile L2-1 shall use data defined in one or more of the following referenced standards:

ISO 7372, *Trade data interchange — Trade data elements directory*

ISO 9897, *Freight containers — Container equipment data exchange (CEDEX) — General communication codes*

ISO 10368, *Freight thermal containers — Remote condition monitoring*

ISO 10374, *Freight containers — Automatic identification*

ISO/TS 10891, *Freight containers — Radio frequency identification (RFID) — Licence plate tag*

ISO/IEC 15418, *Information technology — Automatic identification and data capture techniques — GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance*

ISO/IEC 15459-1, *Information technology — Unique identifiers — Part 1: Unique identifiers for transport units*

ISO/IEC 15459-3, *Information technology — Unique identifiers — Part 3: Common rules for unique identifiers*

ISO/IEC 15459-4, *Information technology — Unique identifiers — Part 4: Individual items*

ISO/IEC 15459-5, *Information technology — Unique identifiers — Part 5: Unique identifier for returnable transport items (RTIs)*

ISO/IEC 14549-6, *Information technology — Unique identifiers — Part 6: Unique identifier for product groupings*

ISO/IEC 14549-8, *Information technology — Unique identifiers — Part 8: Grouping of transport unit*

ISO/IEC 15961, *Information technology — Radio frequency identification (RFID) for item management – Data protocol: application interface*

ISO/IEC 15962, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: data encoding rules and logical memory functions*

ISO 17261, *Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*

ISO 17363, *Supply chain applications of RFID — Freight containers*

ISO 17364, *Supply chain applications of RFID — Returnable transport items (RTIs)*

ISO 17365, *Supply chain applications of RFID — Transport units*

ISO 17366, *Supply chain applications of RFID — Product packaging*

ISO 17367, *Supply chain applications of RFID — Product tagging*

ISO 17687, *Transport Information and Control Systems (TICS) — General fleet management and commercial freight operations — Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation*

ISO 18185-1, *Freight containers — Electronic seals — Part 1: Communication protocol*

ISO/IEC IEEE 21450, *Information technology — Smart transducer interface for sensors and actuators — Common functions, communication protocols, and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-2, *Information technology — Smart transducer interface for sensors and actuators — Part 2: Transducer to microprocessor communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-4, *Information technology — Smart transducer interface for sensors and actuators — Part 4: Mixed-mode communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO 24533, *Intelligent Transport Systems — Data dictionary and message set to facilitate the movement of freight and its intermodal transfer — Road transport information exchanges*

6.8.5 FLC-CIC - Profile No.L2-1: Requirements

6.8.5.1 Where available, sensor information related to individual items within the cargo to be associated to item identification in a format and manner supported by one of the standards referenced in 6.8.4 above.

6.8.5.2 The RFID interrogator on board (system interface), under the instruction of the OBE, shall audit the contents of the land conveyance from time to time, as decided by the operator. The RFID technology is not specified within this profile and is a matter of commercial decision, but it is recommended to use one of the RFID technologies summarized in the list of referenced standards in ISO 26683-1, that has the range and data capability to reliably harvest the data from the items when they are *in situ* loaded in the cargo on board the land conveyance.

6.8.5.3 In the event that the trailer or container(s) on the trailer have an electronic seal, the seal shall provide its identification and status to the vehicle OBE in a format and manner supported by one of the standards referenced in 6.8.4 above.

6.8.5.4 In the event that the container on the trailer has non-item related sensors (for example container temperature monitoring), the sensor(s) to provide its identification and status to the vehicle OBE in a format and manner supported by one of the standards referenced in 6.8.4 above.

6.8.6 FLC-CIC - Profile No.L2-1: Conformance provisions

Conformance shall be in accordance with conformance requirements of the referenced standards used.

