INTERNATIONAL STANDARD

ISO 15638-11

First edition
2014-07-15

Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) —

Part 11: Driver work records

Systèmes intelligents de transport — Cadre pour applications télématiques coopératives pour véhicules réglementés (TARV) —

Partie 11: Enregistrements du travail des conducteurs

Reference number
ISO 15638-11:2014(E)

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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

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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 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

This first edition cancels and replaces ISO/TS 15638-11:2013.

ISO 15638 consists of the following parts, under the general title *Intelligent transport systems — Framework for cooperative telematics applications for regulated commercial freight vehicles (TARV)*:

— *Part 1: Framework and architecture*

— *Part 2: Common platform parameters using CALM*

— *Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

— *Part 5: Generic vehicle information*

— *Part 6: Regulated applications*

— *Part 7: Other applications*

— *Part 8: Vehicle access management and monitoring*

— *Part 9: Remote electronic tachograph monitoring (RTM)*

— *Part 10: Emergency messaging system/eCall (EMS)*

— *Part 11: Driver work records*

— *Part 12: Vehicle mass monitoring*

— *Part 14: Vehicle access control*

— *Part 15: Vehicle location monitoring*

— *Part 16: Vehicle speed monitoring*

— *Part 17: Consignment and location monitoring*

— *Part 18: ADR (Dangerous Goods) transport monitoring (ADR)*

— *Part 19: Vehicle parking facilities (VPF)*

The following parts are under preparation:

— *Part 4: System security requirements*

— *Part 13: 'Mass' information for jurisdictional control and enforcement*

Introduction

Many ITS technologies have been embraced by commercial transport *operators (4.31)* and freight owners in the areas of fleet management, safety, and security. *Telematics (4.41)* applications have also been developed for governmental use. Such regulatory services in use or being considered vary from *jurisdiction (4.25)* to *jurisdiction*, but include electronic on-board recorders, digital *tachograph (4.40)*, on-board *mass (4.29)* monitoring, 'mass' penalties and levies, vehicle *access (4.1) methods*, *hazardous goods* tracking, and e-call. Additional applications with a regulatory impact being developed include, fatigue management, speed monitoring, and heavy vehicle penalties imposed based on location, distance, and time.

In such an emerging environment of regulatory and *commercial applications (4.15)*, it is timely to consider an overall *architecture (4.11)* (business and functional) that could support these functions from a single platform within a commercial freight vehicle that operates within such regulations. International Standards will allow for a speedy development and *specification (4.39)* of new applications that build upon the functionality of a generic specification platform. A suite of International Standard deliverables is required to describe and define the *framework (4.21)* and requirements so that the on-board equipment and back office systems can be commercially designed in an open market to meet common requirements of *jurisdictions (4.25)*.

This International Standard addresses and defines the *framework (4.21)* for a range of cooperative *telematics (4.41)* applications for *regulated commercial freight vehicles (4.35)* [such as *access methods (4.1)*, *driver (4.17)* fatigue management, speed monitoring, on-board '*mass*' *(4.29)* information for jurisdictional control and enforcement]. The overall scope includes the concept of operation, legal and regulatory issues, and the generic cooperative provision of services to *regulated commercial freight vehicles (4.35)*, using an on-board ITS platform. The *framework* is based on a (multiple) *service provider (4.37)* oriented approach with provisions for the *approval (4.4)* and *auditing (4.10)* of *service providers*.

This International Standard will

— provide the basis for future development of cooperative *telematics (4.41)* applications for *regulated commercial freight vehicles (4.35)*. Many elements to accomplish this are already available. Existing relevant standards will be referenced, and the *specifications (4.39)* will use existing standards (such as *CALM*) wherever practicable,

— allow for a powerful platform for highly cost-effective delivery of a range of *telematics* applications for *regulated commercial freight vehicles (4.35)*,

— a business *architecture (4.9)* based on a (multiple) *service provider (4.37)* oriented approach, and

— address legal and regulatory aspects for the *approval (4.4)* and *auditing (4.10)* of *service providers.*

This International Standard is timely as many governments (Europe, North America, Asia, and Australia/New Zealand) are considering the use of *telematics (4.41)* for a range of regulatory purposes. Ensuring that a single in-vehicle platform can deliver a range of services to both government and industry through open standards and competitive markets is a strategic objective.

This part of ISO 15638 provides *specifications (4.39)* for 'Driver Work Records'.

NOTE 1 The definition of what comprises a 'regulated' vehicle is regarded as an issue for national decision, and can vary from *jurisdiction (4.25)* to *jurisdiction*. This International Standard does not impose any requirements on nations in respect of how they define a *regulated vehicle (4.35)*.

NOTE 2 The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and can vary from *jurisdiction (4.25)* to *jurisdiction*. This International Standard does not impose any requirements on nations in respect of which services for *regulated vehicles (4.35) jurisdictions* will require, or support as an option, but will provide standardized sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where implemented.

Intelligent transport systems — Framework for cooperative telematics applications for regulated vehicles (TARV) —

Part 11: Driver work records

1 Scope

This part of ISO 15638 addresses the provision of *'Driver Work Records' (DWR*) *(4.19)* and specifies the form and content of such data required to support such systems, and *access methods (4.1)* to that data.

The scope of this part of ISO 15638 is to provide *specifications (4.39)* for common communications and data exchange aspects of the *application service (4.3)* driver work records that a *regulator (4.26)* can elect to require or support as an option, including

a) high-level definition of the service that a *service provider (4.37)* has to provide, [The service definition describes common service elements; but does not define the detail of how such an *application service (4.3)* is instantiated, nor the acceptable value ranges of the data concepts defined.],

b) means to realize the service, and

c) application data, naming content, and quality that an *IVS (4.22)* has to deliver.

The definition of what comprises a 'regulated' service is regarded as an issue for national decision, and can vary from *jurisdiction (4.25)* to *jurisdiction*. This International Standard does not impose any requirements on nations in respect of which services for *regulated vehicles jurisdictions* will require, or support as an option, but provides standardized sets of requirements descriptions for identified services to enable consistent and cost efficient implementations where instantiated.

This International Standard has been developed for use in the context of regulated commercial freight vehicles [hereinafter referred to as *'regulated vehicles' (4.35)*]. There is nothing, however, to prevent a jurisdiction extending or adapting the scope to include other types of regulated vehicles, as it deems appropriate.

2 Conformance

Requirements to demonstrate conformance to any of the general provisions or specific *application services (4.3)* described in this part of ISO 15638 shall be within the regulations imposed by the *jurisdiction (4.25)* where they are instantiated. Conformance requirements to meet the provisions of this International Standard are therefore deemed to be under the control of, and to the specification of, the *jurisdiction* where the *application service*(s) is/are instantiated.

3 Normative references

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

ISO 15638-1, *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 1: Framework and architecture*

ISO 15638-2, *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 2: Common platform parameters using CALM*

ISO 15638-3, *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 3: Operating requirements, 'Approval Authority' procedures, and enforcement provisions for the providers of regulated services*

ISO 15638-4:—,[1] *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 4: System security requirements*

ISO 15638-5, *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 5: Generic vehicle information*

ISO 15638-6, *Intelligent transport systems — Framework for collaborative Telematics Applications for Regulated commercial freight Vehicles (TARV) — Part 6: Regulated applications*

ISO 15638-7, *Intelligent transport systems — Framework for collaborative telematics applications for regulated commercial freight vehicles (TARV) — Part 7: Other applications*

4 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 15638-1 and the following apply.

4.1
access methods
procedures and protocols to provision and retrieve data

4.2
app
small (usually) Java™[2] applets, organized as software bundles, that support *application services (4.3)* by keeping the *data pantry (4.16)* provisioned with up to date data

4.3
application service
service provided by a *service provider (4.37)*, enabled by accessing data from the *IVS (4.22)* of a *regulated commercial freight vehicle (4.35)* through a wireless communications network

4.4
application service provider
ASP
party that provides an application service *(4.3)*

4.5
app library
separately secure area of memory in *IVS (4.22)* where apps are stored with different access controls to *data pantry (4.16)*

4.6
approval
formal affirmation that an applicant has satisfied all the requirements for appointment as a *service provider (4.37)* or that an application service delivers the required service levels

1) To be published.

2) This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

4.7
approval agreement
written agreement made between an approval authority (regulatory) *(4.8)* and a service provider *(4.37)*

Note 1 to entry: An *approval authority (regulatory) (4.8)* approval agreement recognizes the fact that a *service provider (4.37)*, having satisfied the *approval authority's* requirements for appointment as a *service provider,* is appointed in that capacity, and sets out the legal obligations of the parties, with respect to the on-going role of the *service provider*.

4.8
approval authority (regulatory)
organization (usually independent) which conducts *approval (4.4)* and on-going *audit (4.10)* for *service providers (4.37)* on behalf of a *jurisdiction (4.25)*

4.9
architecture
formalized description of the design of the structure of *TARV* and its *framework (4.21)*

4.10
audit
auditing
review of a party's capacity to meet, or continue to meet, the initial and on-going *approval agreements (4.7)* as a *service provider (4.37)*

4.11
basic vehicle data
data that shall be maintained/provided by all *IVS (4.22)*, regardless of *jurisdiction (4.25)*

4.12
communications access for land mobiles
CALM
layered solution that enables continuous or quasi continuous communications between vehicles and the infrastructure, or between vehicles, using such (multiple) wireless telecommunications media that are available in any particular location, and which have the ability to migrate to a different available media where required and where media selection is at the discretion of *user (4.42)* determined parameters by using a suite of International Standards based on ISO 21217 and ISO 21210, that provide a common platform for a number of standardized media using *ITS-stations (4.24)* to provide wireless support for applications, such that the application is independent of any particular wireless medium

4.13
commercial application(s)
ITS applications in *regulated commercial freight vehicles (4.35)* for commercial (non-regulated) purposes

EXAMPLE Asset tracking, vehicle and engine monitoring, cargo security, driver management, etc.

4.14
cooperative ITS
C-ITS
ITS applications for both regulatory and commercial purposes that require the exchange of data between uncontracted parties using multiple *ITS-stations (4.24)* communicating with each other and sharing data with other parties with whom they have no direct contractual relationship to provide one or more *ITS services (4.23)*

4.15
core data
basic vehicle data (4.11) plus any additional data required to provide an implemented *regulated application service (4.34)*

4.16
data pantry
secure area of memory in *IVS (4.22)* where data values are stored with different access controls to *app library (4.5)*

4.17
driver
person driving the *regulated commercial freight vehicle* at any specific point in time

4.18
driver records device
memory storage device (such as a USB device) used within some (but not all) jurisdictions, with a permanent WORM file containing the details of the drivers licence and drivers work records *(4.19)*

4.19
driver work records
DWR
collection, collation, and transfer of *driver(4.17)* work and rest hours data from an *in-vehicle system (4.22)* to an *application service provider (4.4)*

4.20
facilities
layer that sits on top of the communication stack and helps to provide data interoperability and reuse, and to manage applications and enable dynamic real time loading of new applications

4.21
framework
particular set of beliefs or ideas referred to in order to describe a scenario or solve a problem

4.22
in-vehicle system
IVS
ITS-station (4.24) and connected equipment on board a vehicle

4.23
ITS service
communication functionality offered by an *ITS-station (4.24)* to an *ITS-station* application

4.24
ITS-station
ITS-s
entity in a communication network, comprised of application, *facilities (4.20)*, networking and access layer components specified in ISO 21217 that operate within a bounded secure management domain and also using wireless networks to support general ITS, using any wireless network that is available and supported

4.25
jurisdiction
government, road, or traffic authority which owns the r*egulatory applications (4.33)*

EXAMPLE Country, state, city council, road authority, government department (customs, treasury, transport), etc.

4.26
jurisdiction regulator
regulator
agent of the *jurisdiction (4.25)* appointed to regulate and manage *TARV* within the domain of the *jurisdiction*; might or might not be the *approval authority (regulatory) (4.8)*

4.27
local data tree
LDT
frequently updated data concept stored in the on on-board *data pantry (4.16)* containing a collection of data values deemed essential for either a) *TARV regulated application service (4.34)*, or b) *cooperative intelligent transport systems (4.14)*

4.28
map
spatial dataset that defines the road system

4.29
mass
'mass' of a given heavy vehicle as measured by equipment affixed to the *regulated commercial freight vehicle (4.35)*

4.30
'mass' information for jurisdictional control and enforcement
MICE
MRC
collection, collation, and transfer of *vehicle mass (4.29)* data from an *in-vehicle system (4.22)* to an applic*ation service provider (4.4)* to enable data provision to *jurisdictions (4.25)* for the control and management of equipped vehicles based on the *mass* of the *regulated vehicle (4.35)*, or use of such data to enable compliance with the provisions of regulations

4.31
operator
fleet manager of a *regulated commercial freight vehicle*

4.32
prime service provider
service provider (4.37) who is the first contractor to provide *regulated application services (4.34)* to the *regulated commercial freight vehicle (4.35)*, or a nominated successor on termination of that initial contract; the *prime service provider* is also responsible to maintain the installed *IVS (4.22)*; if the *IVS* was not installed during the manufacture of the vehicle, the *prime service provider* is also responsible to install and commission the *IVS (4.22)*

4.33
regulated application
regulatory application
application arrangement using TARV utilised by *jurisdictions (4.25)* for granting certain categories of commercial vehicles rights to operate in regulated circumstances subject to certain conditions, or indeed to permit a vehicle to operate within the *jurisdiction*; can be mandatory or voluntary at the discretion of the *jurisdiction*

4.34
regulated application service
TARV application service to meet the requirements of a regulated application that is mandated by a regulation imposed by a *jurisdiction (4.25)*, or is an option supported by a *jurisdiction*

4.35
regulated commercial freight vehicle
regulated vehicle
vehicle that is subject to regulations determined by the *jurisdiction (4.25)* as to its use on the road system of the *jurisdiction* in regulated circumstances, subject to certain conditions, and in compliance with specific regulations for that class of regulated vehicle; at the option of *jurisdictions*; this might require the provision of information through *TARV* or provide the option to do so

4.36
remote tachograph monitoring
RTM
collection, collation, and transfer of data from an on-board electronic *tachograph (4.40)* system to an *application service provider (4.4)*

4.37
service provider
party which is approved by an approval *authority (regulatory) (4.8)* as suitable to provide regulated or commercial ITS *application services (4.3)*

4.38
session
wireless communication exchange between the *ITS-station (4.24)* of an *IVS (4.22)* and the *ITS-station* of its *application service provider (4.4)* to achieve data update, data provision, upload apps, or otherwise manage the provision of the *application service (4.3),* or a wireless communication provision of data to the *ITS-station* of an *IVS (4.22)* from any other *ITS-station*

4.39
specification
explicit and detailed description of the nature and functional requirements and minimum performance of equipment, service or a combination of both

4.40
tachograph
sender unit mounted to a vehicle gearbox, a tachograph head and a digital driver card, which records the *regulated vehicle (4.35)* speed and the times at which it was driven and aspects of the *driver's (4.17)* activity selected from a choice of modes

4.41
telematics
use of wireless media to obtain and transmit (data) from a distant source

4.42
user
individual or party that enrols in and operates within a regulated or *commercial application (4.13) service (4.3)*

EXAMPLE *Driver (4.17),* transport *operator (4.31),* freight owner, etc.

4.43
vehicle access control
VAC
control of *regulated vehicles (4.35)* ingress to and egress from controlled areas and associated penalties and levies

4.44
vehicle access management
VAM
monitoring and management of *regulated vehicles (4.35)* approaching or within sensitive and controlled areas

4.45
vehicle location monitoring
VLM
collection, collation, and transfer of vehicle location data from an *in-vehicle system (4.22)* to an *application service provider (4.4)*

4.46
vehicle mass monitoring
VMM
collection, collation, and transfer of vehicle *mass(4.29)* data from an in-vehicle system (*4.22*) to an application service provider (*4.4*)

4.47
vehicle parking facility
VPF
system for booking and *access(4.1)* to and egress from a vehicle parking facility (VPF)

4.48
vehicle speed monitoring
VSM
collection, collation, and transfer of vehicle speed data from an *in-vehicle system (4.22)* to an *application service provider (4.4)*

5 Symbols and abbreviated terms

AA *approval authority (regulatory) (4.8)*

ADR *Accord européen relatif au transport international des marchandises Dangereuses par Route (4.5)* (*dangerous goods*)

app applet (Java™a) application or similar) *(4.2)*

AJ agent of jurisdiction

AS application service

ASP *application service provider (4.4)*

CALM *communications access for land mobiles (4.12)*

CAN *controller area network*

C-ITS *cooperative intelligent transport systems (4.14)*

DLR driving licence reader

Dr driver *(4.17)*

DRD *driver records device (4.18)*

DWR *driver work records (4.19)*

eDL electronic *driver (4.17)* licence

GNSS global navigation satellite system

H&S health and safety

HDOP horizontal dilution of precision

ID identity

IP internet protocol

ITS-S *ITS station (4.24)*

a) This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

IVS	*In-vehicle system (4.22)*
J	jurisdiction *(4.25)*
Java™a)	object-oriented open-source operating language developed by SUN systems
LDT	*local data tree (4.27)*
MICE	'Mass' information for control and enforcement
MRC	*'mass' data for regulatory control and management*
Op	operator *(4.31)*
PDA	personal data assistant/personal digital assistant
PSP	prime service provider *(4.32)*
RTM	*remote tachograph monitoring (4.36)*
SD	service detail
SDD	'Self-declaration' device
SE	service element
SPF	*secure parking facility*
TARV	*telematics (4.41)* applications for *regulated vehicles (4.35)*
USB2	universal serial bus 2
UTC	coordinated universal time
VAC	*vehicle access control (4.43)*
VAM	*vehicle access management (4.44)*
VLM	*vehicle location monitoring (4.45)*
VMM	*vehicle mass monitoring (4.46)*
VSM	*vehicle speed monitoring (4.48)*
VSP	*vehicle secure parking (4.47)*
WORM	write once read many (times)
WRE	work record element
WWD	written work diary

a) This information is given for the convenience of users of this document and does not constitute an endorsement by ISO.

6 General overview and framework requirements

ISO 15638-1 provides a *framework (4.21)* and *architecture (4.9)* for *TARV*. It provides a general description of the roles of the actors in *TARV* and their relationships.

To understand clearly the *TARV* framework, *architecture (4.9)*, and detail and *specification (4.39)* of the roles of the actors involved, the reader is referred to ISO 15638-1.

ISO 15638-6 provides the core requirements for all regulated applications. To understand clearly the general context in to which the provision of this application service, the reader is referred to ISO 15638-6.

In order to be compliant with this part of ISO 15638, the overall architecture employed shall comply with ISO 15638-1.

In order to be compliant with this part of ISO 15638, the communications employed shall comply with ISO 15638-2.

In order to be compliant with this part of ISO 15638, the operating requirements employed shall comply with ISO 15638-3.

In order to be compliant with this part of ISO 15638, the security employed shall comply with ISO 15638-4:—[3)].

In order to be compliant with this part of ISO 15638, the basic vehicle data shall comply with ISO 15638-5.

In order to be compliant with this part of ISO 15638, the generic conditions for this application service shall comply with ISO 15638-6.

This International Standard has been developed for use in the context of regulated commercial freight vehicles. There is nothing, however, to prevent a jurisdiction extending or adapting the scope to include other types of vehicles which it elects to regulate, as it deems appropriate.

