

TELEMATICS MONITORING APPLICATION

**Functional and Technical Specification
Version 1.5**



For Application Service Providers

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Version	Date	Description
1.0	July 2019	Initial version
1.1	September 2019	Replaced 'User' with 'Operator', and 'Producer' with 'Authority'.
1.2	May 2020	Replaced 'telematics in-vehicle unit' with 'telematics device'. Allowed an equivalent approval mechanism that TCA may use as an alternative to type-approval. Updated data records to reflect mandatory or optional usage if a telematics device or connected device is used at Level 2 Assurance. Added an optional speed data element to a position record.
1.3	August 2020	Added requirements for SD (vehicle type/TCM) records to Section 7, and included the record in Appendix B (new data record, updated TMA Data Record JSON Schema, and updated TMA Data Record Batch Sample).
1.4	November 2020	Removed requirements related to installation, operation, maintenance, calibration and documentation of the OBM system, which will be performed by the supplier (or Operator-nominated personnel that the supplier authorises as suitably trained). Removed alarm record requirements from Section 6, as these are not required at Level 2 Assurance, but kept the subset of mass alarm record requirements. Added requirements for mass quality records to Section 6, and included the record in Appendix B (new data record. Updated TMA Data Record JSON Schema, and updated TMA Data Record Batch Sample accordingly. Updated term 'configuration record' to 'mass configuration record'.
1.5	January 2021	Added GDA2020 and WGS84 as additional allowed spatial reference system datums.

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Transport Certification Australia (TCA) is a national organisation that provides assurance services relating to transport technologies and data to enable improved public purpose outcomes from road transport.

Priority outcome areas enabled by TCA services include improved road safety, transport efficiency, freight productivity, asset management and sustainability.

Key aspects of TCA include:

- An independent not-for-profit entity, with government oversight
- Administration of the National Telematics Framework, including its rules, specifications, agreements, digital infrastructure and other supporting services
- Assurance services that support but are appropriately separated from regulators, policy makers and enforcement activities, and underpin telematics applications and associated information and data services
- Advice that is based on evidence and a deep subject matter knowledge
- Trusted partner to both government and industry stakeholders, enabling a nationally consistent open market, with services covering all road vehicle types and associated digital infrastructure.

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1 INTRODUCTION

1.1 Purpose of this Document

- 1.1.1 This document describes the functional and technical requirements of the Telematics Monitoring Application (TMA) operating within the National Telematics Framework (NTF). The NTF is a digital business platform for the use of telematics and related intelligent technologies, to underpin reforms, policies and industry-sought outcomes.
- 1.1.2 The TMA application enables the collection of telematics data from monitored vehicles, including identity, time and location, and data as required by a scheme such as mass and configuration and/or self-declaration.
- 1.1.3 This document describes obligations of parties associated with the TMA application, particularly where these obligations relate to interacting with the Application Service Provider (ASP).
- 1.1.4 The use of this document is linked to other NTF specifications as follows:
- *Telematics Device Functional and Technical Specification*; and
 - *Telematics Business-to-Business Data Exchange Functional and Technical Specification*.
- 1.1.5 If vehicle configuration and mass data will be collected for this application, the use of this document is linked to the following additional NTF specifications:
- *On-Board Mass System Functional and Technical Specification*; and
 - *Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification*.

1.2 Scope

- 1.2.1 This document describes the following TMA requirements:
- Requirements that shall be met by applicants intending to provide telematics devices for usage within the TMA application. TCA will grant approval for telematics devices used within TMA in accordance with its corresponding functional and technical specification.
Note: Approval may be in the form of type-approval or an equivalent approval mechanism acceptable to TCA. The ASP must meet applicable requirements in the functional and technical specification, irrespective of the approval mechanism.
 - Requirements for ASPs intending to provide TMA application services. These are requirements that shall be met by an ASP in fulfilling the functional and technical requirements of an ASP intending to provide TMA application services. TCA will certify ASPs intending to provide TMA application services.
 - Additional requirements, as required by a scheme, for ASPs intending to provide TMA application services that include collection of vehicle configuration and mass data. These are requirements that shall be met by an ASP in fulfilling the functional and technical requirements of an ASP intending to provide TMA application services that incorporate these data types. TCA will incorporate these requirements into the certification of ASPs intending to provide TMA application services.

- Additional requirements, as required by a scheme, for ASPs intending to provide TMA application services that include collection of self-declared data. These are requirements that shall be met by an ASP in fulfilling the functional and technical requirements of an ASP intending to provide TMA application services that incorporate these data types. TCA will incorporate these requirements into the certification of ASPs intending to provide TMA application services.

1.3 Document Overview

- 1.3.1 The philosophy guiding the formation and application of this specification has been to focus on required outcomes without being overly prescriptive or solution-oriented.
- 1.3.2 Applicants for certification and, in an ongoing context, ASPs are encouraged to develop innovative ways of meeting the various functional and technical requirements of this specification and to submit them to TCA for approval. This is intended to allow the application to draw upon the best in available technology as it develops, and to encourage its development rather than being certified against the technology that was available at a point in time. TCA will take due care to ensure that the intellectual property rights of individual applicants and ASPs are protected in this approval process.
- 1.3.3 The specification commences with this Introduction (Section 1), followed by Background (Section 2).
- 1.3.4 Documents referenced in this specification are listed at Section 3.
- 1.3.5 Sections 4, 5, 6 and 7 describe the requirements for:
- TCA approval of a telematics device and (if required by a scheme) an OBM system; and
 - ASPs.
- 1.3.6 Section 4 contains the requirements for telematics device usage within the TMA application. Telematics devices are to be approved by TCA. Requirements in this section are referred to as Part A and are prefixed by an 'A' (e.g. A.1.5).
- 1.3.7 Section 5 contains the mandatory requirements for the certification of an ASP to provide TMA application services. Requirements in this section are referred to as Part B and are prefixed by a 'B' (e.g. B.1.5).
- 1.3.8 Section 6 contains additional requirements, as required by a scheme, for OBM system usage within the TMA application, and additional requirements for the certification of an ASP to provide TMA application services that include collection of vehicle configuration and mass data. OBM systems are to be approved by TCA. Requirements in this section are referred to as Part C and are prefixed by a 'C' (e.g. C.1.5).
- 1.3.9 Section 7 contains additional requirements, as required by a scheme, for the certification of an ASP to provide TMA application services that include collection of self-declared data. Requirements in this section are referred to as Part D and are prefixed by a 'D' (e.g. D.1.5).
- 1.3.10 In fulfilling the functional and technical requirements of an ASP intending to provide the TMA application, the ASP must meet requirements of Parts A and B, and as required by a scheme, Parts C and/or D as applicable.
- 1.3.11 The specification includes the following appendices:
- Appendix A: Acronyms and Definitions;
 - Appendix B: Record Formats; and
 - Appendix C: Alarm Codes.

1.4 Purpose of Telematics Monitoring Application

- 1.4.1 The TMA application allows road infrastructure managers to collect and use data through telematics, to optimise road maintenance planning and investment.
- 1.4.2 TMA draws together NTF components including telematics devices, ASP back-office capabilities and reporting, and optional connected devices. Together, these components provide a technical, functional, business and legal capability concerned with the monitoring of vehicle parameters that include identity, time and location, and optional data as applicable such as vehicle configuration and mass and/or self-declaration.
- 1.4.3 In TMA, a telematics device is installed on a vehicle and monitors the vehicle's activity. Data collected by the telematics device is transferred to the back office of the ASP responsible for it. If mass and configuration or self-declaration data is collected, this data is also transferred to the back office of the ASP.
- 1.4.4 The ASP processes the collected data, generates data records, and forwards them to TCA. After data collation and analysis, TCA provides reports of vehicle activity to the Authority(ies) responsible for the scheme(s) in which the vehicle is enrolled, and in accordance with the terms and conditions of the scheme(s).
- 1.4.5 Benefits of TMA include the provision of road usage information that:
- is credible, reliable and useful;
 - supports improved transport productivity, safety and compliance; and
 - assists in enhanced conformance with standards and requirements.
- 1.4.6 TMA is a Level 2 Assurance application. For more information about levels of assurance, see 2.2.2.

1.5 Nomenclature

- 1.5.1 In this document:
- all references to software include software in any form or medium, including firmware, unless otherwise qualified; and
 - where the context requires it, references to the 'ASP' shall, before the ASP has been certified by TCA, be a reference to that party as an applicant for certification of the application they apply to provide services for.
- 1.5.2 Requirements clauses within this document that are denoted by:
- 'shall' are requirements that must be met;
 - 'should' are requirements that should desirably be met; and
 - 'will' are obligations that will be met by other parties.
- 1.5.3 Notes are included by way of clarification and apply to the immediately preceding clause.
- 1.5.4 Acronyms and terms defined for the purposes of this specification may be found within Appendix A, Acronyms and Definitions.

2 BACKGROUND: NATIONAL TELEMATICS FRAMEWORK AND TELEMATICS APPLICATIONS

2.1 The National Telematics Framework

2.1.1 The NTF is a digital business platform with infrastructure and rules that aims to ensure an open marketplace of telematics and related intelligent technology providers.

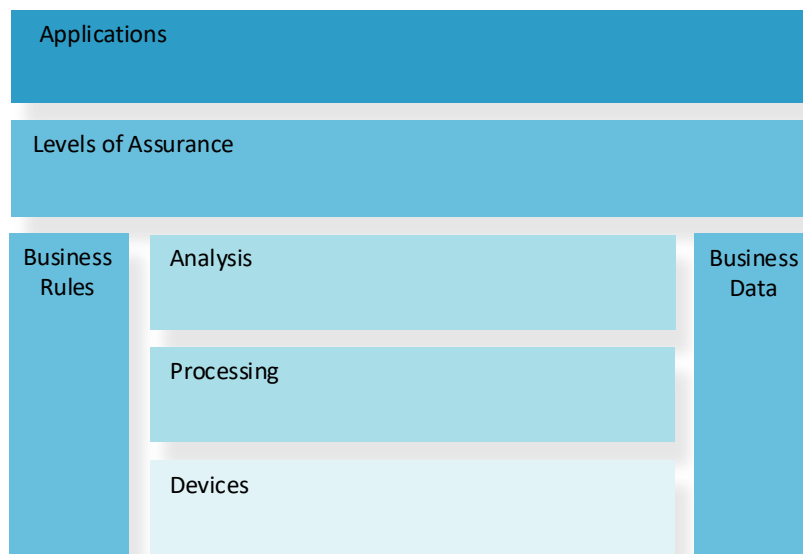
2.1.2 The NTF:

- provides a national platform for the use of telematics and related intelligent technologies;
- supports a number of applications across regulatory, contractual and commercial needs;
- supports different levels of assurance; and
- is outcome-focussed and encourages innovation.

2.2 National Telematics Framework – High-Level Architecture

2.2.1 Telematics applications function within the context of the NTF. The high-level architecture of the NTF is illustrated in Figure 1.

Figure 1: NTF High-Level Architecture



2.2.2 The architectural components of the NTF are as follows:

- Applications – An application is a capability of the NTF that provides business value to stakeholders, delivered as an assembly of policy, business components and technical components, within the context of an intended level of assurance.

- Levels of Assurance – Each level of assurance is determined by the intended use of a telematics application, the risks being managed, the availability and reliability of supporting contextual information, and the needs and expectations of consumers and other stakeholders. Three broad levels of assurance have been defined:
 - Level 1: Self-assessment of data and no independent oversight of a telematics application.
 - Level 2: Independent assessment of specific elements of a telematics application. Telematics data is combined with other data sources.
 - Level 3: Certificate-based data and evidence. Independent assessment and oversight of all aspects of a telematics application and service provision.

For more information, refer to *National Telematics Framework – Levels of Assurance*.

Note: TMA is a Level 2 Assurance application.

- Business Rules – A common set of business rules that ensure an open, robust, secure and interoperable marketplace of providers, and meet the requirements for defined levels of assurance (including evidentiary requirements associated with regulatory requirements).

For more information, refer to *National Telematics Framework – Business Rules*.

- Business Data – Data elements that are common to data analysis, processing and telematics devices, which include the Telematics Data Dictionary and the National Telematics Map (NTM).

Note: The NTM is sourced by TCA from a third party for NTF purposes. It is independent of any telematics application or scheme (see 2.3). The NTM is not used by the TMA application.