6.9 FLC-CIC Profile No.L2-2: Data agglomeration from multiple trailers (OPTIONAL)

6.9.1 FLC-CIC - Profile No.L2-2: scenario illustration

This scenario is similar to ISO 26683 Profile No.L2-1, except that in this profile there are multiple trailers/containers, and the harvesting of data are, as a first stage from the items /sensors/seals to an interrogator onboard the trailer (not directly to the land conveyance OBE) as defined in a n L3 profile, where the communication from the trailer(s) to the land conveyance OBE is a second step Figure 3 provides an example of a 'combi' tractor/trailer. Figure 6 shows two examples of a tractor towing two trailers each with an ISO intermodal container on board. Figure 7 provides a schematic of a possible on board data capture physical architecture, but other combinations are possible with different types of land conveyance, up to and including 'road trains' which may have several trailers (Figures 8 and 9)

Figure 5 — 'Combi' tractor/trailer

Figure 6 — Examples of tractor and two ISO containers

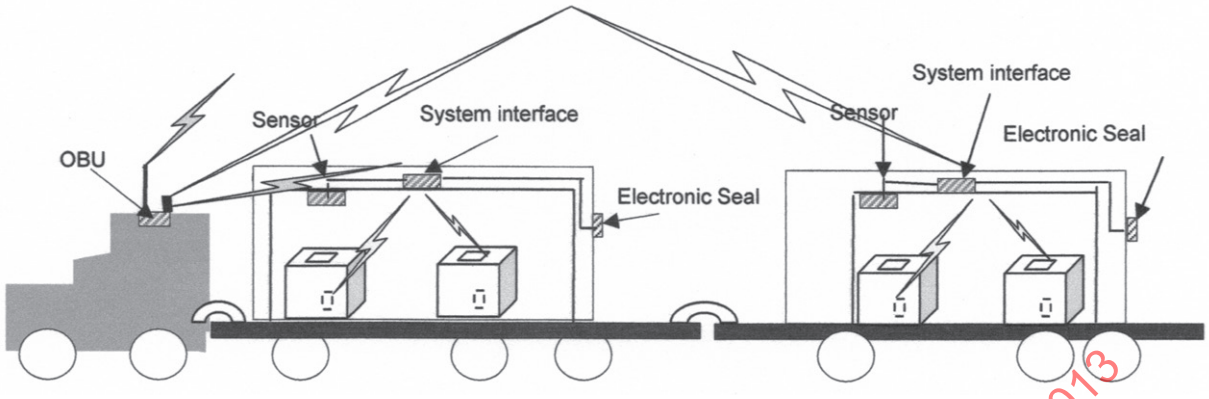

Figure 7 — Tractor with two trailers with containers schematic

Figure 8 — Road train example

Figure 9 — Road train example

6.9.2 FLC-CIC - Profile No.L2-2: Interchange reference points

OBE to/from road side/ central system shall use one or more of the following specifications: CALM satellite (ISO 29282), DSRC (ISO 15628), Mobile [GSM/UMTS/LTE/IMS/PDC/PHS (ISO 21213)], CALM M5 (ISO 21215), CALM Infrared (ISO 21214), or CALM Millimetre (ISO 21217).

OBE on the tractor to/from OBE on each trailer: CALM M5(ISO 21215), WPAN (wireless personal network) such as WiFi (IEEE 802.11 a,b,g,n).

NOTE CALM M5 (ISO 21215) is a specialized development of IEEE 802.11 for ITS V2V and V2I. It is therefore preferred, but not required, to use this variant of IEEE 802.11.

6.9.3 FLC-CIC - Profile No.L2-2: Scope

To collate/agglomerate data from trailers either directly via satellite, each trailer communicating as an ISO 121215 'ITS station', or via GSM/UMTS/LTE/IMS/PDC/PHS or WiFi.