7 Requirements for services using generic vehicle data

The means by which the access commands for generic vehicle information specified in ISO 15638-5 can be used to provide all or part of the data required in order to support a *regulated application service (4.34)* shall be as defined in ISO 15638-6.

8 Application services that require data in addition to basic vehicle data

8.1 General

Application services shall be conducted as defined in ISO 15638-6.

8.2 Quality of service requirements

This part of ISO 15638 contains no general requirements concerning quality of service. Such aspects shall be determined by a *jurisdiction (4.25)* as part of its *specification (4.39)* for any particular *regulated application service (4.34).* However, where a specified *regulated application service (4.34)* has specific quality of service requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10.

8.3 Test requirements

This part of ISO 15638 contains no general requirements concerning test requirements. Such aspects shall be determined by a *jurisdiction (4.25)* as part of its *specification (4.39)* for any particular *regulated application service (4.34),* and issued as a formal test requirements *specification (4.39)* document. However, where a specified *regulated application service (4.34)* has specific test requirements essential to maintain interoperability, these aspects shall be as specified in Clause 10, relating to this *regulated application service,* or in a separate standards deliverable referenced within that clause. Where multiple *jurisdictions* recognize a benefit to common test procedures for a specific *regulated application service,* this shall be the subject of a separate standards deliverable.

3) To be published.

8.4 Marking, labelling, and packaging

This part of ISO 15638 has no specific requirements for marking, labelling, or packaging.

However, where the privacy of an individual can be potentially or actually compromised by any instantiation based on this International Standard, the contracting parties shall make such risk explicitly known to the implementing *jurisdiction (4.25)* and shall abide by the privacy laws and regulations of the implementing *jurisdiction,* and shall mark up or label any contracts specifically and explicitly drawing attention to any loss of privacy and precautions taken to protect privacy. Attention is drawn to ISO/TR 12859 in this respect.

9 Common features of regulated TARV application services

9.1 General

The details of the instantiation of *regulated application service* (*4.34*) are as designed by the application service system to meet the requirements of a particular *jurisdiction* (*4.25*) and are not defined herein. ISO 15638-6 specifies the generic roles and responsibilities of actors in the systems, and instantiations that claim compliance with this part of ISO 15638 shall also be compliant with the requirements of ISO 15638-6.

The means by which data are provisioned into the *data pantry* (*4.16*), and the means to obtain the *TARV LDT* (*4.27*) and *core data* (*4.15*) are referenced in ISO 15638-6, Clause 8 and defined in ISO 15638-5, 8.2, 8.3, and 8.4.

In order to minimize demand on the *IVS* (*4.22*) [which it is assumed will be performing multiple *application services* (*4.3*) simultaneously, as well as supporting general safety related cooperative vehicle systems], and because national requirements and system offerings will differ, a 'cloud' approach has been taken in defining *TARV regulated application services* (*4.34*).

The *TARV* approach is for the on-board *app* (*4.2*) supporting the application service to collect and collate the relevant data, and at intervals determined by the *app* (*4.2*), or on demand from the *application service provider (4.4) (ASP),* pass that data to the *ASP.* All of the actual application service processing shall occur in the mainframe system of the *ASP* (in the 'cloud').

For further information, see ISO 15638-6, Clause 9.

At a conceptual level, the *TARV* system is therefore essentially simple, as shown in Figure 1. The process is similar to that for `CoreData`, but data are supplied to a different on-board file in the *data pantry* (*4.16*).

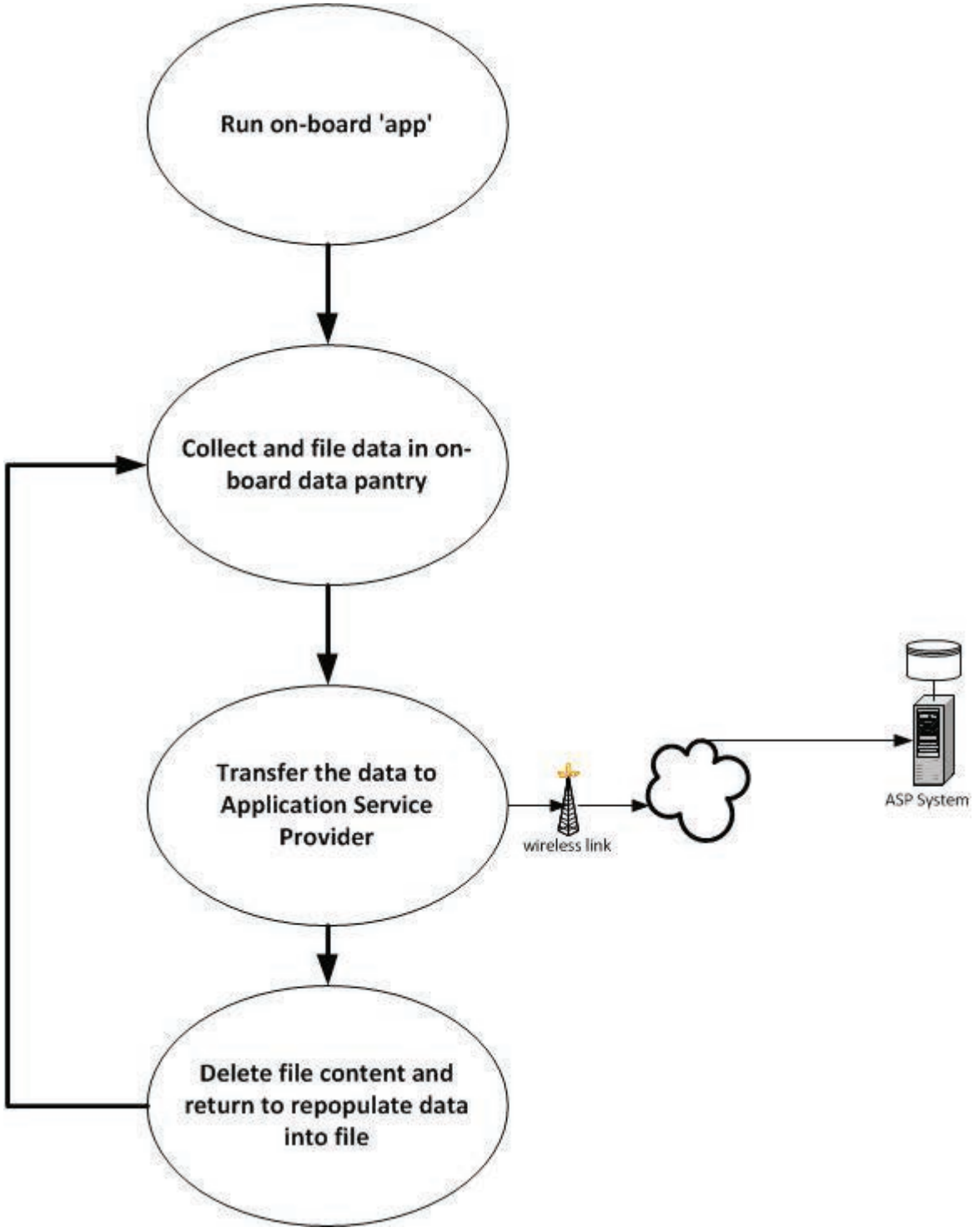

Figure 1 — TARV regulated application service on-board procedure

At a common generic functional level for this application service, the process can be seen as shown in Figure 2, however, the connected equipment might/might not be required in all cases.

9.2 Common role of the jurisdiction, approval authority, service provider, and user

The common role of the jurisdiction, approval authority, application service provider, and user shall be as defined in ISO 15638-6.

9.3 Common characteristics for instantiations of regulated application services

The common characteristics for instantiations of regulated application services shall be as defined in ISO 15638-6.

9.4 Common sequence of operations for regulated application services

The common sequence of operations for regulated application services shall be as defined in ISO 15638-6.

9.5 Quality of service

Generic quality of service provisions for *application services* (4.3) shall be as defined in ISO 15638-6.

9.6 Information security

Information security shall be as defined in ISO 15638-6.

9.7 Data naming content and quality

Data naming and quality shall be as defined in ISO 15638-6.

Variations specific to the driver work records *application service* (4.3) shall be as defined below.

9.8 Software engineering quality systems

Software engineering quality systems shall be as defined in ISO 15638-6.

9.9 Quality monitoring station

The availability of quality monitoring stations shall be as defined in ISO 15638-6.

9.10 Audits

Audits shall be as defined in ISO 15638-6.

9.11 Data access control policy

To protect the data and information held by the *application service provider (4.4),* each provider shall adopt a risk based data access control policy for employees of the provider.

9.12 Approval of IVSs and service providers

Generic provisions for the *approval* (4.6) of *IVSs* and *service providers* (4.37) shall be as specified in ISO 15638-3. Detailed provisions for specific *regulated applications* (4.33) shall be as specified by the regime of the *jurisdiction* (4.25).

10 TARV driver work records (*DWR*)

10.1 (Electronic) Driver work records service description and scope

10.1.1 TARV DWR use case

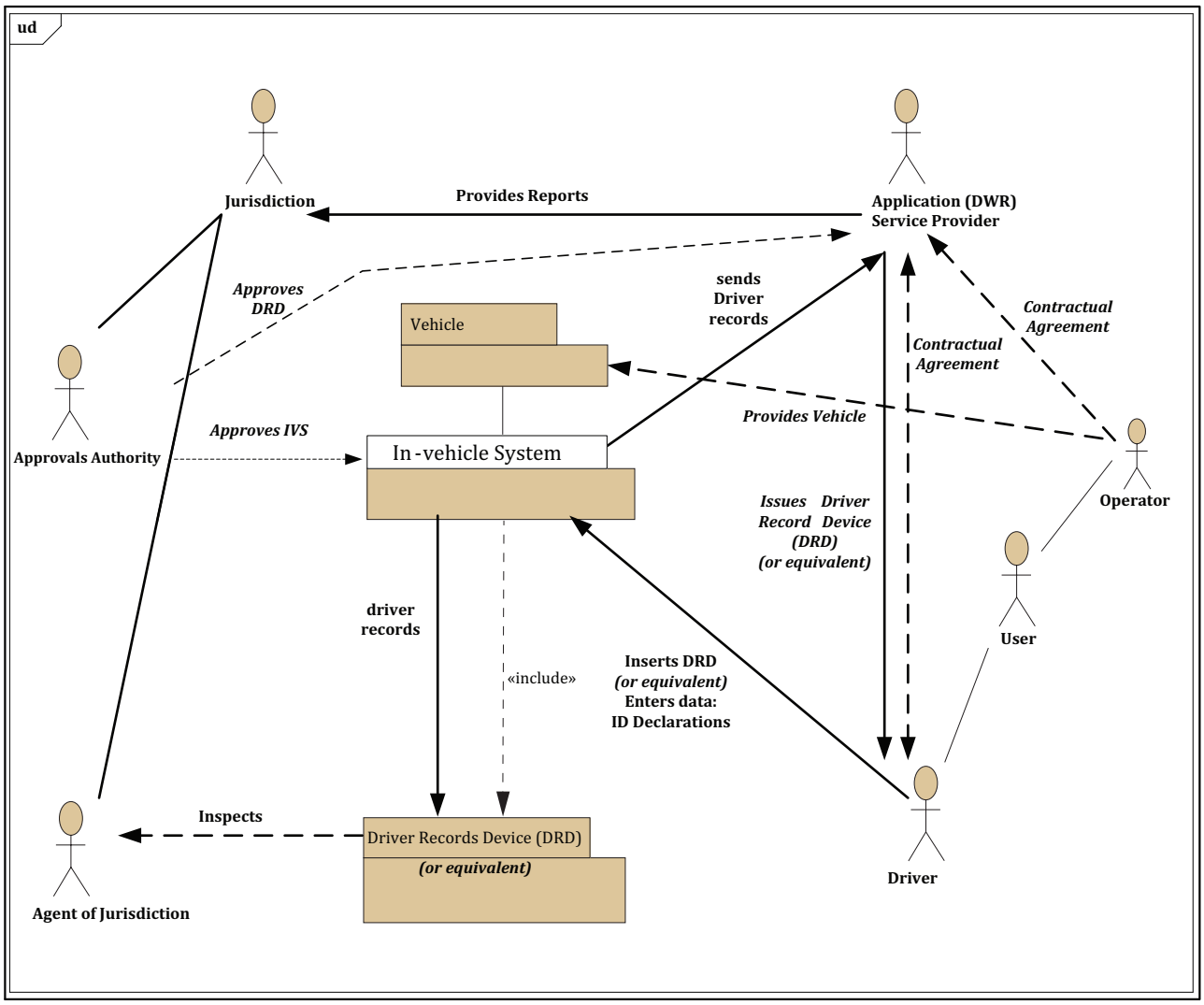

Figure 2 — TARV driver work record (DWR) use case

NOTE In Figure 2, *DRD (4.18)* means a physical *DRD* as specified herein or other means as specified by the jurisdiction (4.22). See 10.2.1.1.

Figure 2 provides an illustration of a *driver work records (4.19)* recording system. This application service is described in 10.1.2.

10.1.2 Description of TARV DWR application service

The *driver work records (4.19)* (*DWR*) application service can exhibit itself in slightly different forms in different *jurisdictions (4.25)*. For some, it can be an issue of mandatory compliance; in others, health and safety; and yet, in others, only a support for employee records. It might or might not involve compliance actions. It can be mandatory as an electronically provided service in some *jurisdictions*; in others, providing this information can be manual or electronic, in which event, this service definition applies only to the electronic provision through *TARV*. Within other *jurisdictions,* it can just be an option for good practice. In each case, the use case shown in Figure 2 will vary slightly. It is likely to be named

differently according to its origin and the regulatory environment in which it instantiates. 'Driver hours monitoring', 'Driver hours compliance', 'Electronic work diary', '*Driver work records (4.19)*', etc. being other typical example names for this type of *application service (4.3).*

This application service differs from electronic *tachograph (4.40)* monitoring, in that, it is designed to be *driver (4.17)* led, creating a record of his/her work history.

The exact nature and form of the requirements and reports will vary from instantiation to instantiation, and such detail is not standardized in this part of ISO 15638. This part of ISO 15638 specifies the basic *architecture (4.9)* and information needed to support this type of application service using *TARV*, so that the *in-vehicle system (4.22)* can satisfy the requirements of any likely instantiation by a different *jurisdiction (4.25)/application service provider (4.4),* or so that the *regulated vehicle (4.35)* and equipment can support the different requirements of different *jurisdictions* when the *regulated vehicle* and *driver (4.17)* are operating within their domain.

Figure 2 shows an example use case, appropriate where reports are required by the *jurisdiction (4.25)* and where compliance is also monitored, such that, transgression can result in an offence/prosecution, perhaps the most comprehensive example of the *DWR application service (4.3).*

The reader should be aware that, within any jurisdiction, legislative privacy requirements for the road operator, vehicle operator, and driver, can be different.

10.2 Concept of operations for (electronic) DWR

10.2.1 General

10.2.1.1 A DWR system can be based on

a) a driver records device (DRD) *(4.18)*, and

b) an alternative means, designated by a *jurisdiction (4.22),* to achieve the same result.

Any alternative means has to recognize that without the *DRD*, an alternative standardized method to achieve interoperability is required.

This standard recognizes that the *DRD (4.18)* provides an interoperable mechanism for driver record transfer and display and review at the roadside. However, the *DRD* is only one such way to achieve this. Instantiations of this standard can use other means designated by a *jurisdiction (4.22).* Any such alternative means shall be specified and declared by the jurisdiction.

This part of ISO 15638 specifies how a *DRD (4.18),* if used, shall be used, and provides an example of the general requirements for interoperability in the event that other means are designated by a jurisdiction.

10.2.1.2 The service concept is that a *driver (4.17)* is equipped with a portable memory device (*Driver Records Device), (DRD) (4.18),* or other means specified by the *jurisdiction (4.22).* The form of such *DRD* is not defined, but such can be a USB2/USB3 memory stick, which he/she connects to the *IVS (4.22)* whenever driving the *regulated vehicle (4.35).* The *DRD* also contains a permanent WORM file containing the details of the *drivers (4.17)* licence.

Alternatively, the IVS can be loaded with an '*app*' *(4.2)* that securely identifies and authenticates the driver, and provides a suitable means to acquire driver's relevant data. Either the *DRD (4.18)* or the *'app' (4.2)* or a combination of both, in accordance with the procedures defined by the *jurisdiction (4.25),* identifies the driver to the *IVS* every time he/she takes control and plugs in his/her *DRD*, or completes the log-in procedure. The *IVS (4.22)* records hours and additional information and reports this at regular intervals to the *application service provider (4.4).*

Where a *DRD (4.19)* is used, the *IVS* shall also copy the records onto the *DRD*.

NOTE For system designers: A complication is the ability to log working hours when not actually driving (for example loading) and to record rest hours.

10.2.1.3 The main application service is provided landside by the *application service provider (4.4),* who prepares, compiles, and sends reports to meet the requirements of the *jurisdiction* (4.25) and its client [who can be the *regulated vehicle* (4.35) *operator* (4.31) or the *driver* (4.17)].

10.2.1.4 Where a *DRD* (4.18) is used, the *IVS* (4.22) also records the *driver's* (4.17) records to the 'driver records device' (*DRD*). This device can be accessed by an agent of the *jurisdiction* (4.25) (inspector, enforcement officer etc.), and provides a long term evidence record of the *drivers* (4.17) *driver work records* (4.19) history.

NOTE If the daily record is kept to about 100kb or less, a year's records are therefore below 0.04 GB, so a 2GB/4GB memory stick will hold nearly 50/100 years of work records, in the event of 200kb per day, that is 25/50 years work records.

10.2.1.5 The objective of this part of ISO 15638 is to provide the data required for the *application service provider (4.4)* to be able to design and run its *application service* (4.3), and provide data to populate the *DRD* (4.18), and for a *jurisdiction* (4.25) to be able to monitor and enforce.

The sequence of operations using *TARV* is defined; the data requirement and format are defined. The format of data stored in the *DRD* (4.18) is also defined.

10.2.2 Statement of the concept of the TARV DWR system

The concepts for TARV DWR are as follows:

The use case for TARV DWR (or its substitute) with the roles, tasks, and entities combined in one diagram, is shown in Figure 2.

The *prime service provider (4.32)* or an entity appointed by the *jurisdiction (4.25)* [driver records device issuer in the case where *DRDs (4.18)* are used] supplies drivers *(4.17)* with *driver record devices (DRD),* or in the case where *DRDs* are not used provides instruction for access and authentication, and where appropriate, reports the issuance (tying together the *DRD* identity and the driver identity) to the jurisdiction or its appointed agent. A 'Drivers Work Record' number to a scheme devised by the *jurisdiction* can be used to provide a unique reference, or the drivers licence number, or the ID number of the first *DRD* device issued to the *driver (4.17)* can be used, at the discretion of the *jurisdiction*. Where *DRDs* are used, it is the responsibility of the jurisdiction to ensure that there is only one *DRD* device per driver if the jurisdiction is relying on this device to monitor/evidence driver conformance.