- Analysis – Advanced analysis of data and information related to telematics devices and applications.
- Processing – Processing components concerned with (generally) automated service provider functionality, comprising a framework of business domain documents.
- Devices – Individual telematics capabilities that are typically able to exist independently, or within the context of broader telematics-based solutions. Each device or technology collects a defined set of data which is packaged in the form of data records.

2.2.3 Business-to-business (B2B) data is exchanged within the NTF using the following data exchange mechanisms, which are fully explained in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*:





- **Tier 1 Data Exchange:**
A web services solution where structured information is exchanged that complies with requirements such as authentication, security, privacy and certainty of delivery. It includes exchanges of information related to a vehicle's enrolment in telematics applications, conditions and adherence to those conditions.
- **Tier 2 Data Exchange:**
The human-initiated (rather than automated) exchange of business-related information and advice. Typical exchanges via this tier include reporting of issues and resolutions, correspondence regarding certification and re-certification, advice regarding information and communications technology (ICT), data assurance and other reporting.

- Tier 3 Data Exchange:**
 The packaging and delivery of data packages, comprising data records and enrolment-related artefacts. Data packages have several uses which include data analysis by the recipient, data assurance, and for research purposes.

2.3 Application Participants

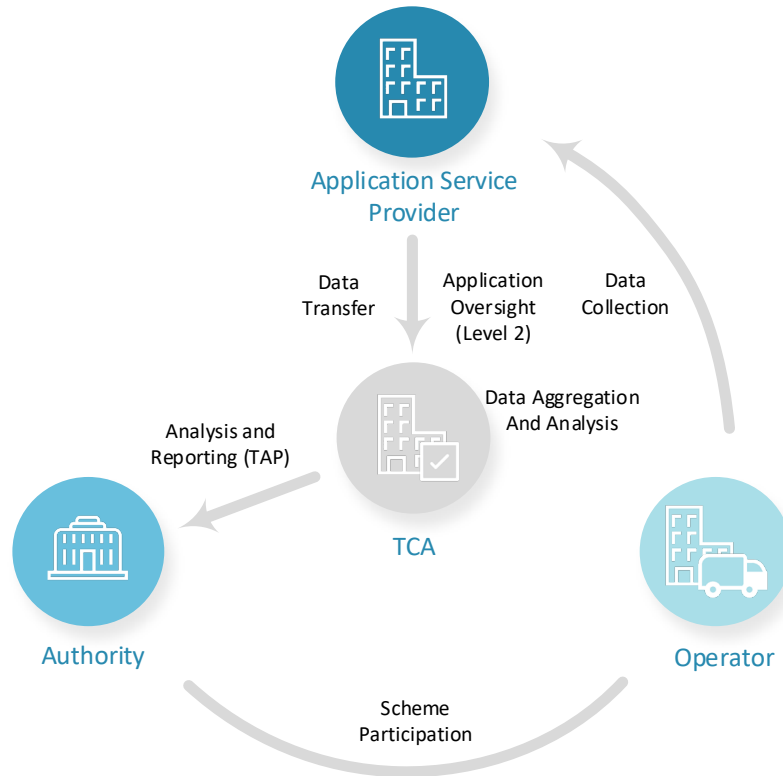
2.3.1 Refer to Table 1 for a description of key participants in the TMA application:

Table 1: Application Participants

Name	Description
 Authority	<p>An Authority develops and publishes schemes which utilise a telematics application. A scheme is a specific use of the application linked to delivering a policy objective of the Authority. Each enrolment of a vehicle in the application must specify a scheme.</p> <p>An Authority may appoint an administrator to perform its functions. If delegation occurs, it applies across all schemes published by the Authority for a given application.</p> <p><i>Note: Wherever a requirement states an operational responsibility for an Authority, it includes responsibility for any administrator that may have been appointed by the Authority to perform its functions.</i></p> <p>Each scheme requires that vehicles enrol in a specific telematics application to ensure telematics monitoring and/or assessment of vehicle operation associated with the application.</p>
 Operator	<p>An Operator operates one or more vehicles eligible to enter a scheme requiring a telematics application.</p> <p>An Operator may apply to enrol vehicles within a scheme by meeting the necessary conditions or agreements. The enrolment conditions or agreements require an Operator to utilise the services of an ASP in order to participate in a scheme offered by an Authority.</p>
 Application Service Provider (ASP)	<p>An ASP is a private-sector entity that provides telematics services (e.g. hardware, software and associated processes) and is certified by TCA for participation in one or more telematics applications (each subject to separate certification assessments for service provision).</p> <p>An ASP is responsible for installation of telematics devices and any other technologies required by applications, monitors vehicles in accordance with the application, and provides the level of assurance sought by Authorities .</p> <p>For TMA, the ASP monitors vehicles via data sent by the telematics device to the ASP back office. For more detail on the operation of TMA, see 2.4.</p>
 TCA	<p>TCA has oversight of all NTF applications, including their publishing, maintenance, data assurance and auditing (if required), and ensures they continue to operate in accordance with the NTF. Oversight includes certification of ASPs and the approval of telematics devices. Reporting and program coordination activities are undertaken in line with the Authority's needs.</p>

2.3.2 Key TMA participants and high-level interactions are shown in Figure 2.

Figure 2: TMA Participants and Interactions

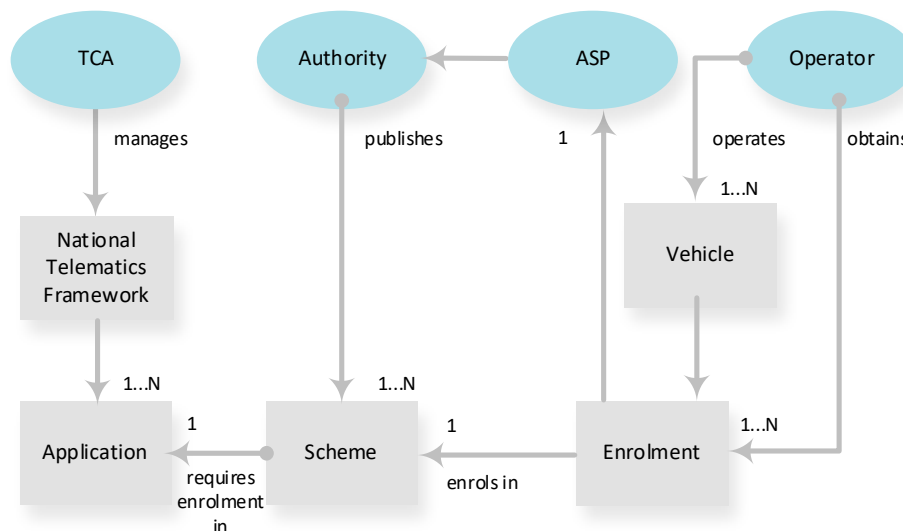


Note: Subject to the specifics of an application and level of assurance, the ASP may also be the Operator.

2.4 Operation of the Telematics Monitoring Application

2.4.1 The operation of the TMA application is shown in Figure 3. It involves interaction of telematics application participants, and includes processes such as enrolment of vehicles in schemes and data reporting.

Figure 3: Operation of a Monitoring Application



2.4.2 Each Authority publishes and operates one or more schemes.

2.4.3 The Operator identifies and undertakes to join a scheme offered by an Authority (or its appointed administrator for operational functions).

Note: Enrolment within a scheme simultaneously confirms enrolment in the application that underpins that scheme.

2.4.4 The Operator engages an ASP to:

- install a telematics device, and as applicable, OBM system(s), to enable monitoring of vehicle parameters;
- provide TMA services; and
- manage vehicle enrolment.

2.4.5 Details of the Operator's enrolment in a TMA scheme are contained in an enrolment form. The enrolment form specifies details about the Authority, Operator, vehicle, ASP and the installed in-vehicle equipment.

Note: A vehicle may operate under one or more schemes. A vehicle may have more than one enrolment.

2.4.6 After an Operator has enrolled a vehicle in a scheme, the Authority is notified and takes any action necessary to manage that enrolment.

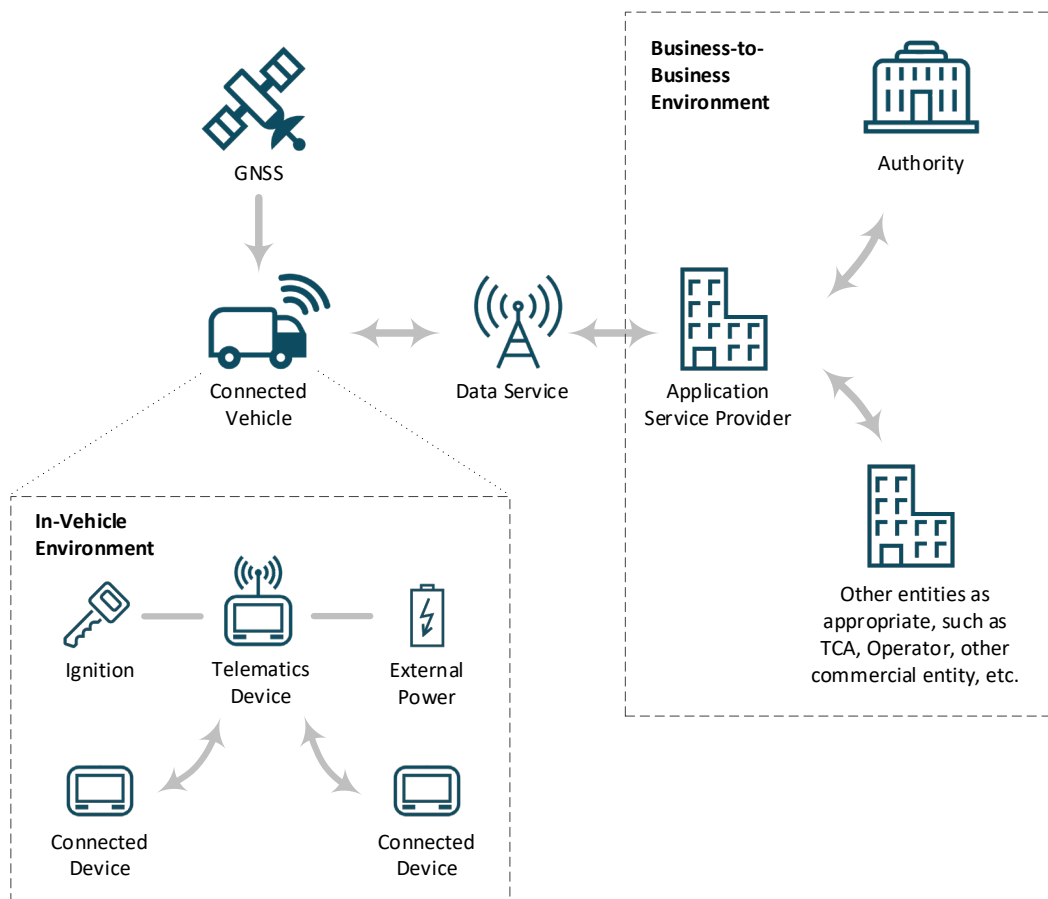
2.4.7 The ASP commences provision of services for TMA. Services include monitoring the vehicle, collecting data and generating data records (see 2.7).

2.4.8 The ASP provides a monthly enrolment report to each Authority.

2.5 Physical Reference Architecture

2.5.1 Figure 4 depicts the main components in the physical reference architecture of a telematics application.

Figure 4: Physical Reference Architecture



2.5.2 The telematics device is the primary device which monitors parameters as required by the scheme.

2.5.3 The telematics device will be supported via an ignition source and external power supply (envisaged to be the vehicle's power supply) and will collect data from a number of sources and sensors, generate telematics device data records and transmit those records to the ASP System for further processing. This activity is performed independently of the Operator.

2.5.4 If vehicle configuration and mass data will be collected as required by a scheme, the telematics device may be connected to other in-vehicle devices or technologies referred to as connected devices. A connected device typically communicates with a telematics device in accordance with *Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification* or equivalent industry or proprietary data interface.

Note: For TMA, and for this version of the specification, the connected device is the OBM system although other TCA-approved connected devices may be used in the future. For more information on the configuration of the OBM system within the vehicle environment, see 2.6.