6.9.4 FLC-CIC - Profile No.L2-2: Referenced standards

Profile L2-2 shall use data defined in one or more of the following referenced standards:

ISO 21212, *Intelligent transport systems — Communications access for land mobiles (CALM) — 2G Cellular systems*

ISO 21213, *Intelligent transport systems — Communications access for land mobiles (CALM) — 3G Cellular systems*

ISO 21214, *Intelligent transport systems — Communications access for land mobiles (CALM) — Infrared systems*

ISO 21215, *Intelligent transport systems — Communications access for land mobiles (CALM) — M5*

ISO 21216, *Intelligent transport systems — Communications access for land mobiles (CALM) — Millimetre wave interface*

ISO 29282, *Intelligent transport systems — Communications access for land mobiles (CALM) — Satellite networks*

ISO 29283, *ITS CALM Mobile Wireless Broadband applications using Communications in accordance with* IEEE 802.20

ISO 15628, *Road transport and traffic telematics — Dedicated short range communication (DSRC) — DSRC application layer*

6.9.5 FLC-CIC - Profile No.L2-2: Requirements

6.9.5.1 An OBE capable to communicate at least 60 m shall be installed on the tractor and each trailer.

6.9.5.2 Each trailer shall be able to provide its ISO 6346 identification or a unique identification provided by the operator and shall be able to report its content in accordance with one of the profiles of this part of ISO 26683.

6.9.5.3 On interrogation from the tractor OBE, each trailer shall provide its audit of its content, each item identification to be tagged with the trailer identification in addition to the item identification.

6.9.5.4 On interrogation by a central system, the tractor OBE shall provide its audit of the content of each trailer, each item tagged with both the trailer identification and the tractor identification.

6.9.6 FLC-CIC - Profile No.L2-2: Conformance provisions

Conformance shall be in accordance with conformance requirements of the referenced standards used.

6.10 FLC-CIC Profile No.L3-1: Item data agglomeration to trailer interrogator using RFID (OPTIONAL)

6.10.1 FLC-CIC - Profile No.L3-1: Scenario illustration

In this scenario, items are identified using an RFID tag attached to them that is capable to transmit its data to an interrogator mounted onto/in the land conveyance trailer (for example, but not necessarily using ISO/IEC 18000-6C, or other medium or longer range RFID technologies). Figure 10 and Figure 11 below show typical examples for this scenario. The focus of this profile is the harvesting of data from the items to the trailer interrogator (system interface)

The RFID technology is not specified within this profile and is a matter of commercial decision, but it is recommended to use a system that complies with one of the RFID Standards referenced in Annex A of ISO 26683-1.

The technology used to transmit data from the trailer interrogator to the vehicle OBE is not specified but is a matter for commercial decision. It may use wired or wireless technology.

NOTE Instantiation varies according to the particular commercial scenario, so technology choice is not standardised.