The *in-vehicle system (4.22)* (IVS) and, where appropriate, the driver records device (*DRD*) *(4.18)* are the technical components of the TARV DWR system out in the field and shall be used by drivers to meet the requirements of the jurisdiction and the *operator (4.31).*

The *prime service provider (4.32)/application service provider (4.4)* collects records and provides services in reporting, as required, to all approved entities in the chain of responsibility who, for TARV DWR, are the jurisdictions or their appointed agents, and *users (4.42)* [which in this case are both *vehicle operators* (4.31) and *drivers* (4.17)].

The *application service provider* (4.4) is responsible to report to the *approval authority (regulatory)* (4.8) of the jurisdiction concerning the overall TARV DWR system in the discharge of responsibilities related to *approval* (4.6) and auditing (4.10).

Where used, the driver records device *(DRD)* (4.18) shall use standard equipment such as USB2/USB3 and data storage in a consistent format, and as a result, is interoperable across TARV *IVSs* (4.22) that are equipped to interface to a *DRD*.

The core of any management system for DWR shall rest within a system operated by an ASP to meet the requirements of its *jurisdiction* (4.25). That system, its processes, accessibility to drivers, and the jurisdiction, shall be to meet local requirements determined by the *jurisdiction.* However, there are two approaches that are embraced by ISO 15638-11:

A system where the driver is issued with a secure electronic storage medium [such as a USB2, USB3, or similar, etc.), which contains WORM (write once read many) (times)] data regarding the *Driver (4.17)* and his license, and maintains a copy of the driving record in WORM memory as it is updated.

A system where the *driver (4.17)* identifies and authenticates himself to the system by a means determined by the *jurisdiction (4.25),* where he does not have an electronic copy of his driving record held in a *DRD (4.18)*, but has a means to access that record directly from the *ASP (4.4)* in conditions determined and controlled by the *jurisdiction*.

10.2.3 Strategies, tactics, policies, and constraints affecting the TARV DWR system

The first strategic decision in order to claim compliance to this part of ISO 15638 is that the issuer of the *DRD (4.18)* [*jurisdiction (4.25), prime service provider (4.32),* or *application service provider (4.4),* according to the regime of the *jurisdiction*] creates a permanent 'Driver Work Record' in the system of the *ASP (4.4).* The record held by the *ASP* shall be considered as the prime 'Driver Work Record'.

In the case that the system does not utilize an electronic *DRD (4.18)*, the *ASP (4.4)/jurisdiction (4.25),* shall make arrangements to provide the driver with a means to identify himself/herself to the vehicle and to the *ASP* system, in order to gain legitimate access to his/her records.

Where a *DRD (4.18)* is used, that system shall copy into a WORM (write once read many) file on the *DRD* the full details of the drivers (4.17) licence as they would be stored in any eDriving licence. If the detail of the driving licence changes, the driver shall be issued with a new *DRD* with a new WORM driving licence detail file, and the application service provider shall upload the drivers work record history to date onto the new *DRD*.

NOTE This avoids the need for the *TARV DWR* system to require an automatic driver licence reader to be connected to the *IVS (4.22)*, and it simplifies the process in practical terms for the *driver (4.17).* When the *driver* takes control of the *regulated vehicle (4.35)*, he/she plugs in their *DRD (4.18)*; that both enables the *TARV DWR* system and identifies the *driver.*

Other principal issues that affect this system, over and above any general *TARV* issues, are threefold.

a) First, whether the DWR system is based on a *driver records device (DRD) (4.18)* or an alternative means, designated by a *jurisdiction (4.22),* to achieve the same result. (See 10.2.1.1).

   This part of ISO 15638 recognizes that the *DRD (4.18)* provides an interoperable mechanism for driver record transfer and display and review at the roadside. However, the *DRD* is only one such way to achieve this. Instantiations of this part of ISO 15638 can use other means designated by a *jurisdiction (4.22).* Any such alternative means shall be specified and declared by the jurisdiction.

   This part of ISO 15638 specifies how a *DRD (4.18),* if used, shall be used, and provides an example of the general requirements for interoperability in the event that other means are designated by a jurisdiction.

b) Second, the choice of medium for any *driver records device* (*DRD*) *(4.18).* This shall be a secure electronic storage medium (such as a USB2, USB3, or similar, etc.), which contains WORM (write once read many) data regarding the *Driver (4.17)* and his license, and maintains a copy of the driving record in WORM memory as it is updated. There are many formats of portable memory available that would be suitable; but there needs to be one type of device selected within a jurisdiction, otherwise it can be difficult for a *driver* to move from one vehicle to another. The selected device type needs to be reasonably robust, and of a size format which is easy to use even wearing gloves, or with dirty hands. It is relatively impervious to ingress of dust etc.

c) The third, and more difficult issue, is about the recording of non-driving hours and rest hours. A *driver (4.17)* can spend time on other activities than driving (for example loading/unloading, waiting time) that counts towards the number of hours that he/she is allowed to work. Means have to be provided to enable this recording to take place. At some point in the future, it might be possible to standardize on a single means to achieve this. At the time of developing this deliverable, this has to be left to a marketplace solution and a requirement solely based on what has to be provided, and not the means by which it is provided. It can be in-vehicle, it can be that in-vehicle processes

are supported by paper-based processes which are input to the application service system by the *application service provider (4.4)* who provides a routine to update the *DRD (4.18)*.

10.2.4 Organizations, activities, and interactions among participants and stakeholders for TARV DWR

It should be noted that an entity can perform multiple roles, and in doing so takes on the responsibility to perform the functions described under those roles.

Table 1 provides a list of the actors involved, their activities, and interactions.

Table 1 — TARV DWR actors involved, their activities, and interactions

Actor	Role	Activities	Interactions
Jurisdiction (J) (*4.25*)	Sets requirements for mandatory and supported *DWR (4.21)*	Publishes specifications (*4.39*)	ALL
		Obtains regulations	ALL: Establish regime and regulations PSP: Register ASP: Register, receive reports Op: Vehicle registration Dr: Licence, employment, H&S, register/issue *DRD (4.18)*(where used), provide *DRD* (where used) with *driver* licence details file
		Can provide *DRD*s	*:Driver:* Receive *DRD* (where used)
		Appoints *approval authority*	AA: Contract. Instruct. Receive reports.
		Monitors reports	AJ: Employ, process enforcement
		Instigates enforcement	
Approval authority (AA) *(4.8)*	Implements *jurisdiction* policy at equipment and service approval level	Approves *IVS (4.22)*, *DRD* (where used), *application service (4.3)* instantiations	PSP: Approve *IVS* *ASP*: *Approve application service* Dr: Approve *DRD (*where used)
		Conducts Q of S maintenance to instruction of jurisdiction	
Agent of *jurisdiction* (AJ)	Inspection and Enforcement	Inspects *DRD*s (where used)	Dr: Inspections
		Instigates enforcement actions	Dr: Enforcement Op: Enforcement
Prime service provider (*4.32*) (PSP)	Responsibility for *IVS*	Installs and/or commissions *IVS*	CA: Can apply to approve *IVS* Op: Installation
		Maintains *IVS*	Op: Maintain *IVS*
		Can provide *DRD*s (where used)	

Table 1 *(continued)*

Application service provider (ASP) *(4.4)*	Provides DWR application services (4.3)	Develops instantiation of *DWR application service*	AA: Applies for approval of service
		Contracts with *users (4.42)*	Op: Contracts
		Provides DWR application service to users (4.42) and jurisdiction	Op: Provides service Dr: Can provide service J: Provides service/reports AJ: reinforcement
Operator (Op) (4.31)	Provides regulated vehicle (4.35)	'Employs'/contracts *drivers*	Dr: Employs/contracts
	Uses *regulated vehicle* for commerce and logistics	Operates *regulated vehicle*	J: Registers *regulated vehicle* PSP: Contracts, receives service ASP: Contracts, receives service
		Receives reports from *ASP*	
Driver (Dr) (4.17)	Drives regulated vehicle to instruction of operator (4.31)	Keeper of *DRD* (where used)	
		Connects *DRD* (where used) into IVS or otherwise identifies/authenticates	IVS: connects *DRD*
		Drives *regulated vehicle*	Op: to instructions
		Provides additional work information	IVS: Updates
		Interfaces with AJ	AJ: Provides access to *DRD* (where used)

10.2.5 Clear statement of responsibilities and authorities delegated for TARV DWR

10.2.5.1 The *jurisdiction (4.25)* shall be responsible for the regime and regulations.

10.2.5.2 The jurisdiction (4.25) shall employ an approval authority (regulatory) *(4.8)* or otherwise provide its function.

10.2.5.3 The *jurisdiction (4.25)* shall employ agents for inspection and enforcement (where required) to meet the requirements of the regime of the *jurisdiction.*

10.2.5.4 Where used, the *jurisdiction (4.25)* shall issue the *DRD (4.18)* to *drivers (4.17)* or make arrangements for provision to drivers. Where *DRD*'s are not used, the ASP shall provide access and authentication instructions to drivers.

10.2.5.5 Where used, the *jurisdiction (4.25)* shall provide a file to the issuer of the *DRD (4.18)* containing the electronic record of the *drivers (4.17)* licence.

10.2.5.6 The issuer of the *DRD (4.18)* shall load the electronic record of the *drivers (4.17)* licence into a *WORM* (write once read many) held in the non-volatile memory of the *DRD* with the file name `<driverlicence>`.

10.2.5.7 The *prime service provider (4.32)* shall install/commission the *IVS (4.22)* and maintain the *IVS.*

10.2.5.8 The *application service provider (4.4)* (*ASP*) shall develop the *TARV DWR* application service or use a *TARV DWR* application service provided by *jurisdiction* (*4.25*).

10.2.5.9 The *application service provider (4.4)* shall obtain any required approval (*4.5*) of its DWR service from the approval authority (regulatory) (*4.8*).

10.2.5.10 The *application service provider (4.4)* shall contract with the *user (4.42)* [normally *operator, (4.31)*, but in some instantiations, also with *driver (4.17)*].

10.2.5.11 The *application service provider (4.4)* shall be responsible to provide the application service to *jurisdiction (4.25), operator (4.31)* and *driver (4.17)* as specified in its service offering.

10.2.5.12 The *operator (4.31)* shall be responsible to provide the *regulated vehicle (4.35)*.

10.2.5.13 The *operator (4.31)* shall be responsible to abide by requirements of the regime re *DWR*.

10.2.5.14 The *operator (4.31)* shall be responsible to pay fees required by *jurisdiction (4.25), prime service provider (4.32)* and *application service provider (4.4).*

10.2.5.15 The *driver (4.17)* shall be responsible to follow instructions, including identification and authentication routines where used, or to follow instructions, including, where issued, for use of the *DRD (4.18)*.

10.2.5.16 The agent of *jurisdiction (4.25)* shall be responsible to follow instructions of *jurisdiction.*

10.2.6 Equipment required for TARV DWR system

10.2.6.1 TARV IVS

10.2.6.1.1 The system shall be designed to work using *TARV IVS (4.22)* as defined in this International Standards.

10.2.6.1.2 As the *TARV DWR* application service requires some level of interface with the *driver (4.17)*, the *IVS (4.22)* shall be capable of receiving, confirming receipt, of accepting and storing 'self-declaration' data, either directly through human interface capabilities of the *IVS*, or from a device connected to the *IVS* ('self-declaration' device) installed/provided by the *prime service provider (4.32)* or *application service provider (4.4).*

10.2.6.1.3 The *IVS (4.22)* shall be able to record the odometer reading at every work/rest change.

10.2.6.1.4 The odometer reading shall be stored to a resolution of 1 km.

10.2.6.1.5 As the *TARV DWR application service (4.3)* requires the *driver (4.17)* to identify his/herself by providing his/her driving licence data, it shall be equipped with a means to read such data.

10.2.6.1.6 The *prime service provider (4.32)/application service provider (4.4)* shall provide to the *approval authority (regulatory) (4.8)*, evidence of compliance from an appropriate body to demonstrate the suitability for use in vehicles for the *IVS (4.22)* and all associated components.

10.2.6.1.7 It shall not be possible for collected or stored *driver work records (4.19)* data or *driver work records (4.19)* in any software or non-volatile memory within the *IVS (4.22)* to be accessible or capable of being manipulated by any person, device, or system (including through any 'self-declaration' device), other than that authorized by the *application service provider (4.4).*

10.2.6.2 TARV DWR 'app'

10.2.6.2.1 The TARV DWR *app (4.2)* running on the *IVS (4.21)*, records the *driver (4.17)* identity and licence details from the `driverLicence` file held in the memory of the *DRD (4.18)* or, where a *DRD* is not used, records identification and authentication data. Authentication verification measures also need to be in place to ensure that the driver *(4.17)* is the same person as that of the *DRD* being used. The *app* then processes the driver's work and rest declarations and files that data in its memory of the *IVS* and, where used, on the *DRD* memory.

10.2.6.2.2 The *TARV DWR app (4.2)* running on the *IVS (4.22)* can automatically populate information to assist the *driver (4.17)* in their declarations (i.e. time and location) but is not necessarily required to do so unless this is a requirement of the *jurisdiction (4.25).*

10.2.6.2.3 The equipment shall provide a means ('self-declaration' device) for the *driver (4.17)* to be able to manually enter the correct information with all changes recorded by the system, for example, where the *driver (4.17)* disagrees with the automatically populated information. Where permitted by the *jurisdiction (4.25)*, the *TARV DWR app (4.2)* shall provide the opportunity for all data recorded to be confirmed by the *driver (4.17)* before it is stored using this means. The means provided to enable the *driver (4.17)* to make such changes is not specified in this release of this part of ISO 15638.

Where this option is not permitted by the *jurisdiction (4.25)*, the *TARV DWR app (4.2)* shall bypass this opportunity.

10.2.6.2.4 The *TARV DWR app (4.2)* shall store a file containing these electronic records on the *driver records device (4.18)* and in the memory of the *IVS (4.22)*. The *TARV DWR app* shall then send the same data to the *TARV DWR* system of the *application service provider (4.4)* through its most appropriate wireless communications interface.

10.2.6.2.5 It is an important requirement that the *driver's (4.17)* electronic records, stored on the *driver records device (4.18)* and sent to the *TARV DWR* system of the *application service provider (4.4)*, are identical.

10.2.6.2.6 Once the *TARV DWR* system of the *application service provider (4.4)* has acknowledged successful receipt of the data, the file shall be deleted from the memory of the *IVS (4.22)* unless the *user (4.42)* or *application service provider (4.4)* requires it for other purposes.

10.2.6.2.7 The *IVS (4.22)* shall alert the *driver (4.17)* when he/she reaches their driving time limit.

10.2.6.2.8 It shall not be possible for collected or stored *driver work records (4.19)* data or *driver work records* in any software or non-volatile memory within the *IVS (4.22)* or *DRD (4.18)* to be accessible or capable of being manipulated by any person, device or system (including through any 'self-declaration' device), other than that authorized by the *application service provider (4.4)* and permitted by the *jurisdiction (4.25).*

10.2.6.3 'Self-declaration' device (SDD)

Where permitted or required by the *jurisdiction (4.25)*, the *TARV DWR app (4.2)* shall provide the opportunity for all data recorded to be confirmed by the *driver (4.17)* before it is stored using this means. The means provided to enable the *driver* to make such changes is not, at this stage, specified in this part of ISO 15638, except that it shall work within the provisions of this part of ISO 15638.

Where permitted or required by the *jurisdiction (4.25)*, in order to support the *TARV DWR* application service, the *IVS (4.22)* shall be capable of receiving, confirming receipt, of accepting and storing 'self-declaration' data, either directly through human interface capabilities of the *IVS*, or from a device connected to the *IVS* ('self-declaration' input device) installed/provided by the *prime service provider (4.32)* or *application service provider (4.4).*

The *prime service provider (4.32)/application service provider (4.4)* shall be responsible for the installation, operation, and maintenance of any 'self-declaration' device.

Such device, whether integrated or connected, shall be secure and shall be approved by the *approval authority (regulatory) (4.8)* of the *jurisdiction (4.25).*

10.2.6.4 Intelligent map

In order to provide a meaningful location where the work/rest change of the *driver (4.17)* occurs in any reporting (i.e. place names in addition to latitude and longitude) required by the *jurisdiction (4.25),* the *ASP (4.4)* shall be required to retain an electronic *map (4.28).* The *map* should be approved or issued by the *approval authority (regulatory) (4.8)* to ensure that all participants utilize the same information.

Clear unambiguous instruction shall be provided to the *driver (4.17)* in the case where he/she is instructed to work/rest/change driver, at a specific location.

10.2.6.5 Drivers record device (DRD)

10.2.6.5.1 The *driver records device (4.18)* shall be a secure electronic storage medium (such as a USB2, USB3, or similar, etc.), which contains WORM (write once read many [times]) data regarding the *Driver (4.17)* and his license, and maintains a copy of the driving record in WORM memory as it is updated. The device shall have permanent memory of type 'flash drive' or similar with a minimum memory capacity of 2GB or 4GB at the discretion of the issuing *jurisdiction (4.25),* and a partitionable memory so that one partition can have files written to/stored on and read from many times but does not allow deletions from the partition where the *TARV DWR* records are stored (Type *WORM*).

NOTE If the daily *DWR* record is kept to about 100kb or less, a year's records are therefore below 0.04 GB, so a 2 GB/4 GB memory stick will hold nearly 50/100 years of work records, in the event of 200 kb per day, that is 25/50 years work records.

10.2.6.5.2 Where used, the *DRD (4.18)* shall be etched with a unique visible identification number to the *specification (4.39)* of the issuing *jurisdiction (4.25)* [most probably the *driver (4.17)* licence number].

10.2.6.5.3 The issuer of the *DRD (4.18)* shall programme into a permanent unchangeable file held in the non-volatile memory of the *DRD*, the data content of the *driver's (4.17)* licence that would be available if it were electronically readable. In the event of a change in the *driver's* licence, he/she shall be issued with a new *DRD* containing his/her new driving licence details, and the *application service provider (4.4)* shall update the new *DRD* with the *driver* work record history to date.

NOTE This process avoids the need for a separate device to read the driver (4.17) licence detail.

10.2.6.5.4 The *driver records device (4.18)* is specific to a *driver (4.17),* and not the regulated vehicle *(4.35)* nor the *IVS*. The *driver (4.17)* shall be responsible to take his/her driver records device [*DRD (4.18)*] from one IVS equipped vehicle to another and use it each time he/she drives a *regulated vehicle (4.35).*

10.2.6.5.5 In the case where a *DRD (4.18)* is used, each approved *TARV IVS (4.22)* shall be interoperable with the *driver records device (4.18)*. It is the responsibility of the *prime service provider (4.32)* to ensure this hardware interoperability is maintained in operation, as initially approved by the *approval authority (regulatory) (4.8)*. It is the responsibility of the *application service provider (4.4)* to ensure this software interoperability is maintained in operation, as initially approved by the *approval authority (regulatory) (4.8).*

10.2.6.5.6 In the case where a *DRD (4.18)* is used, in the event that the *driver records device (4.18)* storage is full, or malfunctioning, the *driver (4.17)* shall be responsible to return the *DRD (4.18)* to the issuer of the device to acquire a new *DRD*. The original, now full, or malfunctioning, driver records device shall be retained by the *driver.*

10.2.6.5.7 In the case where a *DRD (4.18)* is used, in the event that the *driver (4.17)* loses his/her *DRD (4.18)*, or the *DRD* malfunctions, he/she shall immediately inform the issuer [as defined by the *jurisdiction (4.25)*] and follow policies determined by the *jurisdiction* in respect of its replacement. The *application service provider (4.4)* shall make available such files as required, to recreate the *drivers DWR* history on the new *DRD.*

10.2.6.5.8 In the case where a *DRD (4.18)* is used, it shall not be possible for collected or stored *driver work records (4.19)* data or *driver work records (4.19)* in any software or non-volatile memory within the *DRD (4.18)* to be accessible or capable of being manipulated by any person, device, or system (including through any 'self-declaration' device), other than that authorized by the *application service provider (4.4).*

10.2.7 Operational processes for the TARV DWR system

Operational processes for the TARV DWR system shall be as defined in 9.2.