- 2.5.5 Telematics device data records are transferred to the ASP back office.
- 2.5.6 For TMA, data processed by the ASP will allow the ASP to monitor the vehicle.
- 2.5.7 The ASP is also required, on a periodic basis, to generate and transfer an enrolment report to TCA for each Authority.
- 2.5.8 Data moves within the physical reference architecture of a telematics application in various ways as shown in Figure 4 and described in the following phases:
- Data collection: The application describes the data to be collected and the records to be generated and stored by the telematics device prior to data transfer.
 - Data transfer: The application describes the telematics device data records that are to be transmitted from the telematics device to the ASP System, dealing with issues such as frequency, storage, security and access to communication links.
- 2.5.9 While the data to be collected by the telematics device and/or connected device is specified, the ASP determines how that data is collected.
- 2.5.10 The performance of a telematics device and/or connected device(s) is monitored to ensure that it/they are performing in accordance with requirements specified by the application and device functional and technical specification.

Note: The remainder of the Background section is applicable only if the collection of vehicle configuration and mass is required by a scheme associated with TMA.

2.6 OBM System

2.6.1 The OBM system is a connected device that comprises:

- an electronic control unit (ECU);
- mass sensor units (MSUs); and
- related documentation required by *On-Board Mass Functional and Technical Specification*.

Note: For information on OBM system approval requirements, refer to On-Board Mass Functional and Technical Specification.

2.6.2 Three categories of OBM system function within the NTF. Each category differs in the functionality offered and its intended use, noting that the ability to accurately measure and report the mass of an axle group and a vehicle is consistent across all categories.

2.6.3 The OBM system categories applicable to TMA are:

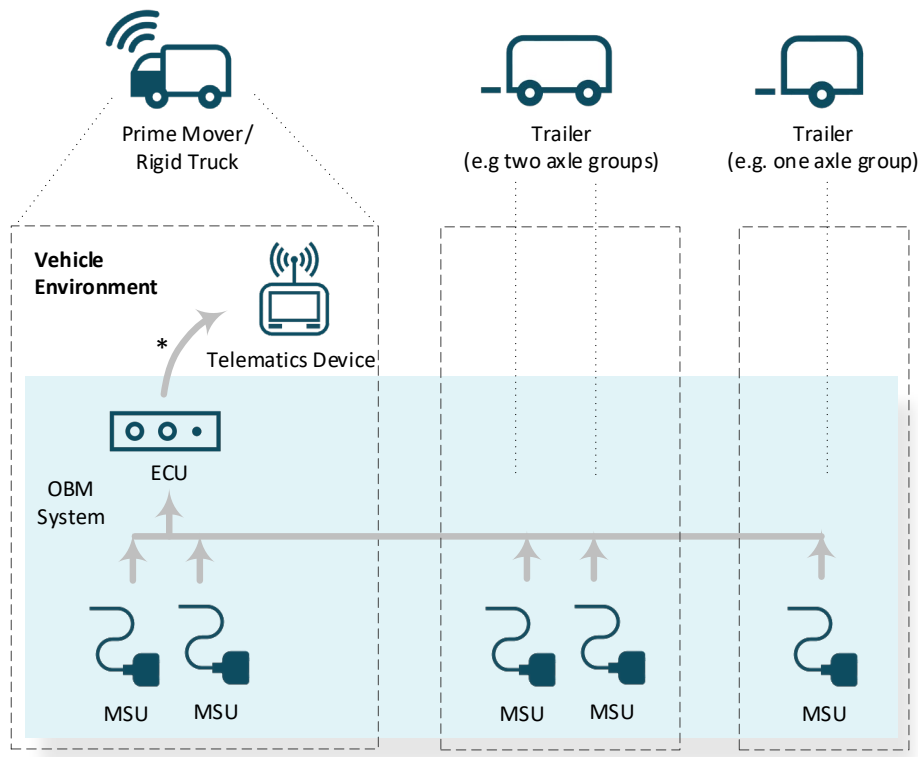
- Category C – OBM systems in this category collect data and transfer data records in a standardised way to a telematics device (in accordance with *Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification*).
- Category B – OBM systems in this category collect data and transfer the collected data to a telematics device using a mechanism agreed and implemented by the ASP and the supplier of the OBM system.

For illustrations of Category B and C OBM systems in relation to data handling, see Figure 7 and Figure 8.

2.6.4 Within an OBM system, each MSU corresponds to the axle group for which it measures axle group mass (AGM), as shown in Figure 5. The ECU collects axle group mass data from the MSUs, and the OBM system derives the gross combination mass (GCM). In OBM systems Category B and C, the OBM system sends this data to the telematics device as connected device data records as shown in Figure 6.

2.6.5 An operational OBM system may vary in the number of MSUs connected to the ECU, given natural variation that occurs in vehicle types and numbers of axle groups.

Figure 5: OBM System – In-Vehicle Environment



* An ECU is connected to a telematics device in a Category B or C OBM system only.

2.7 Data Record Structure and Terminology

2.7.1 Any record that originates from and is generated by a telematics device is referred to as a telematics device data record, as shown in Figure 6.

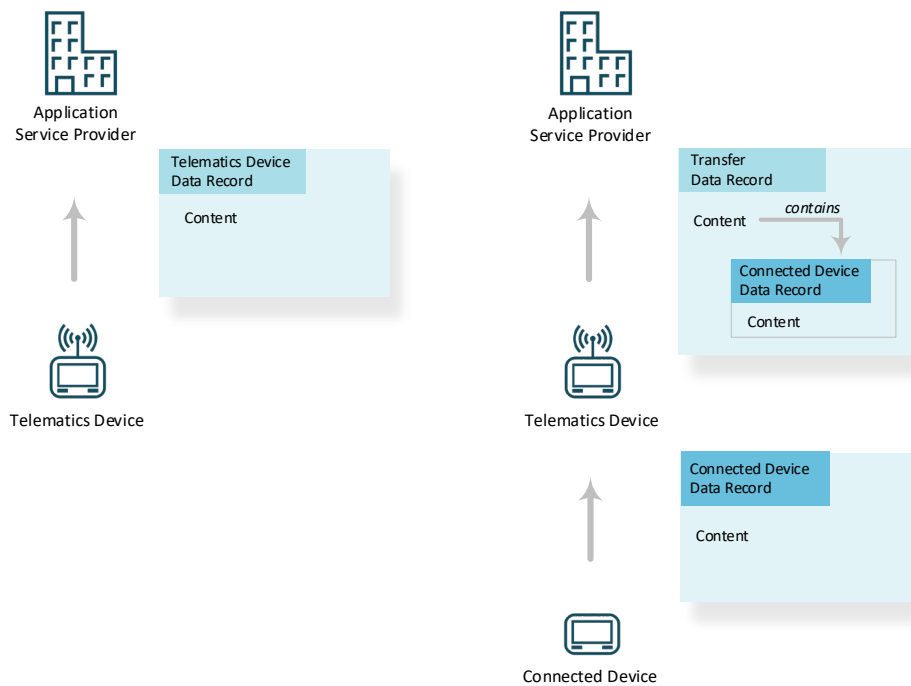
2.7.2 Any record generated by a connected device is called a connected device data record.

Note: For TMA, the connected device is assumed to be the OBM system.

2.7.3 A connected device data record is a record that originates from a connected device and is sent to the telematics device. The telematics device may contain this record within a data record, called a *transfer data record*, for transfer to the ASP back office.

Note: A transfer data record is a telematics device data record which contains content that originates from a connected device.

Figure 6: Data Record Structure and Terminology



- 2.7.4 Upon receipt of a connected device data record from a connected device, the telematics device generates and stores a transfer data record.
- 2.7.5 A transfer data record contains the connected device data record and supporting information from the telematics device.

2.8 Telematics Device Requirements and Data Record Collection

2.8.1 If vehicle configuration and mass data will be collected, this specification is predicated on the use of data records collected by a TCA-approved OBM system (e.g. mass configuration record, mass record). A TCA-approved OBM system must therefore be integrated into the processing environment by either:

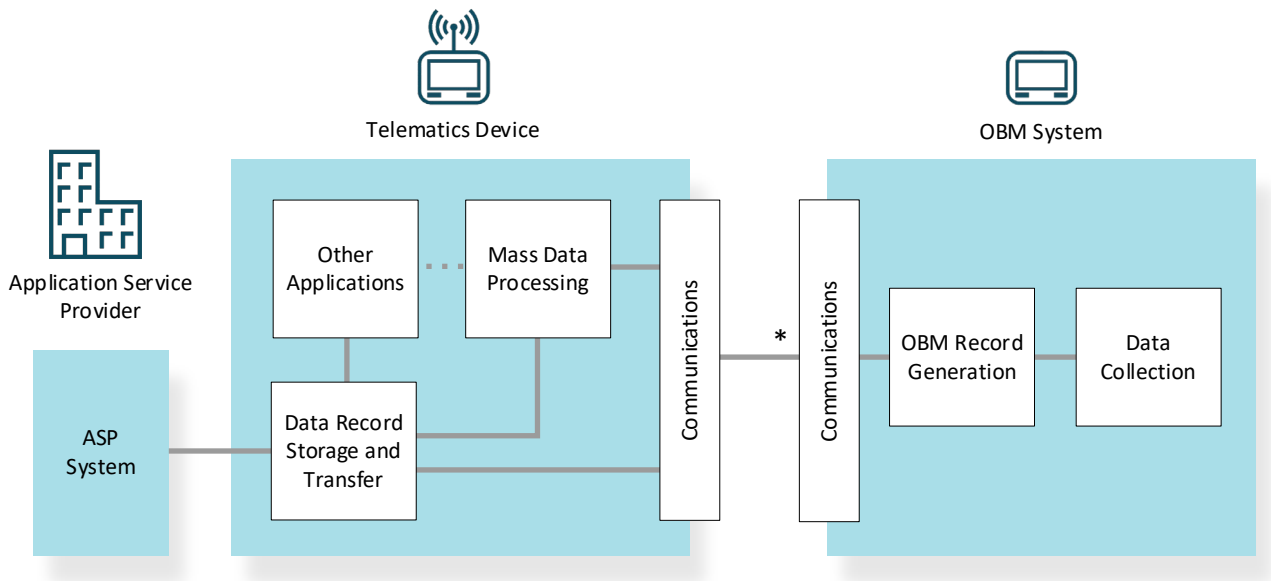
- being an OBM system Category C device that is integrated with the telematics device in a manner that complies with *Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification* (see Figure 7); or
- being an OBM system Category B device that is integrated with the telematics device in a manner agreed and implemented by the ASP and the supplier of the OBM system (see Figure 8).

Note: An OBM system Category B may depend on the telematics device performing certain functions, as shown in Figure 8.

Note: Figure 7 and Figure 8 are illustrative only, and do not imply system design or mandatory functional objects.

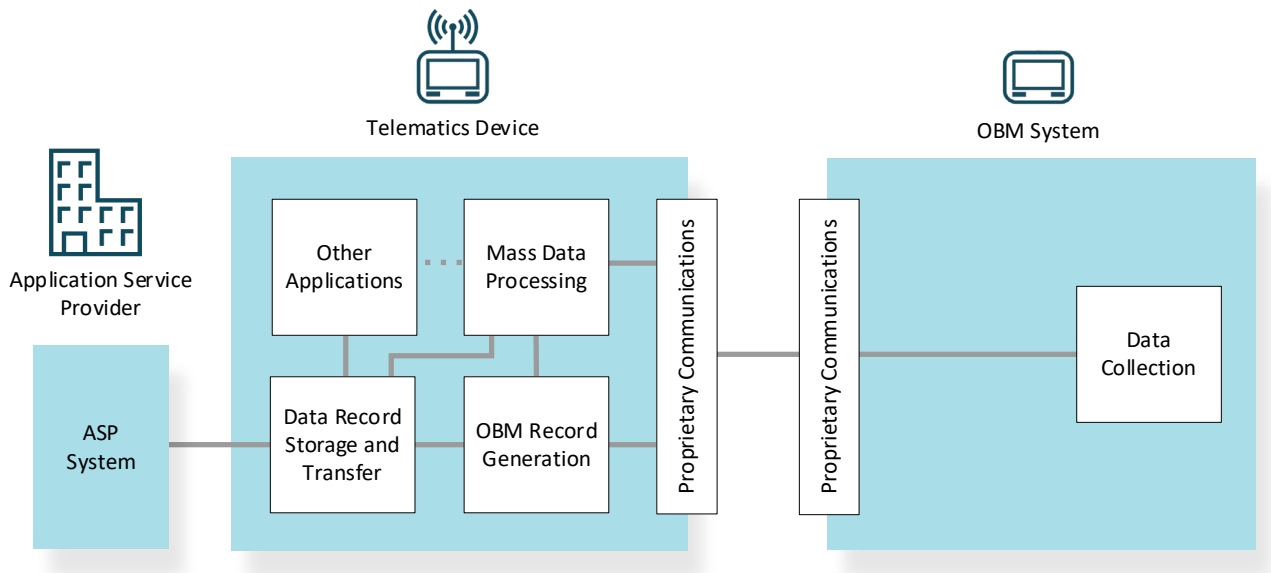
- 2.8.2 The telematics device monitors its connection with the OBM system and generates mass alarms for events that may indicate issues.
- 2.8.3 Data records resulting from the above requirements are transferred to the ASP back office and are then available for processing.

