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VOSA

Type Approval Testing for Portable and Garage Equipment Devices

TYPE APPROVAL CRITERIA SPECIFICATION

Version	8
Date	4th September 2009
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1 INTRODUCTION

1.1 BACKGROUND

The MOT computerisation project is a major project that has been carried out by Siemens on behalf of VOSA. The system is currently fully operational and is in a "Business as Usual" state.

In order to aid user efficiency, the system is being enhanced to support the use of bespoke Devices, which will enable a nominated tester carrying out a MOT test to enter data as the testing progresses or by trade personnel to access documents and data for reference purposes.

The Devices also enable the tester to upload the entered test data to the Vehicle Testing Station (VTS) Device and must implement the interface specified by the Technical Interface Definition Hand Held Devices Specification [2].

VOSA wish to limit their direct involvement in the type approval process for these Devices and consequently have placed a contract with Zircon Software Limited (ZSL) to carry out the Type Approval of any developed Devices. ZSL is to provide a point of initial contact to the developers of Devices and to carry out Type Approval Testing, prior to the Devices being marketed and sold.

ZSL is responsible for supporting the development of Devices by Device developers who have taken out a support contract with ZSL. The scope of the support is limited to the criteria defined in the Type Approval Criteria Specification [1] and the VTS Device Interface as defined by the Technical Interface Definition Hand Held Devices Specification [2].

Note: *The term Device is used to refer to any device that can be connected to the VTS Device that conforms to the Type Approval Criteria defined in the Type Approval Criteria Specification [1] and the Interface defined in [2]. Historically these devices have been called Hand-Held Devices (HHD) and Portable Devices, but such devices need not be physically hand-held or portable, which has resulted in the change of name.*

1.2 SCOPE OF THE DOCUMENT

The objective of this document is to define the Requirements that encapsulate the Business Requirements that are to be type approved for the Devices.
The Requirements defined in this document are intended to be atomic, i.e. a requirement that describes a single non-decomposable feature of the Device. This enables each criterion to be easily demonstrated and tested.

The Document also defines the levels of compliance that Devices may achieve. Each requirement is associated with the appropriate level(s) of compliance that it corresponds to.
The Document provides some guidelines for developers wishing to develop Devices. These guidelines are not intended to be mandatory, but should point the developer in the direction of a "good" solution. However, developers should feel free to ignore these guidelines where a "better" solution can be achieved.
All requirements defined in this document are testable unless otherwise stated.
If there are any discrepancies between this document and the Type Approval Test Specification [2], then these should be raised with the Type Approver.

Where any information is missing, contradicts or duplicated that defined by the Scheme Documentation [3], the Scheme Documentation is treated as definitive set of information.

1.3 GLOSSARY OF ABBREVIATIONS & TERMS USED

Advisory	Indicates a specific condition on the vehicle that, although insufficient to constitute a MOT failure, should be brought to the attention of the vehicle owner.
HHD	Hand Held Device – refers to any device that can connect to the VTS Device, which need not necessarily be a device that can be held in the hand. Also referred to as a Portable Device.
Garage Equipment	Equipment that is capable of interfacing with the VTS Device or any equipment that is interfaced from a Portable Device that provides data input to the Interface.
PRS	Passed after Rectification at the Station – If a fault is found that can be fixed, it may be repaired during the test and recorded as a PRS. Not all faults may be handled in this way.
RfR	Reason for Rejection – Identifies a specific condition on the vehicle that constitutes a MOT failure.

VOSA	Vehicle and Operator Services Agency
VSI	Vehicle Specific Information
VTS	Vehicle Testing Station
ZSL	Zircon Software Limited

1.4 DOCUMENT REFERENCES

No.	Document Title	Reference	Date	Issue
1	Technical Interface Definition – Hand Held Devices	HandHeld Interface Definition Version 8.0 Developers Copy.doc	09/01/09	8
2	Type Approval Test Specification	Type Approval Test Specification.doc	09/03/09	5
3	Scheme Documents **[TBC]**	TBC	TBC	TBC
4	Type Approval Process Specification	Type Approval Process Specification.doc	09/03/09	2

2 COMPLIANCE LEVELS

2.1 INTRODUCTION

This section defines the different compliance levels that a developer can choose from in order to develop a Device and gain approval for via the Type Approval Process.