For detail of the operational processes, see 10.3 [sequence of operations for *driver work records (4.19)*] and Figure 3.

10.2.8 Role of the jurisdiction in a TARV DWR system

10.2.8.1 General

Generally, this shall be as specified in 9.3.

Additionally, the *jurisdiction (4.25)* shall also be responsible to issue the *drivers (4.17)* records device [*DRD (4.18)*] programmed with a permanent file of the electronic record of the *drivers* licence, or shall determine who shall undertake this process and shall provide that party with an electronic record of the *drivers* licence to drive and instruct that it be loaded into the non-volatile memory of the *DRD* in a *WORM* (write once read many) format that cannot be altered.

10.2.8.2 Agent of the jurisdiction in a TARV DWR system

Generally, this shall be as specified in 9.3.

Additionally, in the case of the *TARV DWR (4.19) application service (4.3)*, where *DRD's (4.18)* are used, the agent of the *jurisdiction (4.25)* can ask the *driver (4.17)* for their *DRD* and electronically inspect the records in accordance with the regime specified by the *jurisdiction.*

Where *DRD's (4.18)* are not in use, the *jurisdiction (4.25)* shall determine and publish alternative enforcement methods.

10.2.8.3 Approval authority in a TARV DWR system

This shall be as specified in 9.3.

10.2.9 Role of the TARV DWR prime service provider

This shall be as defined in 9.2, 10.2.4, and 10.2.5.

10.2.10 Role of the TARV DWR application service provider

This shall be as defined in 9.2, 10.2.4, and 10.2.5.

10.2.11 Role of the TARV DWR user

In the case of the *driver work records (4.19)* application service, the *user (4.42)* can be the *driver (4.17)*, or the *driver* and the *operator (4.31)*, depending on the regime imposed by the *jurisdiction (4.25).* The principal responsibility for the inaction of the *driver work records* service shall be the *driver.*

10.2.11.1 Role of the driver in a TARV DWR system

The *driver (4.17)* shall be responsible for declaring their details and working state (i.e. work or rest) to the *IVS (4.22)*. The *driver (4.17)* shall be responsible for using the identification and authentication method supplied by the *prime service provider (4.32)*/*application service provider (4.4)*, and for using the *driver records device (4.18)* and *IVS* to declare their work and rest changes. The declaration of their personnel details such as name, *driver's* licence number, and issuing *jurisdiction (4.25)* shall be automatically declared by the method of identification and authentication.

The *driver (4.17)* shall be responsible for declaring his/her work and rest changes into the *TARV DWR* system. The working state shall be declared by the *driver.* Depending on the individual system functionality, the remaining information such as time, location, accreditation number, odometer reading, and cumulative work tallies can be manually or automatically populated.

For the *TARV DWR application service (4.3)*, the *driver (4.17)* shall be responsible for the records he/she declares and for being aware of the necessary *driver* operational responsibilities (e.g. identification and authentication procedures).

The *driver (4.17)* shall be responsible for reporting any system malfunction alerts or apparent system failures to the *operator (4.31)* and/or *application service provider (4.4)*, as per the instructions provided to him at the commencement of his/her contract. The *driver* is not responsible for *DWR*, and where used, *DRD,* malfunction or rectification processes beyond these actions.

In the case where a *DRD (4.18)* is used, the *driver (4.17)* is also responsible to make the *DRD (4.18)* available to an authorized agent of the *jurisdiction (4.25)* at the roadside upon request, in accordance with the regime imposed by the *jurisdiction.*

In the case where a *DRD (4.18)* is used, in the event that the *driver (4.17)* loses his/her *DRD*, or it malfunctions, the *driver* shall immediately inform the issuer [as defined by the *jurisdiction (4.25)*] and follow policies determined by the *jurisdiction* in respect of its replacement. The *application service provider (4.4)* shall make available such files as required, to recreate the *driver's (4.17) DWR* history on the new *DRD*.

10.2.11.2 Role of the operator in a TARV DWR system

The *operator (4.31)* shall be responsible to advise and request action from the *application service provider (4.4)* in the event that the *driver (4.17)* advises him of a potential or actual system malfunction, and shall make the *regulated vehicle (4.35)* reasonably accessible to the *application service provider* in order that they can rectify the problem.

10.2.12 Generic characteristics for all instantiations of the TARV DWR application service

10.2.12.1 A driver work records (*4.19*) application service is approved; it utilizes a TARV IVS (*4.22*) which communicates to the prime service provider (*4.32*)/application service provider *(4.4)* and has the ability to insert a driver records device (*4.18*) (e.g. USB2 port), or other means provided for driver identification and authentication in compliance with the regulations of the home jurisdiction (*4.25*).

10.2.12.2 In the case where a *DRD (4.18)* is used, the *jurisdiction (4.25)* shall issue the *driver (4.17)* with a *driver records device* (*DRD*), or shall provide a regime where the *DRD* is issued to the *driver* by the *prime service provider (4.32)*, or *application service provider (4.4)*, or other body specified by the *jurisdiction,* and shall provide electronic detail of the *drivers* licence for the `driverLicence` file held in the non-volatile memory of the *DRD.*

10.2.12.3 In the case where a *DRD (4.18)* is used, the *driver (4.17)* shall retain the *DRD* and use it on every occasion that he/she drives a *TARV DWR* equipped *regulated vehicle (4.35).*

10.2.12.4 The application service provider *(4.4)* shall load a *DWR app* (*4.2*) into the IVS (*4.22*) of the operator's (*4.31*) vehicles.

10.2.12.5 In the case where a *DRD (4.18)* is used, the '*DWR app*' shall run whenever a *DRD* is inserted into the *IVS (4.22)* interface, or shall run when prompted in accordance with the regulation of the home *jurisdiction (4.25).*

10.2.12.6 The '*DWR app*' shall record the data, specified herein, in both the *IVS (4.22)* and in the case where a *DRD (4.18)* is used, to the *DRD* in the format specified herein. Data written to the *DRD* shall be locked into the memory of the *DRD* such that it cannot be deleted.

10.2.12.7 The application service provider *(4.4)* shall design/install/operate its driver work records *(4.19)* system.

10.2.12.8 The *IVS (4.22)* shall provide its DWR data to the *application service provider (4.4)* using the *TARV IVS* wireless link at least once every 24 h.

Every transfer shall include framing data that identifies its sequential order, IVS ID, version number of *IVS (4.22),* and version number of the *DWR app (4.2).*

The *ASP (4.4)* system shall acknowledge receipt of the data through the *TARV IVS (4.22)* wireless link. Once the data has been acknowledged, it shall be deleted from the *IVS* memory unless the *operator (4.31)* chooses to retain it in the *IVS* memory for other openly declared purposes with the assent of the user.

10.2.12.9 In the case where a *DRD (4.18)* is used, the application service system shall retain and back up the *DRD* data to the requirements of the *jurisdiction (4.25).*

10.2.12.10 The *application service provider (4.4)* shall provide reports to the *jurisdiction (4.25)* or its agents are specified and required by the *jurisdiction* when approving the product.

10.3 Sequence of operations for TARV DWR

The business process and sequence of operations is shown in Figure 3.

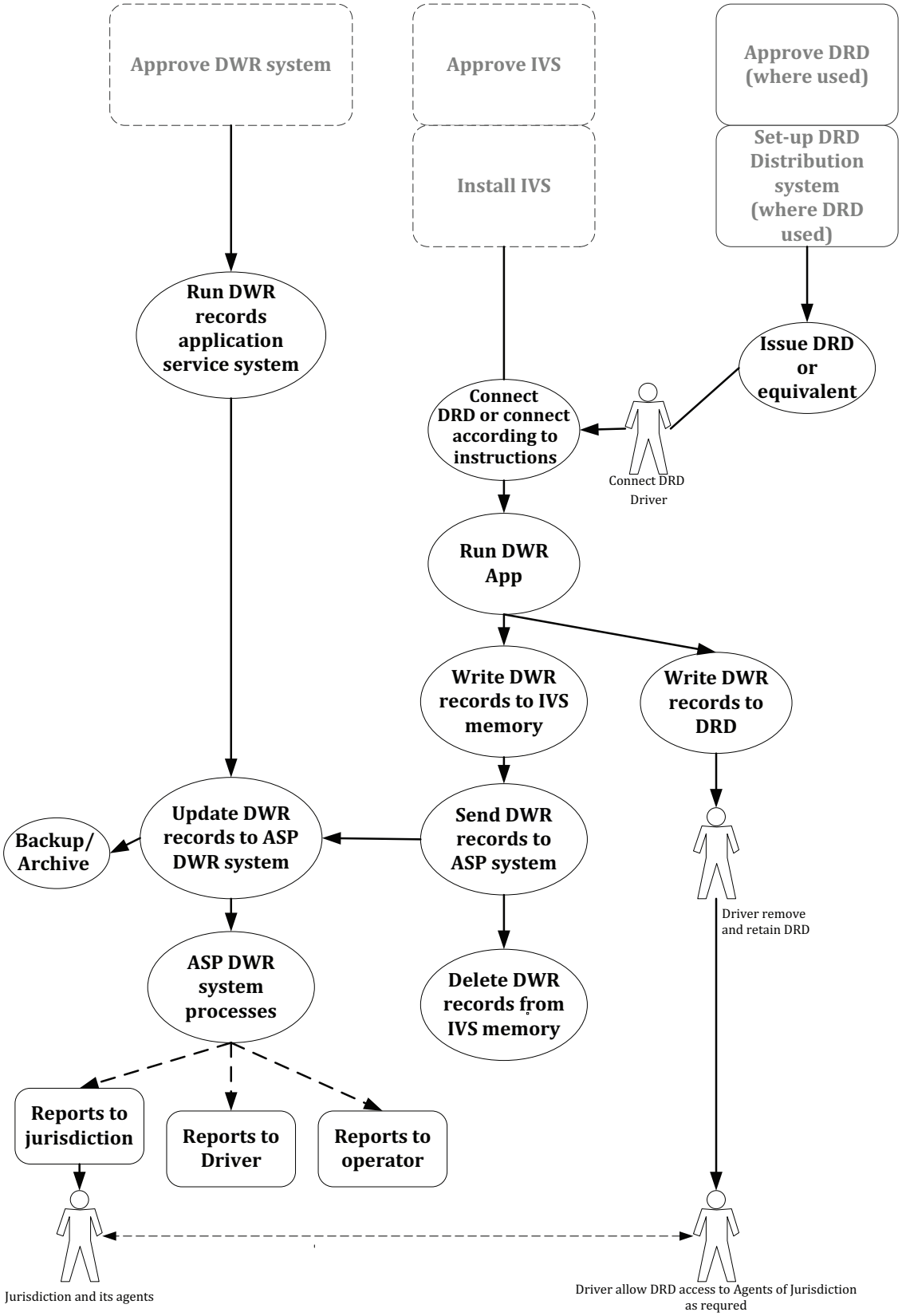

Figure 3 — TARV DWR business process and sequence

10.4 Driver work records service elements

10.4.1 TARV DWR service element (SE) 1: Establish 'driver work records' regulations, requirements, and approval arrangements

The *jurisdiction (4.25)* shall be responsible to define its requirements for its variant of the *driver work records (4.19) application service (4.3),* obtain any legislation and/or regulations, and define the procedure for an *application service provider (4.4)* to gain approval for its instantiation of the *TARV DWR application service.*

10.4.2 TARV DWR SE2: Request system approval

The *application service provider (4.4)* shall seek approval for its instantiation of the *driver work records (4.19)* application service from the *approval authority (regulatory) (4.8)* in accordance with the regime established by the *jurisdiction (4.25).*

10.4.3 TARV DWR SE3: User (operator) contracts with prime service provider

It is a prerequisite requirement that any potential vehicle *operator (4.31)* opting or being required to sign up for the *TARV DWR application service (4.3)* shall equip its *regulated vehicles (4.35)* with a *TARV* compliant *IVS (4.22)* at point of manufacture or installed by a *prime service provider (4.32)*, and that, there shall be a maintenance contract with a *prime service provider* for that equipment. (See ISO 15638-1).

10.4.4 TARV DWR SE4: User (operator) contracts with application service provider

The *user (4.42)* [*operator (4.31)]* shall contract with an *application service provider (4.4)* who offers an approved *TARV DWR* application service to provide the *TARV DWR* application service to nominated vehicles/*drivers (4.17)*.

In some *jurisdictions (4.25),* the *user (4.42)* (driver) can also need to contract with an approved *TARV DWR* application service to provide the *TARV DWR* application service to *drivers (4.17)* of nominated *regulated vehicles (4.35).*

10.4.5 TARV DWR SE5: Application service provider uploads software into the TARV-equipped vehicles of the operator

The service provider shall upload and commission the on-board *TARV DWR app (4.2)* software into the *TARV*-equipped vehicles of the *operator (4.31)*.

10.4.6 TARV DWR SE6: The driver identification and authentication method for the IVS

Through the *application service provider (4.4),* the *prime service provider (4.32)/application service provider (4.4)* shall provide the *driver (4.17)* with their identification and authentication method for access to use the *IVS (4.22)*. The method of identification and authentication can be unique to each *prime service provider/application service provider,* but shall meet at least the security requirements defined in ISO 15638-4:—[4)].

NOTE 1 The method of identification and authentication (*4.14*) can be proprietary to the prime service providers (*4.32*) IVS (*4.22*) and only work with IVSs supplied by that prime service provider (*4.32*)/application service provider *(4.4)*.

NOTE 2 By not prescribing the method of identification and authentication but rather the standard of assurance provided by the method, the performance-based *specification (4.39)* allows existing systems to potentially retain the method they currently use to identify and authenticate *drivers (4.17)*.

4) To be published.

10.4.7 TARV DWR SE7: The driver obtains a driver records device (DRD)

To be able to use a *TARV DWR* system, the *driver (4.17)* shall obtain a *driver records device (4.18)* in accordance with procedures issued by the *jurisdiction (4.25).* The procedures specified by the *jurisdiction* shall include procedures to populate the *driver records device (4.18)*, and the *jurisdiction* shall provide the issuer of the *DRD (4.18)* with the detail for the `driverLicence` *WORM* file to be loaded into the non-volatile memory of the *DRD*.

EXAMPLE In some *jurisdictions (4.25)*, the *DRD (4.18)* can be automatically supplied to all HGV *drivers (4.17)*. In other *jurisdictions,* the *driver* might have to apply to the *jurisdiction,* or an agent appointed by the *jurisdiction,* or to the *prime service provider (4.32),* or *application service provider (4.4),* in order to obtain his/her *DRD* according to the regime of the *jurisdiction.*

10.4.8 TARV DWR SE8: Driver use of DRD routines

In the case where a *DRD (4.18)* is used as part of the DWR system, at the commencement of work, the *driver (4.17)* shall introduce (connect) the *DRD* to the *IVS (4.22)*. This shall cause the on-board *TARV DWR app (4.2)* to run, and shall identify the *DRD* record of the *driver* licence to the *IVS*.

The *driver (4.17)* shall then use the approved identification and *authentication (4.14)* method to identify themselves to the *IVS (4.22)*. As this is the first declaration for the *IVS,* it shall create a DWR record, and this shall be considered as the commencement of a new '*session*' *(4.38)*. The '*session*' shall end when the *driver* elects to remove (i.e. ejects) the *driver records device (4.18)* from the *IVS*.

EXAMPLE The entry of the *DRD (4.18)* can cause the *app (4.2)* to pull the *driver (4.17)* licence file from the *DRD*. The *driver* might then be asked to authenticate that he/she is the named *driver* with a password or code that is held encrypted on the *DRD*. This is an example and not a requirement. The actual means of identification and *authentication (4.14)* is *jurisdiction (4.25)* defined, or otherwise, is an application service system issue.

The electronic DWR records declared by the *driver (4.17)* during the '*session*' *(4.38)* shall be stored in both the *IVS (4.22)* and, where used, in the memory of the *DRD (4.18)*. They shall be removed from the memory of the *IVS* after the *IVS* has received an acknowledgement from the *application service provider (4.4)* that they have been successfully received by the *application service provider* system.

At each change from work to rest and rest to work, the *driver (4.17)* shall use their identification and *authentication (4.14)* method to identify themselves to the *IVS (4.22)*, and shall declare if they are working or resting, creating for each declaration a work record. The means by which this is achieved is an issue of system design and is not standardized in this part of ISO 15638.

For example, if the *driver's (4.17)* identification and authentication method consisted of a token and a password, the *driver* would use the token and password and then declare through the *IVS (4.22)* that they were resting; this creates one driver 'work' record. When the *driver* returns from his/her rest, the *driver* would use their token and password again and declare that they had recommenced working; this would then create another 'work' record.

The *TARV DWR* shall not automatically create a work record without the *driver's (4.17)* declaration.

For example, the movement of the regulated vehicle *(4.35)* or turning off of the ignition shall not automatically generate a work record.

If a *driver (4.17)* changes to another regulated vehicle *(4.35)*, the *driver* shall affirm the work records and then remove (i.e. 'eject') his/her *driver records device (4.18)* from the first vehicle *IVS (4.22)* and insert it into the *IVS* of the second vehicle. If the second vehicle has an *IVS* supplied by a different *application service provider (4.4),* the *driver* shall then use the second *application service provider's* identification and *authentication (4.14)* method to declare his/her DWR declaration for rest and work through the work record system.

Information within the DWR can be automatically populated by the *IVS (4.22)*. For example, a *GNSS* receiver can be used to automatically generate the location and time of the declaration. Except where otherwise instructed by the regime of the *jurisdiction (4.25),* where this functionality is employed, the automatically populated information shall be confirmed by the *driver (4.17)* prior to recording. In the

event that the *driver* does not agree with the information, the *driver* can declare the correct information. The detail of all changes shall be recorded and stored, including the automatically generated information.

10.4.9 TARV DWR SE9: Creation of DWR record

This electronic record shall be created at every work or rest declaration. This electronic record shall contain information about the driver, their operations, and the work and rest change that the *driver (4.17)* has declared. This includes the time, location, multiple *driver (4.17)* identity (if applicable), and cumulative periods of work and rest.

10.4.10 TARV DWR SE10: Multiple driver situation (corroboration declared by additional driver)

If the *TARV DWR* system is to be used in a multiple driver arrangement, the additional *driver(s) (4.17)* can be required by the regime of the *jurisdiction (4.25)* to use their identification and *authentication (4.14)* method to verify the declared electronic records of the first *driver* (i.e. 'DWR' records). In this event, the *DWR app (4.2)* shall prompt the additional *driver* to corroborate this work and rest change of the first *driver* by using their identification and *authentication (4.14)* method.