Figure 7: OBM System Category C Reference Model



* Standardised interconnectivity

Figure 8: OBM System Category B Reference Model



3 REFERENCES

3.1.1 Documents referenced in this specification are listed below:

- Transport Certification Australia (TCA) 2018. *National Telematics Framework – Levels of Assurance*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2018. *National Telematics Framework – Business Rules*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2020. *Telematics Device Functional and Technical Specification*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2018. *On-Board Mass System Functional and Technical Specification*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2019. *Telematics Business-to-Business Data Exchange Functional and Technical Specification*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2020. *Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2020. *National Telematics Framework – Vehicle Categories*. Transport Certification Australia. Melbourne.
- Transport Certification Australia (TCA) 2018. *Telematics Data Dictionary*. Transport Certification Australia. Melbourne.

4 REQUIREMENTS FOR TELEMATICS DEVICE APPROVAL

4.1 Overview

4.1.1 This section contains the functional requirements for the use of devices within TMA. The section consists of the following:

- Telematics Device

4.1.2 If required by the scheme, additional requirements for OBM system type approval are provided in Section 6.

4.2 Requirements

TELEMATICS DEVICE

A.1 Telematics Device

A.1.1 The ASP shall provide a telematics device that meets the requirements of the following:

- a. *Telematics Device Functional and Technical Specification*; Part A and Part B, or Part A and Part C; and
- b. any additional requirements in Part A of this specification.

Note:

- i) *Section C.2 of this specification contains additional requirements for a telematics device that are applicable only to an ASP that chooses to provide Part C features.*
- ii) *Section D.2 of this specification contains additional requirements for a telematics device that are applicable only to an ASP that chooses to provide Part D features.*

A.2 Position Records

A.2.1 The telematics device shall be configured to generate position records at a frequency of 30 seconds (+/- 0.2 seconds) while the vehicle is operation.

5 REQUIREMENTS FOR ASP

5.1 Overview

5.1.1 This section contains the shared requirements for the certification of an ASP to provide TMA application services. These requirements are divided into the following:

- ASP Certification;
- Telematics Device Installation, Operation and Maintenance;
- ASP System;
- Data Handling;
- Enrolment;
- Data Reporting;
- Enrolment Report;
- Data Exchange;
- ASP Quality System;
- ASP Performance System;
- ASP Audit and Review; and
- ASP Restriction on Post-Certification Change.

5.1.2 Additional requirements for vehicle configuration and mass are provided in Section 6. These requirements will apply only if required by the scheme.

5.1.3 Additional requirements for self-declaration data are provided in Section 7. These requirements will apply only if required by the scheme.

5.2 Philosophy

5.2.1 ASPs must be certified to provide TMA services. TCA is responsible for the assessment of applicants seeking certification and for granting certification where appropriate.

5.2.2 If an ASP meets requirements of optional features such as vehicle configuration and mass (Section 6) and/or self-declaration (Section 7), this will be recognised through the certification process.

5.2.3 Wherever possible, telematics applications have been designed to share components with other applications within the NTF. For an ASP already certified to provide services for other telematics applications, if the ASP was to apply for the provision of TMA services, their solution must comply with requirements as described in each of the corresponding specifications.

5.2.4 TMA services will only be provided by entities certified by TCA as an ASP.

5.3 Requirements

ASP CERTIFICATION

B.1 Certification of an ASP

B.1.1 Additional to the TCA approval of telematics devices (and where applicable, TCA approval of OBM systems), certification as an ASP for TMA is granted on the basis of TCA being satisfied as to the conformance with this specification's requirements in Sections B.1 to B.21 of the:

- a. ASP System, being the ASP's hardware and software (excluding telematics devices) used in the collection, processing, testing, storage and reporting of TMA data;
- b. ASP Performance System; and
- c. ASP Quality System being the ASP's systems and processes.

Note:

- i) *For additional optional certification requirements related to vehicle configuration and mass, see C.1.*
- ii) *For additional optional certification requirements related to self-declared data, see D.1.*

TELEMATICS DEVICE INSTALLATION, OPERATION AND MAINTENANCE

B.2 TCA-Approved Telematics Devices

B.2.1 The ASP shall provide to TCA a TCA-approved telematics device in accordance with the requirements of Part A of this specification.

Note: In the remainder of this section and in B.3 to B.4, the term 'telematics device' includes telematics devices, and key peripherals.

B.2.2 Any change to a TCA-approved telematics device shall be managed according to the applicable ASP change management process.

Note: The change management process may be monitored by TCA and will consider impacts to any application supported by a TCA-approved telematics device.

B.3 Installation, Operation and Maintenance of Telematics Devices

B.3.1 The ASP shall be responsible for installation, operation and maintenance of all telematics device hardware and software.

Note: The ASP will provide a Quality System that may include the Operator performing this function.

B.3.2 The ASP shall ensure that only suitably qualified and trained personnel are used for the installation, operation and maintenance of all installed TCA-approved telematics devices.

B.3.3 The ASP shall have a system in place for the programmed maintenance of its installed telematics devices to ensure that they are maintained in an operational state in accordance with this specification.

- B.3.4 If a telematics device does not function in accordance with this specification, the ASP shall:
- a. immediately liaise with the Operator and/or device supplier to commence to resolve the malfunction;
 - b. immediately report the malfunction (including an estimated resolution period) to TCA, using a mechanism provided by TCA;
 - c. complete the resolution process within 10 working days of becoming aware of the malfunction subject to the reasonable cooperation of the Operator;
 - d. ensure data records held by the telematics device are transferred to the ASP System for processing; and
 - e. notify TCA when the malfunction has been resolved, using a mechanism provided by TCA.
- B.3.5 The ASP shall immediately report to TCA, using a mechanism provided by TCA:
- a. evidence of any tampering or attempt at tampering with the device or any connection(s); and
 - b. any telematics device malfunction which appears to be the result of tampering or an attempt at tampering.
- B.3.6 The ASP shall not advise an Operator of any detection of tampering, or suspected tampering, with their telematics device(s).
- B.3.7 The ASP shall be responsible for monitoring the in-service health of its installed devices to determine whether telematics devices are performing correctly, reporting tampering or malfunctioning telematics devices in accordance with B.3.4.

Note: This responsibility includes a duty to perform data checking, communications and other indicators of device health as determined by the ASP.

B.4 Documentation

- B.4.1 For each telematics device, the ASP shall document all installation, operation, programmed maintenance and remediation-of-malfunction activity.
- B.4.2 The documentation referred to in B.4.1 shall be compiled by the ASP's installation, operation and maintenance personnel and shall:
- a. contain:
 - i) telematics device type and identifier;
 - ii) version numbers of the hardware and software;
 - iii) date and time of activity;
 - iv) identification of personnel responsible;
 - v) details of the activity including cause of malfunction and the remediation;
 - vi) personnel signatures; and
 - b. be available for auditing by TCA.
- B.4.3 The ASP shall maintain archives of the documentation described within B.4.1 and B.4.2 for a period of not less than 4 years.

ASP SYSTEM

B.5 ASP System

- B.5.1 The ASP System shall have sufficient transfer capability in its specified communication coverage area, and sufficient storage and processing capacity to support the number of telematics devices for which it has been certified.

Note: If resources used for this application are shared with vehicles that are not monitored under this application, this requirement will consider any adverse affects that may have on transfer capacity.

B.6 ASP System Maintenance and Continuity

- B.6.1 If the ASP System does not function in accordance with this specification the ASP shall:

- a. immediately commence to resolve the malfunction;
- b. immediately report the malfunction (including an estimated resolution period) to TCA; and
- c. complete the resolution process to the reasonable satisfaction of TCA.

Note:

- i) *The resolution of the malfunction may reasonably require the reprocessing of data.*
- ii) *See also B.22: Any remedy involving any change to the ASP System will require re-certification.*

- B.6.2 The ASP shall have sufficient equipment and resources available such that, if a component becomes inoperable, the ASP System can be returned to an operational state within 3 working days.

- B.6.3 The ASP shall document their plan for duplicating ASP System operations if a catastrophic situation occurs, including procedures for activating critical information systems in a new location and recovering critical information systems within a maximum period of 20 working days.

- B.6.4 The ASP shall immediately report to TCA:

- a. evidence of any tampering or attempt at tampering with the ASP System; and
- b. any ASP System malfunction which appears to be the result of tampering or an attempt at tampering.

- B.6.5 The ASP shall review its procedures for recovering its ASP System from failures partially or fully no less than once every calendar year.

Note: See also B.10.2.

- B.6.6 The ASP shall notify TCA of any planned ASP System outage at least 3 working days prior to the scheduled outage if:

- a. the planned outage affects communication with TCA and is more than 12 hours in duration; and/or
- b. the planned outage affects communication with its telematics devices and is more than 1 hour in duration.

Note: A planned outage is the advanced scheduling of an ASP System maintenance activity.

B.7 Documentation

- B.7.1 The ASP shall document all installation, programmed maintenance and remediation-of-malfunction activity for the ASP System, and shall maintain archives of the documentation for a period of not less than 4 years.

DATA HANDLING

B.8 Data Collection

- B.8.1 Communications between the telematics device and ASP System shall be designed such that:
- a. a form of secure and reliable data transfer is used;
 - b. the communication channel between the telematics device and ASP System is established and maintained at regular intervals;
 - c. transmission of data from the telematics device to the ASP System occurs at regular intervals; and
 - d. data transfer accounts for network interruptions (e.g. communications coverage).

B.9 Data Processing

- B.9.1 The ASP shall use data records only from devices managed by the ASP.
- B.9.2 The ASP shall document the communications protocols and associated handshaking for data transfers from the telematics device including confirmation of successful data receipt.
- B.9.3 The ASP shall collect position data using one of the following spatial reference system (SRS) datums:
- a. GDA94;
 - b. GDA2020; or
 - c. WGS84.

Note: Position data refers to any representation of latitude and longitude.

- B.9.4 The ASP shall provide the SRS datum used as part of the data packages sent to TCA (see B.14).

Note: If the ASP does not provide the SRS datum in the data packages sent to TCA, it will be assumed that GDA94 is being used.

- B.9.5 The ASP shall annotate each data record with the date time at which it was received by the ASP system.

B.10 Data Backup and Archiving

- B.10.1 The ASP shall document and have in place appropriate procedures for backup and archiving of applications and data, including testing of the procedures.
- B.10.2 The ASP shall maintain backups, for a minimum period of 12 months, of:
- a. all application data including enrolments and data records;
 - b. artefacts associated with transfer of data including data packages (or any of their components) and logs; and
 - c. all versions of telematics device software and ASP system application software that is currently approved and in use.

ENROLMENT

B.11 Enrolment

- B.11.1 The ASP shall manage the enrolment of the vehicle:
- a. in a scheme managed by the Authority; and
 - b. as a prerequisite to enrolment in the scheme, in the application.

Note:

- i) *Management of an enrolment includes collation and oversight of enrolment information, formal enrolment approval, and (as required) enrolment cancellation.*
- ii) *A scheme is a specific use of the application linked to delivering a policy objective of the Authority. Each enrolment of a vehicle in the application must specify a scheme. A vehicle enrolled within a scheme should meet the obligations of the scheme as stipulated by the Authority.*
- iii) *A vehicle may have multiple active enrolments. A vehicle may be enrolled in applications of different Authorities. For a single Authority, a vehicle may also be enrolled in multiple times in different applications and different schemes.*

- B.11.2 An ASP shall only proceed with enrolment of a vehicle where the application is one that it is approved to provide services for by TCA.