There are 2 compliance levels that apply to Devices:

- Testing
- Reference

2.2 TESTING DEVICE

A Device that is aimed at achieving the Testing compliance level should be fully compliant with the Technical Interface Definition Hand Held Devices Specification [1].

The Device need not provide full coverage of all of the criteria detailed in this document. It is for the Developer to decide which Criteria are relevant for their Device. Criteria that are not implemented should be defined in the developers scope document. (See the Type Approval Process Specification [4] for more information on the scope document)

For example:

If the Device is only populating Roller Brake Results then the Criteria relating to RfR management would not be applicable. Further the Criteria relating to Roller Brake Result validation would be applicable.
However if the Device is a Portable Device then **all** of the Criteria would be relevant.

2.3 REFERENCE DEVICE

A Device that is aimed at achieving the Reference compliance level should be compliant with the functions of the Technical Interface Definition Hand Held Devices Specification [1] as defined in the VTS Device Interface section (section 3.2) of this document and should meet all of the Reference requirements defined in the rest of the Requirements section of this document. Such a Device should not be capable of uploading data to or downloading vehicle details from the VTS Device.

3 REQUIREMENTS

3.1 INTRODUCTION

This section defines the Requirements for the Devices. The Requirements are addressed for the following different aspects of the Device:

- Interface Requirements (not covered by the Interface Specification [1]);
- Documentation that is downloaded by the Device;
- Vehicle Identification Information;
- Inspection Item Display and Result Selection;
- Test Results uploaded to the VTS Device;
- Error Handling;
- User Support and Updates;
- Security.

Each section addresses the requirements that apply to both compliance levels; to the Testing level; and to the Reference level in separate subsections. Italic text is used to indicate supplementary information that does not specifically define a requirement, but that is included to aid understanding of the criterion it is associated with.

3.2 VTS DEVICE INTERFACE

The Device interfaces with the VTS Device in order to obtain documents and data that are used during testing and to upload test results if appropriate. The number of functions provided by the Interface that are supported by the Device depends on the Level of Compliance of the Device.

3.2.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.2.1.1	In the event that the Device loses connectivity to the VTS Device part way through receiving data from it, the Device shall discard any data downloaded. *In this case the VTS Device will need to be prompted by the Device to resend the data when the connection is re-established. This facility may be manual or automatic.*	Yes	Yes
3.2.1.2	The Device shall provide a Hardware Serial Number, which corresponds to the hardware that it is installed on or the particular instance of the Device, to the VTS Device (as specified in the Interface Specification [1]).	Yes	Yes

Id	Requirement	Reference	Testing
	The Hardware Serial Number will be useful for diagnosis of faults occurring on a particular generation of a Device or an individual Device.		
3.2.1.3	The Device shall provide a Software Version Number to the VTS Device (as specified in the Interface Specification [1]) that corresponds to the current version of the Device Software used to communicate with the VTS Device.	Yes	Yes
3.2.1.4	The Device shall only implement the following functions of the interface with the VTS Device defined by the Technical Interface Definition Hand Held Devices Specification [1]: Check Status	Yes	No
3.2.1.5	The Device shall not provide any test results to the VTS Device via the Upload Test Results function of the Interface with the VTS Device.	Yes	No
3.2.1.6	The Device shall not request Vehicle Details from the VTS Device via the Get Vehicle Details function of the Interface with the VTS Device.	Yes	No
3.2.1.7	The Device shall implement all aspects of the interface with the VTS Device defined by the Technical Interface Definition Hand Held Devices Specification [1].	No	Yes
3.2.1.8	In the event that the Device loses connectivity to the VTS Device part way through sending data to it, the Device shall cease attempting to send data to the VTS Device until the connection is re-established. *In this case the VTS Device will discard any transferred data and either the user will be expected to reinitiate the transfer of test results once the connection has been re-established or the Device will automatically attempt to resend (depending on the implementation).*	Yes	Yes
3.2.1.9	In the event that the Device loses connectivity to the VTS Device part way through sending data to it, the Device shall report a meaningful error to the user.	Yes	Yes

3.3 DOWNLOADED DOCUMENTATION

Testing and Reference Devices are expected to be capable of downloading the latest set of MOT Data and Documentation, referred to as configuration items, as part of the synchronisation process described in the Technical Interface Definition Hand Held Devices Specification [1]. Both types of Devices should also be capable of storing and displaying the MOT Data and Documentation to the user.