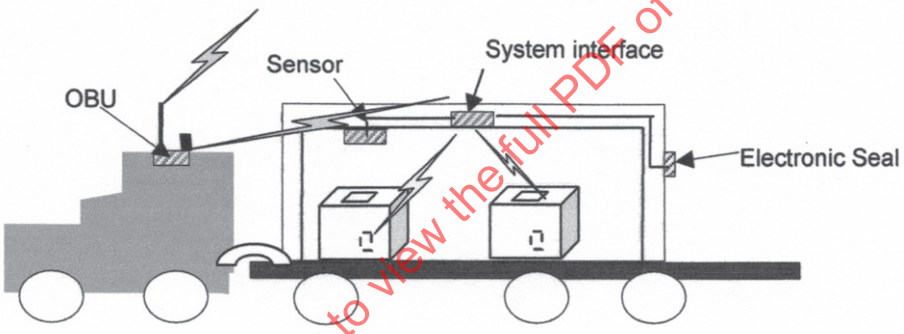

Figure 10 — Tractor with one trailer with cargo on it

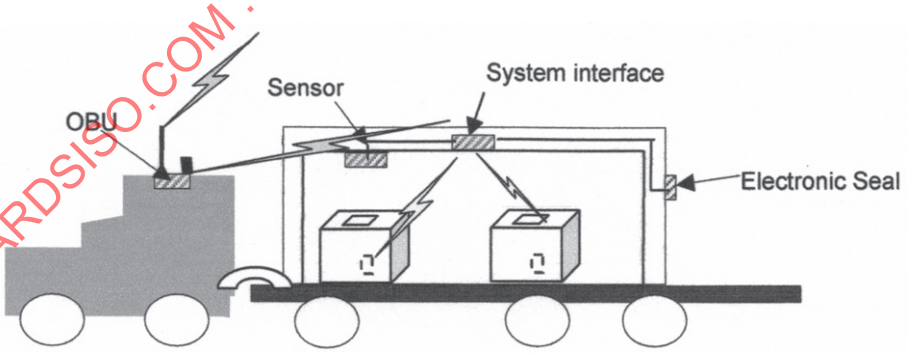

Figure 11 — Tractor with one trailer with container and electronic seal

6.10.2 FLC-CIC - Profile No.L3-1: Interchange reference points

Item identification tag to trailer interrogator.

Transmission of data from trailer interrogator to vehicle OBE.

6.10.3 FLC-CIC - Profile No.L3-1: Scope

This profile specifies the methodology by which this data are collected, and specifies which data formats are acceptable.

6.10.4 FLC-CIC - Profile No.L3-1: Referenced standards

Profile L3-1 shall use data defined in one or more of the following referenced standards:

ISO 7372, *Trade data interchange — Trade data elements directory*

ISO 9897, *Freight containers — Container equipment data exchange (CEDEX) — General communication codes*

ISO 10368, *Freight thermal containers — Remote condition monitoring*

ISO 10374, *Freight containers — Automatic identification*

ISO/TS 10891, *Freight containers — Radio frequency identification (RFID) — Licence plate tag*

ISO/IEC 15418, *Information technology — Automatic identification and data capture techniques — GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance*

ISO/IEC 15459-1, *Information technology — Unique identifiers — Part 1: Unique identifiers for transport units*

ISO/IEC 15459-3, *Information technology — Unique identifiers — Part 3: Common rules for unique identifiers*

ISO/IEC 15459-4, *Information technology — Unique identifiers — Part 4: Individual items*

ISO/IEC 15459-5, *Information technology — Unique identifiers — Part 5: Unique identifier for returnable transport items (RTIs)*

ISO/IEC 14549-6, *Information technology — Unique identifiers — Part 6: Unique identifier for product groupings*

ISO/IEC 14549-8, *Information technology — Unique identifiers — Part 8: Grouping of transport unit*

ISO/IEC 15961, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: application interface*

ISO/IEC 15962, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: data encoding rules and logical memory functions*

ISO 17261, *Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology*

ISO 17262, *Road Transport and Traffic Telematics — Automatic Vehicle and Equipment identification — Intermodal Goods Transport Numbering and Data Structures*

ISO 17363, *Supply chain applications of RFID — Freight containers*

ISO 17364, *Supply chain applications of RFID — Returnable transport items (RTIs)*

ISO 17365, *Supply chain applications of RFID — Transport units*

ISO 17366, *Supply chain applications of RFID — Product packaging*

ISO 17367, *Supply chain applications of RFID — Product tagging*

ISO 17687, *Transport Information and Control Systems (TICS) — General fleet management and commercial freight operations — Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation*

ISO 18185-1, *Freight containers — Electronic seals — Part 1: Communication protocol*

ISO/IEC IEEE 21450, *Information technology — Smart transducer interface for sensors and actuators — Common functions, communication protocols, and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-2, *Information technology — Smart transducer interface for sensors and actuators — Part 2: Transducer to microprocessor communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-4, *Information technology — Smart transducer interface for sensors and actuators — Part 4: Mixed-mode communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO 24533, *Intelligent Transport Systems — Data dictionary and message set to facilitate the movement of freight and its intermodal transfer — Road transport information exchanges*

6.10.5 FLC-CIC - Profile No.L3-1: Requirements

6.10.5.1 Where available, sensor information related to individual items within the cargo shall be associated to item identification in a format and manner supported by one of the standards referenced in 6.10.4 above.

