
**One Box: Single Vehicle Architecture
System Requirements**

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In 2012 the Home Office published the Single Vehicle Architecture Criteria, which detailed suggested performance standards for the on-board communications and control architecture needed to support emergency service equipment used by emergency service vehicles. The aims of the criteria were to ensure a common approach to police vehicle design, improve user efficiency through standardisation, future proof vehicles to enable easy integration of new equipment, and improve the resell value of the vehicle, while ensuring occupant safety.

One of the provisions of the criteria was that the document would be regularly updated and, since its publication, the Home Office has continued to liaise closely with the vehicle telematics industry. To this end, CAST has published two documents (numbers 25/14 and 26/14) to clarify certain points in the criteria, revamp the accreditation mechanism, and outline the testing protocols systems should undergo to show compliance.

This document is a spreadsheet containing all the provisions of the main criteria document separated into single, numbered requirements. This is to aid tracking and clarity, and to allow users of the criteria to navigate between requirements with ease. In addition, each requirement has been labelled as mandatory or desirable along with an assigned priority. This is to aid manufacturers in identifying the key requirements and those which are desirable. A verification method for each requirement has also been included along with a reference to the associated test protocol.

This document is produced as a PDF. Users can request a copy of the original Excel file by contacting CAST on CASTenquiries@homeoffice.gsi.gov.uk. Columns containing the original text from the SVA Criteria document related to each requirement have been hidden but can be found in the original Excel document if required.

The SVA Test Protocols document (number 26/14) defines the intended test protocol to be used to satisfy each system requirement. The test protocols provide high level guidance on a test use case for each system requirement. They are not designed to provide a list of proposed test equipment or define detailed test procedures as both of these will be developed by test houses during the accreditation process.

Most importantly, these documents **supersede** section 3 of the original criteria, which outlined the accreditation process for SVA compliant systems. In the original version accreditation was granted by the Home Office's Centre for Applied Science and Technology (CAST) following testing by an approved test house. The intention is now that manufacturers may self-certify SVA compliance, provided they have the agreement of CAST (or bodies appointed by CAST for the purpose) and are following the test protocols outlined in the associated documents. Self certification will be considered sufficient to claim compliance.

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0001	1 SVA Introduction	Title1							
SVA_R_0006	This document has been prepared by MASS under authorisation from the Home Office Centre for Applied Science Technologies (CAST) and represents an independent review and update of the One Box Single Vehicle Architecture (SVA) Criteria document Association of Chief Police Officers (ACPO) Publication No.39/11. The purpose of the review and update was to result in a document that was a reflection of the SVA system requirements in a more formal requirement structure.	Information	N/A		N/A		N/A		
SVA_R_0007	This document has been structured as a Verification Cross Reference Index (VCRI) providing a unique reference ID for each entry and traceability from the derived system requirement to the original SVA Criteria statement in ACPO Publication No. 39/11 to verify the correct interpretation has been applied. It also provides traceability from the derived system requirement through to the anticipated verification method and appropriate test protocol.	Information	N/A		N/A		N/A		
SVA_R_0008	This document has been divided into three main sections: <ul style="list-style-type: none"> • SVA Introduction and concept; • SVA Functional and Performance requirements; and • SVA Non-functional requirements. 	Information	N/A		N/A		N/A		
SVA_R_0009	This document still contains a number of TBD/TBC's, it is anticipated these will be resolved in future releases.	Information	N/A		N/A		N/A		
SVA_R_0005	1.1 SVA Description and Scope	Title2							
SVA_R_0010	The SVA is the name given to the integrated vehicle technology architecture to be used as the basis for emergency service equipment control and data management. It has been designed from the ground up to work with and, where appropriate and possible, integrate with the equipment installed by the vehicle manufacturers.	Information	N/A		N/A		N/A		
SVA_R_0011	SVA is based on the multiple utilisation of components wherever possible, so long as this does not compromise safety or functionality. The vision is that OEM hardware components, such as switchgear and screens, are reused rather than additional technology being needed to manage emergency service equipment. These will run vehicle and emergency service functions in a much better integrated, more seamless way, creating a safer, more ergonomically efficient and more user-friendly in-vehicle environment.	Information	N/A		N/A		N/A		
SVA_R_0012	The concept comprises a core architecture, consisting of an in-vehicle LAN for data transfer, the processing hardware and software to support this and the applications that will run on it. It includes provision for a managed power supply and connection points at key locations in the vehicle and a control system based on CAN bus technology.	Information	N/A		N/A		N/A		
SVA_R_0013	The SVA includes the following elements: <ul style="list-style-type: none"> • Power management; • Local Area Network (LAN) or similar high bandwidth data transport mechanism; • Emergency Services Controller Area Network (esCAN) • RF Network cabling; • esCAN control systems (intelligent CAN nodes, gateway/firewall); and • Human-Machine Interface (HMI) (Emergency Warning Control Panel, Non-critical Controls). 	Information	N/A		N/A		N/A		
SVA_R_0015	The scope of the SVA physical architecture fitted to vehicles does not include those components that may be attached to it. Items such as cameras and light bars are outside the scope of the architecture itself. In this respect the SVA is currently restricted to the provision of cabling and control systems, together with physical interfaces, connectors, operating systems for the control systems and HMI for the hardware.	Information	N/A		N/A		N/A		
SVA_R_0579	Where an SVA interface is used with emergency services equipment, it is considered as part of the architecture as it will need to be compliant with the chosen esCAN open data dictionary (such as CiA 447), industry standard connectors and utilise the CAN power supply. As such, it would be within the scope of these criteria. The functionality of emergency service equipment itself is outside of the scope.	Information	N/A		N/A		N/A		
SVA_R_0016	However, emergency services equipment considered overall must be compliant with the SVA system requirements going forward to ensure interoperability. It will not be permitted to supply non-SVA-compliant equipment for fitment to police vehicles in the future.	Information	N/A		N/A		N/A		
SVA_R_0017	Note that there is a distinction between the SVA system requirements and the physical architecture that is fitted to the vehicle.	Information	N/A		N/A		N/A		
SVA_R_0018	The SVA system requirements will neither mandate a specific computer system nor an operating system. It will lay down industry standard protocols for specific components – for example, CAN (ISO 11898), Local Area Network (LAN) and so on.	Information	N/A		N/A		N/A		

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SVA_R_0019	Crucially, the SVA will be designed and installed in cooperation with vehicle manufacturers and equipment providers. Better integration in this way will ensure that the architecture does not conflict with vehicle manufacturers systems, whilst providing the functionality necessary to support current and future emergency service systems. This will include connection with relevant OEM systems, where appropriate, through an agreed fire walled access point.	Information	N/A		N/A		N/A		
SVA_R_0020	The SVA uses a CAN bus architecture that is managed in order to provide the capability for switching and operating emergency service equipment, such as emergency lights. It can switch emergency services equipment using OEM switchgear and display screens but without interfering with OEM vehicle systems. This is achieved by the use of a firewall (or gateway) interface between the OEM's vehicle CAN and the emergency services CAN (known as "esCAN"), which filters communications between the vehicle's systems and the emergency services equipment. The esCAN will operate on a principle similar to a vehicle CAN bus and will employ industry standard connectors that will be common to all vehicle, system and component manufacturers.	Information	N/A		N/A		N/A		
SVA_R_0025	The fitment of the SVA to new police vehicles will be a requirement of National Policing and the NAPFM. The purpose of this is to facilitate the development and installation of effective, safe, better-integrated emergency service equipment to vehicles and to ensure commonality of approach, whilst providing a safe and efficient working environment for officers. This will lead to the realisation of cost efficiencies across the police service, as well as being in line with the standardisation of all types of police vehicle currently being undertaken by National Policing.	Information	N/A		N/A		N/A		
SVA_R_0030	1.2 Maximisation of Usability	Title2							
SVA_R_0031	Usability is a key reason for taking an integrated approach to emergency service vehicle equipment fit. One way that is being turned to the advantage of the users of emergency service vehicles is by standardising the configuration and colours of the switchgear that operates the five most common modes of emergency service equipment, namely: 1) 999; 2) At scene; 3) Front blues; 4) Low power; and 5) ALL OFF	Information	N/A		N/A		N/A		
SVA_R_0032	By ensuring that this configuration, order and colour of switches are consistent between emergency service vehicles, any officer should be able to find the controls necessary to perform their duties quickly and without significant distraction from the task of driving.	Information	N/A		N/A		N/A		
SVA_R_0033	The adoption of the CAN open standards and the capability to reuse cables or to change between vehicle and equipment suppliers will become increasingly important for the emergency services. It should ensure that emergency service equipment is generic and has a high level of interoperability.	Information	N/A		N/A		N/A		
SVA_R_0580	Equipment fitted to a vehicle may well be replaced over its operational life as organisations introduce new technologies, such as mobile data and dispatching systems. Similarly, equipment may be added, removed or refreshed, such as when there is a change of equipment supplier. A CAN bus approach will minimise or ideally eliminate the requirement for a partial or full refit of the cabling and additional control systems within the vehicle, resulting in significant reductions to costs involved in stripping out and refitting proprietary control systems.	Information	N/A		N/A		N/A		
SVA_R_0581	It is intended that the SVA will also promote innovation and competition between equipment providers in terms of the provision of user functionality, interoperability and services to actively support delivery of front line services.	Information	N/A		N/A		N/A		
SVA_R_0068	1.3 Document Definitions	Title2							
SVA_R_0069	The following sections detail the meaning of the definitions used within this document.	Information	N/A		N/A		N/A		
SVA_R_0070	1.3.1 Definition of Terms	Title3							