Note: Eligibility for enrolment rests upon the nature of the scheme.

B.12 Enrolment Form

- B.12.1 The ASP shall document the enrolment of a vehicle in an enrolment form as described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Section 4.6 and Appendix B, Enrolment Form Schema, and comprises:
- a. enrolment identifying information;
 - b. Part 1 – identifies scheme;
 - c. Part 2 – Operator details;
 - d. Part 3 – ASP and telematics device installation details; and
 - e. Part 4 – enrolment approval and cancellation information.

B.12.2 The ASP shall manage the enrolment in accordance with:

- a. the enrolment data exchange requirements defined in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*; and
- b. the data exchange requirements of the scheme.

Note:

- i) *The data exchange requirements for the enrolment form include notifying the Authority of updates to the enrolment form, for example when the enrolment is approved or cancelled.*
- ii) *The data exchange requirements for the enrolment form are in addition to the inclusion of the enrolment form within data packages (see B.14).*

B.12.3 If the ASP has at least one active enrolment for the vehicle detailed in Part 2 of the enrolment form, the ASP shall ensure that:

- a. the registration number, state and vehicle identification number (VIN) or non-VIN identifier (if no VIN is available) details for the vehicle are the same as those previously provided; and
- b. all required information in the enrolment form is provided.

Note: The vehicle may be associated with one or more Operators and one or more Authorities.

B.12.4 Noting B.12.3, if any such incompleteness or inconsistency, or implausibility of information is detected, the ASP shall not proceed with enrolment.

B.12.5 Prior to completing an enrolment, the ASP shall ensure that the telematics device and/or user interface (for entry of self-declared comments **and/or vehicle type/total combination mass [TCM]**) are installed and functioning correctly.

B.12.6 The ASP shall complete Parts 1, 2 and 3 of the enrolment form, including (after physical/visual identification of the VIN) the insertion of the VIN of the prime mover/rigid truck and trailer(s) (as necessary) into Part 3 of the enrolment form. If a VIN is unavailable the ASP shall provide a non-VIN identifier which is the chassis number, or if that is also unavailable, the engine number.

B.12.7 When the ASP enrolls a vehicle, the ASP shall ensure that the enrolment has a unique identifier.

Note: TCA will assign Authority and ASP-specific prefixes and number ranges to use in allocating enrolment identifiers.

B.12.8 The ASP shall be able to commence monitoring the vehicle in accordance with the enrolment no later than 1 working day after its formal approval date and time.

B.12.9 The ASP shall deactivate the enrolment within 1 working day of:

- a. the stated cessation date in accordance with the approved enrolment; or
- b. the enrolment being cancelled.

B.13 Enrolment Cancellation

B.13.1 As required, the ASP shall manage the cancellation of an enrolment.

Note: The transmission of requests for cancellation between an Operator, Authority and ASP are out of scope of this specification and are dependent on the rules of the applicable scheme(s). Communications between an ASP and Authority should occur via Tier 2 Data Exchange.

B.13.2 If the details contained in either Parts 1 or 2 of an enrolment change, the Operator will request cancellation of that enrolment and then proceed through the normal application process for the issuing of a new enrolment.

B.13.3 If the ASP changes any installed device details as documented in Part 3 of the enrolment form, then the ASP shall cancel the enrolment and replace it with a new enrolment.

Note: Any proposed change to the ASP's business details requires prior approval from TCA and re-certification (see B.22).

B.13.4 If an ASP replaces an enrolment (by way of cancellation and completing a new enrolment), it shall ensure that the identifier of the new enrolment is unique and reference the previous enrolment identifier.

DATA REPORTING

B.14 Data Reporting

B.14.1 The ASP shall support transmission of data packages to TCA as required by *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Part C.

Note: The transmission of data packages to TCA is to facilitate auditing of the application, and data analysis and reporting for monitoring applications.

B.14.2 The ASP shall include application data in the data package as required by *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Part C, for each enrolment that was active at any time during the data collection period.

Note:

- i) *Application data included within the data package comprises telematics device data records, enrolment forms and enrolment reports.*
- ii) *A data collection period is a whole number of days in the UTC time zone for which all application data is provided. Successive data collection periods are contiguous.*

B.14.3 The ASP shall implement a data collection period of one week or one calendar month.

Note:

- i) *Where data reporting occurs using the progressive transfer mechanism, the data collection period is nominal and data transfer to TCA will generally occur more frequently – for example, daily.*
- ii) *Some schemes of this application may be concerned with time-sensitive analysis of data, and therefore may only allow enrolment of vehicles where the ASP System supports either the progressive transfer mechanism or a data collection period of one week.*
- iii) *Monday is the first day of a weekly data collection period.*

- B.14.4 For a data collection period of one calendar month, data packages shall be provided within 7 days of the end of the data collection period.
- B.14.5 For a data collection period of one week, data packages shall be provided within 2 days of the end of the data collection period.

ENROLMENT REPORT

B.15 Enrolment Report

- B.15.1 The ASP shall issue Authority-specific enrolment reports monthly, and in a format as specified in *Telematics Business-to-Business Data Exchange Specification*, Appendix B, Enrolment Report Schema.

Note: A separate enrolment report is required for each application.

- B.15.2 The ASP shall generate an enrolment report for every Authority that is referenced in at least one active enrolment during the reporting period.
- B.15.3 The enrolment report shall include all vehicles which were monitored for an Authority at some time during the reporting period, which shall start and end based upon the Authority's local date and time (which may differ from that of the ASP).
- B.15.4 Each enrolment report shall be assigned a unique identifier.

Note: TCA will provide each ASP with a unique, three-character identifier which the ASP shall use as a prefix in the enrolment report identifier.

- B.15.5 An enrolment report shall contain a unique entry for each combination of:
 - a. vehicle identifier (by VIN or non-VIN identifier);
 - b. telematics device identifier; and
 - c. enrolment identifier.

- B.15.6 Within an enrolment report, each unique entry identified in accordance with B.15.5 shall comprise details of entry and exit date and time.

Note:

- i) *The entry date and time are only required if the enrolment was commenced during the reporting period.*
 - ii) *The exit date and time are only required if the enrolment was ceased or cancelled during the reporting period.*
 - iii) *If the ASP provides more than one application for an Authority, separate enrolment reports are produced for each application.*
- B.15.7 The enrolment report shall contain the time and date of generation of the report, which shall be based upon the ASP's local time.
- B.15.8 The enrolment report shall be formatted as per *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix B, Enrolment Report Schema.

DATA EXCHANGE

B.16 Tier 2 Data Exchange

- B.16.1 The ASP shall meet Tier 2 Data Exchange requirements as described in Part B of *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, and as follows:
- a. Tier 2 Data Exchange shall be supported using secure email, FTPS, registered mail and/or secure web portal according to requirements B.1–B.4 of *Telematics Business-to-Business Data Exchange Functional and Technical Specification*;
 - b. the Authorities and TCA will be responsible for the implementation of their Tier 2 Data Exchange requirements;
 - c. ASP requests for approval by TCA shall be submitted via Tier 2 Data Exchange, with supporting information appropriate for the approval request; and
 - d. any TCA response approving or rejecting a request for approval will be provided via Tier 2 Data Exchange. No verbal communication or representations will be binding.

B.17 Tier 3 Data Exchange

- B.17.1 The ASP shall meet Tier 3 Data Exchange requirements as described in Part C of *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, with included data records formatted in accordance with Appendix B of this specification.

Note: Tier 3 Data Exchange is used to support the transmission of data packages (see B.14).

ASP QUALITY SYSTEM

B.18 General

- B.18.1 The ASP shall have a Quality System that addresses the functions it uses to deliver this application, including at least:
- a. documentation of processes;
 - b. document control;
 - c. record control; and
 - d. configuration management.

B.19 Information Security

- B.19.1 The ASP shall implement a documented information security management system to protect the confidentiality, integrity and availability of its system.
- B.19.2 The ASP shall monitor and review the information security practices in general, against documented objectives and targets.
- B.19.3 The ASP shall report to TCA any breach or attack on its system within 1 working day of it being recognised.

ASP PERFORMANCE SYSTEM

B.20 ASP Performance System

- B.20.1 The ASP shall be responsible for monitoring the ongoing in-service performance of its Total System to determine whether it is performing correctly in accordance with this specification.

ASP AUDIT AND REVIEW

B.21 Telematics Device Audit

- B.21.1 Upon entering into the TCA–ASP Certification Agreement, the ASP shall provide to TCA devices used in the application as described in the applicable section of the device functional and technical specification.
- B.21.2 As and when applicable, upon re-certification by TCA, the ASP shall leave with TCA two samples of any changed hardware or software for the duration of the TCA–ASP Certification Agreement.

ASP RESTRICTION ON POST-CERTIFICATION CHANGE

B.22 ASP Restriction on Post-Certification Change

- B.22.1 Subsequent to certification as an ASP, the ASP shall not, without prior approval of TCA:
- a. make any change to its ASP System or ASP Performance System; and
 - b. make any material change to its Quality Systems, being systems and processes as described in this specification.
- B.22.2 The ASP shall use only the ASP System, ASP Performance System and ASP Quality System as certified, and no others.

6 REQUIREMENTS FOR ASP – REQUIREMENTS FOR VEHICLE CONFIGURATION AND MASS

6.1 Overview

6.1.1 This section contains the additional requirements for the certification of an ASP to provide TMA services if vehicle configuration and mass data are collected. The section is divided into the following:

- Certification of ASPs;
- Telematics Device;
- On-Board Mass (OBM) System;
- OBM System Operation and Change Management;
- Data Handling; and
- Enrolment.

6.2 Philosophy

6.2.1 ASPs must be certified to provide TMA services as described in 5.2.1.

6.2.2 If an ASP meets requirements of optional features such as vehicle configuration and mass (Section 6) and/or self-declaration (Section 7), this will be recognised through the certification process.

6.2.3 Wherever possible, telematics applications have been designed to share components with other applications within the NTF. For an ASP already certified to provide services for other telematics applications, if the ASP was to apply for the provision of TMA services, their solution must comply with requirements as described in each of the corresponding specifications.

6.2.4 TMA services that require monitoring of mass and configuration will only be provided by entities certified by TCA as an ASP.

6.2.5 The supplier of the OBM system will be responsible for installation, operation, maintenance, calibration and documentation activities related to TCA-approved OBM systems.

6.2.6 The supplier is responsible for the following, in accordance with TCA-approval of the OBM system.

- a. ensure that only suitably trained personnel are used for the installation, operation and maintenance of installed TCA-approved OBM systems;

Note: Suitably trained personnel may include:

- *persons nominated by the Operator; and*
- *documented as suitably trained personnel by the supplier;*

- b. for each OBM system, document all installation, operation, calibration, programmed maintenance and remediation-of-malfunction activity;

6.3 Requirements

ASP CERTIFICATION

C.1 Certification of an ASP

C.1.1 Additional to the TCA-approval of telematics devices and OBM systems, if the ASP intends to enrol vehicles in schemes which feature vehicle configuration and mass, certification as an ASP for TMA is granted on the basis of TCA being satisfied as to the conformance with this specification's requirements in Sections B.1 to B.21 and Sections C.1 to C.11 of the:

- a. ASP System, being the ASP's hardware and software (excluding telematics devices and OBM systems) used in the collection, processing, testing, storage and reporting of TMA data;
- b. ASP Performance System; and
- c. ASP Quality System being the ASP's systems and processes.

TELEMATICS DEVICE

C.2 Telematics Device

C.2.1 The telematics device shall:

- a. support connection of a TCA-approved Category C OBM system in accordance with the *Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification*; and/or
- b. support connection of a TCA-approved Category B OBM system (using the data collection and transfer mechanism agreed and implemented by the ASP and supplier of the OBM system).

Note: Subclauses (a) and (b) should provide functional equivalence with respect to the requirements of this specification. Connection to a Category B OBM system will be assessed on a per-system-type basis due to the proprietary nature of the connection.

C.3 Transfer Data Records

C.3.1 The telematics device and OBM system in combination shall generate the following data records in accordance with the *On-Board Mass System Functional and Technical Specification*:

- a. mass record (see C.4.1);
- b. mass configuration record; and
- c. mass quality record (refer to C.4.3); and
- d. mass alarm record.