6.10.5.2 In the case of a tractor/trailer combination, the RFID interrogator on board shall audit the contents of the trailer from time to time, as decided by the operator, or on demand from the vehicle OBE. The RFID technology is not specified within this profile and is a matter of commercial decision, but it is recommended to use one of the RFID technologies summarized in the list of referenced standards in ISO 26683-1, that has the range and data capability to reliably harvest the data from the items when they are *in situ* loaded in the cargo on board the land conveyance.

6.10.5.3 In the event that the trailer or container(s) on the trailer have an electronic seal, the seal shall provide its identification and status to the trailer interrogator or vehicle OBE in a format and manner supported by one of the standards referenced in 6.10.4 above.

6.10.5.4 In the event that the trailer or container on the trailer has non-item related sensors (for example container temperature monitoring), the sensor(s) shall provide its identification and status to the trailer interrogator or vehicle OBE in a format and manner supported by one of the standards referenced in 6.10.4 above.

6.10.5.5 On demand from the vehicle OBE the trailer interrogator shall pass the current audit of the content of the trailer, and if appropriate the electronic seal data, and, if appropriate non item related sensor information, to the vehicle OBE.

6.10.5.6 In the case of a rigid body truck, the above procedures shall also apply in a similar manner, or the vehicle OBE may also perform the function of the trailer interrogator, in which case the provisions of 6.10.5.5 become redundant.

6.10.6 FLC-CIC - Profile No.L3-1: Conformance provisions

Conformance shall be in accordance with conformance requirements of the referenced standards used.

6.11 FLC-CIC Profile No.L3-2: Item data agglomeration to vehicle OBE using short range RFID and/or bar-code or OCR (OPTIONAL)

6.11.1 FLC-CIC - Profile No.L3-2: Scenario illustration

In this scenario, item identification is by using a short range RFID system or bar-code identification or optical character recognition (OCR) equipment that does not have the range and data capability to reliably harvest the data from the items when they are *in situ* loaded in the cargo on board the land conveyance.

In this scenario, the land conveyance content is audited by the loader by interrogating/scanning the RFID tag/bar-code label/optically reading the label as the goods are loaded onto the land conveyance.

The RFID technology is not specified within this profile and is a matter of commercial decision, but it is recommended to use a system that complies with one of the RFID Standards referenced in Annex A of ISO 26683-1.

The bar-code reading equipment and symbology is not specified within this profile and is a matter of commercial decision, but it is recommended to use a symbology that complies with one of the bar-code symbology Standards referenced in 6.11.4 below, and it is required to present the bar-code data in a form specified by one of the bar-code data standards specified in 6.11.4 below.

NOTE 1 It is not necessary to specify the particular bar-code symbology as most bar-code readers are able to read, and in many cases auto-discriminate between, the principal standardised symbologies.

The OCR technology equipment is not specified this profile and is a matter of commercial decision.

The operator then uploads the cargo data to the vehicle OBE. The technology used to transmit data from the RFID interrogator/bar-code reader/OCR reader to the vehicle OBE is not specified but is a matter for commercial decision. It may use wired or wireless technology.

NOTE 2 Instantiation varies according to the particular commercial scenario, so technology choice is not standardised.

Figure 12 shows an example of an item that carries a complex multi bar-code shipping label and an embedded RFID tag. In actual instantiation an item may have all or these, or just an RFID tag or just a bar-code label, which may take different formats, according to the standard to which it is compliant.

NOTE 3 Fortunately almost all bar-codes use one of the standardised symbologies.

Figure 12 — Carton with shipping label, multiple bar-codes, human/OCR readable text and an RFID tag

6.11.2 FLC-CIC - Profile No.L3-2: Interchange reference points

Item RFID tag/bar-code label to interrogator/reader.

Interrogator/reader to vehicle OBE.

6.11.3 FLC-CIC - Profile No.L3-2: Scope

This profile specifies the profile to manually read each item identification tag/barcode label as the item is loaded onto the land conveyance and to upload this data to the vehicle OBE.