The following configuration items will be synchronised with the Device:

- MOT Manuals configuration item, consisting of:
  - MOT Manuals
  - MOT Testing Guide
  - Special Notices

Note: *The MOT Testing Guide is available for display by the Devices. However, its display is not mandated and consequently its download is not mandated.*

- RfR configuration item, consisting of:
  - Reasons for Refusal (RfRs)
  - Component (Inspection Item) Hierarchy

It is anticipated that some Device Developers may wish to develop devices for particular classes of vehicle, e.g. Motorcycles only. However the Device should support the download of all documentation for all vehicle classes that are supported by the VTS Device and make available the documents corresponding to the vehicle class that the Device supports. If the Device does not report the correct version number for configuration items, then the checking carried out by the VTS Device on the synchronisation state of the Device will fail and consequently will not allow the upload of test results.

The following Requirements are specified in relation to the download and display of Device Documentation (the details of the synchronisation process are dealt with by the Technical Interface Definition Hand Held Devices Specification [1]):

3.3.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.3.1.1	The Device shall provide a facility for the User to view the latest version of the Inspection Manual(s) for the class(es) of vehicle that the Device supports. *It is worth noting that the Inspection Manual for a given class may also include information for other classes.*	Yes	Yes
3.3.1.2	The Device shall provide a facility for the User to view the latest version of the Special Notices.	Yes	Yes
3.3.1.3	The Device shall provide a facility for the User to view the latest version of the RfRs for the class(es) of vehicle that the Device supports.	Yes	Yes
3.3.1.4	The Device shall provide feedback to the User to indicate that the Device is downloading Device configuration items.	Yes	Yes
3.3.1.5	The Device shall provide a facility for the User to view the version number of all downloaded configuration items at any time.	Yes	Yes

3.4 VEHICLE IDENTIFICATION INFORMATION

Vehicle identification information is entered into the VTS Device by the Tester and is then downloaded to the Device as part of the Interface Standard defined by the Technical Interface Definition Hand Held Devices Specification [1].

In this section the term Vehicle Identification Details is used to describe the following items of vehicle data:

- Vehicle Registration Mark (VRM);
- Test Number.

The downloaded information also includes the MOT Checklist appropriate to the vehicle under test.

3.4.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.4.1.1	It shall be possible for the Device to display vehicle identification details to the user at all times during the MOT test.	No	Yes
3.4.1.2	The Device shall provide a facility for the User to view downloaded VSI data (as specified by the Technical Interface Definition Hand Held Devices Specification [1]) for the class(es) of vehicle under test that the Device supports.	No	Yes
3.4.1.3	The Device shall prevent the User from changing any vehicle identification details downloaded to the Device that are not contained in the xsd schema for the Upload Test Results VTS Device service.	No	Yes
3.4.1.4	The Device shall enable the User to change any vehicle identification details downloaded to the Device that are contained in the xsd schema for the Upload Test Results VTS Device service.	No	Yes
3.4.1.5	The Device shall prevent the User from changing the Vehicle Registration Mark (VRM) and Test Number.	No	Yes
3.4.1.6	The Device shall use the Brake Weight data received as part of the VehicleDetails to initialise any controls that enable the user to change the Brake Weight and Brake Weight Source.	No	Yes

3.5 INSPECTION ITEMS

During the test each component that is tested is referred to as an Inspection Item. All Inspection Items can be failed. Where a failure is detected for an Inspection Item a reason for refusal (RfR) must be associated with that item. RfRs can also be supplemented with a dangerous condition indicator that is used to indicate that the vehicle should not be driven away from the Test Centre following the MOT Test.

Some Inspection Items may have advisories associated with them. An advisory is something that does not constitute a failure, but that should be brought to the attention of the vehicle owner. There are 2 different kinds of advisory:

- RfR
- Non-component

Where a failure can be legitimately fixed as part of the test an indication is used that shows that the Inspection Item was "Passed after Rectification at Station" (PRS). A PRS is used to indicate that something that would have constituted an RfR was fixed as part of the test.