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SVA_R_0071	<p>The use of the terms 'shall', 'should', 'must', 'will' and 'may' within this document are subject to the following rules of interpretation:</p> <ul style="list-style-type: none"> • The word shall expresses a mandatory requirement of the specification; • The word must is used to express legislative or regulatory requirements (e.g. Health and Safety Regulations); • The word should expresses a recommendation or advice on implementing a requirement of this specification. Such recommendations or advice will be followed if timescales, resources and prioritisation permits; • The word may expresses a permissible practice or action. It does not express a requirement of this Specification, and it does not express a recommendation or advice; • The word will expresses an intended condition or simple future tense. 	Information	N/A		N/A		N/A		
SVA_R_0072	1.3.2 Definition of Verification Methods	Title3							
SVA_R_0073	<p>The following verification methods definitions apply to this document:</p> <ul style="list-style-type: none"> • N/A - test method is not applicable; • Analysis - compliance is proved through analysis of design documentation or design statements that specifically address the intended requirements; • Inspection - an inspection of a hardware item or documentation to satisfy the intended requirement; • Demonstration - physical demonstration of the requirement function or feature; • Bench Test - testing of a SVA system in isolation from the vehicle; • Vehicle Test - testing that requires the SVA to be installed within a vehicle to prove compliance. 	Information	N/A		N/A		N/A		
SVA_R_0074	1.3.3 Definition of Organisations	Title3							
SVA_R_0075	<p>The definition of SVA contracted organisations within this specification are subject to the following rules of interpretation::</p> <ul style="list-style-type: none"> • User organisation - the person or organisation making the purchase of the SVA equipment; • Supplier - the person or organisation contracted to supply the SVA equipment; • Installer - the person or organisation contracted to install the SVA equipment, may also be the supplier in certain circumstances; • Vehicle Manufacturer - the person or organisation responsible for manufacturing the original vehicle. In the context of the SVA this could be the person or organisation as the Supplier and/or Installer. • The Authority - the person or organisation responsible for overseeing the SVA evaluation. 	Information	N/A		N/A		N/A		
SVA_R_0076	1.3.4 Definition of Priorities	Title3							
SVA_R_0077	<p>The following priority definitions apply to this document:</p> <ul style="list-style-type: none"> • Key - mandatory requirement, non-tradable, defines the core requirements of the SVA; • 1 - mandatory requirement, that is not part of the core SVA requirements; • 2 - mandatory requirement that may be tradable; • 3 - desirable requirement only. 	Information	N/A		N/A		N/A		
SVA_R_0078	1.4 Abbreviations and Acronyms	Title2							
SVA_R_0079	For the purpose of this document the following abbreviation and acronyms apply.	Information	N/A		N/A		N/A		
SVA_R_0080	AES – the Automotive and Equipment Section	Information	N/A		N/A		N/A		
SVA_R_0586	CAN – Controller Area Network	Information	N/A		N/A		N/A		
SVA_R_0587	CAST – [Home Office] Centre for Applied Science and Technology	Information	N/A		N/A		N/A		
SVA_R_0588	DVDMS – (One Box) Driver and Vehicle Data Management System	Information	N/A		N/A		N/A		
SVA_R_0589	EMC – Electromagnetic compatibility	Information	N/A		N/A		N/A		
SVA_R_0590	esCAN – emergency service Controller Area Network	Information	N/A		N/A		N/A		
SVA_R_0704	ESN – Emergency Service Network	Information	N/A		N/A		N/A		
SVA_R_0591	HMI – Human-machine interface	Information	N/A		N/A		N/A		
SVA_R_0592	ISO – International Organisation for Standardisation worldwide	Information	N/A		N/A		N/A		
SVA_R_0593	NAPFM – National Association of Police Fleet Managers	Information	N/A		N/A		N/A		

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SVA_R_0594	NPA - National Police Association	Information	N/A		N/A		N/A		
SVA_R_0595	OEM – Original Equipment Manufacturer (vehicle manufacturer)	Information	N/A		N/A		N/A		
SVA_R_0596	SMS – Short Message Service	Information	N/A		N/A		N/A		
SVA_R_0597	SDS - Short Data Service (as used on TETRA)	Information	N/A		N/A		N/A		
SVA_R_0598	SVA – Single Vehicle Architecture	Information	N/A		N/A		N/A		
SVA_R_0599	TETRA – Terrestrial Trunked Radio	Information	N/A		N/A		N/A		

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SVA_R_0084	2 SVA Functional and Performance Requirements	Title1							
SVA_R_0086	The following sections detail the functional and performance requirements for the SVA.	Information	N/A		N/A		N/A		
SVA_R_0090	These SVA system requirements will be of direct interest to vehicle manufacturers and importers, emergency service equipment manufacturers, suppliers, installers and importers and to motor vehicle insurers.	Information	N/A		N/A		N/A		
SVA_R_0085	2.1 General	Title2							
SVA_R_0087	The SVA system requirements are only intended to apply to emergency service vehicles and are currently restricted to the provision of cabling and control systems, connectors, operating systems for the control systems and the HMI for the hardware, either forming part of the SVA system or a component attached to it.	Information	N/A		N/A		N/A		
SVA_R_0698	Figure 1 shows the scope of the SVA and provides details on the network architecture and the intended components/systems to be connected to those networks.	Information	N/A		N/A		N/A		
SVA_R_0240	<p>Figure 1 – Example of an SVA bus architecture and emergency service systems</p>	Information	N/A		N/A		N/A		
SVA_R_0111	The SVA system requirements have been defined under four broad categories of system functionality: <ul style="list-style-type: none"> • Power management system; • Control of emergency service Controller Area Network (esCAN) equipment, connectors and switch gear; • High-volume data transfer, for example, Local Area Network (LAN) – Ethernet; and • HMI, for example, countermeasures to distraction. 	Information	N/A		N/A		N/A		
SVA_R_0103	The SVA shall be designed to work with DVLA category vehicles, B, B Auto and others as specified by the user organisation.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		

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SVA_R_0104	The supplier shall provide details to the user organisation of any particular vehicle type the SVA is not designed to work with.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0114	The supplier shall agree with the vehicle manufacturer, the secure, safe routing of the SVA cables for, power, data and control capability to ensure the SVA cabling does not interfere with other systems.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0619	Relevant SVA modules shall comply with CAST-AES Specification 5.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0175	Where, as part of the process of fitting aftermarket equipment, it is not possible to comply with new vehicle legislation, Directives, standards or HMI best practice, all deviations shall be formally recorded, the liabilities and consequences assessed.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0701	The deviations shall be agreed in writing by the user organisation, supplier and vehicle manufacturer, which may result in refusing, restricting or removing the SVA.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0115	All SVA cables shall be terminated with SVA standard connectors whether components are attached to them or not.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0300	The SVA shall not allow the user to deactivate directly, change or override the functionality or performance of the system.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0169	2.1.1 Audit Trail	Title3							
SVA_R_0171	The audit trail, where possible, requires the ability to identify the person undertaking each action, the date and time of the action, and the action or process carried out.	Information	N/A		N/A		N/A		
SVA_R_0700	The SVA shall be designed to identify the driver of a vehicle and shall be capable of assigning control inputs to individual persons.	Desirable Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0116	2.2 Power Management System	Title2							
SVA_R_0036	The SVA shall provide a power management system, connected to one or more batteries, with power distributed to appropriate points in the vehicle.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0037	The SVA power management system provided can be in two forms: • Core; or • Enhanced.	Information	N/A		N/A		N/A		
SVA_R_0038	An SVA core power management system would normally be fitted to a vehicle which has less emergency service equipment fitted to it, such as a response vehicle. The managed power supply is intended to be protected and provide suitably fused distribution points in the rear of the vehicle.	Information	N/A		N/A		N/A		
SVA_R_0039	An SVA enhanced power management system would normally be fitted to vehicles with more equipment fitted, such as ANPR. These are intended to have additional power distribution points at the front of the vehicle and in the roof for additional equipment and functions.	Information	N/A		N/A		N/A		
SVA_R_0040	The SVA power management system shall provide power distribution points that are managed and surge-protected to the appropriate voltages and currents required by the connected devices, with sufficient spare capacity for future systems.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0118	The SVA power management system shall operate from a power source location specified by the vehicle manufacturer.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0623	The SVA power management system shall not have an adverse effect on any other vehicle systems or components.	Mandatory Requirement			Vehicle test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		