Note:

- i) *A TCA-approved Category C OBM system will collect the above data records, and transfer them to the telematics device in accordance with Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification. A TCA-approved Category B OBM system will form the above data records jointly with the telematics device as defined by the ASP (see C.2.2).*

- ii) *Transfer data records are numbered from the main record numbering sequence.*

C.3.2 The telematics device shall generate and store a transfer data record for each connected device data record.

Note:

- i) *A transfer data record is a data record generated by the telematics device that contains a connected device data record (e.g. a data record generated by the OBM system).*
- ii) *A transfer data record is always generated for a connected device data record irrespective of the conditions under which that connected device data record was generated. For example, a transfer data record is generated for mass records collected every 5 minutes as required by this specification, but also for a mass record that was manually requested through the ECU.*

C.3.3 A transfer data record shall consist of at least the following data:

- a. date/time of generation (UTC time zone);
- b. the type of the connected device;
- c. the identifier of the connected device; and
- d. the connected device data record.

Note:

- i) *The date/time of generation are those assigned by the telematics device, and are separate to any date/time values within the connected device data record.*
- ii) *For clarity, a transfer data record is a type of telematics device data record, as shown in Figure 6.*
- iii) *Telematics device data records shall be numbered in accordance with Telematics Device Functional and Technical Specification.*

C.4 Connected Device Data Records

C.4.1 The telematics device and OBM system in combination shall support the periodic generation of mass records by the ECU at intervals of every 5 minutes.

C.4.2 The telematics device and the OBM system in combination shall generate mass configuration records in accordance with the conditions identified in Section A.20 of the *On-Board Mass System Functional and Technical Specification*.

C.4.3 The telematics device and OBM system in combination shall support the periodic generation of mass quality records by the ECU at intervals of not less than 6 hours as required by the application, with a default interval of 6 hours.

C.4.4 The telematics device and the OBM system in combination shall provide the capability to request generation of a mass quality record for each axle group where all the following apply:

- a. the vehicle is travelling at a stable speed above 60 km/h (i.e. does not accelerate or decelerate quickly); and
- b. at least 6 hours have elapsed since the last such mass quality record was generated.

Note:

- i) *The telematics device identifies the axle group it is requesting a mass quality record for using the axle group sequence number (refer to On-Board Mass Functional and Technical Specification).*
- ii) *The determination of the vehicle being travelling at stable speed about 60 km/h may be achieved within the telematics device, within the OBM system, or a combination of these.*

C.4.5 The telematics device and the OBM system in combination shall generate mass alarm records in accordance with the conditions identified in Section A.23 of the *On-Board Mass System Functional and Technical Specification*.

C.5 Data Storage and Transfer

C.5.1 In addition to the storage requirements of other functional and technical specifications, the telematics device shall be capable of storing 1,000 transfer data records formed in accordance with C.5.1.

ON-BOARD MASS (OBM) SYSTEM

C.6 OBM System

C.6.1 The ASP shall ensure that an OBM system is fitted that meets the requirements of the *On-Board Mass System Functional and Technical Specification* and C.7.2 of this specification as either:

- a. TCA-approved Category B OBM system with supporting telematics device functionality (see C.2.1); or
- b. TCA-approved Category C OBM system.

C.6.2 Subject to the approval of TCA, the ASP may utilise the telematics device in full or in part to meet the requirements of the ECU of the OBM system (see C.2.2).

OBM SYSTEM OPERATION AND CHANGE MANAGEMENT

C.7 TCA-Approved OBM Systems

C.7.1 Any change to a TCA-approved OBM system shall be managed according to the applicable ASP change management process.

Note:

- i) *The change will be submitted to TCA for approval by the ASP or the supplier of the TCA-approved OBM system. Either submitting party will communicate the change to the other before the change is submitted for approval.*
- ii) *The change management process may be monitored by TCA and will consider impacts to any application supported by a TCA-approved OBM system.*

C.8 Operation of OBM Systems

- C.8.1 If an OBM system does not function in accordance with this specification, the ASP shall perform malfunction resolution activities in accordance with B.3.4.
- C.8.2 The ASP shall immediately report to TCA evidence of tampering or attempt at tampering, using a mechanism provided by TCA, in accordance with B.3.5.
- C.8.3 The ASP shall not advise an Operator of any detection of tampering, or suspected tampering, with its OBM system(s), in accordance with B.3.6.
- C.8.4 The ASP shall be responsible for monitoring the in-service health of its installed OBM systems to determine whether OBM systems are performing correctly, reporting tampering or malfunctioning devices in accordance with B.3.4.

Note: This responsibility includes a duty to perform data checking, communications and other indicators of device health as determined by the ASP.

- C.8.5 The ASP shall provide to TCA via Tier 2 Data Exchange a record in an approved format of MSU installation that links the MSU ID and vehicle registration number.
- C.8.6 The ASP shall update the record in C.8.1 if either of the MSU ID or the vehicle registration number change.

DATA HANDLING

C.9 Data Backup and Archiving

- C.9.1 The ASP shall maintain backups for a minimum period of 12 months from the date received, of all versions of OBM system software.

ENROLMENT

C.10 Enrolment Form

- C.10.1 Prior to completing an enrolment that required monitoring of mass and configuration, the ASP shall ensure that the OBM system is installed and functioning correctly.

7 REQUIREMENTS FOR ASP – REQUIREMENTS FOR SELF-DECLARED DATA

7.1 Overview

7.1.1 This section contains the additional requirements for the certification of an ASP to provide TMA services if self-declared data is collected. The section is divided into the following:

- Certification of ASPs;
- Telematics Device; and
- Data Handling.

7.2 Philosophy

7.2.1 ASPs must be certified to provide TMA services as described in 5.2.1.

7.2.2 If an ASP meets requirements of optional features such as vehicle configuration and mass (Section 6) and/or self-declaration (Section 7), this will be recognised through the certification process.

7.2.3 Wherever possible, telematics applications have been designed to share components with other applications within the NTF. For an ASP already certified to provide services for other telematics applications, if the ASP was to apply for the provision of TMA services, their solution must comply with requirements as described in each of the corresponding specifications.

7.2.4 TMA services that require monitoring of self-declared data will only be provided by entities certified by TCA as an ASP.

7.3 Requirements

ASP CERTIFICATION

D.1 Certification of an ASP

D.1.1 Additional to the TCA approval of telematics devices, if the ASP intends to enrol vehicles in schemes which feature self-declared data via a user interface, certification as an ASP for TMA is granted on the basis of TCA being satisfied as to the conformance with this specification's requirements in Sections B.1 to B.21 and Sections D.1 to D.6 of the:

- a. ASP System, being the ASP's hardware and software (excluding telematics devices and OBM systems) used in the collection, processing, testing, storage and reporting of TMA data;
- b. ASP Performance System; and
- c. ASP Quality System being the ASP's systems and processes.

TELEMATICS DEVICE

D.2 User Interface

D.2.1 The telematics device shall include a user interface that permits entry and display of data, subject to the needs of the scheme.

D.2.2 The user interface may be external to the telematics device.

D.2.3 If the user interface is external to the telematics device then the combination of user interface and telematics device shall, to the extent appropriate to their combined functionality, meet the requirements of this specification applicable to the telematics device.

Note: Where functionality resides between devices; an external user interface of the telematics device that performs only user interface functionality may be excluded from certain requirements, such as environmental tests.

D.2.4 The telematics device shall accept input from the user interface.

Note: See also D.6.1.

D.2.5 Where the ASP elects to provide an alternative facility for the entry of self-declared (SD) data which involves a direct link between a user interface and the ASP System, the data shall be time-stamped by the user interface immediately upon entry.

D.2.6 It shall not be possible for the user interface to access or modify the data in the telematics device or the telematics device software that it is not permitted to access or modify.

D.3 Self-Declared Data

- D.3.1 The user interface shall provide for the selection, by the Operator and/or its nominated representative, of the following SD data types:
- a comment name from the predefined list of comment names (see D.3.2) followed by the optional entry of a free form comment text; and
 - a vehicle type from the predefined list of vehicle categories and number of axles (refer to D.3.13), followed by the optional entry of total combination mass (TCM) or the selection of 'No Load'.
- D.3.2 The user interface shall provide for the SD comments options as issued by TCA.
- D.3.3 The user interface shall have the capability of expanding the existing SD comments options (see D.3.2).
- D.3.4 The user interface shall have the capability to include additional SD data types as required by TCA, in accordance with Section D.3.
- D.3.5 TCA will be responsible for the supply of SD comments options to the ASP, including the supply of updated versions.
- D.3.6 The adoption of new versions of SD comments options shall be aligned with the NTM version number and NTM adoption dates.
- Note: Not all NTM versions will require an update and/or SD comments options.*
- D.3.7 SD comments options shall include:
- comment code; and
 - comment name.
- D.3.8 The ASP shall allocate a comment code to a self-declared comment name as issued by TCA.
- Note: See also D.3.11.*
- D.3.9 TCA will provide the updated version of SD comments options at least 4 weeks prior to the date when the update is required to be adopted by the ASPs.
- D.3.10 The ASP shall have procedures in place to receive and implement any updated versions of SD comments options.
- D.3.11 The ASP shall confirm to TCA 2 weeks prior to the date when the update is required to be adopted that the SD comments options can be loaded and used reliably.
- D.3.12 The adoption of an SD comments options revision shall be implemented such that after the date and time of that adoption SD comments options available for self-declaration match the adoption.
- Note: This requirement allows a reasonable timeframe for update of user interfaces to occur taking communications coverage into consideration.*
- D.3.13 The user interface shall provide for the SD vehicle type options as issued by TCA.
- D.3.14 The user interface shall have the capability of expanding the existing SD vehicle type options (refer to D.3.13).
- D.3.15 TCA will be responsible for the supply of SD vehicle type options to the ASP, including the supply of updated versions.

D.3.16 The adoption of new versions of SD vehicle type options shall be aligned with the National Telematics Map (NTM) version number and NTM adoption dates.

Note: Not all NTM versions will require an update and/or SD vehicle type options.

D.3.17 SD vehicle type options shall include:

- a. vehicle category code; and
- b. number of axles.

Note: The vehicle category of Prime Mover with 'N/A' number of axles refers to a prime mover/rigid truck with no trailer(s) connected.

D.3.18 The ASP shall allocate a vehicle category code to a self-declared vehicle category as issued by TCA.

D.3.19 The ASP shall allocate zero to the number of axles in the case that 'N/A' was self-declared.

D.3.20 The ASP shall allocate a vehicle load status (refer to Appendix B) of 'No Load' to a self-declared TCM of 'No Load'.

D.3.21 The user interface shall prompt for selection of SD vehicle type immediately after the user interface and/or ignition is turned on, and shall be repeated as a minimum once every 24 hours.

Note: The intention of the prompt is to assist the Operator and/or its nominated representative to meet any obligation they may have to self-declare data.

The ASP has discretion in the design of the user interface and may offer such features as the ability to simply confirm the previously entered vehicle type and/or TCM (rather than specifically entering data each time), or to customise the set of vehicle category/number of axles according to the needs of each Operator, etc.

D.3.22 TCA will provide the updated version of SD vehicle type options at least 4 weeks prior to the date when the update is required to be adopted by the ASPs.

D.3.23 The ASP shall have procedures in place to receive and implement any updated versions of SD vehicle type options.

D.3.24 The ASP shall confirm to TCA 2 weeks prior to the date when the update is required to be adopted that the SD vehicle type options can be loaded and used reliably.

D.3.25 The adoption of an SD vehicle type options revision shall be implemented such that after the date and time of that adoption SD vehicle type options available for self-declaration match the adoption.

Note: This requirement allows a reasonable timeframe for update of user interfaces to occur taking communications coverage into consideration.

D.4 Self-Declared Records

D.4.1 The telematics device shall collect SD data (see D.4.2).

D.4.2 The telematics device shall have the capability of receiving, confirming receipt of and storing SD data from a user interface connected to it.

D.4.3 The telematics device shall generate SD records from the SD data received.

D.4.4 An SD (comments) record shall consist of at least the following data:

- a. date/time of generation (UTC time zone);
- b. functional and technical specification version number;
- c. comment name; and
- d. comment text.