The Testing Devices will fully support the display and selection of RfR data. The Reference Devices will provide facilities for the display of RfRs to the User and will enable the user to jump to appropriate places within the Inspection Manual for an identified component that an RfR could apply to. However, the Reference Device will not be expected to record user entered RfR information.

The following sections detail all the requirements relating to RfR entry on a Device during testing:

3.5.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.5.1.1	The Device shall, for any RfR, associate a corresponding context sensitive link to the Inspection Manual at any point during testing at which the component can be selected.	Yes	Yes
3.5.1.2	The Device shall enable the User to enter one or more RfRs (indicating a failure) for each component. *The same RfR may be selected more than once. For instance more than one tyre could have low tread.*	No	Yes
3.5.1.3	The Device shall enable the User to link an RfR to a dangerous condition indicator.	No	Yes
3.5.1.4	The Device shall enable the User to enter one or more PRS for each component, as indicated by the Interface Specification [1].	No	Yes

Id	Requirement	Reference	Testing
3.5.1.5	The Device shall enable the User to associate one or more advisory with each component that can have an associated advisory, as indicated by the Interface Specification [1]. *The data received from the VTS Device determines whether an advisory can be associated with a given component, refer to the Interface Specification [1].*	No	Yes
3.5.1.6	The Device shall prevent the selection of RfRs that are not applicable to the Vehicle Class for the Vehicle currently under test.	No	Yes
3.5.1.7	The Device shall enable the User to enter free text for a non-component advisory. *For the number of characters refer to the Interface Specification [1].*	No	Yes
3.5.1.8	The Device shall only enable the User to select text from a fixed list (as defined by the RfR data received from the VTS Device) for a RfR advisory.	No	Yes
3.5.1.9	The Device shall ensure that location information is specified for RfRs and component related advisories that require location to be defined. *The RfR data passed to the Device as defined by the Interface Specification [1] will specify the RfRs that require a location to be specified. For example an RfR indicating a missing steering wheel needs no location qualification, whereas a bald tyre would require location information to qualify which tyre is being failed.*	No	Yes
3.5.1.10	The Device shall enable the user to enter free text preceeding the fixed location information in order to make the location information more accurate or to specify locations that are not covered by the fixed values for longitudinal, lateral and vertical positions.	No	Yes
3.5.1.11	The Device shall provide fixed values for longitudinal position that correspond to those defined by the Interface Specification [1].	No	Yes
3.5.1.12	The Device shall provide fixed values for lateral position that correspond to those defined by the Interface Specification [1].	No	Yes
3.5.1.13	The Device shall provide fixed values for vertical position that correspond to those	No	Yes

Id	Requirement	Reference	Testing
	defined by Interface Specification [1].		
3.5.1.14	The Device shall enable a set containing a maximum of 99 RfR, PRS and RfR advisories to be uploaded to the VTS Device.	No	Yes
3.5.1.15	The Device shall enable a set containing a maximum of 99 non-component advisories to be uploaded to the VTS Device.	No	Yes

3.6 TEST RESULTS

The Testing Devices will be capable of uploading test results recorded during a MOT test to the VTS Device.
The Testing Devices will provide facilities for the user to enter test results. Such Devices are expected to validate any entered brake data according to rules defined by section 5.
This section defines Requirements related to the validation and upload of Test Results:

3.6.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.6.1.1	The Device shall ensure that only one test is extant on the device at any one point in time.	No	Yes
3.6.1.2	The Device shall be capable of downloading results multiple times to the VTS Device for an individual MOT test. *This will enable the tester to correct errors made whilst recording the MOT test results on the Device.*	No	Yes
3.6.1.3	The Device shall validate Brake Test Data according to the rules defined by section 5.	No	Yes
3.6.1.4	Failures in validation of data shall not preclude the Device from uploading the results to the VTS Device. *The validation performed by the Device will be a simplified version of the validation performed by the VTS Device. Hence there may be discrepancies between the validation performed by the Device and the VTS Device that should ultimately be decided by the VTS Device. The rules for the validation are defined in section 5.*	No	Yes
3.6.1.5	The Device shall populate non-brake Test Result data according to the rules defined by section 6.	No	Yes

3.7 ERROR HANDLING

The Requirements contained in this section are related to the handling of errors that occur during use of the Devices.
Errors from the following different sources should be displayed to the user:

- Errors reported by the VTS Device
- Errors detected by the Device

3.7.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.7.1.1	The Device shall handle any conditions relating to user error that arise on the Device during use, without the software or hardware needing to be manually restarted.	Yes	Yes
3.7.1.2	The Device shall report all errors to the user in an understandable way.	Yes	Yes
3.7.1.3	The Device shall ensure that errors reported by the VTS Device are handled gracefully without interruption of the operation of the Device.	Yes	Yes

3.8 USER SUPPORT AND UPDATES

The Device Developers are required to provide the following support facilities for users of the Devices:

- Printed User Manual
- Online Help
- Support Telephone Number
- Support Email Address

Note: *Online Help is used to mean help that is provided on the Device itself (not via an internet connection).*

The Devices are required to provide facilities for software updates. The Devices will be capable of being updated in a straightforward and prompt manner. The method of applying updates is not mandated, but should involve a minimal amount of user interaction.

3.8.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.8.1.1	The Device shall be packaged with a printed User Manual.	Yes	Yes
3.8.1.2	The Device shall provide a help facility that enables the user to access help whilst using the Device.	Yes	Yes
3.8.1.3	The User Manual for the Device shall contain contact details consisting of an email address and telephone number for the purposes of end-user support.	Yes	Yes
3.8.1.4	The Device shall provide contact details consisting of an email address and telephone number for the purposes of end-user support.	Yes	Yes

Id	Requirement	Reference	Testing
3.8.1.5	In the event of a problem, that requires assistance in order to be resolved, being detected by the Device, the Device shall display support contact details (consisting of an email address and telephone number).	Yes	Yes
3.8.1.6	It shall be possible to deliver and apply software updates to the Device within a period of 30 minutes.	Yes	Yes
3.8.1.7	Any Device documentation shall include statements produced by VOSA in respect of the scope of data validation provided by the Device.	No	Yes
3.8.1.8	The developer shall provide a minimum support level that must be provided that comprises: A telephone number that can be called for support during specified office hours. An email address that can be used for support with a specified maximum response time. *It will not be permissible for the product to be supplied without support.* *This requirement will not be explicitly testable during the Type Approval Test. However, the Type Approver reserves the right to withdraw Type Approval immediately should the developer fail to subsequently meet this requirement.*		

3.9 USER INTERACTION

The way in which a user interacts with a Device does not affect interface compatibility. However, it is important that the Device does not make or influence decisions that the Nominated Tester will make during the course of an MOT test.

3.9.1 Requirements

The following table identifies the Requirements and what compliance level they are appropriate for:

Id	Requirement	Reference	Testing
3.9.1.1	The Device shall not influence decisions or make decisions that should be made by the Nominated Tester. HHD developers may infer certain MOT testing requirements from the information in the Criteria Spec and related documents, but any such inference should not	Yes	Yes

Id	Requirement	Reference	Testing
	be presented to the HHD user as though it were something to do with MOT standards.		

4 TIPS AND GUIDELINES FOR DEVELOPERS

4.1 INTRODUCTION

This section provides some guidance for Developers of Devices. The information in this section should not be read as mandatory requirements on Device development, but should be interpreted as advice for Developers wishing to develop a "good" Device.

4.2 AUTOMATIC STATUS CHECK AND UPDATE

The Device is required to check the status of configuration items at the start of each day. It is recommended that the Device will provide an automatic facility for the checking of the configuration item status and then subsequently retrieving any configuration items that require an update.

4.3 SOFTWARE UPDATES

The Device is required to provide facilities for software updates. It is recommended that such updates should be automatically applied to the Device via an Internet Connection. Automating the update procedure will detach any user responsibility for applying updates, as the user may not have sufficient technical skill to carry out such an update. While the update is in progress it is anticipated that the Device will display a suitable indication to the User and will prevent the user from initiating any functionality on the device.

4.4 COMPONENT HIERARCHY

The Component Hierarchy is downloaded from the VTS Device to the Device as part of the synchronisation data.
The Component Hierarchy defines Inspection Items in terms of logical groupings related to physical parts of the vehicles that are subject to MOT tests. RfRs are associated with each Inspection Item at the bottom of the hierarchy tree.
If the Component Hierarchy is used to build up a string to represent the RfR on the Device then it is suggested that the string should be built up using the following formula:

= location data + inspection item description + RfR description

e.g. where location data is "left front", inspection item description is "tyre" and RfR description is "has had the tread recut".