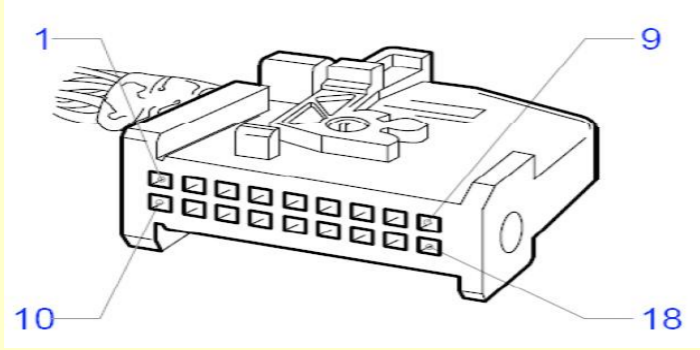
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SVA_R_0625	The SVA power management system shall provide a standardised connection for all power supply connection points.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0626	The supplier/installer shall agree with the vehicle manufacturer and user organisation on the location of the power supply connection points.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0143	The SVA power management system shall not adversely affect existing vehicle power systems by providing suitable protection and filtering.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0144	The SVA power management system shall be capable of managing power distribution between all standardised connection points.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0117	2.2.1 Electrical Requirements	Title3							
SVA_R_0119	The SVA power management system shall operate from a nominal 12 volt DC supply.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0120	The SVA power management system shall be able to operate with an external trickle feed power supply when used.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0121	The SVA power management system shall not draw excessive current such that the vehicle can still start after 28 days of non-use.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0122	The SVA power management system shall be able to resume normal operation, without loss of data, after repeated low, flat or no power events lasting up to 28 days.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0125	The SVA power management system shall follow the guidance in FCS 1362 and not use the vehicle body as the negative return path.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0132	The SVA power management system shall protect the emergency service aftermarket equipment and vehicle equipment from electrical system malfunctions.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0133	The SVA power management system shall prevent any attached aftermarket emergency service equipment from drawing excessive current such that the vehicle can still start after 28 days of non-use.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0135	Each power supply connection point provided by the SVA power management system shall be capable of supplying the appropriate current required by the attached equipment.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0136	Each power supply connection point provided by the SVA power management system shall be fused to the appropriate level required by the attached equipment.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0137	The SVA power management system shall be scalable and flexible to support additional power connection points and increased power load capacities as defined by the user organisation.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0138	The SVA power management system shall be capable of receiving and sending control data to and from the eSCAN.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0130	2.2.2 Core Power Management System	Title3							
SVA_R_0134	An SVA power management system shall provide sufficient power supply connections for the planned equipment installation plus a minimum of 2 spare connections in a suitable location in the rear of the vehicle, or ten (10) power supply connection points (whichever is the greater).	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0139	2.2.3 Enhanced Power Management System	Title3							
SVA_R_0624	An SVA enhanced power management system (if fitted) shall provide a minimum of twenty (20) power supply connection points in a single location to the rear of the vehicle for emergency service systems to draw power from.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0141	An SVA enhanced power management system (if fitted) shall provide a minimum of ten (10) power supply connection points in a single location to the front of the vehicle for emergency service systems to draw power from.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		

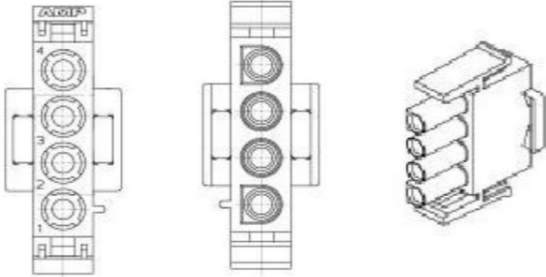
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SVA_R_0142	An SVA enhanced power management system (if fitted) shall provide a minimum of five (5) power supply connection points in a single location to the roof of the vehicle for emergency service systems to draw power from.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0145	An SVA enhanced power management system (if fitted) shall provide the capability to operate from an emergency service battery supply, in addition to the standard OEM-fitted vehicle battery.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0146	An SVA enhanced power management system (if fitted) shall provide the capability to automatically shut off power to the emergency service equipment systems in a managed and prioritised way, ensuring that emergency service equipment is maintained for as long as possible, where the power management system detects power usage from emergency service equipment that may risk the continued operation of the emergency warning equipment	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0147	An SVA enhanced power management system (if fitted) shall provide the capability to automatically shut off power to the emergency service equipment systems in a managed and prioritised way, ensuring that emergency service equipment is maintained for as long as possible, where the power management system detects power usage from emergency service equipment.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0148	Where an SVA enhanced power management system (if fitted) has to shut off the emergency warning equipment in order to protect the vehicle start capability, it shall warn the user 5 minutes before doing so and repeated the warning every 30 seconds thereafter.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0627	Acceptable warnings include: • alert to Force Control Room – text or other; • distinct audible warning (sound or spoken); • distinct visual warning that can be seen from the vehicle; and • maximum decibel limit of 100 db(C) (C-weighted).	Information	N/A		N/A		N/A		
SVA_R_0149	Note: There is a general requirement to ensure that vehicle occupants are not exposed to a daily or weekly exposure of 85db (A-weighted), as specified in the Control of Noise at Work Regulations 2005.	Information	N/A		N/A		N/A		
SVA_R_0150	An SVA enhanced power management system (if fitted) shall provide the capability for the user to disable visual or audible warnings.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0628	An SVA enhanced power management system (if fitted) shall warn the user at every engine start of any disabled visual or audible warnings.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0153	With agreement from the vehicle manufacturer, an SVA enhanced power management system (if fitted) should activate, when appropriate, the automatic engine start/stop (where applicable) when the vehicle is stationary in order to manage the power supply for the emergency service equipment. For example when the vehicle is protecting a scene for long periods with warning lights illuminated to reduce the engine run time at idle.	Desirable Requirement	3		Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0154	An SVA enhanced power management system (if fitted) should provide an output on the SVA esCAN Network when it has taken actions in managing the power system to allow the Driver and Vehicle Data Management System (DVDMS) or another data collection device to record such information.	Desirable Requirement	3		Bench Test		MC/SC1101A/TSP001 TP4 - SVA Power Management System		
SVA_R_0236	2.3 Local Area Network (LAN)	Title2							
SVA_R_0239	The SVA Local Area Network (LAN) will be the carrier for all data-intensive communications between emergency service modules within the vehicle. A bus with this capacity will be essential for carrying video or bulk data, such as used by MDTs.	Information	N/A		N/A		N/A		
SVA_R_0043	The information that the LAN bus carries will include, but is not limited to, the following: • Data from cameras, SATNAV and speed enforcement equipment; • Data to mobile data terminals, docking station(s) and SATNAV equipment.	Information	N/A		N/A		N/A		