6.11.4 FLC-CIC - Profile No.L3-2: Referenced standards

Profile L3-2 shall use data defined in one or more of the following referenced standards:

ISO 7372, *Trade data interchange — Trade data elements directory*

ISO 9897, *Freight containers — Container equipment data exchange (CEDEX) — General communication codes*

ISO 9897, *Freight containers — Container equipment data exchange (CEDEX) — General communication codes*

ISO 10368, *Freight thermal containers — Remote condition monitoring*

ISO 10374, *Freight containers — Automatic identification*

ISO/TS 10891, *Freight containers — Radio frequency identification (RFID) — Licence plate tag*

ISO/IEC 15418, *Information technology — Automatic identification and data capture techniques — GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance*

ISO/IEC 15420, *Information technology — Automatic identification and data capture techniques — EAN/UPC bar code symbology specification*

ISO 15394, *Packaging — Bar code and two-dimensional symbols for shipping, transport and receiving labels*

ISO/IEC 15424, *Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)*

ISO/IEC 15438, *Information technology — Automatic identification and data capture techniques — PDF417 bar code symbology specification*

ISO 15459, *Information technology — Unique identifiers*

ISO/IEC 15459-1, *Information technology — Unique identifiers — Part 1: Unique identifiers for transport units*

ISO/IEC 15459-2, *Information technology — Unique identifiers — Part 2: Registration procedures*

ISO/IEC 15459-3, *Information technology — Unique identifiers — Part 3: Common rules for unique identifiers*

ISO/IEC 15459-4, *Information technology — Unique identifiers — Part 4: Individual items*

ISO/IEC 15459-5, *Information technology — Unique identifiers — Part 5: Unique identifier for returnable transport items (RTIs)*

ISO/IEC 15459-6, *Information technology — Unique identifiers — Part 6: Unique identifier for product groupings*

ISO/IEC 15459-8, *Information technology — Unique identifiers — Part 8: Grouping of transport unit*

ISO/IEC 15961, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: application interface*

ISO/IEC 15962, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: data encoding rules and logical memory functions*

ISO/IEC 16022, *Information technology — Automatic identification and data capture techniques — Data Matrix bar code symbology specification*

ISO/IEC 16023, *Information technology — International symbology specification — MaxiCode*

ISO/IEC 16388, *Information technology — Automatic identification and data capture techniques — Code 39 bar code symbology specification*

ISO 17261, *Intelligent transport systems — Automatic vehicle and equipment identification — Intermodal goods transport architecture and terminology*

ISO 17262, *Intelligent transport systems — Automatic vehicle and equipment identification — Numbering and data structures*

ISO 17363, *Supply chain applications of RFID — Freight containers*

ISO 17364, *Supply chain applications of RFID — Returnable transport items (RTIs)*

ISO 17365, *Supply chain applications of RFID — Transport units*

ISO 17366, *Supply chain applications of RFID — Product packaging*

ISO 17367, *Supply chain applications of RFID — Product tagging*

ISO 17687, *Transport Information and Control Systems (TICS) — General fleet management and commercial freight operations — Data dictionary and message sets for electronic identification and monitoring of hazardous materials/dangerous goods transportation*

ISO/IEC 18004, *Information technology — Automatic identification and data capture techniques — QR Code 2005 bar code symbology specification*

ISO 18185-1, *Freight containers — Electronic seals — Part 1: Communication protocol*

ISO/IEC/IEEE 21450, *Information technology — Smart transducer interface for sensors and actuators — Common functions, communication protocols, and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-2, *Information technology — Smart transducer interface for sensors and actuators — Part 2: Transducer to microprocessor communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO/IEC/IEEE 21451-4, *Information technology — Smart transducer interface for sensors and actuators — Part 4: Mixed-mode communication protocols and Transducer Electronic Data Sheet (TEDS) formats*

ISO 22742, *Packaging — Linear bar code and two-dimensional symbols for product packaging*

ISO/TS 24533, *Intelligent transport systems — Electronic information exchange to facilitate the movement of freight and its intermodal transfer — Road transport information exchange methodology*

ISO 28219, *Packaging — Labelling and direct product marking with linear bar code and two-dimensional symbols*

6.11.5 FLC-CIC - Profile No.L3-2: Requirements

6.11.5.1 In the case of an RFID instantiation, where available, sensor information shall be associated to item identification in a format and manner supported by one of the standards referenced in 6.11.4 above. In the event of the use of bar-codes item related sensor information will not be possible.