10.4.11 TARV DWR SE11: 'Interrogated' request for driver work records

10.4.11.1 An interrogating ITS-station shall request specific data as determined in ISO 15638-6, 7.1 and 8.1.2.

10.4.11.2 In the event that the IVS of a vehicle receives a wireless interrogation requesting the DWR data, the interrogator shall also provide at the time of the request a unique 8-byte reference number (`URef`) and a destination IPv6 address (`ReqDest`) where it requests the data to be sent.

10.4.11.3 On receipt of the request, the IVS shall acknowledge the request with the appropriate ACKnowledgement defined in ISO 15638-6, 8.3.5, `<W>`, which acknowledges that a request for DWR data has been received.

10.4.11.4 The IVS shall then close the communication session.

10.4.11.5 The IVS shall then open a new communication session using an available and appropriate CALM wireless medium.

10.4.11.6 The IVS shall then send the DWR data file to a predetermined destination IPv6 (internet) address that has previously been stored in the memory of the data pantry by its ASP, together with the `URef` and `ReqDest` provided by the interrogator.

10.4.11.7 On successful receipt of the data, the recipient at the predetermined destination IPv6 address shall send an acknowledgement `<DWX>` to the IVS.

10.4.11.8 On receipt of the acknowledgement `<DWX>` the IVS shall close its communication session.

10.4.11.9 The ASP shall be responsible to verify that the interrogation is legitimate, appropriate and from an accepted source, and having verified this, shall be responsible to send the data to the interrogator requested IPv6 address. The means and detail of how this is achieved is outside the scope of this part of ISO 15638.

10.4.12 TARV DWR SE12: End of session

At the end of the driving *session (4.38),* the *driver (4.17)* shall be provided with a means to indicate to the *IVS (4.22)* that his/her driving *session* is finished. In the case where a *DRD (4.18)* is used as part of the

DWR system, on receipt of this information, the *IVS* shall ensure that the *DRD* memory and *IVS* memory is updated, and wherever possible, that the *application service provider (4.4)* system is updated through a wireless connection from the *IVS*.

If it is not possible for the *IVS (4.22)* to update the *application service provider (4.4)* system at this point in time, the *IVS* shall update the *application service provider* system at the earliest opportunity [for example, when the *regulated vehicle (4.35)* ignition is next switched on].

10.4.13 TARV DWR SE13: The driver's records are available to the jurisdiction and agent of the jurisdiction

10.4.13.1 In the case where a *DRD (4.18)* is used as part of the DWR system, to inspect a *driver's (4.17)* records at the roadside, the agent of the *jurisdiction (4.25)* can ask the *driver* for their *driver records device (4.18)* in accordance with the provisions of the regime of the *jurisdiction.* After reading the device in the presence of the *driver,* the agent of the *jurisdiction* shall immediately return the *driver records device (4.18)* to the *driver.*

An alternative process, or where *DRDs (4.18)* are not used, is for the personal ITS-station of the agent of the distribution to interrogate and request the required data from the ITS-s of the vehicle, which shall be processed and sent through the *ASP (4.4)*, once validated, to the ITS-s of the agent of the jurisdiction.

10.4.13.2 Where required by the regulation of the jurisdiction, or where instructed by the *ASP (4.4)*, and permitted by the privacy regulations of the jurisdiction, the DWR *'App' (4.2)* shall create (for audit trail purposes) a `logfile`, which shall record on the hour and quarter hour of each hour that the ignition is switched on (or other time interval as determined by the regulation of the jurisdiction or operator), the following data in a DWR `Logfile`.

File title `<DWR number><yyyymmdd><Vehicle Reg no>`

Date <yyyymmdd>	Time <hhmmss>	Latitude	Longitude	Work/rest status

where

— The DWR number shall be as specified in WRE001 (see 10.5.1).

— `<yyyymmdd>` shall be as recorded by the real time clock of the *IVS (4.22).*

— The `<Vehicle Reg no>` shall be as defined in WRE025 (see 10.5.25).

— `<hhmmss>` shall be as recorded by the real time clock of the *IVS (4.22).*

— Lattitude shall be as defined in WRE035 (see 10.5.35).

— Longitude shall be as defined in WRE036 (see 10.5.36).

— Work/rest status shall be as defined in WRE021 (see 10.5.21).

10.4.13.2.1 If required, according to the provisions of 10.4.13.2, each time that the ignition is switched ON, a new `logfile` shall be created in the *IVS (4.22)* using the titling protocol specified in 10.4.13.2.

10.4.13.2.2 If required, according to the provisions of 10.4.13.2, each time that there is a driver change during a driving session (as notified in accordance with 10.4.11), the open `logfile` shall be closed and a new `logfile` shall be created using the titling protocol specified in 10.4.13.2.

10.4.13.2.3 If required, according to the provisions of 10.4.13.2, each time that the ignition is switched OFF, the open `logfile` shall be closed and stored in the memory of the IVS for transmission in a subsequent driving session, in accordance with the provisions specified in 10.4.13.2.4.

10.4.13.2.4 If required, according to the provisions of 10.4.13.2, the *IVS (4.22)* shall transmit all `logfile` data once per day (or at a frequency determined by the jurisdiction or operator) to a predetermined destination IPv6 (internet) address that has previously been stored in the memory of the data pantry by its *ASP (4.4)*. It shall terminate the transmission of all of the retained `logfiles` following the transmission of <LFEND> to the ASP.

10.4.13.2.5 On successful receipt of the `logfiles` and the receipt of the <LFEND> , the recipient *ASP (4.4)* at the predetermined destination IPv6 address shall send an acknowledgement <RLOG> to the *IVS (4.22).* If the *IVS* has not received an <RLOG> acknowledgement within 10 min of completely sending its data, it shall continue to resend at intervals of 10 min until an <RLOG> acknowledgement is received.

10.4.13.2.6 On receipt of the acknowledgement <RLOG>, the IVS shall close its communication session and shall delete all retained and closed `logfiles`.

NOTE The `logfile` for the driving session in progress at that time is still open and shall of course be retained.

10.4.13.2.7 The *ASP (4.4)* shall retain the `logfile` records, sorted by driver/date/time for inspection in accordance with the regulations of the *jurisdiction (4.25)*, and shall delete all such records in accordance with the privacy regulations of the jurisdiction.

10.4.13.3 The *jurisdiction (4.25)* shall also have access to a *driver's (4.17)* electronic records through inspection of the records held by the *application service provider (4.4).*

10.4.13.4 See Annex A for an example ASN.1 module for the <logfile> defined in this subclause.

10.4.14 TARV DWR SE14: The DWR records are available to the driver

A printed version of the DWR records [both `DWR files` declared by the *driver (4.17)* and any `logfiles` (if used) sent by the IVS with the *drivers* DWR number in its title], shall be available to the *driver* on his/her request to the *application service provider (4.4).*

10.5 TARV record of work (Driver Work Record)

10.5.1 General

10.5.1.1 Electronic record

This electronic record shall be created at every work or rest declaration. See 10.4.8. This electronic record shall contain information about the driver, their operations, and the work and rest change that the *driver (4.17)* has declared. This includes the time, location, multiple *driver* identity (if applicable) and cumulative periods of work and rest.

The 'record of work [Driver Work Record *(4.18)*]' shall comprise the data semantically defined in 10.5, and its format defined in Table 2.

All mandatory data fields shall be provided. Where an optional field is not populated, it shall be padded by zeros.

The DWR electronic record, record of work, shall comprise the following 'Work Record Elements' (WRE).

10.5.1.2 DWR record types

A 'Driver Work Record' is generated from both automatically captured information (e.g. time and location) and declared information from the driver.

10.5.1.2.1 Record type 1: 'Accepted work record'

The principal driver work record is created and identified as a 'record type 1'. It constitutes the primary driver work record.

When a driver generates a record and accepts the automatically generated information as being correct, this is the only driver work record created.

10.5.1.2.2 Record type 0: 'Commentary record'

However, if the driver disagrees with the automatically generated information and wishes to change this, a second, additional record shall be created. This second record is identified as a 'record type 0', and is known as a 'commentary record', with the fields altered as required by the driver.

This second record type, and opportunity for the driver to challenge the automatically produced record (type 1), has been created to allow the driver to, as they deem appropriate, emend the record, without losing the original automatically generated record. This assists authorities to determine whether the driver has changed automatically generated information in good faith (i.e. the GPS reading was inaccurate) or maliciously (i.e. to appear compliant when really non-compliant).

10.5.1.3 Use of the DWR

In some jurisdictions, drivers are only required to keep electronic records under certain circumstances.

Where this is the case, there needs to be an indication in the DWR records that some data are not being recorded within the electronic records and which state the driver is moving to.

In this context, there can be

— states of continuing with the DWR,

— moving to a 'Written Work Diary' (WWD), i.e. paperbased recording,

— moving to local hours (i.e. close to base work that does not require recording), or

— where the driver discontinues their work with the vehicle.

This status/state change is recorded in WRE022 below.

10.5.1.4 Use of padded zeros

If the entered data field is less than the specified number of characters, it shall be padded by zeros or blanks to the specified number, normally padded following the actual data, except where otherwise specified below.

10.5.2 WRE001 DWR number (Mandatory)

This is the driver's DWR registration number/Work diary scheme number.

An alphanumeric of up to 20 characters allocated by the home base *jurisdiction (4.25)* as a unique registration for each DWR scheme registered driver, it can be recorded on the drivers *DRD (4.18) (where used)* or can be displayed on a paper work diary record, and entered by the driver into the *IVS (4.22)* using the deployed identification and authentication method or manually entered.

At the discretion of the *jurisdiction (4.25)*, this number can be a *jurisdiction* registration scheme ID number (it can be alphanumeric) of a scheme designed and created by the jurisdiction; it can be the

serial number of the first *DRD (4.18)* device issued to the driver, or can be the drivers licence number. Where there is no such scheme implemented by a *jurisdiction*, it is recommended (but not required) that the drivers licence number can be used as a default unique ID.

It is important that the number is unique within the *jurisdiction (4.25)*, the intention is that this registration number remains allocated to the driver throughout his driving lifetime; and so is useable by the *ASP (4.4)* and *jurisdiction* to associate together all DWR records (and `logfile` records where used) of a particular driver, even where his first allocated DRD has for some reason to be changed.

A registration scheme is required especially where mixed electronic and paper-based systems are used.

This are entered using deployed identification and authentication method or manually entered.

Format: OCTET STRING(`x,0..20),` where x = number of characters.

10.5.3 WRE002 Record type (Mandatory)

This is based upon the declaration of the *driver (4.17).*

Entered by: driver input

Format: BOOLEAN

TRUE = 'DWR Accepted'	confirms that the driver has accepted the generated record as being correct. This identifies the record as a 'Record of work'
FALSE = 'DWR-Challenged'	indicates that the driver disagrees with the generated record and wishes to emend it

10.5.4 WRE003 Specification version number (Mandatory)

This is the version number of the specification of the DWR regulations [issued by *jurisdiction (4.25)*], entered automatically by the *IVS (4.22).*

Format: DECIMAL (4.2)

10.5.5 WRE004 Date (Mandatory)

This is the UTC Date of generation of the record, entered automatically by the *IVS (4.22).*

Format: INTEGER (8) `YYYYMMDD`

10.5.6 WRE005 Time of declaration (Mandatory)

This is the UTC Time of generation of the record, entered automatically by the *IVS (4.22).*

Format: INTEGER (6) `HHMMSS`

10.5.7 WRE006 Date and time (UTC offset) (Mandatory)

The UTC offset that was used by the *IVS (4.22)* to display the UTC date and time (10.5.5 and 10.5.6) to the *driver (4.17)* as a local date and time relative to the driver's base time zone. For example, +1000 or 0930.

These are determined by regulation of the *jurisdiction (4.25)* and/or system design, and entered (or as a minimum confirmed) by the driver.

Format: STRING (5)

10.5.8 WRE007 IVS ID (Mandatory)

This is a 12-character identifier for IVS; entered automatically by the *IVS (4.22).*

Format: STRING (12)

10.5.9 WRE008 Record number (Mandatory)

This is a 10-digit numeric reference number for DWR record,as recorded by the *IVS (4.22)*.

This shall be unique to the IVS, sequential, and ascending; and entered automatically by the *IVS (4.22)*
Format: INTEGER (10)

10.5.10 WRE009 Driver's licence number (Mandatory)

Driver's licence number has up to 20 character identifier *drivers (4.17)* licence number, extracted from the eDrivers licence/*DRD (4.18),* or identification and authentication method determined by regulation of the jurisdiction and system design.

This is entered automatically by the deployed identification and authentication method or directly from an eDrivers licence.

Format: OCTET STRING `(x,0..20),` where x = number of characters.

10.5.11 WRE010 Driver's licence issuing jurisdiction (Mandatory)

Refers to the three letter abbreviation for jurisdiction code for drivers licence issuing jurisdiction.

This can be at country or state level, or other level at the determination of the *jurisdiction (4.25)*.

This is extracted from the eDrivers licence/*DRD (4.18)* or identification and authentication method (determined by regulation of the jurisdiction and system design).

This is entered automatically by the deployed identification and authentication method or directly from an eDrivers licence.

Format: STRING (3)

10.5.12 WRE011 Driver's name (Mandatory)

This is the drivers name (Family name first; a space shall be used between words in the name).

This is extracted from the eDrivers licence/*DRD (4.18)* or identification and authentication method (determined by regulation of the jurisdiction and system design) (up to 40 characters).

This is entered automatically by the deployed identification and authentication method, or DRD, or directly from an eDrivers licence.

Format: OCTET STRING `(x,0..40),` where x = number of characters.

10.5.13 WRE012 Driver's base jurisdiction (Mandatory)

This is the *drivers (4.17)* base *jurisdiction (4.25)* as identified by use of an ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). This can be extracted from the identification and authentication method or manually entered (determined by system design); andpadded to six numeric characters.

NOTE Some country codes can be identified in one or two numbers (e.g. USA = 1; France = 33), while other countries require three characters for the country code.

Some subordinate locations, identified by an area code, require only one character (e.g. Paris = 1), while others require four characters (e.g. Hemel Hempstead = 1442).

Examples:

Australia	Sydney	612000
China	Beijing	861000
England	London	447100 (or 448100)
England	Hemel Hempstead	441442
France	Lyon	334000
France	Macon	334780
USA	Washington DC	120200

Entered (or as a minimum confirmed) by the driver.

Format: INTEGER (6)

10.5.14 WRE013 Driver's base address (Mandatory)

This is the street address of the *driver's (4.17)* base (normal or administratively issued) work location.

It is expected that the *ASP (4.4)* or *PSP (4.32)* would be normally responsible for entering the *drivers'* base address into any *DRD (4.18)* (Up to 40 characters).

This is entered (or as a minimum confirmed) by the *driver.*

Format: OCTET STRING `(x,0..40),` where x = number of characters.

10.5.15 WRE014 Driver's base latitude (Mandatory)

Driver's base latitude are signed decimal degrees from –90,00000 to +90,00000; for example, +12,34567.

It is expected that the *ASP (4.4)* or *PSP (4.32)* would be normally responsible for converting the driver's base location into a latitude and longitude and entering into the IVS memory.

These are populated by the *ASP* or *PSP.*

Format: DECIMAL (9,5)

10.5.16 WRE015 Driver's base longitude (Mandatory)

Driver's base longitude are signed decimal degrees from –180,00000 to +180,00000; for example, +123,45678.

It is expected that the *ASP (4.4)* or *PSP (4.32)* would be normally responsible for converting the driver's base location into a latitude and longitude and entering into the IVS memory.

These are populated by the *ASP (4.4)* or *PSP.*

Format: DECIMAL (10,5)

10.5.17 WRE016 Work hours option (Mandatory)

This refers tothree letter code describing the work and rest hour rules (or exemption) that the driver is working within; Code list determined and published by *jurisdiction (4.25).*

This is entered by the *driver (4.17).*

Format: STRING (3)

10.5.18 WRE017 Accreditation detail (Optional)

This refers to code of up to eight characters which identifies predefined competencies of the *driver (4.17)* (for example: has received basic training in managing driver fatigue; has been provided with an exemption for a particular driving purpose or vehicle class; etc.).

The code list is determined and published by *jurisdiction (4.25).*

This is entered by the *driver (4.17).*

Format: OCTET STRING `(x,0..8),` where x = number of characters.

10.5.19 WRE018 Record keeper address (Mandatory)

This is the street address where the driver's records are stored (up to 40 characters).

It is expected that the *ASP (4.4)* or *PSP (4.32)* will be responsible for converting the 'Record Keepers Address' and state into a latitude and longitude and placing the record in the IVS memory.

This is populated by the *ASP (4.4)* or *PSP (4.32).*

Format: OCTET STRING `(x,0..40),` where x = number of characters.

10.5.20 WRE019 Record keeper address jurisdiction (Mandatory)

Record keeper address jurisdiction refers to ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail); padded to six numeric characters (see 10.5.13).

It is expected that the ASP or *PSP* will be responsible for recording the 'Record Keepers Address jurisdiction' and placing the record in the IVS memory.

These are populated by the *ASP (4.4)* or *PSP (4.32).*

Format: INTEGER (6)

10.5.21 WRE020 Mass storage device serial number (Optional)

This is the serial number of the mass storage device/ *DRD (4.18)* as read by the IVS (up to 10 characters). This field can be left as 0 if unknown.

This is identified automatically by the *IVS (4.22).*

Format: OCTET STRING `(x,0..10),` where x = number of characters.

10.5.22 WRE021 Work/Rest status (Mandatory)

This status refers to 'Work' or 'Rest' status. These are the declared states of the *driver (4.17)* and shall be manually entered as work incorporates both driving and non-driving tasks.

This is entered by the *driver (4.17).*

Format: BOOLEAN

```
FALSE = Rest
TRUE = Work
```

10.5.23 WRE022 Type of usage of the DWR (Mandatory)

This is the statement of the nature of the 'work' being undertaken by the *driver (4.17).*

This is entered by the driver.

Format: 2 bits binary:

`00` – Maintaining DWR

`01` – Changing to WWD (manually written diary)

`10` – Changing to local* work

`11` – Discontinuing the use of the vehicle

*The scope of 'Local' is determined by *jurisdiction (4.25)* where the vehicle is being operated.

10.5.24 WRE023 Odometer reading at the time of declaration (Mandatory)

This is the odometer reading at the time of declaration.

This can be entered by the driver or can be generated by the entered automatically by the *IVS (4.22),* or captured from the vehicle according to regulation of the base jurisdiction and/or system design.

Format: INTEGER (1,7)

`1` for kilometres,

`2` for Miles,

followed by the numeric odometer reading.

[seven rightmost digits of whole units (kilometres or miles),parts of units ignored]

As `00000000`

10.5.25 WRE024 Distance travelled (Mandatory)

This refers to incremental GNSS derived value; generated by calculating the distance between successive GNSS readings providing a *driver (4.17)* independent measure of distance.

Format: INTEGER (1,7)

`1` for kilometres,

`2` for Miles,

followed by the numeric odometer reading.

[seven rightmost digits of whole units (kilometres or miles),parts of units ignored]

As `00000000`

10.5.26 WRE025 Registration number of the regulated vehicle (Mandatory)

This is the registration number of the vehicle (up to eight characters).

This is generated automatically by the *IVS (4.22).*

Format: OCTET STRING `(x,0..8),` where x = number of characters.