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SVA_R_0670	<p>The SVA LAN network can be shown as given below.</p> <p>Figure 2 - SVA Local Area Network architecture</p>	Information	N/A		N/A		N/A		
SVA_R_0045	The inclusion of a LAN, together with standardised connectors, will both simplify emergency services equipment fitment and lead to enhanced functionality, whilst reducing overall cost over the vehicles life.	Information	N/A		N/A		N/A		
SVA_R_0237	The SVA shall provide an IEEE 802.3/11 compatible LAN capable of transporting of data at rates in excess of 1Mbit/s between equipment within the vehicle.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0155	2.4 Emergency Services Controller Area Network	Title2							
SVA_R_0048	<p>The transportation of command data on the esCAN can be summarised as follows:</p> <ul style="list-style-type: none"> To send low volume data from sensors to multiple locations. To standardise the command functions of a wide range of electronic emergency service equipment. To send data via a dedicated connection to the vehicle OEM CAN to receive and at times input data and commands in a safe and controlled way. 	Information	N/A		N/A		N/A		
SVA_R_0050	It is intended the SVA control system will utilise intelligent data-controlled systems and switching approach, operating on open published data standards and industry standardised connectors.	Information	N/A		N/A		N/A		
SVA_R_0156	The SVA shall provide a dedicated CAN bus compliant with the ISO 11898 specification, for communication and control of the emergency service electronic equipment within the vehicle known as the esCAN Network.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0157	Note: ISO standards are available through the ISO website at http://www.iso.org .	Information	N/A		N/A		N/A		

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SVA_R_0159	The SVA esCAN Network and systems attached to it shall use an open published data dictionary, such as that defined in CiA 447.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0161	The SVA esCAN network shall support the connection of other emergency service equipment, systems or components via a standard ISO 11898 CAN bus controller.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0699	The provision of technology in emergency service vehicles will require CAN bus controllers to broadcast a status onto the CAN so that future data recorders may record that signal for any subsequent investigation. In other words, a 999 activation switch will need to send a message to activate the blue lights and also receive a message to illuminate the 999 function button when it is activated. This would include remote operation of the 999 function via a steering wheel control.	Information	N/A		N/A		N/A		
SVA_R_0163	The information that the esCAN bus carries will include, but is not limited to, the following: <ul style="list-style-type: none"> • emergency warning lights –controls; • sirens –controls; • RESTORE functionality; • power management system –related to the above functions; • Automatic Number Plate Recognition (ANPR) – controls/status; • evidential or other camera – controls/status; • speed or other enforcement equipment N.B. Any changes to enforcement system may require re-qualification of the device; • matrix signs; • GNSS (satellite navigation); • One Box Driver and Vehicle Data Management System (DVDMS); • defined subset of vehicle CAN data; and • other non-safety-critical functions. 	Information	N/A		N/A		N/A		
SVA_R_0164	The SVA esCAN Network shall be capable of communicating to the OEM vehicle CAN via an agreed (between supplier and vehicle manufacturer) firewall, which is to be provided by the vehicle manufacturer or by the supplier in partnership with the vehicle manufacturer.	Mandatory Requirement	N/A		Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		

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SVA_R_0165	<p>The esCAN is shown diagrammatically below.</p> <p>KEY SVA Component / Network Non SVA Component / System</p> <p>Base Vehicle Buses (High speed CAN, low speed CAN, LAN etc.)</p>	Information	N/A		N/A		N/A		
	<p>Figure 3 – SVA esCAN Network architecture</p>								
SVA_R_0167	The SVA esCAN Network shall permit emergency service equipment or components to operate base vehicle functions by facilitating the transmission of the appropriate message via the firewall.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0168	The SVA esCAN Network should include additional cables to ensure built-in redundancy for future technology not yet developed, for example twisted pair for power supply of low power items.	Desirable Requirement	3		Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0630	Any redundant wiring provided as part of the SVA esCAN Network shall be terminated to ensure safety and prevent interference with other vehicle systems.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0170	The SVA esCAN Network shall support the connection of the DVDMS or other data recorder device so that all data on the esCAN can be recorded as part of the audit trail process, regardless of origin.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0705	2.4.1 esCAN Firewall/Gateway	Title3							
SVA_R_0049	The SVA shall provide a firewall or gateway to interface between the esCAN and the vehicle's existing CAN.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0582	The SVA esCAN firewall or gateway and associated transmissions shall be agreed with the vehicle manufacturer in order to ensure that it does not effect the operation of any safety-critical systems on-board the vehicle.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0629	The esCAN firewall or gateway shall be capable of reading information from the internal vehicle CAN, interpreting it and then writing it to the esCAN using the appropriate Data Dictionary.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		

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SVA_R_0706	2.4.2 esCAN Intelligent Nodes	Title3																																																																																																																
SVA_R_0688	The SVA shall utilise Intelligent Nodes on the esCAN to distribute the control of the emergency service equipment to reduce the overall complexity of the vehicle wiring, unless an alternative architecture can be demonstrated to the user organisation by the supplier to provide either a performance or cost benefit.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis																																																																																																											
SVA_R_0241	2.4.3 esCAN Connectors and Interfaces	Title3																																																																																																																
SVA_R_0242	The SVA shall allow connection of equipment to the esCAN without disrupting the network.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network																																																																																																											
SVA_R_0669	The SVA shall allow connection of equipment to the esCAN via T-connection or stub cable.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network																																																																																																											
SVA_R_0243	CIA447-1, Section 4.3 - Connectors recommends using the 18-pin VDA interface connector (e.g. micro quadlok system 0.64 from Tyco or equivalent connectors from other manufacturers). The 18-pin VDA interface socket connector is shown in Figure 4 below.	Information	N/A		N/A		N/A																																																																																																											
SVA_R_0244	 <p>Figure 4 – Drawing of 18-pin VDA connector</p>	Information	N/A		N/A		N/A																																																																																																											
SVA_R_0245	<table border="1"> <thead> <tr> <th>Optional/ Mandatory</th> <th>Pin No.</th> <th>Colour</th> <th>Name</th> <th>Description</th> <th>Recommended use in emergency vehicle</th> <th>Input/output from car view</th> </tr> </thead> <tbody> <tr> <td>Mandatory if 2-pin power connector not used</td> <td>1</td> <td>Brown</td> <td>KL31</td> <td>Ground (0V/ max. 4A)</td> <td>Ground (0V/ max. 4A)</td> <td>Output</td> </tr> <tr> <td>Optional</td> <td>2</td> <td>Brown/violet</td> <td>PTT</td> <td>Reserved for PTT</td> <td>PTT mobile radio</td> <td>Input/output</td> </tr> <tr> <td>Optional</td> <td>3</td> <td>Green/blue</td> <td>S1</td> <td>Reserved for PTT</td> <td>PTT siren</td> <td>Input/output</td> </tr> <tr> <td>Optional</td> <td>4</td> <td>Violet</td> <td>S2</td> <td>Reserved for audio mute</td> <td>Reserved for audio mute</td> <td>Input/output</td> </tr> <tr> <td>Optional</td> <td>5</td> <td>Black/white</td> <td>S3</td> <td>Reserved</td> <td>Beacon low</td> <td>Input/output</td> </tr> <tr> <td>Optional</td> <td>6</td> <td>Brown/black</td> <td>S4</td> <td>Reserved</td> <td>Radio emergency call request</td> <td>Output</td> </tr> <tr> <td>Optional</td> <td>7</td> <td>Black/green</td> <td>AUDIO_OUT+</td> <td>Reserved for audio receiver</td> <td>AUDIO_OUT+</td> <td>Input/output</td> </tr> <tr> <td>Mandatory</td> <td>8</td> <td>Yellow</td> <td>CAN_L</td> <td>CAN low line</td> <td>CAN_L</td> <td>Bus</td> </tr> <tr> <td>Optional</td> <td>9</td> <td>Black</td> <td>AUDIO_IN-</td> <td>Reserved for microphone shield</td> <td>AUDIO_IN-</td> <td>Input/output</td> </tr> <tr> <td>Optional</td> <td>10</td> <td>Black/blue</td> <td>KL15</td> <td>Ignition</td> <td>KL15</td> <td>Output</td> </tr> <tr> <td>Mandatory if 2-pin power connector not used</td> <td>11</td> <td>Red/yellow</td> <td>KL30</td> <td>Power supply voltage (+11 to 15V/ max. 4A)</td> <td>Power supply voltage (+11 to 15V/ max. 4A)</td> <td>Output</td> </tr> <tr> <td>Optional</td> <td>12</td> <td>Grey/blue</td> <td>KL58</td> <td>Position lamp status</td> <td>KL58</td> <td>Output</td> </tr> <tr> <td>Optional</td> <td>13</td> <td>Green/yellow</td> <td>SPEED_PLUS</td> <td>Speed pulse signal</td> <td>Speed pulse signal</td> <td>Output</td> </tr> <tr> <td>Optional</td> <td>14</td> <td>Blue/yellow</td> <td>S5</td> <td>Reserved</td> <td>Radio main switch</td> <td>Input/output</td> </tr> </tbody> </table>	Optional/ Mandatory	Pin No.	Colour	Name	Description	Recommended use in emergency vehicle	Input/output from car view	Mandatory if 2-pin power connector not used	1	Brown	KL31	Ground (0V/ max. 4A)	Ground (0V/ max. 4A)	Output	Optional	2	Brown/violet	PTT	Reserved for PTT	PTT mobile radio	Input/output	Optional	3	Green/blue	S1	Reserved for PTT	PTT siren	Input/output	Optional	4	Violet	S2	Reserved for audio mute	Reserved for audio mute	Input/output	Optional	5	Black/white	S3	Reserved	Beacon low	Input/output	Optional	6	Brown/black	S4	Reserved	Radio emergency call request	Output	Optional	7	Black/green	AUDIO_OUT+	Reserved for audio receiver	AUDIO_OUT+	Input/output	Mandatory	8	Yellow	CAN_L	CAN low line	CAN_L	Bus	Optional	9	Black	AUDIO_IN-	Reserved for microphone shield	AUDIO_IN-	Input/output	Optional	10	Black/blue	KL15	Ignition	KL15	Output	Mandatory if 2-pin power connector not used	11	Red/yellow	KL30	Power supply voltage (+11 to 15V/ max. 4A)	Power supply voltage (+11 to 15V/ max. 4A)	Output	Optional	12	Grey/blue	KL58	Position lamp status	KL58	Output	Optional	13	Green/yellow	SPEED_PLUS	Speed pulse signal	Speed pulse signal	Output	Optional	14	Blue/yellow	S5	Reserved	Radio main switch	Input/output	Information	N/A		N/A		N/A		
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	Optional	15	Blue/white	S6	Reserved	Beacon high	Input/output									
	Optional	16	Green	AUDIO_GND	Reserved for ground for audio signals	AUDIO_OUT -	Input/output									
	Mandatory	17	Yellow/black	CAN_H	CAN high line	CAN_H	Bus									
	Optional	18	White	AUDIO_IN/MIC	MIC +	AUDIO_IN +	Input/output									
	<p>Table 1 – Pin assignment for 18-pin VDA connector</p> <p>The SVA shall provide a 2-pin power connector AMP926474-1 or an equivalent connector for power connections to devices requiring in excess of 4 Amps, with the pin assignment given in Table 3.</p>															
SVA_R_0246								Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection			
SVA_R_0247	Optional/Mandatory	Pin No.	Colour	Name	Description	Recommended use in emergency vehicle	Input/output from car view	Information	N/A		N/A		N/A			
	Recommended for current >4A	1	Brown	KL31	Ground (0V/ max. 4A)	Ground (0V/ max. 4A)	Output									
	Recommended for current >4A	2	Red/yellow	KL30	Power supply voltage (+11 to 16V/ max. 15A)	Power supply voltage (+11 to 16V/ max. 15A)	Output									
	<p>Table 2 – Pin assignment for 2-pin power connector</p>															
SVA_R_0248	<p>The SVA esCAN Network shall use an 18-pin VDA interface connector, micro quadlok system 0.64 from Tyco or equivalent for connection to the OEM CAN firewall , with the pin assignment given in Table 2.</p>							Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection			
SVA_R_0249	<p>The SVA esCAN Network shall use an 4-pin MATE-N-LOK from Tyco/Amp or equivalent for connection of slave esCAN devices, with the pin assignment given in Figure 5.</p>							Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection			
SVA_R_0250	Pin 1	Ground						Information	N/A		N/A		N/A			
	Pin 2	Power supply														
	Pin 3	CAN_L														
	Pin 4	CAN_H														
	 <p>Figure 5 – Pin assignment for 4-pin MATE-N-LOK connector</p>															
SVA_R_0051	<p>2.5 Equipment Controls</p>							Title2								
SVA_R_0053	<p>The SVA system requirements have been developed in recognition of the context of the operational use of emergency service vehicles and the complex environment that the occupants of such vehicles must operate them within, with the additional pressures and competing priorities of being required to respond to calls, deal with radios, plan responses and drive safely.</p>							Information	N/A		N/A		N/A			
SVA_R_0633	<p>The SVA provides controls that allow the user to operate specific SVA functions. These functions controls fall into two (2) categories, Emergency Warning Controls and Non-critical Controls with the requirement for each defined in the following sections.</p>							Information	N/A		N/A		N/A			