= left front tyre has had the tread recut

4.5 VEHICLE CLASS ASSOCIATION

It is recommended that if the developer is developing a Device that only supports specific classes that the Device also supports classes that are closely associated with the supported class. The following classes go with one another:

- I and II;
- IV and IVA;
- V and VA.

4.6 NON-COMPONENT ADVISORIES

It is recommended that a Device with a facility for entering non-component advisories should provide a list of the most commonly used advisories that the user can select from. This facility would sit alongside a generic facility for entering free text for the non-component advisories.
The following table gives an example list of the most commonly used non-component advisories:

Commonly Used Non-component Advisory
Nail in nearside front tyre
Nail in nearside rear tyre
Nail in offside front tyre
Nail in offside rear tyre
Nail in front tyre
Nail in rear tyre
Spare tyre defective
Child seat fitted not allowing full inspection of adult belt
Seat belt pre-tensioner has been activated
Electrical wiring damaged/contaminated
Fuel pipe/s corroded
Headlamp main beamp warning lamp not working
Engine/gearbox mounting(s) defective
Propshaft component defective
Battery insecure
Coolant leak
Non obligatory mirror damaged
Headlamp masks/converters fitted
No lights fitted at time of test
Oil leak
Temporary fuel cap fitted
Front bumper insecure

Read bumper insecure
Nearside outer track rod end joint cover split/missing
Nearside inner track rod end joint cover split/missing
Offside outer track rod end joint cover split/missing
Offside inner track rod end joint cover split/missing
Suspension joint nearside upper dust cover split/missing
Suspension joint nearside lower dust cover split/missing
Suspension joint offside upper dust cover split/missing
Suspension joint offside lower dust cover split/missing
Rear mudguard missing
Chain guard missing

4.7 ERROR HANDLING

Errors should be handled generically without any interpretation. The list of errors defined by the Interface Specification [2] is not an exhaustive list and the codes and errors generated are subject to change. However, the way in which the errors are generated is generic and as such the Device should report the Error Data as received from the VTS Device.

4.7.1 Service Name

When an error is reported that corresponds to XML that cannot be parsed by the VTS Device, the service name given in the response will either be Unknown or the service name corresponding to the requested URI as defined by the Interface Specification [2], as each request should be requested from a different URI.

5 BRAKE TEST VALIDATION

5.1 INTRODUCTION

This section contains the rules for validating brake data that should be used by Device Developers. The rules are presented in a tabular format.

5.2 BRAKE TEST RESULTS APPLICABILITY

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
1	Control 1	Roller	Roller1	Brake Weight
		Plate	Plate1	Brake Weight
		Floor	Floor1	Brake Weight
		Decelerometer	Decelerometer1	-
		Gradient	Gradient1	-
	Control 2	Roller	Roller1	Brake Weight
		Plate	Plate1	Brake Weight
		Floor	Floor1	Brake Weight
		Decelerometer	Decelerometer1	-
		Gradient	Gradient1	-

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
2	Control 1	Roller	Roller1	Brake Weight
		Plate	Plate1	Brake Weight
		Floor	Floor1	Brake Weight
		Decelerometer	Decelerometer1	-
		Gradient	Gradient1	-
	Control 2	Roller	Roller1	Brake Weight
		Plate	Plate1	Brake Weight
		Floor	Floor1	Brake Weight
		Decelerometer	Decelerometer1	-
		Gradient	Gradient1	-
3	Service	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				Axle Config
				PB Axles
				Braking System
	Parking	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Braking System
	Imbalance	Roller	Roller3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
			RollerImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
		Plate	Plate3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
			PlateImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
4 and 4A	Service	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Braking System
	Parking	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Braking System
	Imbalance	Roller	Roller3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				Axle Config
				PB Axles
			RollerImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
		Plate	Plate3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
			PlateImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
5 and 5A	Service	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Braking System

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Braking System
	Parking	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Braking System
				Axle Config
				PB Axles
		Gradient	Gradient3	Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Axle Config

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				PB Axles
				Braking System
	Imbalance	Roller	Roller3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
			RollerImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
		Plate	Plate3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
			PlateImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
7	Service	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Laden Unladen
				Braking System