10.5.27 WRE026 Registration jurisdiction of the regulated vehicle (Mandatory)

This is the identification of the base *jurisdiction (4.25)* of the *regulated vehicle (4.35)* using ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail); padded to six numeric characters (see 10.5.11).

This is generated automatically by the *IVS (4.22).*

Format: INTEGER (6)

10.5.28 WRE027 Multiple driver arrangement status (Mandatory)

This is the identification of single or multiple *drivers (4.17).*

This is entered by the driver.

Format: One bit binary

Format: BOOLEAN

FALSE = One driver

TRUE = Multiple drivers

10.5.29 WRE028 Accompanying driver's licence number (Optional)

This refers to up to 20 character identifier driving licence number of additional driver (4.17), using deployed identification and authentication method.

These are generated automatically from the information stored on the identification and authentication method or *DRD (4.18).*

Format: OCTET STRING `(x,0..20),` where x = number of characters.

10.5.30 WRE029 Accompanying driver's license issuing jurisdiction (Optional)

This is the identification of an accompanying *drivers (4.17)* licence issuing *jurisdiction (4.25)* using ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail); padded to six numeric characters (see 10.5.13).

This is entered using deployed identification and authentication method.

Format: INTEGER (6)

10.5.31 WRE030 Accompanying driver's name (Optional)

This is the accompanying driver's name (up to 40 characters).

This is entered using deployed identification and authentication method.

Format: OCTET STRING `(x,0..40),` where x = number of characters.

10.5.32 WRE031 Accompanying driver's DWR number (Optional)

This is the accompanying Drivers DWR registration number/Work diary number.

An alphanumeric of up to 20 characters, allocated by the home base *jurisdiction* (4.25), recorded in the *DRD (4.18)* or displayed on a paper work diary record. See also 10.5.2, WRE001.

This is entered using deployed identification and authentication method or manually entered.

Format: OCTET STRING `(x,0..20),` where x = number of characters.

10.5.33 WRE032 Accompanying Driver's DWR issuing jurisdiction (Optional)

This is the identification of an accompanying *drivers (4.17)* DWR issuing *jurisdiction (4.25)* using ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail); padded to six numeric characters (see 10.5.13).

This is entered using deployed identification and authentication method.

Format: INTEGER (6)

10.5.34 WRE033 Description of 'self-declaration' position (Mandatory)

This is the translation of the 'self-declaration' position latitude and longitude; referring to the vehicle's current location, in a format acceptable to the regulations of the home base jurisdiction. Abbreviations are acceptable, for example, Hume HWY, Albury. (up to 40 characters).

This is generated automatically by the *IVS (4.22).*

Format: OCTET STRING `(x,0..40),` where x = number of characters.

10.5.35 WRE034 Location jurisdiction (Mandatory)

This is the identification of the *jurisdiction (4.25)* of the location of the vehicle at the time and place that the current DWR record is created, using ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail); padded to six numeric characters (see 10.5.13).

This is entered using deployed identification and authentication method.

Format: INTEGER (6)

10.5.36 WRE035 Declaration position latitude (Mandatory)

This is the position latitude at the time of the declaration, calculated by the GNSS system used by the *IVS (4.22).*

These are signed decimal degrees from –90,00000 to +90,00000; for example, +12,34567.

These are generated automatically by the *IVS (4.22).*

Format: DECIMAL (9,5)

10.5.37 WRE036 Declaration position longitude (Mandatory)

This is the position longitude at the time of the declaration, calculated by the GNSS system used by the *IVS (4.23).*

These are signed decimal degrees from –180,00000 to +180,00000; for example, +123,45678These are generated automatically by the *IVS (4.22).*

Format: DECIMAL (10,5)

10.5.38 WRE037 Date of last known non-void position (Mandatory)

This is the detail of the last known (most recent) GNSS position prior to losing GNSS reception; UTC Date of generation of the record.

This is generated automatically by the *IVS (4.22).*

Format: INTEGER (8) as `YYYYMMDD`

10.5.39 WRE038 Time of last known non-void position (Mandatory)

This is the detail of the time of the last known (most recent) GNSS position prior to losing GNSS reception; UTC Time of generation of the record.

This is generated automatically by the *IVS (4.22).*

Format: INTEGER (6) as `HHMMSS`

10.5.40 WRE039 Last known non-void position latitude (Mandatory)

This is the detail of the last known (most recent) GNSS position latitude prior to losing GNSS reception.

These are signed decimal degrees from −90,00000 to +90,00000; for example, +12,34567.

These are generated automatically by the *IVS (4.22).*

Format: DECIMAL (9,5)

10.5.41 WRE040 Last known non-void position longitude (Mandatory)

This is the detail of the last known (most recent) GNSS position longitude prior to losing GNSS reception.

These are signed decimal degrees from −180,00000 to +180,00000; for example, +123,45678.

These are generated automatically by the *IVS (4.22).*

Format: DECIMAL (10,5)

10.5.42 WRE041 Number of satellites (of declaration position) (Mandatory)

This is the number of satellites visible to the GNSS system of the *IVS (4.22)* at the time of declaration.

This is generated automatically by the *IVS (4.22)* from GNSS device data.

Format: INTEGER (2)

10.5.43 WRE042 HDOP (of declaration position) (Mandatory)

This is the calculation value of the HDOP.

NOTE The concept of dilution of precision (DOP) is to state how errors in the measurement will affect the final state estimation.

HDOP = \frac{\delta [(\rm output \ location)]}{\delta [(\rm measured \ data)]}

Neglecting ionospheric and tropospheric effects, the signal from navigation satellites has a fixed precision. Therefore, the relative satellite receiver geometry plays a major role in determining the precision of estimated positions and times. Due to the relative geometry of any given satellite to a receiver, the precision in the pseudorange of the satellite translates to a corresponding component in each of the four dimensions of position measured by the receiver (i.e. x, y, z, and t). The precision of multiple satellites in view of a receiver combine according to the relative position of the satellites to determine the level of precision in each dimension of the receiver measurement. When visible navigation satellites are close together in the sky, the geometry is said to be weak and the DOP value is high; when far apart, the geometry is strong and the DOP value is low. Other factors that can increase the effective DOP are obstructions such as nearby mountains or buildings.

These are generated automatically by the GNSS system of the *IVS (4.22)*

Format: DECIMAL (4,1) Decimal value

10.5.44 WRE043 Comment text

This provides opportunity for the *driver (4.17)* to enter comments in respect of the work record (up to 160 characters).The text is entered by the *driver (4.17);* the number of characters is calculated by *IVS (4.22).*

Format: OCTET STRING `(x,0..160),` where x = number of characters.

10.6 'Record of Work' (DWR) file

The 'record of work' shall comprise the data and sequence and formats defined in Table 2.

Table 2 — TARV DWR electronic record - Record of work- Work record elements (WRE)

Number	Field name	Entered and/or automatically populated	Use	Format	Notes and explanations
WRE001	*Driver's* DWR ID number	using deployed identification and authentication method or manually entered	Mandatory	OCTET STRING AN (x,0..20)	Drivers DWR Registration ID/Work diary number(up to 20 characters) See 10.5.32
WRE002	Record Type	*Driver* (4.18) input	Mandatory	BOOLEAN	TRUE = 'DWR Activity' FALSE = DWR-Challenged See 10.5.3
WRE003	Specification version number	Automatically by the *IVS (4.22)*	Mandatory	DECIMAL (4.2)	Version number of the specification of the jurisdiction See 10.5.4
WRE004	Date	Automatically by the *IVS*	Mandatory	INTEGER YYYYMMDD	UTC Date of generation of the record See 10.5.5
WRE005	Time of declaration	Automatically by the *IVS*	Mandatory	INTEGER HHMMSS	UTC Time of generation of the record See 10.5.6
WRE006	Date and time (UTC offset)	Entered (or as a minimum confirmed) by the *driver*	Mandatory	STRING AN (5)	Determined by regulation of the *jurisdiction (4.25)* and/or system design See 10.5.7
WRE007	IVS ID	Automatically by the IVS	Mandatory	STRING AN (12)	IVS identifier (12-character identifier) See 10.5.8
WRE008	Record number	Automatically by the IVS	Mandatory	INTEGER N (10)	As recorded by the IVS. Shall be unique to the IVS, sequential, and ascending. See 10.5.9
WRE009	Driver's licence number	Automatically by the deployed identification and authentication method	Mandatory	OCTET STRING AN (x,0..20)	Number of characters, name (up to 20 characters) Extracted from the eDrivers licence/DRD or identification and authentication method. See 10.5.10

Table 2 *(continued)*

Number	Field name	Entered and/or automatically populated	Use	Format	Notes and explanations
WRE010	*Driver*'s licence issuing *jurisdiction*	Automatically by the deployed identification and authentication method	Mandatory	STRING AN (3)	Abbreviation for jurisdiction. Extracted from the eDrivers licence/DRD or identification and authentication method See 10.5.11
WRE011	*Driver*'s name	Automatically by the deployed identification and authentication method	Mandatory	OCTET STRING AN (x,0..40)	Number of characters, name (up to 40 characters) Extracted from the eDrivers licence/DRD or identification and authentication method See 10.5.12
WRE012	*Driver*'s base *jurisdiction*	Entered (or as a minimum confirmed) by the *driver*	Mandatory	INTEGER N (6)	ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). Padded to six numeric characters See 10.5.13
WRE013	*Driver*'s base address	Entered (or as a minimum confirmed) by the *driver*	Mandatory	OCTET STRING AN (x,0..40)	Number of characters, address (up to 40 characters) The street address of the driver's base work address location See 10.5.14
WRE014	*Driver*'s base latitude	Populated by the *ASP* (4.4) or *PSP* (4.32)	Mandatory	DECIMAL (9.5)	Signed decimal degrees from −90,00000 to +90,00000; for example, −12,34567 See 10.5.15
WRE015	*Driver*'s base longitude	Populated by the *ASP* or *PSP*	Mandatory	DECIMAL D (10.5)	Signed decimal degrees from −180,00000 to +180,00000; for example, +123,45678 See 10.5.16
WRE016	Work hours option	Entered by the *driver*	Mandatory	STRING AN (3)	Code list determined and published by jurisdiction See 10.5.17
WRE017	Accreditation detail	Entered by the *driver*	Optional	OCTET STRING AN (x,0..8)	Number of characters, detail (up to eight characters) Code list determined and published by jurisdiction See 10.5.18

Table 2 *(continued)*

Number	Field name	Entered and/or automatically populated	Use	Format	Notes and explanations
WRE018	Record keeper address	Populated by the *ASP* or *PSP*	Mandatory	OCTET STRING AN (x,0..40)	Number of characters, address (up to 40 characters) The street address where the driver's records are stored See 10.5.19
WRE019	Record keeper address *jurisdiction*	Populated by the *ASP* or *PSP*	Mandatory	INTEGER N(6)	ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). Padded to six numeric characters See 10.5.20
WRE020	Mass storage device serial number	Automatically by the *IVS*	Optional	OCTET STRING AN (x,0..10)	Number of characters, serial number (up to 10 characters) The identification number of the DRD read by the IVS field can be left blank (padded zeros)if unknown See 10.5.21
WRE021	Work/Rest status	Entered by the *driver*	Mandatory	BOOLEAN	FALSE – Rest TRUE– Work See 10.5.22
WRE022	Type of usage of the DWR	Entered by the *driver*	Mandatory	BINARY 2 bits	00 – Maintaining DWR 01 - Changing to WWD 10 – Changing to local* work 11 – Discontinuing the use of the vehicle See 10.5.23
WRE023	Odometer reading at the time of declaration	Entered by the driver *or* automatically by the *IVS*	Mandatory	INTEGER N (1,7)	Can be entered by the driver or can be generated by the IVS or captured from the vehicle according to regulation of the base jurisdiction and/or system design. See 10.5.24
WRE024	Distance travelled	Automatically by the *IVS*	Mandatory	INTEGER N (1,7)	Incremental GNSS derived value; 1 for kilometres, 2 for Miles, followed by the numeric odometer reading. [seven rightmost digits of whole units (kilometres or miles),parts of units ignored] See 10.5.25

Table 2 *(continued)*

Number	Field name	Entered and/or automatically populated	Use	Format	Notes and explanations
WRE025	Registration number of the *regulated vehicle* (*4.35*)	Automatically by the *IVS*	Mandatory	OCTET STRING AN (x,0..8)	Number of characters, Registration number (up to eight characters) See 10.5.26
WRE026	Registration *jurisdiction* of the *regulated vehicle*	Automatically by the *IVS*	Mandatory	INTEGER N (6)	ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). Padded tosix numeric characters See 10.5.27
WRE027	Multiple driver arrangement status	Entered by the *driver*	Mandatory	BOOLEAN	FALSE – single driver TRUE – multiple drivers See 10.5.28
WRE028	Accompanying *driver's* licence number	using deployed identification and authentication method	Optional	OCTET STRING AN (x,0..20)	Number of characters, licence number (up to 20 characters) See 10.5.29
WRE029	Accompanying *driver's license* issuing *jurisdiction*	using deployed identification and authentication method	Optional	INTEGER N (6)	ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). Padded to six numeric characters See 10.5.30
WRE030	Accompanying *driver*'s name	using deployed identification and authentication method	Optional	OCTET STRING AN (x,0..40)	The next driver's name (up to 40 characters). See 10.5.31
WRE031	Next *driver*'s DWR ID number	using deployed identification and authentication method or manually entered	Optional	OCTET STRING AN (x,0..20)	Next Drivers DWR Registration ID/Work diary number (up to 20 characters). See 10.5.32
WRE032	Next Driver's DWR issuing Jurisdiction	using deployed identification and authentication method or manually entered	Optional	INTEGER N(6)	ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). Padded to six numeric characters See 10.5.33
WRE033	Description of 'Self-declaration' position	Automatically by the *IVS*	Mandatory	OCTET STRING AN (x,0..40)	Translation of the 'self-declaration' position latitude and longitude (up to 40 characters). Abbreviations acceptable. See 10.5.34

Table 2 *(continued)*

Number	Field name	Entered and/or automatically populated	Use	Format	Notes and explanations
WRE034	Location state	Automatically by the *IVS*	Mandatory	INTEGER N (6)	ITU e.164 telephone country code (without international dialling prefix) + area prefix (without domestic lead detail). Padded to six numeric characters See 10.5.35
WRE035	Declaration position latitude	Automatically by the *IVS*	Mandatory	DECIMAL (9.5)	Position latitude at the time of the declaration calculated by the GNSS system used by the *IVS (4.22)*. See 10.5.36
WRE036	Declaration position longitude	Automatically by the *IVS*	Mandatory	DECIMAL (10.5)	Position longitude at the time of the declaration calculated by the GNSS system used by the *IVS (4.22)*. See 10.5.37
WRE037	Date of last known non-void position	Automatically by the *IVS*	Mandatory	INTEGER YYYYMMDD	UTC Date of generation of the record This is the details of the last known GNSS position prior to loosing GNSS reception. See 10.5.38
WRE038	Time of last known non-void position	Automatically by the *IVS*	Mandatory	INTEGER HHMMSS	UTC Time of generation of the record See 10.5.39
WRE039	The last known non-void position latitude	Automatically by the *IVS*	Mandatory	DECIMAL (9.5)	Signed decimal degrees See 10.5.40
WRE040	The last known non-void position longitude	Automatically by the *IVS*	Mandatory	DECIMAL (10.5)	Signed decimal degrees See 10.5.41
WRE041	Number of satellites (of declaration position)	Automatically by the *IVS*	Mandatory	INTEGER N (2)	From GNSS device See 10.5.42
WRE042	HDOP (of declaration position)	Automatically by the *IVS*	Mandatory	DECIMAL (4.1)	Decimal value See 10.5.43
WRE043	Comment text	Entered by the *driver*	Use	OCTET STRING AN (x,0..0..160)	No of characters, comment Up to 160 characters See 10.5.44

See Annex A for an example ASN.1 module for this data concept.

10.7 TARV DWR application service specific provisions for quality of service

The integrity of the data are important, and other sensors as well as parameters can then be required based on the approaches and techniques used to provide assurance of the quality of the data. The generic quality of service provisions that are specified in 10.4 are defined in ISO 15638-6 and ISO 15638-5.

Instantiation specific requirements shall be part of the regulation of the *jurisdiction (4.25).* However, in defining such requirements, *jurisdictions* shall, wherever possible, use performance-based or functionally *specifications (4.39)* in order to avoid locking requirements into technologies that will become obsolete.

NOTE Having prescribed integrity and its parameters into an operational system, it is harder to move to other integrity indicators when new technologies come along.

See also Clause 9 for general quality of service requirements.

10.8 TARV DWR application service specific provisions for test requirements

There are no specific provisions for test requirements specified in this version of this part of ISO 15638.

10.9 TARV DWR application specific rules for the approval of IVSs and 'service providers'

This shall be as specified in 9.12.

11 Declaration of patents and intellectual property

This part of ISO 15638 contains no known patents or intellectual property other than that, which is implicit in the media standards referenced herein and in ISO 15638-2. While the *CALM* standards themselves are free of patents and intellectual property, *CALM* in many cases relies on the use of public networks, and IPR exists in many of the public network media standards. The reader is referred to those standards for the implication of any patents and intellectual property.

Application services (4.3) specified in this part of ISO 15638 and ISO 15638-7 contain no direct patents nor intellectual property other than the copyright of ISO. However, national, regional or local instantiations of any the applications services defined in this part of ISO 15638 and ISO 15638-7, or of the generic vehicle information defined in ISO 15638-5, the security requirements contained in ISO 15638-4:—[5)], or the requirements of ISO 15638-3, can have additional requirements which can have patent or intellectual property implications. The reader is referred to the regulation regime of the *jurisdiction (4.25)* and its regulations for instantiation in this respect.

5) To be published.

Annex A
(informative)

ASN.1 modules for ISO 15638-11 data concepts

A.1 Use of ASN.1

ISO TC204 requires that data concepts defined in ISO TC204 ITS standards deliverables are elaborated in ASN.1 (ISO 14813-6).

ISO 21217 (ITS- CALM -ITS-station communications architecture) and its associated standards require the exchange of data using ASN.1 PER or UPER.

The following example provides a definition for the data concepts used in this Standard.