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SVA_R_0184	The SVA Controls shall be positioned such that they can always be operated with the driver keeping one hand on the steering wheel and the allocation of driver attention to the controls remains compatible with the cognitive demand of the driving situation in normal, high demand and emergency service use.	Mandatory Requirement			Demonstration		MC/SC1101A/TSP001 TP3 - Demonstration		
SVA_R_0636	SVA Controls shall be positioned so as not to obstruct the driver's view of the road scene.	Mandatory Requirement			Demonstration		MC/SC1101A/TSP001 TP3 - Demonstration		
SVA_R_0637	SVA Controls shall be positioned so as not to obstruct vehicle controls and displays required for the primary driving task.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0638	SVA Controls shall be positioned so that a front-seat passenger can operate them, whether the vehicle is moving or not.	Mandatory Requirement			Demonstration		MC/SC1101A/TSP001 TP3 - Demonstration		
SVA_R_0642	The SVA Controls shall not require long and uninterruptible sequences of interactions.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0643	The SVA Controls shall be designed so that they can be operated without adverse impact on the primary driving task.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0644	The SVA Controls shall provide a visual response within 250ms second following user input.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0650	The SVA shall provide a clear distinction between controls through the use or combination of: • location; • touch; and • colour.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0651	The SVA Controls shall provide an audible response within 250ms second following user input. However, due regard must be given to driver distraction.	Allowable Condition			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0211	SVA Controls shall use standardised logos and icons to allow the user to identify and differentiate between them. Example icons are. <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>999</p>  </div> <div style="text-align: center;"> <p>At Scene</p>  </div> <div style="text-align: center;"> <p>Front Blues</p>  </div> </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>Low Power</p>  </div> <div style="text-align: center;"> <p>Cancel All</p>  </div> </div>	Desirable Requirement	3		Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0179	2.5.1 Emergency Warning Controls	Title3							
SVA_R_0181	The SVA Emergency Warning Controls shall allow the driver to ascertain through visual confirmation that the emergency service warning equipment has been and remains activated. This requirement is applicable in: • all light conditions: day, night, glare, etc; • under normal and high demand vehicle use.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0702	The SVA Emergency Warning Controls shall provide confirmation of activation such that it can be ascertained by the driver of a vehicle operating in high demand/emergency response mode, requiring the minimum of interruption of eye contact with the road.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0182	The SVA Emergency Warning Controls may allow the driver to ascertain through audible confirmation that the emergency service warning equipment has been and remains activated.	Allowable Condition			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0183	Where the SVA Emergency Warning Controls provide audible confirmation, there shall be a way for the user to adjust the volume of the audible signal to prevent driver distraction.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0634	The SVA Emergency Warning Controls shall be positioned as close as practicable to the driver's normal line of sight in agreement with the vehicle manufacturers.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0645	The SVA Emergency Warning Controls shall be backlit illuminated.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
SVA_R_0646	The SVA Emergency Warning Controls both functions and area fitted, shall be standardised in all vehicles.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0647	The SVA Emergency Warning Controls shall be tactile controls, not screen based, so that the vehicle remains operational and useable should a screen issue arise.	Mandatory Requirement	2		Demonstration		MC/SC1101A/TSP001 TP3 - Demonstration		