6.11.5.2 In the case of identification by short range RFID, the items shall be read when the item is loaded onto the land conveyance. The RFID technology is not specified within this profile and is a matter of commercial decision, but it is recommended to use one of the RFID technologies summarized in the list of referenced standards in ISO 26683-1 in a manner prescribed by the referenced standard.

6.11.5.3 In the case of identification by bar code, the bar codes of the items shall be read when the item is loaded onto the land conveyance. The type of bar code is not specified within this standard but shall be one of the standardised bar codes referenced in 6.11.4 above.

6.11.5.4 In the event that the trailer or container on the trailer has an electronic seal, the seal shall provide its identification and status to the vehicle OBE in a format and manner supported by one of the standards referenced in 6.11.4 above at times determined by the operator. It may use wired or wireless technology.

6.11.5.5 In the event that the trailer or container on the trailer has non-item related sensors (for example temperature monitoring), the sensor(s) shall provide its identification and status to the vehicle OBE in a format and manner supported by one of the standards referenced in 6.11.4 above at times determined by the operator. It may use wired or wireless technology.

6.11.6 FLC-CIC - Profile No.L3-2: Conformance provisions

Conformance shall be in accordance with conformance requirements of the referenced standards used.

6.12 FLC-CIC Profile No.L3-3: Item data agglomeration to vehicle OBE using short range RFID and/or bar-code where the tractor/truck does not have fixed OBE (OPTIONAL)

6.12.1 FLC-CIC - Profile No.L3-3: Scenario illustration

In this scenario, which is common in express parcel and postal delivery systems, and in supermarket/store depot-store deliveries, etc., the land conveyances do not have fixed OBE capability that can communicate in the manner described in Profiles 1 to 7, but utilize driver operated portable equipment that communicates to the back-office system either by physical docking or by GSM/UMTS/LTE/IMS/PDC/PHS or similar wireless communications. Figure 13 shows a typical example.