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*
				Laden Unladen
				Braking System
				Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Laden Unladen
				Axle Config
				PB Axles
				Braking System
	Parking	Roller	Roller3	Brake Weight Source
				Brake Weight*
				Braking System
				Laden Unladen
				Axle Config
				PB Axles
		Plate	Plate3	Brake Weight Source
				Brake Weight*

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				Braking System
				Laden Unladen
				Axle Config
				PB Axles
		Decelerometer	Decelerometer3	Brake Weight Source
				Brake Weight*
				Laden Unladen
				Axle Config
				PB Axles
				Braking System
	Imbalance	Roller	Roller3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Laden Unladen
			RollerImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Laden Unladen
		Plate	Plate3FIEfforts *(Optional)*	Brake Weight Source
				Brake Weight*

Class	Brake (inclusion in results is mandated unless otherwise indicated)	Test Type (Choice of 1 for the specified class)	Structure to Fill in	Associated Data
				Axle Config
				PB Axles
				Laden Unladen
			PlateImbalance *(Optional)*	Brake Weight Source
				Brake Weight*
				Axle Config
				PB Axles
				Laden Unladen

Table 1.

1. Field names listed in table 1 are as specified in the Interface Specification [2].
2. There are some exceptions to these validation rules. It is suggested that the NT is advised to enter results at the VTS device in these circumstances.
3. There is no requirement to check that the user specifies results for each type of brake i.e. one set of results for service brake, one set for parking brake and one for imbalance for a class 3 test.
4. Validation should ensure that only the data specified in the "Structure to Fill in" and "Associated Data" columns in table 1 is submitted for a given test and other data fields are left blank or not submitted (as mandated by the Interface Specification [2]). The user of the Device need not necessarily complete the specified fields. Where an item of associated data is required for part of the brake results but not for another, then it is required in the results set.
5. Note that the Service Brake Type is only required for vehicles that were first used prior to 1968, but this need not be validated.
6. For brake data structures where a lock can be specified, the lock may only be specified where a value is also specified.
7. If quad or trike is specified as true for class 3 or 4 there is no need to specify brake results.

8. * - When brake results are uploaded to the VTS Device and where brake weight source is specified as Not Applicable, 0 (Zero) must be supplied as the BrakeWeight value. It may be appropriate to prohibit the user from entering any values in this circumstance.
9. Where the brake weight source is specified as V (VSI) the brake weight should not be changed from the value received in the Get Vehicle Details Response. I.e the user must not be able to change the brake weight.
10. When brake results are uploaded to the VTS Device, valid values for PBAxles and AxleConfig must be supplied, even in circumstances where they are irrelevant to the test being performed. Acceptable defaults for these values can be set by the Device to 1 and 2-4 respectively.

5.2.1 Brake Weight Data

The following rules must be observed when validating Brake Weight Data:

1. For Classes 1 and 2 at least one of: Front, Rear, Rider and Sidecar must be specified and be non-zero unless passed test on wheel locking.

5.2.2 Brake Weight Sources

The following table defines the options that are available for the Brake Source for a particular test type. Where more than one test type is used for a given brake type the intersection of the sets of options is the valid set of options, e.g. for Class 3, if a Roller Tester and a Plate Tester are used then the Kerbside and VSI options are the only valid brake Weight Sources.

Class	Brake	Test Type	Valid Brake Source Options

Class	Brake	Test Type	Valid Brake Source Options
3	Service	Roller	Kerbside N/A VSI
		Plate	Kerbside VSI
		Decelerometer	Kerbside N/A VSI
	Parking	Roller	Kerbside N/A VSI
		Plate	Kerbside VSI
		Decelerometer	Kerbside N/A VSI

Class	Brake	Test Type	Valid Brake Source Options
	Imbalance	Roller	Kerbside N/A VSI
		Plate	Kerbside VSI
4 and 4A	Service	Roller	Kerbside N/A VSI
		Plate	Kerbside VSI
		Decelerometer	Kerbside N/A VSI
	Parking	Roller	Kerbside N/A VSI
		Plate	Kerbside VSI