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments																														
SVA_R_0201	The SVA shall include, as a minimum the following five (5) Emergency Warning Controls: <ul style="list-style-type: none"> • 999 • At Scene • Front Blue • Low Power • ALL OFF. 	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection																																
SVA_R_0202	<p>The SVA Emergency Warning Controls shall include the functionality given below in Table 1.</p> <table border="1"> <thead> <tr> <th>Control</th> <th>Feature</th> <th>Colour</th> <th>Functions</th> <th>Cancel – linked systems</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>999</td> <td>Backlit. Change colour to blue when activated. Unique tactile switch surface (shape or feel).</td> <td>Activate front and rear blue lights, including all blue auxiliary lights. Activate headlight flash or equivalent unless headlights are on. Arm siren, to standby. Arm run lock, where fitted.</td> <td>Cancel by press again. Any of linked system buttons. Control 5 below.</td> </tr> <tr> <td>2</td> <td>At scene/rear protect</td> <td>Backlit. Change colour to red when activated.</td> <td>Activate rear blue and red lights and rear blue and red ancillary lights, where fitted. Arm run lock, where fitted. If previously activated: Deactivate front blue lights. Deactivate headlight flash or equivalent.</td> <td>Cancel by press again. Any of linked system buttons. Control 5 below.</td> </tr> <tr> <td>3</td> <td>Front blues</td> <td>Backlit. Change colour to blue when activated.</td> <td>Activate front blue lights and front ancillary blue lights. Arm siren. Arm run lock where fitted. Deactivate rear blue lights.</td> <td>Cancel by press again. Any of linked system buttons. Control 5 below.</td> </tr> <tr> <td>4</td> <td>Low power</td> <td>Backlit. Illuminate when activated.</td> <td>Reduce power to 360 blue lights by 40%.</td> <td>Cancel by press again. Control 5 below.</td> </tr> <tr> <td>5</td> <td>ALL OFF</td> <td>Backlit. Change colour to green when system activated then return to backlit.</td> <td>Turn off blue lights, rear lights and all blue and red ancillary warning lights. Restore lights to full power, where low power selected. Disarm siren. Disarm run lock.</td> <td></td> </tr> </tbody> </table> <p>Table 3 – Functions of the five standardised buttons for all emergency service vehicles</p>	Control	Feature	Colour	Functions	Cancel – linked systems	1	999	Backlit. Change colour to blue when activated. Unique tactile switch surface (shape or feel).	Activate front and rear blue lights, including all blue auxiliary lights. Activate headlight flash or equivalent unless headlights are on. Arm siren, to standby. Arm run lock, where fitted.	Cancel by press again. Any of linked system buttons. Control 5 below.	2	At scene/rear protect	Backlit. Change colour to red when activated.	Activate rear blue and red lights and rear blue and red ancillary lights, where fitted. Arm run lock, where fitted. If previously activated: Deactivate front blue lights. Deactivate headlight flash or equivalent.	Cancel by press again. Any of linked system buttons. Control 5 below.	3	Front blues	Backlit. Change colour to blue when activated.	Activate front blue lights and front ancillary blue lights. Arm siren. Arm run lock where fitted. Deactivate rear blue lights.	Cancel by press again. Any of linked system buttons. Control 5 below.	4	Low power	Backlit. Illuminate when activated.	Reduce power to 360 blue lights by 40%.	Cancel by press again. Control 5 below.	5	ALL OFF	Backlit. Change colour to green when system activated then return to backlit.	Turn off blue lights, rear lights and all blue and red ancillary warning lights. Restore lights to full power, where low power selected. Disarm siren. Disarm run lock.		Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP5 - SVA esCAN Network		
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SVA_R_0203	<p>SVA Emergency Warning Controls if mounted in a horizontal position shall be fitted in the following sequence:</p> <table border="1"> <tr> <td>999</td> <td>At scene</td> <td>Front blue</td> <td>Low power</td> <td>ALL OFF</td> </tr> </table>	999	At scene	Front blue	Low power	ALL OFF	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection																											
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SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments					
SVA_R_0204	<p>SVA Emergency Warning Controls if mounted in a vertical position shall be fitted in the following sequence:</p> <table border="1"> <tr><td>999</td></tr> <tr><td>At scene</td></tr> <tr><td>Front blue</td></tr> <tr><td>Low power</td></tr> <tr><td>ALL OFF</td></tr> </table>	999	At scene	Front blue	Low power	ALL OFF	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
999														
At scene														
Front blue														
Low power														
ALL OFF														
SVA_R_0177	2.5.1.1 Re-use of Vehicle OEM Controls	Title4												
SVA_R_0055	Vehicle manufacturers have invested time and money to design vehicles that are safe and efficient to use and compliant with all relevant legislation. This includes the provision of a range of vehicle controls, located in and around the dashboard and on the steering wheel.	Information	N/A		N/A		N/A							
SVA_R_0056	When a vehicle is converted to an emergency service vehicle, a number of the functions that are normally utilised in the vehicle are not used and the vehicle controls can be made available for reuse. These often include controls that were previously used to control entertainment systems or mobile phones in the vehicle, both on the steering wheel and on the dashboard or centre console.	Information	N/A		N/A		N/A							
SVA_R_0057	The SVA system requirements allow these controls to be reused to control emergency service systems such as activation of warning equipment or activation of MDT. They are most often directly connected to the vehicle CAN bus and can be pressed into service to control emergency service equipment but only as additional controls to the standardised five buttons that control critical emergency service warning instruments. For example, OEM switchgear could be used to activate the mobile data terminal (MDT) and emergency service radio.	Information	N/A		N/A		N/A							
SVA_R_0178	Where an OEM vehicle control is used for the activation of a emergency service system such as the emergency warning lights or siren the supplier shall inform the user organisation.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis							
SVA_R_0631	Where an OEM vehicle control is used for the activation of a emergency service system such as the emergency warning lights or siren the supplier shall provide an assessment on the suitability of the control, position, look feel, functionality, safety and usability while the vehicle is being operated under emergency response conditions from an independent organisation with suitable expertise.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis							
SVA_R_0632	Where an OEM vehicle control or MDT screen is used for the activation of a emergency service system such as the emergency warning lights or siren the appropriate Emergency Warning Control shall also be activated, to provided an indication that the emergency service system has been activated.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing							
SVA_R_0185	2.5.2 Non-Critical Controls	Title3												
SVA_R_0186	In addition to the SVA Emergency Warning Controls, there may be a number of other SVA Non-Critical Controls to operate and control a range of emergency service equipment.	Information	N/A		N/A		N/A							
SVA_R_0187	SVA Non-Critical Controls can be in the form of separate switches positioned singularly, incorporated into panels, included as part of an on-screen function within a touch-sensitive screen or integrated within the functions of an MDT.	Information	N/A		N/A		N/A							
SVA_R_0188	SVA Non-Critical Controls shall be positioned separately from the SVA Emergency Warning Controls.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection							
SVA_R_0189	SVA Non-Critical Controls for functions not intended to be used by the driver while driving shall be restricted or rendered inoperable while the vehicle is in motion or clear warnings shall be provided against their unintended use.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing							
SVA_R_0664	SVA Non-Critical Controls both functions and area fitted, shall be standardised, as far as is practicable, in all vehicles.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection							

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0209	SVA Non-Critical Controls shall be positioned so that they are distinct from the Emergency Warning Controls.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0191	2.5.2.1 Separate Switch Panels or Keyboards	Title4							
SVA_R_0192	Some emergency service applications may require a separate switch panel or keyboard for the operation of the emergency equipment. Where this is absolutely necessary, in addition to the requirements for SVA Non-Critical Controls these switch panels or keyboards will meet the requirements in this section.	Information	N/A		N/A		N/A		
SVA_R_0196	Any switch panel or keyboard connected via an extension or connection cord shall be designed, constructed and installed so as to minimise the risk to any vehicle occupant, from contact under any circumstances, including during vehicle collisions.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0197	Any switch panel or keyboard connected via an extension or connection cord shall be designed, constructed and installed so as not to represent a trip hazard and to avoid the possibility of being used as a potential weapon against the occupants (for example, via strike or strangulation).	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0212	2.6 Emergency Services Roof Equipment	Title2							
SVA_R_0213	Emergency service vehicles are fitted with an array of equipment located on the roof, both in the middle or at the rear. These include: • emergency warning lights; • camera(s); and • antennae.	Information	N/A		N/A		N/A		
SVA_R_0214	Historically, each of roof mounts systems have been fitted in isolation, requiring power, control systems and data cables for them to operate. These require the cables to pass from the inside of the vehicle to the outside, requiring several holes to be cut in the vehicle roof, which can significantly reduce the resale value.	Information	N/A		N/A		N/A		
SVA_R_0217	The SVA shall group functionality and cabling together through the provision of a single connection point to the roof of the vehicle, with the location of the connection point chosen to minimise the impact on the vehicle resale e.g. the use of existing roof holes provided by the vehicle manufacturer.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0218	The SVA shall minimise the need to drill holes in the roof as far as practical by providing sufficient wiring capability (power, data and control) to additionally run at least two ANPR or other evidential cameras, with the option of additional connection points being provided if required, operationally.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0219	2.6.1 Antenna Cabling	Title3							
SVA_R_0220	Most vehicle manufacturers fit radio and GPS antennae to the roof, which will need to be replaced to achieve compliance with the SVA system requirements.	Information	N/A		N/A		N/A		
SVA_R_0221	The SVA shall provide radio network cabling to support the connection of a multi-band antenna(s) to provide radio capability for: • Emergency Service Networks (e.g. TETRA); • mobile data; • car entertainment radio (if fitted); and • GPS.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0222	The SVA shall provide an industry standard terminated connection within 150mm of the intended position of the roof mounted antennae as defined by the user organisation.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0223	The SVA shall provide 2m of appropriate RF antenna cable, un-terminated to the boot area so that it can be trimmed to length dependent on the location of equipment in this area.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0224	The GPS antenna cabling shall provide multiple connection points within the vehicle, as it is expected several systems will have to operate from a single antenna.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0226	The SVA Emergency Service Networks cabling shall permit connection and use of the emergency service radio.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0227	The mobile data antenna cabling shall provide multiple connection points within the vehicle, as it is expected several systems will have to operate from a single antenna.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0229	2.6.2 Light Bar Cabling	Title3							