A.2 ASN.1 modules for ISO 15638-11 (driver work records)

A.2.1 Data concepts defined in ISO 15638-5 and used in this part of ISO 15638

```
TARVLocalDataTree DEFINITIONS AUTOMATIC TAGS::=
   BEGIN
        LDTData::= SEQUENCE
        {dataFormatVersion      DataFormatVersion,
         messageID              MessageIdentifier,
         primeSPID              PrimeServiceProviderIdentifier,
         applicationSPAddress   ApplicationServiceProviderAddress,
         sessionControlData     SessionControlData OPTIONAL,
         vehicleUniqueID        VehicleUniqueIdentifier OPTIONAL,
         vehicleClassID         VehicleClassIdentification OPTIONAL,
         vin                    VIN,
         propulsionStorageType  PropulsionStorageType,
         time                   TimeAndTimestamp DEFAULT 0,
         location               Location,
         direction              DirectionOfTravel,
         ignition               Ignition,
         movementSensors        OtherMovementSensors,
         driverID               DriverIdentification,
         trailerID              TrailerIdentification OPTIONAL,
         loadData               LoadData
         }

        DataFormatVersion::= VisibleString (SIZE (6))

        MessageIdentifier::= INTEGER

        PrimeServiceProviderIdentifier::= VisibleString (PATTERN "\w#4:\w#4:\w#4:\w#4:\
w#4:\w#4:\w#4:\w#4") -IPv6 address in the format xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx

        ApplicationServiceProviderAddress::= CHOICE {
        content   [0] INTEGER (128..16511), -contained in two octets
        extension [1] OCTET STRING(SIZE (2))
        }

        SessionControlData::= VisibleString

        VehicleUniqueIdentifier::= SEQUENCE {
        countryCode       VisibleString,
        alphabetIndicator VisibleString,
        licPlateNumber    NumericString
        }
```

```
        VehicleClassIdentification::= NumericString (SIZE (2))

        VIN::= VisibleString (SIZE (17))

        PropulsionStorageType::= BIT STRING {
        gasoline (0),
        diesel   (1),
        cng      (2),
        lpg      (3),
        electric (4),
        hydrogen (5)
        } -Enter type value with curly bracket at beginning and end, assignment type will
accept word and binary forms of storage type

        TimeAndTimestamp::= INTEGER

        Location::= SEQUENCE {
                              latitude  VisibleString (SIZE (10)),
                              longitude VisibleString (SIZE (10)),
                              altitude  VisibleString (SIZE (4..5)) DEFAULT "0000",
                              noOfSats  VisibleString (PATTERN "Sat\d+"), -Type value
must be in the format "SatN", where N = the number of satellites present
                              trust     INTEGER {
                                                 false (0),
                                                 true  (1)
                                                 } (0 | 1) -accepts true, false, 0 or 1
                              }

        DirectionOfTravel::= INTEGER (0..360) -degrees clockwise

        Ignition::= VisibleString ("Ign 1" | "Ign 0" | "Ign d") -where 1=on, 0=off,
d=disconnected

        OtherMovementSensors::= SEQUENCE
        {sensorOne VisibleString (PATTERN "\d+\s\Mvt\s[m,n,d]"|"000") DEFAULT "000", -Type
value must be in the format "[SensorNumber] Mvt [m/n/d]", where m=movement, n=no movement,
d=disconnected
        sensorTwo  VisibleString (PATTERN "\d+\s\Mvt\s[m,n,d]"|"000") DEFAULT "000"
        }

        DriverIdentification::= SEQUENCE
        {jurisdictionID    VisibleString (PATTERN "\d#6\s\w+\s\w+\s(\w+,)*\s\d#6"), -
Must be in the format "[IssueDate(yymmdd)] [IssuingJurisdiction] [Driver'sName]
[VehicleClasses(comma separated)] [ExpiryDate(yymmdd)]"
        userAuthorisation VisibleString (PATTERN "\d#6\s\w+\s\w+\s(\w+,)*\s\d#6"|"000000")
DEFAULT "000000" -Same format as jurisdictionID
        }

        TrailerIdentification::= VisibleString

        LoadData::= VisibleString
   END
```

A.2.2 Data concepts defined in this part of ISO 15638 (DWR)

```
-Type definition for 15638-11 module
TARVDriverWorkRecords DEFINITIONS AUTOMATIC TAGS::=
   BEGIN
        DWRData::= SEQUENCE
        {wRE001 DWRID,
         wRE002 RecordType,
         wRE003 SpecVersionNumber,
         wRE004 Date, -Date in UTC
         wRE005 TimeOfDeclaration, -Time in UTC
         wRE006 UTCOffset,
         wRE007 IVSID,
         wRE008 RecordNumber,
         wRE009 DriversLicenceNumber,
         wRE010 DriversLicenceIssuingJurisdiction,
         wRE011 DriversName,
         wRE012 DriversBaseJurisdiction,
```

```
        wRE013 DriversBaseAddress,
        wRE014 DriversBaseLatitude,
        wRE015 DriversBaseLongitude,
        wRE016 WorkHoursOption,
        wRE017 AccreditationDetail OPTIONAL,
        wRE018 RecordKeeperAddress,
        wRE019 RecordKeeperAddressJurisdiction,
        wRE020 MassStorageDeviceSerialNumber OPTIONAL,
        wRE021 WorkRestStatus,
        wRE022 DWRUsage,
        wRE023 OdometerReading, -Odometer reading at the time of declaration
        wRE024 DistanceTravelled,
        wRE025 RegistrationNumber, -Registration number of the heavy vehicle
        wRE026 RegistrationJurisdiction, -Registration jurisdiction of the heavy vehicle
        wRE027 MultipleDriverArrangementStatus,
        wRE028 AccompanyingDriversLicenceNumber OPTIONAL,
        wRE029 AccompanyingDriversLicenceIssuingJurisdiction OPTIONAL,
        wRE030 AccompanyingDriversName OPTIONAL,
        wRE031 AccompanyingDriversDWRID OPTIONAL,
        wRE032 AccompanyingDriversDWRIssuingJurisdiction OPTIONAL,
        wRE033 DescriptionOfDeclarationPosition,
        wRE034 LocationState,
        wRE035 DeclarationPositionLatitude,
        wRE036 DeclarationPositionLongitude,
        wRE037 DateOfLastKnownNonVoidPosition,
        wRE038 TimeOfLastKnownNonVoidPosition,
        wRE039 LastKnownNonVoidPositionLatitude,
        wRE040 LastKnownNonVoidPositionLongitude,
        wRE041 NumberOfSatellites,
        wRE042 HDOP,
        wRE043 CommentText OPTIONAL
        }

        DWRID::= VisibleString (SIZE(0..20))

        RecordType::= BOOLEAN -Where TRUE='DWR Activity', FALSE='DWR Challenged'

        SpecVersionNumber::= VisibleString (PATTERN "\d#1\.\d#2") -Type value of the
Specification Version Number must be in the format x.xx, where x is an integer, e.g. "0.01"

        Date::= NumericString (SIZE (8)) -YYYYMMDD

        TimeOfDeclaration::= NumericString (SIZE (6)) -HHMMSS

        UTCOffset::= VisibleString (PATTERN " (\s|[+|-])#(,1)\d#4") -e.g. "+1000" for
UTC+10:00, or "-0930" for UTC-9:30

        IVSID::= VisibleString (SIZE (12))

        RecordNumber::= NumericString (SIZE (10))

        DriversLicenceNumber::= VisibleString (SIZE (0..20))

        DriversLicenceIssuingJurisdiction::= VisibleString (SIZE (3))

        DriversName::= VisibleString (SIZE (0..40))

        DriversBaseJurisdiction::= NumericString (SIZE (6))

        DriversBaseAddress::= VisibleString (SIZE (0..40))

        DriversBaseLatitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\d#(1,2)\.\d#5")
-e.g. "-12.34567"

        DriversBaseLongitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\d#(1,3)\.\d#5")
-e.g. "-123.45678"

        WorkHoursOption::= VisibleString (SIZE (3))

        AccreditationDetail::= VisibleString (SIZE (0..8))
```

```
        RecordKeeperAddress::= VisibleString (SIZE (0..40))

        RecordKeeperAddressJurisdiction::= NumericString (SIZE (6))

        MassStorageDeviceSerialNumber::= VisibleString (SIZE (0..10))

        WorkRestStatus::= BOOLEAN -Where TRUE=Work, FALSE=Rest

        DWRUsage::= BIT STRING (SIZE (2)) -Where 00=Maintaining DWR, 01=Changing to WWD,
10=Changing to local work, 11=Discontinuing the use of the vehicle

        OdometerReading::= NumericString (PATTERN "[1|2]\d#7")

        DistanceTravelled::= NumericString (PATTERN "[1|2]\d#7")

        RegistrationNumber::= VisibleString (SIZE (0..8))

        RegistrationJurisdiction::= NumericString (SIZE (6))

        MultipleDriverArrangementStatus::= BOOLEAN -Where TRUE=multiple drivers,
FALSE=single driver

        AccompanyingDriversLicenceNumber::= VisibleString (SIZE (0..20))

        AccompanyingDriversLicenceIssuingJurisdiction::= NumericString (SIZE (6))

        AccompanyingDriversName::= VisibleString (SIZE (0..40))

        AccompanyingDriversDWRID::= VisibleString (SIZE (0..20))

        AccompanyingDriversDWRIssuingJurisdiction::= NumericString (SIZE (6))

        DescriptionOfDeclarationPosition::= VisibleString (SIZE (0..40))

        LocationState::= NumericString (SIZE (6))

        DeclarationPositionLatitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\
d#(1,2)\.\d#5") -e.g. "-12.34567"

        DeclarationPositionLongitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\
d#(1,3)\.\d#5") -e.g. "-123.45678"

        DateOfLastKnownNonVoidPosition::= NumericString (SIZE (8)) -YYYYMMDD

        TimeOfLastKnownNonVoidPosition::= NumericString (SIZE (6)) -HHMMSS

        LastKnownNonVoidPositionLatitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\
d#(1,2)\.\d#5") -e.g. "-12.34567"

        LastKnownNonVoidPositionLongitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\
d#(1,3)\.\d#5") -e.g. "-123.45678"

        NumberOfSatellites::= NumericString (SIZE (2))

        HDOP::= VisibleString (PATTERN "\d#2\.\d#1")

        CommentText::= VisibleString (SIZE (0..160))

   END
```

A.2.3 ASN.1 module for the LOGFILE defined in 10.4.13

```
-Type definition for DWR logfile
DWRLogFile DEFINITIONS AUTOMATIC TAGS::=
   BEGIN
        LogFileData::= SEQUENCE
        {dLF001 FileTitle,
         dLF002 Date,
         dLF003 Time,
         dLF004 Latitude,
         dLF005 Longitude,
```

```
        dLF006 WorkRestStatus
        }

        FileTitle::= SEQUENCE {
                    dWRID              VisibleString (SIZE(0..20)),
                    date               Date,
                    registrationNumber VisibleString (SIZE (0..8))
                                }

        Date::= NumericString (SIZE (8)) -YYYYMMDD

        Time::= NumericString (SIZE (6)) -HHMMSS

        Latitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\d#(1,2)\.\d#5") -e.g.
"-12.34567"

        Longitude::= VisibleString (PATTERN "(\s|[+|-])#(,1)\d#(1,3)\.\d#5") -e.g.
"-123.45678"

        WorkRestStatus::= BOOLEAN -Where TRUE=Work, FALSE=Rest

   END
```

Annex B
(informative)

Independent testing of the protocols defined in this part of ISO 15638

B.1 Objectives

To test the validity of TARV standards it is necessary to simulate the TARV transactions. These are of two types

B.1.1 Instigation

a) The IVS of a vehicle establishes a new communication using one of (and shall be tested for each of) several wireless media defined below.

b) The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address.

c) The vehicle sends the data file to the predetermined destination IPv6 (internet) address.

d) The recipient address sends acknowledgement.

e) The IVS closes the communication on receipt of acknowledgement.

B.1.2 Interrogation

a) The IVS of a vehicle receives a wireless interrogation requesting a packet of data.

b) The IVS of a vehicle is switched on but is not connected.

c) The IVS of a vehicle receives a wireless interrogation requesting a packet of data.

d) On receipt, it acknowledges the request (ACK).

e) It closes the communication.

f) It opens a new communication session using one of (and shall be tested for each of) several wireless media defined below.

g) It sends the data file to a predetermined destination IPv6 (internet) address.

h) The recipient address sends acknowledgement.

i) The IVS closes the communication on receipt of acknowledgement.

These scenarios need to be tested using each of 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11) using the same data

A number of different data files (of different length) and acknowledgements need to be sent, which differ according to the application service. Each of the sequences defined below need to be tested.

In respect of 'interrogation' scenarios, the ability to receive the interrogation on one medium (esp. 5,9 GHz) and to instigate the subsequent message using a different medium needs to be tested.

B.1.3 Preconditions, assumptions, and simulations

a) The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards).

b) CALM and media choice are assumed, and not S.U.T.

c) The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, Mesh WiFi, 5,9 GHz (IEEE 802.11p).

d) The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated.

e) The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

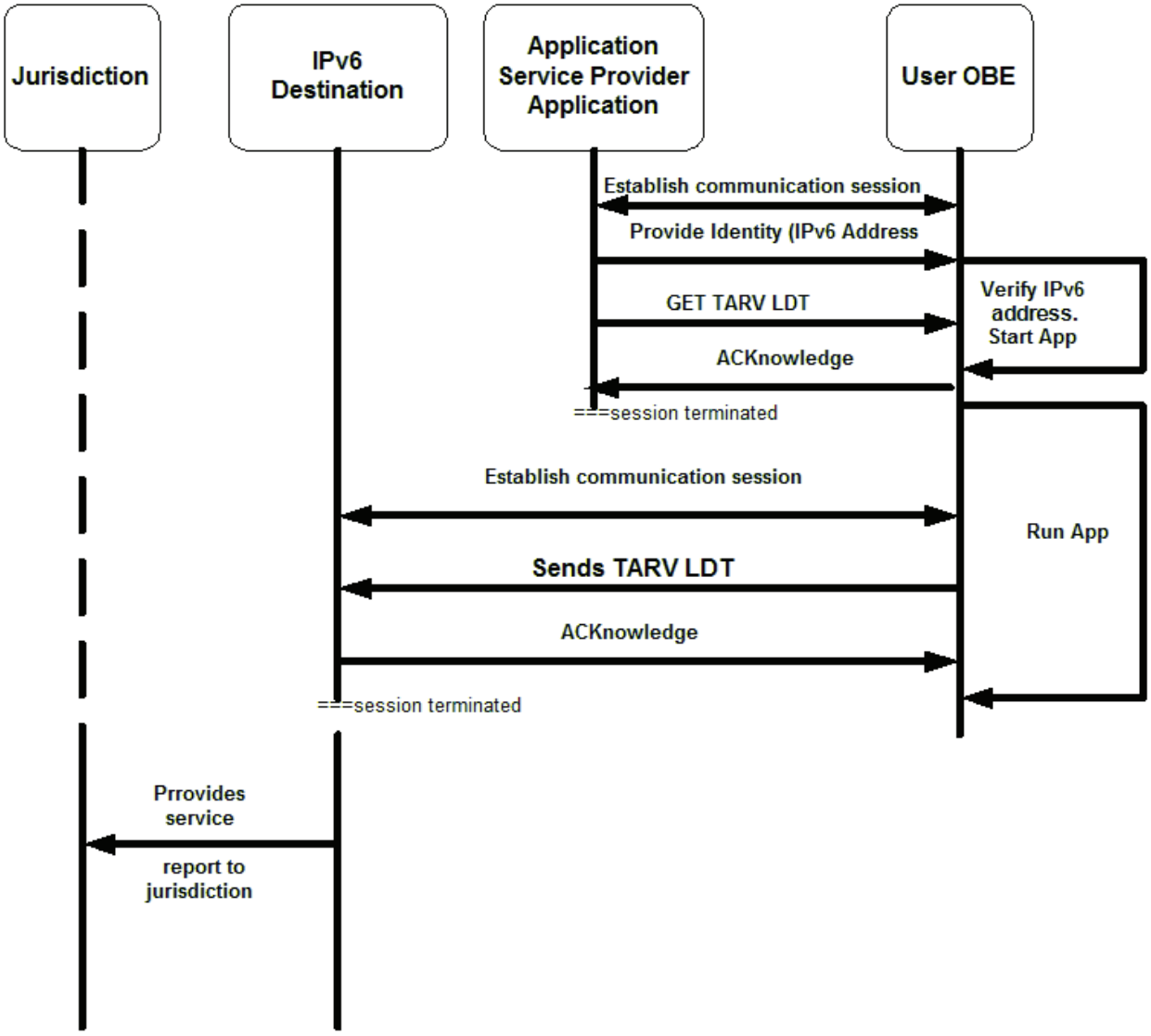

Figure B.1 — Communications sequences to obtain TARV LDT

B.1.4 Application Services where the verity of the communication needs to be physically tested

a) *VAM* *vehicle access monitoring*

b) *RTM* *remote electronic tachograph monitoring*

c) EMS *emergency messaging system*

d) *DWR* *driver work records* (work and rest hours compliance)

e) *VMM* *vehicle mass monitoring*

f) *MRC* *'mass' data for regulatory control and management (no test - data as VMM)*

g) *VAC* *vehicle access control (no test - data as VAM)*

h) *VLM* *vehicle location monitoring*

i) *VSM* *vehicle speed monitoring*

j) *CLM* *consignment and location monitoring*

k) *ADR* *Accord Dangereuses par Route (Dangerous Goods) monitoring*

l) *VPF* *vehicle parking facilities*

B.2 Test Sequences

B.2.1 Test script 5 service: DWR Driver work records

NOTE These independent tests were conducted using an older version of the data concept contents. However, while the detail of the data content is now altered, the communications and sequences remain unaltered and therefore the tests remain valid.

TEST 5.1 .1: DWR– through 2G. Instigated

STEP 5.1.1.1 IVS instigates a communication session using 2G media to predetermined destination IP address

AS **API** IPv6 address

As AS 00000000 00000000 xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx

Example: PSP 128..16511 1050:0000:0000:0000:0005:0600:300c:326b

Using ',' as a data field separator

Table B.1 — Data format for DWR records for TARV DWR

Number	Name	Use	Format	Notes/source
*SDD*001	Date	Mandatory	YYYYMMDD	Converted from *UTC* time provided by IVS (ISO 15638-5, 8.3.10)
*SDD*002	Time	Mandatory	HHMMSS	Converted from *UTC* time provided by IVS (ISO 15638-5, 8.3.10)
*SDD*003	*IVS* ID	Mandatory	AN (9)	*IVS* identifier as defined in ISO 15638-5
*SDD*004	Record Number	Mandatory	AN (50)	As recorded by the IVS Example: 000127WIL-LI502139RK9MA854401110310071927
*SDD*005	*DWR* Spec Version Number	Mandatory	D (4.2)	Version number of the *specification (4.73)*. As provided by *DWR app (4.6)*
*SDD*006	*Driver's* Licence Number	Mandatory	AN (20)	Obtained from record number
* shall be filled with spaces if no data are available.				

Table B.1 *(continued)*

Number	Name	Use	Format	Notes/source
*SDD*007	*Driver's* Licence Issuing Jurisdiction	Mandatory	AN (3)	Three letters representing the *jurisdiction*. If the *jurisdiction* identifier has only two letters, the last letter shall be populated with a space. Obtained from Record Number
*SDD*008	*Driver's* name	Mandatory	AN (4(0)	*Driver's* name; a space shall be used between two words in the name. Obtained from driving licence.
*SDD*009	*Driver's* work and rest scheme (STD, BFM, AFM)	Mandatory	AN (3)	Three characters represent work and rest scheme. Entered manually by driver.
*SDD*010	Accreditation number	Mandatory*	AN (8)	Locally determined by *jurisdiction*
*SDD*011	*Driver's* Base Latitude	Mandatory	D (9.5)	Signed decimal degrees (GDA94) from −90,00000 to +90,00000; for example, −12,34567. Obtained from *TARV LDT*.
*SDD*012	*Driver's* Base Longitude	Mandatory	D (13.5)	Signed decimal degrees (GDA94) from -180,00000 to +180,00000; for example, +123,45678. Obtained from *TARV LDT*.
*SDD*013	Record Position Latitude	Mandatory*	D (9.5)	Signed decimal degrees (GDA94) from −90.00000 to +90.00000, for example −12.34567. Obtained from *TARV LDT*.
*SDD*014	Record Position Longitude	Mandatory*	D (13.5)	Signed decimal degrees (GDA94) from -180,00000 to +180,00000, for example +123,45678. Obtained from *TARV LDT*.
*SDD*015	Number of Satellites	Mandatory	N (2)	Obtained from *TARV LDT*.
*SDD*016	HDOP	Mandatory	D (4.1)	Decimal value

*SDD*017	Vehicle registration number	By IVS automatically	CS4:: = SEQUENCE {
			countryCode
			CountryCode, alphabetIndicator
			AlphabetIndicator, licPlateNumberLicPlateNumber
			}
				The IVS shall be programmed by the *prime service provider (4.61)* with a file containing the vehicle registration number as defined in ISO 14816, 4.10..