Class	Brake	Test Type	Valid Brake Source Options
		Decelerometer	Kerbside N/A VSI
	Imbalance	Roller	Kerbside N/A VSI
		Plate	Kerbside VSI
5 and 5A	Service	Roller	Design Gross Weight N/A Unladen
		Plate	Design Gross Weight Unladen
		Decelerometer	Design Gross Weight N/A Unladen

Class	Brake	Test Type	Valid Brake Source Options
	Parking	Roller	Design Gross Weight N/A Unladen
		Plate	Design Gross Weight Unladen
		Decelerometer	Design Gross Weight N/A Unladen
		Gradient	Design Gross Weight N/A Unladen
	Imbalance	Roller	Design Gross Weight N/A Unladen
		Plate	Design Gross Weight Unladen
7	Service	Roller	Design Gross Weight N/A

Class	Brake	Test Type	Valid Brake Source Options
		Plate	Design Gross Weight
		Decelerometer	Design Gross Weight N/A
	Parking	Roller	Design Gross Weight N/A
		Plate	Design Gross Weight
		Decelerometer	Design Gross Weight N/A
	Imbalance	Roller	Design Gross Weight N/A
		Plate	Design Gross Weight

Table 2.

1. Where the source is N/A the brake weight need not be specified (see note 8 on Table 1).

5.2.3 Brake Result Structures

The following rules must be observed when validating Brake Results:

Structure	Rules
Roller1	For each control, a value must be specified for at least one of: Front, Rear and Sidecar. Locks can only be specified (equal to "Y") where a value is specified.
Plate1	For each control, a value must be specified for at least one of: Front, Rear and Sidecar.
Floor1	Both Controls require a value to be entered.
Decelerometer1	Both Controls require a value to be entered.
Gradient1	ResultA, ResultB and ResultC values have to be entered.
Roller3	A value must be specified for at least one of: O1, N1, O2, N2, O3, N3. e.g. O1 = "2", N1 = "", O2 = "", N2 = "", O3 = "", N3 = "" is valid, whereas O1 = "", N1 = "", O2 = "", N2 = "", O3 = "", N3 = "" is not. Locks can only be specified where a value is specified.
Plate3	A value must be specified for at least one of: O1, N1, O2, N2, O3, N3.
Decelerometer3	A value must be specified for the efficiency.
Roller3FIEfforts	For a given axle, Nearside and Offside values must be both specified, e.g. O1 = "25", N1= "25" is valid, whereas O1 = "25", N1 = "" is not. O1, N1, O2 and N2 are to be used for 3 axle vehicles. The Roller3FIEfforts cannot be used in conjunction with RollerImbalance (or any other Imbalance data

Structure	Rules
	structure).
Plate3FIEfforts	For a given axle, Nearside and Offside values must be both specified. O1, N1, O2 and N2 are to be used for 3 axle vehicles. The Plate3FIEfforts cannot be used in conjunction with PlateImbalance (or any other Imbalance data structure).
RollerImbalance	The RollerImbalance cannot be used in conjunction with Roller3FIEfforts (or any other Imbalance data structure).
PlateImbalance	The PlateImbalance cannot be used in conjunction with Plate3FIEfforts (or any other Imbalance data structure).
Gradient3	Result must have a value.

Table 3.

Where a structure uses specifies brake results in terms of offside and nearside wheels, the following rules apply:

1. For 3 wheel vehicles with the single wheel at the front (e.g. Reliant Robin) use either O1 or N1 for the front wheel and O2 and N2 for the rear wheels.
2. For 3 wheel vehicles with the single wheel at the rear use O1 and N1 for the front wheels and O2 or N2 for the rear wheel.
3. O3 and N3 are only intended to be used for vehicles with 3 axles.

6 NON-BRAKE RESULT VALIDATION

The following table shows usage notes for elements within the TestResults element type:

Test Number	This must be the same value as received in the HHD-Get-Vehicle-Details response.
VRM	This must be the same value as received in the HHD-Get-Vehicle-Details response.
Colour	This is mandatory; may be changed from the value received in the HHD-Get-Vehicle-Details response.
Other Colour	This is optional; may be changed from the value received in the HHD-Get-Vehicle-Details response.
Odometer Reading	This is optional.
QuadorTrike	For TestClass III or IV this is to be determined by the user; otherwise it must be not be specified. *Where used, it would be sensible for the user interface of the Device to default this value to N.*

Table 4.

[End of Document]