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0230	The SVA shall terminate signalling and control cables for light bars with CAN industry standard quick fit connectors.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0690	The SVA shall provide signalling and control cables for light bars of the length that permits the connection to be made within the light bar.	Mandatory Requirement			Demonstration		MC/SC1101A/TSP001 TP3 - Demonstration		
SVA_R_0232	Light bar connections provided by the SVA shall also provide sufficient power, control and data (LAN) wiring capacity for at least two (2) ANPR cameras if specified by the user organisation.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0252	2.7 Human Machine Interface	Title2							
SVA_R_0059	While much of this document sets out the requirements for the physical architecture of cables and connections required to operate the emergency service equipment, the other critical area to consider is where and how the hardware is fitted in the vehicle and how the emergency service staff operate and interact with that equipment when the vehicle is: • stationary; • moving; or • being driven as part of an emergency response.	Information	N/A		N/A		N/A		
SVA_R_0060	This consideration must include both the driver and the front-seat passenger. The interaction between people and equipment is called the human-machine interface (HMI).	Information	N/A		N/A		N/A		
SVA_R_0061	One of the underpinning principles of the SVA is the creation of a safe, efficient and effective working and driving environment for the operation of all the equipment within an emergency service vehicle, including the specialised emergency service equipment.	Information	N/A		N/A		N/A		
SVA_R_0062	In order to achieve this, the SVA concept minimises any impact on the existing vehicle layout and ergonomics by focusing on the safe fitment and operation of the emergency service equipment.	Information	N/A		N/A		N/A		
SVA_R_0254	The scope of the SVA HMI system requirements is limited to the location, installation and operation of the hardware provided as part of emergency service electronic equipment fitted to the SVA in that vehicle. Specifically, this includes: • Mobile data terminal or aftermarket screens; • Emergency service equipment controls and switchgear; • Keyboards; and • Docking stations.	Information	N/A		N/A		N/A		
SVA_R_0255	It excludes the software operating on systems, the content displayed on screens, the carriage of other emergency service equipment within the passenger or load carrying area (such as bags, cones, fire extinguishers, clipboards and torches).	Information	N/A		N/A		N/A		
SVA_R_0258	2.7.1 Dedicated Emergency Service Equipment Control Screen	Title3							
SVA_R_0260	Where the SVA requires a screen to be fitted for the operation of emergency service equipment, it shall for safety be either flush mounted or recessed into the existing vehicle trim, with sufficient space behind it to comply with the new vehicle impact legislation.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0262	Where the SVA requires a screen to be fitted for the operation of emergency service equipment, it should be touch screen capable.	Desirable Requirement	3		Demonstration		MC/SC1101A/TSP001 TP3 - Demonstration		
SVA_R_0264	Where the SVA requires a screen to be fitted for the operation of emergency service equipment, it shall be located in a position agreed with the vehicle manufacturers and user organisation.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0265	Where the SVA requires a screen to be fitted for the operation of emergency service equipment, it shall be located so that a front-seat passenger can operate it.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0267	Where the SVA requires a screen to be fitted for the operation of emergency service equipment, it shall provide an on/off button, separate from the five emergency warning controls, that can be accessed by both driver and front-seat passenger.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0269	2.7.2 Docking Stations	Title3							

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0270	The SVA shall have the infrastructure to provide a docking station or equivalent connection in the vehicle for the connection of smart devices.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0671	The docking station or equivalent connection provided by the SVA shall allow docked devices to share data between the devices and the in-vehicle system.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0672	The docking station or equivalent connection provided by the SVA shall allow docked devices to use the communication capability of the in-vehicle system.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0673	The docking station or equivalent connection provided by the SVA shall allow docked devices to use their HMI software capabilities to operate the emergency service equipment attached to the SVA.	Mandatory Requirement	2		Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0271	The supplier shall agree with the vehicle manufacturer and the user organisation on the location of the docking station or equivalent connection provided by the SVA.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0274	Any docking station or equivalent connection that is within the passenger cell of the vehicle, whether the portable device is docked or not, shall be located so as not to cause risk of injury to a vehicle occupant(s) when the vehicle is in use, be that stationary, normal or high demand/emergency driving or during a collision or other event.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0275	The docking station or equivalent connection provided by the SVA shall provide a positive locking mechanism to hold the docked device or equivalent connection in place.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0276	The docking station or equivalent connection provided by the SVA shall provide the user with visual or mechanical confirmation that the device has been docked or connected correctly.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0674	The docking station or equivalent connection provided by the SVA may provide the user with an audible conformation of a docked or connected device.	Allowable Condition			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0691	If the docking station or equivalent connection provided by the SVA provides an audible conformation of a docked or connected device it shall be capable of being disabled by user.	Mandatory Requirement		Bench Test	Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0277	The docking station or equivalent connection provided by the SVA shall continuously alert the user if the docked device becomes unsecured, but not removed from the docking station, until the device is docked correctly.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0279	The docking station or equivalent connection provided by the SVA shall be designed and located so that the device can be undocked and docked in a manner that does not cause a safety hazard.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0280	Where a docking station or equivalent connection provided by the SVA in the passenger cell is used to run in-vehicle systems, connections between the device and the vehicle shall be positive locking and resistant to vibration to ensure reliable operation of on-board systems.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0281	The docking station or equivalent connection provided by the SVA shall while being used to run in-vehicle systems ensure that, while the vehicle is in motion and those systems are in operation, the device cannot be undocked without a warning being given to the user that in-vehicle systems may no longer operate effectively.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0308	2.8 Additional Functions	Title2							
SVA_R_0309	2.8.1 Camera Interfacing	Title3							
SVA_R_0310	It is intended that cameras connected to the SVA will be digital and communicate via the SVA LAN network for video data transfer and use either the LAN or esCAN for general communication and control.	Information	N/A		N/A		N/A		