* shall be filled with spaces if no data are available.				

Note The following is an example of SD (Detail) Record (spaces have been shown as '^' and artificial filed separators (|) have been inserted purely for clarity in this part of ISO 15638):

FILENAME: < SD000127WIIL502139RK9MA8544011103100719 27 >

FILE CONTENT:

20120501,101506,ID0o3M45S,000127WILLI502139RK9MA8544011103100719 27,1234^12, WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, −12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR

Table B.2 — Data format for SD (Work) records

Number	Name	Use	Format	Notes/Source
SDW001	Date	Mandatory	YYYYMMDD	Converted from *UTC* time provided by *IVS (4.22)* (ISO 15638-5, 8.3.10)
SDW002	Time	Mandatory	HHMMSS	Converted from *UTC* time provided by *IVS* (ISO 15638-5,8.3.10)
SDW003	*IVS* ID	Mandatory	AN (9)	*IVS* identifier as defined in ISO 15638-5
SDW004	Record Number	Mandatory	N (6)	As recorded by the *IVS.* Example: 000127WIL-LI502139RK9MA854401110310071927 Example: 000127WIL-LI502139RK9MA854401110310071927
SDW005	EWD F&T Spec Version Number	Mandatory	D (4.2)	Version number of the *specification (4.39)*. As provided by *DWR app (4.6)*
SDW006	*Driver's (4.17)* Licence Number	Mandatory	N (9)	Obtained from record number
SDW007	*Driver's* Licence Issuing jurisdiction	Mandatory	AN (3)	Three letters representing the *jurisdiction*. If the *jurisdiction* has only 2 letters, the last letter shall be populated with a space Obtained from record number
SDW008	*Driver's* name	Mandatory	AN (40)	*Driver's* name; a space shall be used between two words in the nameObtained from driving licence.
SDW009	Work/Rest status	Mandatory	N (1)	0 – Rest 1 - Work
SDW010	Work time or Rest time spent since the last Work/Rest change	Mandatory	DDDHHMMSS	If Work/Rest status = 0, this represents Work time; if Work/Rest status = 1, this represents Rest time. Derived from *IVS* time.
SDW011	Odometer reading at the Work/Rest change	Mandatory	D (9.1)	Odometer reading

SDW012	Registration number of the *regulated vehicle*	Mandatory	CS4:: = SEQUENCE {
			countryCode
			CountryCode, alphabetIndicator
			AlphabetIndicator, licPlateNumberLicPlateNumber
			}
				Registration number from *DWR* app. The IVS shall be programmed by the *prime service provider (4.32)* with a file containing the vehicle registration number as defined in ISO 14816, 4.10.

SDW013	Registration *jurisdiction* of the *regulated vehicle (4.35)*	Mandatory	AN (3)	Three letters representing the *jurisdiction*. If the *jurisdiction* has only two letters, the last letter shall be populated with a space.
SDW014	Two-up arrangement status	Mandatory	N (1)	0 – single driver 1 – two-up driver
SDW015	The accompanying Driver*'s* name	Mandatory*	AN (40)	The accompanying driver*'s* name. To be populated with space if only single *driver.* Input from accompanying *drivers* licence.

Table B.2 *(continued)*

Number	Name	Use	Format	Notes/Source
SDW016	Accompanying Driver*'s* licence number	Mandatory*	N (20)	Input from accompanying *drivers (4.17)* licence.
SDW017	Accompanying Driver*'s* work diary number	Mandatory*	AN (7)	Input from accompanying *drivers (4.17) DRD.*
SDW018	*Jurisdiction* that issued accompanying Driver*'s* work diary	Mandatory*	AN (3)	Three letters representing the *jurisdiction*. Input from accompanying *drivers* licence.
SDW019	The last known position Latitude	Mandatory	D (9.5)	Signed decimal degrees (GDA94) from −90,00000 to +90,00000; for example, −12,34567. Input from *TARV LDT.*
SDW020	The last known position Longitude	Mandatory	D (13.5)	Signed decimal degrees (GDA94) from -180,00000 to +180,00000; for example, +123,45678. Input from *TARV LDT.*
SDW021	Cumulative daily Work time	Mandatory	HHMMSS	Sum of all work times for the day, calculated by *DWR app*
SDW022	Cumulative daily Rest time	Mandatory	HHMMSS	Sum of all Rest times for the day, calculated by *DWR App.*
SDW023	Comment text	Mandatory*	AN (40)	Input from the driver.

FILENAME: < SDW 000128WIIL502139RK9MA854401110310071927 >

FILE CONTENT:

20120501,101626,ID0o3M45S,A2345678Z,1 WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,1,00060926,123456, MV03WRR,GBR,1,JOHN SMITH, SMITH503239JA9MA,a23456t,GBR, −12.34567, +123.45678, 062113,013000,xxxxx

STEP 5.1.1.2 IVS sends file named < SD 000127WIIL502139RK9MA854401110310071927 >

YYYYMMDD,HHMMSS,ID0o3M45S,000127WILLI502139RK9MA8544011103100719271234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, −12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR

STEP 5.1.1.3 Destination address sends ACK < DWR >

STEP 5.1.1.4 IVS receives ACK < DWR >

STEP 5.1.1.5 IVS closes communication session

STEP 5.1.1.6 IVS instigates a communication session using 2G media to predetermined destination IP address

STEP 5.1.1.7 IVS sends file named < SDW 000128WIIL502139RK9MA854401110310071927 >

20120501,101626,ID0o3M45S,A2345678Z,1 WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,1,00060926,123456, MV03WRR,GBR,1,JOHN SMITH, SMITH503239JA9MA,a23456t,GBR, −12.34567, +123.45678, 062113,013000,xxxxx

STEP 5.1.1.8 Destination address sends ACK < DWR >

STEP 5.1.1.9 IVS receives ACK < DWR >

STEP 5.1.1.10 IVS closes communication session

CTP 5.1.1 Instigated Driver Work Records using 2G

S.U.T. reference		Instigated send of Driver Work Records using 2G	
CTP/5.1.1			
S.U.T. test objective		The IVS of a vehicle establishes a new communication using one of (and shall be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address. The vehicle sends the data file to the predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.	
CTP origin		CSI	
Reference requirement		ISO 15638-11	
Initial conditions		The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.	
Stimulus and expected behaviour			
Test point		**Tester action**	**Pass condition**
5.1.1.1	1	The IVS instigates a communication session using selected media (2G) to predetermined destination IP address	Session established
5.1.1.2	2	The IVS sends file named < SD000127WIIL502139RK9MA8544011103100719 27 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA 8544011103100719 27,1234^12,WILLI402137RK9MA,GBR,RO BERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.1.1.3	3	Destination address sends ACK < DWX >	The IVS closes communication session
5.1.1.4	4	The IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.1.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.1.1	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.1.2 Interrogated Driver Work Records using 2G

S.U.T. reference	Interrogated send of Driver Work Records using 2G
CTP/5.1.2	
S.U.T. test objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session. The IVS of a vehicle receives a 2G wireless interrogation requesting a packet of data. On receipt, it acknowledges the request (ACK). It closes the communication. It opens a new communication session using one of (and shall be tested for each of) several wireless media defined below. It sends the data file to a predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CEN
Reference requirement	ISO 15638-11
Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated.
	The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.1.2.1	1	Session connected (incoming call)	Call in progress
5.1.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET DWR	Data request sent
5.1.2.3	3	IVS acknowledges request by returning ACKnowledgement < W >	ACK < W > received
5.1.2.4	4	IVS closes communication session	Communication session closed
5.1.2.5	5	IVS instigates a communication session using selected media to predetermined destination IP address	Communication session successfully opened

5.1.2.5	6	IVS sends file named < SD000127WIIL502139RK9MA8544011103100719 27 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA 8544011103100719 27,1234^12,WILLI402137RK9MA,GBR,RO BERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.1.2.6	7	Destination address sends ACK < DWX >	
5.1.2.7	8	IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.1.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.1.2	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.1.3 Interrogated Driver Work Records using 5,9 GHz and responding using 2G or 3G

S.U.T. reference	Interrogated Driver Work Records using 5,9 GHz and send of Driver Work Records using 2G or 3G
CTP/5.1.3	
S.U.T. test objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session. The IVS of a vehicle receives a 5,9 GHz (IEEE 802.11p) wireless interrogation requesting a packet of data. On receipt, it acknowledges the request (ACK). It closes the communication. It opens a new communication session using 2G or 3G. It sends the data file to a predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CEN
Reference requirement	ISO 15638-11

Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.1.3.1	1	Session connected (incoming call) using 5,9 GHz (IEEE 802.11p)	Call in progress
5.1.3.2	2	Caller sends data request command GET DWR	Data request sent
5.1.3.3	3	IVS acknowledges request by returning ACKnowledgement < W >	ACK < W > received
5.1.3.4	4	IVS closes communication session	Communication session closed
5.1.3.5	5	IVS instigates a communication session using 2G or 3G	Communication session successfully opened
5.1.3.5	6	IVS sends file named < SD000127WIIL502139RK9MA854401110310071927 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END > < END >	File sent and arrives correctly at destination
5.1.3.6	7	Destination address sends ACK < DWX >	
5.1.3.7	8	IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.1.3.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.1.3	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.2.1 Instigated Driver Work Records using 3G

S.U.T. reference	Instigated send of Driver Work Records using 3G
CTP/5.2.1	

S.U.T. test objective	The IVS of a vehicle establishes a new communication using one of (and shall be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address. The vehicle sends the data file to the predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CSI
Reference requirement	ISO 15638-11
Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.2.1.1	1	IVS instigates a communication session using selected media (3G) to predetermined destination IP address	Session established
5.2.1.2	2	IVS sends file named < SD000127WIIL502139RK9MA854401110310071927 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.2.1.3	3	Destination address sends ACK < DWX >	
5.2.1.4	4	IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.2.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.2.1	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	 k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.2.2 Interrogated at 5,9 GHz and send of Driver Work Records using 3G

S.U.T. reference		5,9 GHz Interrogated and send of Driver Work Records using 3G	
CTP/5.2.2			
S.U.T. test objective		The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session. The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt, it acknowledges the request (ACK). It closes the communication. It opens a new communication session using one of (and shall be tested for each of) several wireless media defined below. It sends the data file to a predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.	
CTP origin		CEN	
Reference requirement		ISO 15638-11	
Initial conditions		The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.	
Stimulus and expected behaviour			
Test point		**Tester action**	**Pass condition**
5.2.2.1	1	Session connected (incoming call) using 5,9 GHz (IEEE 802.11p)	Call in progress
5.2.2.2	2	Caller sends data request command GET DWR	Data request sent
5.2.2.3	3	IVS acknowledges request by returning ACKnowledgement < W >	ACK < W > received
5.2.2.4	4	IVS closes communication session	Communication session closed
5.2.2.5	5	IVS instigates a communication session using selected media (2G or 3G) to predetermined destination IP address	Communication session successfully opened
5.2.2.5	6	IVS sends file named < SD000127WIIL502139RK9MA8544011103100719 27 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.2.2.6	7	Destination address sends ACK < DWX >	
5.2.2.7	8	IVS receives ACK < DWX >	File received and ACK < DWX > sent

5.2.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.2.2	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	 k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.3.1 Instigated Driver Work Records using 802.11p (WAVE) 5,9 GHz

S.U.T. reference	Instigated Driver Work Records using 802.11p (WAVE) 5,9 GHz
CTP/5.3.1	
S.U.T. test objective	The IVS of a vehicle establishes a new communication using one of (and shall be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address. The vehicle sends the data file to the predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CSI
Reference requirement	ISO 15638-11
Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.3.1.1	1	IVS instigates a communication session using selected media (5,9 G) to predetermined destination IP address	Session established

5.3.1.2	2	IVS sends file named < SD000127WIIL502139RK9MA8544011103100719 27 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.3.1.3	3	Destination address sends ACK < DWX >	
5.3.1.4	4	IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.3.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.3.1	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	 k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.3.2 Interrogated Driver Work Records using 802.11p (WAVE) 5,9 GHz

S.U.T. reference	Interrogated send of Driver Work Records using 802.11p (WAVE) 5,9 GHz
CTP/5.3.2	
S.U.T. test objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session. The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt, it acknowledges the request (ACK). It closes the communication. It opens a new communication session using one of (and shall be tested for each of) several wireless media defined below. It sends the data file to a predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CEN
Reference requirement	ISO 15638-11

Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.3.2.1	1	Session connected (incoming call) using 5,9 GHz (IEEE 802.11p)	Call in progress
5.3.2.2	2	Caller sends data request command GET DWR	Data request sent
5.3.2.3	3	IVS acknowledges request by returning ACKnowledgement < W >	ACK < W > received
5.3.2.4	4	IVS closes communication session	Communication session closed
5.3.2.5	5	IVS instigates a communication session using 5,9 GHz selected media to predetermined destination IP address	Communication session successfully opened
5.3.2.5	6	IVS sends file named < SD000127WIIL502139RK9MA854401110310071927 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.3.2.6	7	Destination address sends ACK < DWX >	
5.3.2.7	8	IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.3.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.3.2	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	innovITS ADVANCE k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.4.1 Instigated Driver Work Records using Mesh WiFi

S.U.T. reference	Instigated send of Driver Work Records using Mesh WiFi
CTP/5.4.1	

S.U.T. test objective	The IVS of a vehicle establishes a new communication using one of (and shall be tested for each of) several wireless media defined below. The IVS of a vehicle internally triggers a requirement to send a packet of data to a predetermined destination IPv6 (internet) address. The vehicle sends the data file to the predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CSI
Reference requirement	ISO 15638-11
Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.4.1.1	1	IVS instigates a communication session using selected media (Mesh WiFi) to predetermined destination IP address	Session established
5.4.1.2	2	IVS sends file named < SD000127WIIL502139RK9MA8544011103100719 27 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.4.1.3	3	Destination address sends ACK < DWX >	
5.4.1.4	4	IVS receives ACK < DWX >	File received and ACK < DWX > sent
5.4.1.5	5	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.4.1	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	 k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

CTP 5.4.2 Interrogated Driver Work Records using Mesh WiFi

S.U.T. reference	5,9 GHz Interrogated and send of Driver Work Records using Mesh WiFi
CTP/5.4.2	
S.U.T. test objective	The IVS of a vehicle receives a wireless interrogation requesting a packet of data. The IVS of a vehicle is switched on but is not connected to an active wireless communication session. The IVS of a vehicle receives a wireless interrogation requesting a packet of data. On receipt, it acknowledges the request (ACK). It closes the communication. It opens a new communication session using one of (and shall be tested for each of) several wireless media defined below. It sends the data file to a predetermined destination IPv6 (internet) address. The recipient address sends acknowledgement. The IVS closes the communication on receipt of acknowledgement.
CTP origin	CEN
Reference requirement	ISO 15638-11
Initial conditions	The S.U.T. concerns only the communication between the IVS and the application service provider address. No other part of the system specifications are to be tested (they appear in the figures below for context, and because there are copied from the base standards). CALM and media choice are assumed and not S.U.T. The vehicle is equipped with wireless communications that enable it to make communications using 2G, 3G, WiFi, 5,9 GHz (IEEE 802.11p). The means to trigger the sending of a message from the vehicle is a function of IVS design, not S.U.T., therefore can be simulated. The destination address is intended to be an IPv6 address, but can be simulated with an IPv4 address as this is an internet issue, not S.U.T.

Stimulus and expected behaviour

Test point		Tester action	Pass condition
5.4.2.1	1	Session connected (incoming call) using 5,9 GHz (IEEE 802.11p)	Call in progress
5.4.2.2	2	Caller sends data request command (GPRS, EDGE etc) GET DWR	Data request sent
5.4.2.3	3	IVS acknowledges request by returning ACKnowledgement < W >	ACK < W > received
5.4.2.4	4	IVS closes communication session	Communication session closed
5.4.2.5	5	IVS instigates a communication session using mesh WiFi selected media to predetermined destination IP address	Communication session successfully opened
5.4.2.5	6	IVS sends file named < SD000127WIIL502139RK9MA8544011103100719 27 > < START > < 20120501,101506,ID0o3M45S,000127WILLI502139RK9MA854401 110310071927,1234^12,WILLI402137RK9MA,GBR,ROBERT KENNETH WILLIAMS,BFM,123, –12.34567, +123.45678, 12.34567,+123.45678,8,1234.1, 44EMV03WRR > < END >	File sent and arrives correctly at destination
5.4.2.6	7	Destination address sends ACK < DWX >	
5.4.2.7	8	IVS receives ACK < DWX >	File received and ACK < DWX > sent

5.4.2.8	9	IVS closes communication session	Communication session closed
			If ALL individual pass conditions listed in this column above have been met THEN CTP PASS ELSE CTP FAIL

TEST RESULT: CTP 5.4.2	PASS/FAIL	Date: 28th June 2102
Signature/initials 	PASS	k4, MIRA, Watling St, Nuneaton, Warwickshire, CV10 0TU, UK Tel: +44 (0)7730 922 810 Web: www.innovits.com/advance

Bibliography

[1] ISO/IEC/TR 10000-1, *Information technology — Framework and taxonomy of International Standardized Profiles — Part 1: General principles and documentation framework*

[2] ISO 10241, *International terminology standards — Preparation and layout*

[3] ISO 128-30, *Technical drawings — General principles of presentation — Part 30: Basic conventions for views*

[4] ISO 128-34, *Technical drawings — General principles of presentation — Part 34: Views on mechanical engineering drawings*

[5] ISO 128-40, *Technical drawings — General principles of presentation — Part 40: Basic conventions for cuts and sections*

[6] ISO 128-44, *Technical drawings — General principles of presentation — Part 44: Sections on mechanical engineering drawings*

[7] ISO 8000 (all parts), *Quantities and units*

[8] IEC 60027 (all parts), *Letter symbols to be used in electrical technology*

[9] ISO 1000, *SI units and recommendations for the use of their multiples and of certain other units*

[10] ISO 690, *Information and documentation — Guidelines for bibliographic references and citations to information resources*

[11] ISO 690-2, *Information and documentation — Bibliographic references — Part 2: Electronic documents or parts thereof*

[12] ISO 16844-1, *Road vehicles — Tachograph systems — Part 1: Electrical connectors*

[13] ISO 16844-2, *Road vehicles — Tachograph systems — Part 2: Electrical interface with recording unit*

[14] ISO 21210, *Intelligent transport systems — Communications access for land mobiles (CALM) — IPv6 Networking*

[15] ISO 21217, *Intelligent transport systems — Communications access for land mobiles (CALM) — Architecture*

ICS 03.220.20;35.240.60

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