Note: It will be on the basis of the information in (d) that the ASP maps to the comment codes for subsequent reporting (in accordance with D.3.8).

D.4.5 An SD (vehicle type/TCM) record shall consist of at least the following data:

- a. date/time of generation (UTC time zone);
- b. functional and technical specification version number;
- c. vehicle category;
- d. number of axles; and
- e. total combination mass.

Note: It will be on the basis of the information in (c) that the ASP maps to the vehicle category codes for subsequent reporting (in accordance with D.3.8).

D.5 Data Storage and Transfer

D.5.1 The transmission of SD data from the user interface to the telematics device shall support a form of SD data authentication (i.e. some form of message authentication code only known and accessible to the ASP), subject to the approval of TCA, that can prove the origin and integrity of the SD data.

D.5.2 The ASP shall document, to the satisfaction of TCA, the SD data authentication mechanism.

DATA HANDLING

D.6 SD Data

D.6.1 The ASP may facilitate, as an alternative to entry of SD data into a user interface, the entry of SD data directly to the ASP System by the Operator, subject to the approval of TCA. Where this facility is applied, the ASP shall:

- a. only accept SD data entered into the ASP System up to 72 hours after the data entry time if such data entry has taken place by use of a user interface; and
- b. ensure that a full audit trail is maintained to facilitate verification of all SD data so entered by the Operator.

Note: An ASP may offer an Operator access to both facilities.

D.6.2 If the ASP elects to provide the alternative facility outlined in B.6.1, as a minimum the ASP shall provide:

- a. the data outlined in D.4.4; and
- b. a value for the date/time of generation (UTC time zone) which is representative of a data entry time if such data entry had taken place by use of a user interface.

Appendix A Acronyms and Definitions

Acronyms

Acronym	Definition
AGM	axle group mass
ASP	Application Service Provider
B2B	business-to-business
ECU	electronic control unit
FTPS	File Transfer Protocol Secure
GCM	gross combination mass
GDA2020	Geocentric Datum of Australia 2020
GDA94	Geocentric Datum of Australia 1994
GNSS	Global Navigation Satellite System
HDOP	horizontal dilution of precision
ICT	information and communications technology
MSU	mass sensor unit
NTF	National Telematics Framework
NTM	National Telematics Map
OBM	on-board mass
SD	self-declared
TCM	total combination mass
TMA	Telematics Monitoring Application
UTC	Coordinated Universal Time
VIN	vehicle identification number
WGS84	World Geodetic System 1984

Definitions

Term	Definition
applicant	A party which has applied for certification to provide telematics application services.
application	A capability of the NTF that provides business value to stakeholders, delivered as an assembly of policy, business components and technical components, within in the context of an identified level of assurance.
Application Service Provider (ASP)	A service provider that has been certified by TCA as meeting the requirements of one of more telematics applications.
approval mechanism	The mechanism by which TCA approves a device, such as a telematics device or connected device, for use in a telematics application. The approval mechanism used may be type-approval, or an equivalent approval mechanism acceptable to TCA.
Authority	An entity, associated with a Jurisdiction, responsible for the administration of one or more NTF applications. An Authority may appoint an administrator to perform its functions. <i>See also: Jurisdiction.</i> <i>Note: The functions associated with an Authority may involve a road authority or regulator, or both, as applicable to the scheme.</i>
axle group mass	The mass of an axle group as collected by a TCA-approved OBM system.
connected device	Any device or technology connected to a telematics device.
connected device data record	A record generated by a connected device.
data collection period	A whole number of days in the UTC time zone for which all application data is provided. Successive data collection periods are contiguous.
data package	A package of information sent via Tier 3 Data Exchange for a data collection period.
data record	A discrete and defined set of data elements generated by a device.
device	A telematics capability (i.e. telematics device or connected device), able to produce data records, that can exist independently or within the context of broader telematics solutions.
electronic control unit (ECU)	A component of a TCA-approved OBM system installed in a vehicle that collects, amongst other things, data from connected MSUs.
enrolment	Both the process and outcome by which an Operator enters an Authority's scheme. Each vehicle must be enrolled for each scheme it participates in. Enrolment also confirms the application and conditions (if applicable) that the vehicle is monitored under.
enrolment form	An electronic document that formally and simultaneously records the enrolment of a vehicle within a scheme, and within the application required by that scheme.

Term	Definition
enrolment report	A summary of enrolments relevant to a given Authority for a specified reporting period, including any aggregated data required by specific applications.
framing data	Supplementary information associated with transferred data for purposes that include identification and security.
Global Navigation Satellite System (GNSS)	Several networks of satellites that transmit high-frequency radio signals containing time and distance data that can be picked up by a receiver, allowing the user to identify the location of the receiver anywhere around the globe.
gross combination mass	The mass of a vehicle comprising the total of the axle group masses.
independent movement sensor	A sensor which detects movement of a vehicle independent of GNSS signal.
jurisdiction	A geographical area containing a road network (i.e. typically an Australian state or territory). <i>See also: Authority.</i>
last known configuration	The most recently established configuration, used in the context of processing mass configuration records.
level of assurance	An assurance level that supports telematics applications, structured around the intended use of a telematics application, risks being managed, and the needs and expectations of consumers and other stakeholders.
lift axle status	An indication of whether an axle group is fitted with a lift axle, and if so, whether that lift axle is raised, lowered or in an unknown position.
mass sensor unit (MSU)	A component of a TCA-approved OBM system installed on a vehicle that determines, amongst other things, axle group mass.
National Telematics Map (NTM)	The map used for the purposes of determining location.
OBM system category	A category of OBM system that is defined as follows: <ul style="list-style-type: none"> • Category A – OBM systems in this category electronically display collected data to drivers and/or loaders. • Category B – OBM systems in this category also collect data and transfer the collected data to a telematics device using a mechanism agreed and implemented by the ASP and supplier of the OBM system. • Category C – OBM systems in this category collect data and transfer data records in a standardised way to a telematics device (in accordance with <i>Interconnectivity of Telematics Device with Other Systems Functional and Technical Specification</i>).
operation (in)	A vehicle status when the telematics device's supporting external power supply is connected to the telematics device and the ignition status is ON.
Operator	An entity that operates one or more vehicles eligible to enter a scheme.

Term	Definition
Performance System	Equipment and/or processes used by the ASP to monitor the in-service performance of its Total System with respect to accuracy and integrity.
prime mover/rigid truck	That part of a vehicle which contains the power unit to which the telematics device is affixed.
Regulator	In the context of a scheme, an entity that provides regulatory and/or legislative context for the scheme, and may conduct compliance activities as applicable to the scheme.
self-declaration	The self-declaration of data by an Operator and/or its nominated representative to the ASP.
scheme	A specific use of the application linked to delivering a policy objective of the Authority. Each enrolment of a vehicle in the application must specify a scheme.
telematics device	The primary telematics unit which monitors parameters, which may include identity, time, location, speed, vehicle category or mass.
telematics device data record	A record that originates from and is generated by a telematics device.
Tier 1 Data Exchange	A web services solution where structured information is exchanged that complies with requirements such as authentication, security, privacy and certainty of delivery. It includes exchanges of information related to a vehicle's enrolment in telematics applications, conditions and adherence to those conditions.
Tier 2 Data Exchange	The human-initiated (rather than automated) exchange of business-related information and advice. Typical exchanges via this tier include reporting of issues and resolutions, correspondence regarding certification and re-certification, advice regarding information and communications technology (ICT), data assurance and other reporting.
Tier 3 Data Exchange	The packaging and delivery of data packages, comprising data records and enrolment-related artefacts. Data packages have several uses which include data analysis by the recipient, data assurance, and for research purposes.
Total System	The totality of the ASP's TCA-approved devices; its peripheral devices; its ASP System; its Performance System; and its Quality System, together with all incidental equipment and systems used by it in connection herewith.
transfer data record	A telematics device data record which contains a connected device data record.
vehicle category	A named business-level description of a prime mover/rigid truck and any trailers as defined by a vehicle category dataset approved for use by TCA. Example: 'Semi Trailer 6 Axle'.
vehicle configuration	A technical representation of the on-road footprint of the vehicle (that is, the number and configuration of trailers and axle groups), and is determined using data from the OBM system and data supplied by the ASP. It is typically captured with axle group pattern notation, for example '2-44/S444' for the vehicle category of Semi Trailer 6 Axle.
vehicle type	The vehicle category and number of axles.

Appendix B Data Records

Introduction

This appendix specifies the core data requirements that shall be supported by the ASP to facilitate Tier 3 data delivery.

Data reporting via Tier 3 Data Exchange shall be delivered in accordance with *Telematics Business-to-Business Data Exchange Functional and Technical Specification*.

Data Formats

Data formats for all data records defined across NTF applications are described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E.

The data record tables in this appendix provide a complementary set of data record tables that list:

- the data elements that are relevant to the application (with those not listed being considered not relevant); and
- whether elements that are relevant to the application are mandatory or optional.

Note: In the Use column of each data record table, 'Mandatory' denotes that the field must always be populated. 'Optional' denotes that the field must be populated if a valid measurement is available, but is otherwise left blank – for example, when position cannot be established.

The data record tables in this appendix and in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, must be used in combination during the software development process to ensure valid data records are generated.

Note: The telematics device ID is always associated with its telematics device data records via the structure of the data package.

JSON Schemas

The JSON schema that specifies JSON encoding for all data records defined across NTF applications is provided in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix C.

The JSON schema at the end of this appendix provides a complementary schema that reflects the information in the data record tables.

The JSON schemas in this appendix and in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix C, must be used in combination during the software development process to ensure valid data records are generated.

Alarm Record

An alarm record will only be expected if the ASP uses a telematics device approved by TCA for use at Level 3 Assurance.

Each alarm record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-1.

Table B-1: Alarm Record Fields

Name	Use
Record Date Time	Mandatory
Record Number	Optional
Alarm Code	Mandatory
Connected Device Type	Optional
Connected Device ID	Optional
Receipt Date Time	Mandatory

Position Record

Each position record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-2.

Table B-2: Position Record Fields

Name	Use
Record Date Time	Mandatory
Record Number	Optional
Latitude	Mandatory*
Longitude	Mandatory*
Speed	Optional
Direction of Travel	Optional
Satellite Count	Optional
Horizontal Dilution of Precision	Optional
Ignition Switch Status	Optional
Movement Sensor Status	Optional
Receipt Date Time	Mandatory

* Latitude and Longitude are optional only when there is no valid measurement of position, such as signal interruption in a tunnel. In this case, a record is created without a latitude or longitude measurement. If a measurement is available, it must be included in the record.

SD (Comments) Record

Each SD (comments) record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory fields as described in Table B-3.

Table B-3: SD (Comments) Record Fields

Name	Use
Record Date Time	Mandatory
Record Number	Optional
Version Number	Mandatory
Comment Code	Mandatory
Comment Name	Mandatory
Comment Text	Mandatory
Receipt Date Time	Mandatory

SD (Vehicle Type/TCM) Record

Each SD (comments) record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory fields as described in Table B-4.

Table B-4: SD (Vehicle Type/TCM) Record Fields

Name	Use
Record Date Time	Mandatory
Record Number	Optional
Version Number	Mandatory
Vehicle Category Code	Mandatory
Vehicle Category Name	Mandatory
Axle Count	Mandatory
Mass Status	Mandatory
Total Combination Mass	Optional
Receipt Date Time	Mandatory

The remaining data record formats in this section are only applicable if vehicle configuration and mass data is being collected.

Mass Record

Each mass record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-5.

Table B-5: Mass Record Fields

Name	Use
Record Version	Mandatory
Record Type	Mandatory
Record Date Time	Mandatory
ECU Record Number	Mandatory*
ECU ID	Mandatory
Gross Vehicle Mass	Mandatory
MSU Count	Mandatory
Mass Record MSU Sub-Record Container	

* ECU Record Number is mandatory only when an OBM system Category C is used. The data element is optional when an OBM system Category B is used.

Note: A mass record is transferred within a transfer data record.

Table B-5.1: Mass Record MSU Sub-Record Container Fields

Name	Use
MSU Sequence Number	Mandatory
MSU ID	Mandatory
Lift Axle Status	Mandatory
Axle Group Mass	Mandatory

Mass Configuration Record

Each mass configuration record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-6.