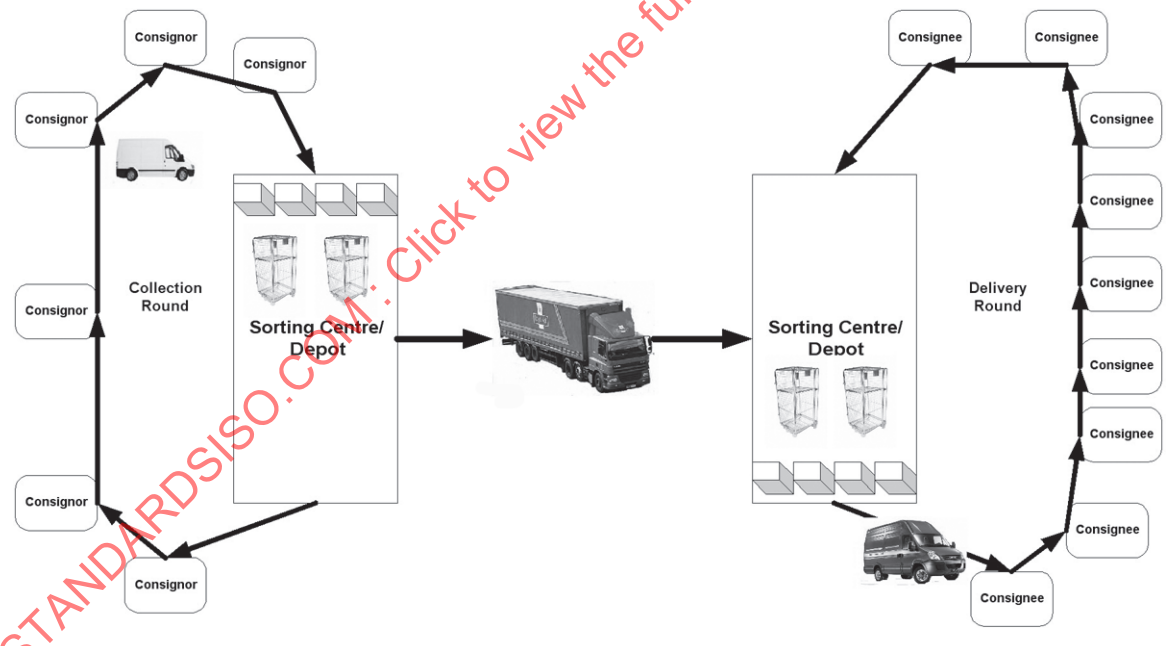

Figure 13 — Example of make and break bulk- Express packet service

Real time information is only possible if the portable equipment used is connected by GSM/UMTS/LTE/IMS/PDC/PHS or similar wireless communications technology. The actual wireless communications technology used by the portable equipment is not standardised and is a matter for local commercial decision.

6.12.2 FLC-CIC - Profile No.L3-3: Interchange reference points

Consignor item to collection land conveyance

Collection land conveyance to sorting centre/depot

Item to rollercage (or similar)

Rollercage (or similar) to bulk land conveyance

Bulk land conveyance to sorting centre/depot

Sorting centre/depot to delivery land conveyance

Delivery land conveyance to consignee

6.12.3 FLC-CIC - Profile No.L3-3: Scope

This profile provides real-time data throughout the consignor to consignee collection – delivery process, without the requirement for fixed OBE.

6.12.4 FLC-CIC - Profile No.L3-3: Referenced standards

Profile L3-3 shall use data defined in one or more of the following referenced standards:

ISO/IEC 15418, *Information technology — Automatic identification and data capture techniques — GS1 Application Identifiers and ASC MH10 Data Identifiers and maintenance*

ISO/IEC 15420, *Information technology — Automatic identification and data capture techniques — EAN/UPC bar code symbology specification*

ISO 15394, *Packaging — Bar code and two-dimensional symbols for shipping, transport and receiving labels*

ISO/IEC 15424, *Information technology — Automatic identification and data capture techniques — Data Carrier Identifiers (including Symbology Identifiers)*

ISO/IEC 15438, *Information technology — Automatic identification and data capture techniques — PDF417 bar code symbology specification*

ISO 15394, *Packaging — Bar code and two-dimensional symbols for shipping, transport and receiving labels*

ISO/IEC 15459-1, *Information technology — Unique identifiers — Part 1: Unique identifiers for transport units*

ISO/IEC 15459-4, *Information technology — Unique identifiers — Part 4: Individual items*

ISO/IEC 15459-5, *Information technology — Unique identifiers — Part 5: Unique identifier for returnable transport items (RTIs)*

ISO/IEC 15961, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: application interface*

ISO/IEC 15962, *Information technology — Radio frequency identification (RFID) for item management — Data protocol: data encoding rules and logical memory functions*

ISO/IEC 16022, *Information technology — Automatic identification and data capture techniques — Data Matrix bar code symbology specification*

ISO/IEC 16023, *Information technology — International symbology specification — MaxiCode*

ISO/IEC 16388, *Information technology — Automatic identification and data capture techniques — Code 39 bar code symbology specification*

ISO 17363, *Supply chain applications of RFID — Freight containers*

ISO 17364, *Supply chain applications of RFID — Returnable transport items (RTIs)*

ISO 17365, *Supply chain applications of RFID — Transport units*

ISO 17366, *Supply chain applications of RFID — Product packaging*

ISO 17367, *Supply chain applications of RFID — Product tagging*