Table B-6: Mass Configuration Record Fields

Name	Use
Record Version	Mandatory
Record Type	Mandatory
Record Date Time	Mandatory
ECU Record Number	Mandatory*
ECU ID	Mandatory
MSU Count	Mandatory
Configuration Record MSU Sub-Record Container	

* ECU Record Number is mandatory only when an OBM system Category C is used. The data element is optional when an OBM system Category B is used.

Note: A mass configuration record is transferred within a transfer data record.

Table B-6.1: Mass Configuration Record MSU Sub-Record Container Fields

Name	Use
MSU Sequence Number	Mandatory
MSU ID	Mandatory

Mass Quality Record

Each mass quality record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-7.

Table B-7: Mass Quality Record Fields

Name	Use
Record Version	Mandatory
Record Type	Mandatory
Record Date Time	Mandatory
ECU Record Number	Mandatory*
ECU ID	Mandatory
MSU Count	Mandatory
MSU Sequence Number	Mandatory
MSU ID	Mandatory
Lift Axle Status	Mandatory
Frequency of Axle Group Mass Data	Mandatory
Number of Axle Group Mass Data	Mandatory
Axle Group Mass Data	Mandatory

* ECU Record Number is mandatory only when an OBM system Category C is used. The data element is optional when an OBM system Category B is used.

Note: A mass quality record is transferred within a transfer data record.

Mass Alarm Record

Each mass alarm record shall have the format described in *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix E, with mandatory and optional fields as described in Table B-8.

Table B-8: Mass Alarm Record Fields

Name	Use
Record Version	Mandatory
Record Type	Mandatory
Record Date Time	Mandatory
ECU Record Number	Mandatory*
ECU ID	Mandatory
Alarm Code	Mandatory
MSU Sequence Number	Optional
MSU ID	Optional

* ECU Record Number is mandatory only when an OBM system Category C is used. The data element is optional when an OBM system Category B is used.

Note: A mass alarm record is transferred within a transfer data record.

TMA Data Record JSON Schema

The TMA Data Record JSON schema presented below complements the Telematics Data Exchange JSON schema provided within *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix C.

This schema formally specifies which data elements defined within *Telematics Business-to-Business Data Exchange Functional and Technical Specification*, Appendix C, are relevant to TMA, and of those, which are mandatory.

```
{
  "$id": "http://www.tca.gov.au/schemas/tde/mass/data-record/2018-07",
  "$schema": "http://json-schema.org/draft-07/schema#",
  "title": "Telematics Data Exchange (TDE) - data record definitions for Telematics
    Monitoring Application (TMA)",

  "type" : "object",

  "oneOf": [
    {"$ref": "#/definitions/struct.data-record.set"},
    {"$ref": "#/definitions/struct.data-record.batch"}
  ],

  "definitions": {

    "struct.data-record" : {
      "if" : {
        "properties" : { "type" : { "const" : "POSITION" } }
      },
      "then" : {
        "patternProperties" : {
          "^(type|dateTime|number|receiptDateTime|position|direction|
            speed|satelliteCount|hdop|ignition|movementSensor)$" : {}
        },
        "required" : ["type", "dateTime", "receiptDateTime"],
        "additionalProperties" : false
      },
      "else" : { "if" : {
        "properties" : { "type" : { "const" : "ALARM" } }
      },
      "then" : {
        "patternProperties" : {
          "^(type|dateTime|number|receiptDateTime|code|connectedDevice)$" : {}
        },
        "required" : ["type", "dateTime", "receiptDateTime", "code"],
        "additionalProperties" : false
      },
      "else" : { "if" : {
        "properties" : { "type" : { "const" : "SD_COMMENT" } }
      },
      "then" : {
        "patternProperties" : {
          "^(type|dateTime|number|receiptDateTime|version|comment|commentName|
            commentText)$" : {}
        }
      },
    },
  },
}
```

```

    "required" : ["type", "dateTime", "receiptDateTime", "version", "comment",
        "commentName", "commentText"],
    "additionalProperties" : false
},
"else" : { "if" : {
    "properties" : { "type" : { "const" : "SD_TCM" } }
},
"then" : {
    "patternProperties" : {
        "^(type|dateTime|number|receiptDateTime|version|categoryCode|
            categoryName|axleCount|load|mass)$" : {}
    },
    "required" : ["type", "dateTime", "receiptDateTime", "version",
        "categoryCode", "categoryName", "axleCount", "load"],
    "additionalProperties" : false
},
"else" : { "if" : {
    "properties" : { "type" : { "const" : "TRANSFER" } }
},
"then" : {
    "patternProperties" : {
        "^(type|dateTime|number|receiptDateTime|connectedDevice)$" : {}
    },
    "properties" : {
        "connectedDeviceRecord" : {
            "type" : "object",
            "if" : {
                "properties" : { "type" : { "const" : "OBM_ALARM" } }
            },
            "then" : {
                "patternProperties" : {
                    "^(type|dateTime|number|deviceId|version|code|msuId|
                        msuSequence)$" : {}
                },
                "required" : ["type", "dateTime", "code"],
                "additionalProperties" : false
            },
            "else" : { "if" : {
                "properties" : { "type" : { "const" : "OBM_CONFIG" } }
            },
            "then" : {
                "patternProperties" : {
                    "^(type|dateTime|number|deviceId|version|msuCount|
                        msuRecords)$" : {}
                },
                "properties": {"msuRecords": {
                    "type": "array",
                    "items": {
                        "patternProperties": {"^(msuId|msuSequence)$": {}},
                        "required": [ "msuId", "msuSequence" ],
                        "additionalProperties": false
                    }
                }
            },
            "required" : ["type", "dateTime",
                "msuCount", "msuRecords"],
            "additionalProperties" : false
        },
    }
},

```

```

"else" : { "if" : {
  "properties" : { "type" : { "const" : "OBM_MASS" } }
},
"then" : {
  "patternProperties" : {
    "^(type|dateTime|number|deviceId|version|mass|msuCount|
    msuRecords)$" : {}
  },
  "properties": {"msuRecords": {
    "type": "array",
    "items": {
      "patternProperties": {
        "^( msuId|msuSequence|liftAxle|mass)$": {}
      },
      "required": [ "msuId", "msuSequence", "liftAxle", "mass"],
      "additionalProperties": false
    }
  }
},
"required" : ["type", "dateTime", "mass",
  "msuCount", "msuRecords"],
"additionalProperties" : false
},
"else" : { "if" : {
  "properties" : { "type" : { "const" : "OBM_QUALITY" } }
},
"then" : {
  "patternProperties" : {
    "^(type|dateTime|number|deviceId|version|msuCount|msuId|
    msuSequence|liftAxle|dataFrequency|dataCount|massData)$" : {}
  },
  "required" : ["type", "dateTime", "number", "deviceId",
    "msuCount", "msuId", "msuSequence", "liftAxle",
    "dataFrequency", "dataCount", "massData"],
    "additionalProperties" : false
  },
  "else" : {
    "description" : "",
    "properties" : {},
    "minProperties" : 1,
    "additionalProperties" : false
  }
} } } }
},
"required" : ["type", "dateTime", "receiptDateTime", "connectedDevice",
  "connectedDeviceRecord"],
"additionalProperties" : false
},
"else" : {
  "description" : "disallow any other types of data records",
  "properties" : {},
  "minProperties" : 1,
  "additionalProperties" : false
} } } } }
},

```

```
"struct.data-record.set" : {
  "type" : "object",
  "properties" : {
    "device" : {},
    "records" : {
      "type" : "array",
      "items" : {"$ref" : "#/definitions/struct.data-record"}
    }
  },
  "required" : ["device"]
},

"struct.data-record.batch" : {
  "type" : "object",
  "properties" : {
    "batchId" : {},
    "deviceRecords" : {
      "type" : "array",
      "items" : {"$ref" : "#/definitions/struct.data-record.set"}
    }
  },
  "required" : ["batchId" ]
}

}

}
```

TMA Data Record Batch Sample

The following is an example of a data record batch that contains one data record of each type supported by the application. Note that OBM system data records are contained within transfer data records.

```
{
  "tdeVersion" : "2.0",
  "device": {
    "id" : "1234"
  },
  "records" : [
    {
      "type" : "POSITION",
      "number" : 1234,
      "dateTime" : "2019-01-23T03:04:05Z",
      "position": {
        "latitude": -36.00001,
        "longitude":140
      },
      "direction" : 23.1,
      "satelliteCount" : 3,
      "hdop" : 23.5,
      "ignition" : "ON",
      "movementSensor" : "MOVEMENT",
      "receiptDateTime" : "2019-01-23T03:04:05Z"
    },
    {
      "type" : "SD_COMMENT",
      "number" : 1234,
      "dateTime" : "2019-01-23T03:04:05Z",
      "version" : "2.02/MAY19",
      "comment" : 14,
      "commentName" : "DETOUR",
      "commentText" : "Avoid road works",
      "receiptDateTime" : "2019-01-23T03:04:05Z"
    },
    {
      "type" : "SD_TCM",
      "number" : 1234,
      "dateTime" : "2019-01-23T03:04:05Z",
      "version" : "2.02/MAY19",
      "categoryCode" : 12,
      "categoryName" : "Example Truck Category",
      "axleCount" : 5,
      "load" : "LOAD",
      "mass" : 12.3,
      "receiptDateTime" : "2019-01-23T03:04:05Z"
    },
    {
      "type" : "TRANSFER",
      "number" : 1234,
      "dateTime" : "2019-01-23T03:04:05Z",
      "connectedDevice" : {
        "type" : "ECU",
        "id" : "ECU12341234"
      }
    }
  ]
}
```

```

"connectedDeviceRecord" : {
  "type" : "OBM_ALARM",
  "number" : 1234,
  "dateTime" : "2019-01-23T03:04:05Z",
  "version" : 1,
  "deviceId" : "ECU12341234",
  "code" : 4
},
"receiptDateTime" : "2019-01-23T03:04:05Z"
},
{
  "type" : "TRANSFER",
  "number" : 1234,
  "dateTime" : "2019-01-23T03:04:05Z",
  "connectedDevice" : {
    "type" : "ECU",
    "id" : "ECU12341234"
  },
  "connectedDeviceRecord" : {
    "type" : "OBM_CONFIG",
    "number" : 1234,
    "dateTime" : "2019-01-23T03:04:05Z",
    "version" : 1,
    "deviceId" : "ECU12341234",
    "msuCount" : 1,
    "msuRecords" : [{
      "msuId" : "MSU1234",
      "msuSequence" : 1
    }]
  },
  "receiptDateTime" : "2019-01-23T03:04:05Z"
},
{
  "type" : "TRANSFER",
  "number" : 1234,
  "dateTime" : "2019-01-23T03:04:05Z",
  "connectedDevice" : {
    "type" : "ECU",
    "id" : "ECU12341234"
  },
  "connectedDeviceRecord" : {
    "type" : "OBM_MASS",
    "number" : 1234,
    "dateTime" : "2019-01-23T03:04:05Z",
    "version" : 1,
    "deviceId" : "ECU12341234",
    "mass" : 2342,
    "msuCount" : 1,
    "msuRecords" : [{
      "msuId" : "MSU1234",
      "msuSequence" : 1,
      "liftAxle" : "RAISED",
      "mass" : 123
    }]
  },
},

```


Appendix C Alarm Codes

This appendix specifies the alarm codes that shall be used by the ASP to indicate the event that caused the alarm.

In Table C-1, alarm codes 40–45 are related to vehicle configuration and mass. They are only applicable if this data is collected by an OBM system. Although they are forwarded by the telematics device to the back office, they are not processed in accordance with requirements for alarm codes generated by the telematics device.

Alarm Codes

Each alarm record is identified by a corresponding code as provided in Table C-2.

Table C-2: Summary of Alarm Codes

Alarm Code	Description	Alarm Record Type
40	MSU is disconnected from the ECU while ECU in operation	*
41	MSU is reconnected to the ECU while ECU in operation	*
42	MSU is not communicating with the ECU as required by this specification	*
43	After the ECU comes into operation, all the vehicle's axle groups have an MSU connected to the ECU	*
44	After the ECU comes into operation, one or more of the vehicle's axle groups do not have an MSU connected to the ECU	*

*Alarm codes 40–44 report alarms generated by an OBM system connected to a telematics device, and are reported within a mass alarm record. Although they are forwarded by the telematics device to the back office, they are not reported as events.



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