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0684	The SVA shall provide standardised connections for cameras which will include as a minimum, connections to the SVA power, LAN and esCAN networks.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0311	2.8.2 Voice Activation	Title3							
SVA_R_0312	Where the SVA provides voice activated systems the supplier shall agree with the vehicle manufacturer and the user organisation on the location of the microphone, so as not to distract the driver.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0313	Where the SVA provides a voice activated system that activates a safety-related warning device, it shall also activate the visual control system.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0314	Where the SVA provides a voice activated system it shall only operate the intended system.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0315	Where the SVA provides voice activation or text to speech functionality this shall be tested by a competent organisation to ensure that it is not distracting and complies with HMI principles and regulations.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0316	2.8.3 Hands Free Operation of Emergency Service Radio	Title3							
SVA_R_0317	Where the SVA provides hands-free systems the supplier shall agree with the vehicle manufacturer and the user organisation on the location of the system.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0301	2.9 Operating Conditions	Title2							
SVA_R_0302	The SVA supplier shall provide a robust warranty / support agreement to the satisfaction of the user organisation to cater for any potential failure in the field.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0304	The SVA should be tested against its operating condition requirements by an ISO 17025 Accredited Test House.	Desirable Requirement	3		Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0675	The SVA components shall operate correctly in all weather conditions, including lightning strikes when installed externally on the vehicle.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0676	The SVA components shall operate correctly when subjected to the environmental test BS EN 60068-2-2:2007, Test B, Dry heat, maximum temperature of 85°C for 72 hours.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0677	The SVA components shall operate correctly when subjected to the environmental test BS EN60068-2-1:2007, Test A, Cold, -20°C for 72 hours.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0678	The SVA components shall operate correctly when subjected to the environmental test BS EN60068-2-78:2013: steady damp test 30°C 93% humidity 12 hours.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0679	The SVA components shall operate correctly when subjected to the environmental test BS EN60068-2-14:200-, Test N, change of temperature.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0680	The SVA components shall operate correctly when subjected to the environmental test BS EN 60068-2-6:2008 Test Fc, vibration (sinusoidal) 5 Hz to 500 Hz max amplitude 5mm peak to peak up to 3g. Frequency variation of 1 octave per minute using 10 cycles in each of 3 axes.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0681	The SVA components shall operate correctly when subjected to the environmental test BS EN 60068-2-31:2008 Test Ec, rough handling shocks, 1m drop test.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0682	The SVA components shall operate correctly when subjected to the environmental test BS EN60068-2-27:2009 Test Ea, impact resistance of sudden acceleration and deceleration, 80g for 0.1ms.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0683	The SVA components shall operate correctly when subjected to the environmental test BS EN 1363-1:2012, Fire resistance tests general requirements for Low smoke and Fumes.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0703	The SVA components shall at least have a minimum ingress protection rating of IP54 as defined by EN 60529.	Mandatory Requirement			Bench Test		MC/SC1101A/TSP001 TP6 - SVA EMC and Environmental Testing		
SVA_R_0320	2.10 Part Marking	Title2							
SVA_R_0321	Individual SVA components or systems shall be marked with the following information as a minimum: <ul style="list-style-type: none"> the SVA manufacturer's name or trade mark; the model number or name; component part number; and the serial number or batch number or date of manufacture of the SVA. 	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0707	3 SVA Non-Functional Requirements	Title1							
SVA_R_0708	3.1 Quality Assurance	Title2							
SVA_R_0618	The SVA shall be designed, manufactured and installed in accordance with BS EN ISO 9001:2000.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0709	3.2 Safety	Title2							
SVA_R_0107	The mechanical and physical properties of the SVA shall be such that it presents no unacceptable risk of danger or hazard to any person.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0109	The SVA shall, in the event of a system or component failure, not affect the performance or the safe operation of the vehicle or its components, especially with regard to brakes or steering. This is critical where the esCAN connects to the internal vehicle CAN and allows for message or command inputs.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0639	The SVA and component parts such as mountings, housings, brackets and other materials used for the installation shall be designed, located and installed so as not to cause risk of injury to any vehicle occupant under any circumstances, including during vehicle collisions.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		The supplier is to produce a safety case through using analysis/test methods to demonstrate compliance with the safety requirements.
SVA_R_0093	3.3 Legislation	Title2							
SVA_R_0094	The SVA shall be designed, manufactured and installed to comply with all relevant new vehicle legislative requirements.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0614	The SVA components shall be CE marked.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0615	The SVA components shall be E marked where applicable.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0616	The SVA shall be supplied with a certificate of conformity and associated Technical File.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0617	The SVA shall conform to the requirements of the applicable UK Health and Safety Legislation.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0097	Compliance with the SVA system requirements does not confer immunity from legal obligations. If a conflict exists between these system requirements and those of legislation, the requirements of the legislation shall take precedence.	Information	N/A		N/A		N/A		
SVA_R_0710	3.4 Availability and Reliability	Title2							
SVA_R_0106	The SVA shall have an installation and operating life of at least ten (10) years.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0295	Additional or auxiliary equipment interfacing with the SVA shall not adversely affect the normal operation of the OEM CAN.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0296	The SVA shall not degrade the performance of the vehicle, its systems or components, during the normal vehicle lifetime.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0297	3.5 System Changes and Upgrades	Title2							
SVA_R_0298	The SVA should be designed to be upgradeable, to enable future functionality, with redundant communication and power capability to allow for expansion and through standardised connections, operating systems and an open Data Dictionary.	Desirable Requirement	3		Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0516	The SVA supplier shall be responsible for documenting all changes made to the SVA system in its lifetime and consider the effect of each change with respect to compliance with the system requirements.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0519	The SVA supplier shall be responsible for reporting all failures, warranty incidents and changes made to the SVA during its lifetime to the Authority.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0711	3.6 Human Machine Interface	Title2							

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0052	The SVA HMI should comply with the guidelines specified in the European Statement of Principles on HMI (2008), (2008/653/EC) or later versions as this document is amended.	Desirable Requirement	3		Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0324	3.7 Installation	Title2							
SVA_R_0583	The SVA for each different vehicle installation shall be subject to an assessment against the Transport Research Laboratory (TRL) Checklist for the assessment of in-vehicle information systems.	Mandatory Requirement		Assessment to include no Minor or Serious Concerns.	Inspection		MC/SC1101A/TSP001 TP1 - Inspection		TRL checklist available on request
SVA_R_0584	The SVA for each different vehicle installation shall comply with the design guidelines specified in the TRL Checklist for the assessment of in-vehicle information systems.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0620	The SVA installation shall comply with the NAPFM Installation Guidelines.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0621	The SVA installation shall comply with the FCS 1362 Installation Guidelines.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0326	Installation of the OBSVA may be carried out at any of the following locations: <ul style="list-style-type: none"> • vehicle production line; • vehicle import or distribution centre; • vehicle dealer; or • independent OBSVA installer. 	Information	N/A		N/A		N/A		
SVA_R_0328	The supplier shall provide the installer a kit of components for each SVA installation.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0686	The SVA kit of components provided by the supplier to the installer should include the following: <ul style="list-style-type: none"> • SVA control equipment; • power management systems; • fixings; • brackets; • protective shields; • audible or visible indicators for change of status; • wiring harnesses; • connectors; • fuses; and • additional/optional equipment. 	Desirable Requirement	3		Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0330	The supplier shall provide a servicing and functional checking facility during the normal lifetime (10 years) of the SVA.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0331	The SVA shall be subject to a full end-to-end test by the supplier following installation, upgrade or repair to ensure correct operation.	Mandatory Requirement			Vehicle Test		MC/SC1101A/TSP001 TP7 - SVA Vehicle Testing		
SVA_R_0342	The SVA installer shall supply Certificate of Installation to the user organisation for each permanently installed SVA.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0337	3.7.1 Installation Instructions	Title3							
SVA_R_0338	The SVA shall be provided with installation instructions.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		

SYS REQ ID	Derived System Requirement	Type	Priority	Pass/Fail Criteria	Verification Method	Verification Status	Test Protocol	Responsibility	Verification Comments
SVA_R_0339	The installation instructions as a minimum should include: <ul style="list-style-type: none"> • a list of compatible vehicles; • system components; • wiring diagrams; • a schedule of routing for all wiring for that model of vehicle, as agreed with the vehicle manufacturer; • power supply voltage range and system current consumption; • the electrical characteristics of inputs and outputs; • installation directions, illustrated by photographs or clear drawings; • component installation directions – locations and orientations; • wiring installation directions; • recommended methods of wiring interconnection; • specific fixing instructions for components and wiring; • correct and incorrect vehicle circuits or systems to interface; • earthing and fusing directions; • specific detail of any adjustments and recommended adjustment procedure; • the effects of adjustable controls on SVA performance; • any special tools required; • testing of the SVA; • fault finding; • maintenance directions; and • a requirement to conduct end-to-end system test of all functionality before final commissioning. 	Desirable Requirement	3		Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0332	3.7.2 Technical Installation Requirements	Title3							
SVA_R_0333	The following technical installation requirements are specified in order to provide a minimum acceptable level of security.	Information	N/A		N/A		N/A		
SVA_R_0335	Where practical, all components and wiring of the SVA shall be concealed from view when installed, excepting visible indicators.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0336	All components and wiring of the SVA shall be securely fixed to the vehicle.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0692	3.8 Maintenance	Title2							
SVA_R_0693	The SVA shall be provided with a maintenance schedule.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0694	The SVA maintenance schedule should as a minimum detail: <ul style="list-style-type: none"> • Any special tools required; • Connection to the various networks esCAN, LAN, Power, Radio, GPS etc; • Testing of the SVA networks and controls; • Fault finding; • Maintenance directions. 	Desirable Requirement	3		Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0695	3.9 Training	Title2							
SVA_R_0696	The Supplier shall provide and agree suitable training with the user organisation on the use of the SVA to applicable users.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0712	3.10 User Documentation	Title2							
SVA_R_0322	The SVA shall be provided with user instructions.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0323	The SVA user instructions should as a minimum detail: <ul style="list-style-type: none"> • System components; • Operation of the SVA functions; • A general warning regarding the risk of making any alterations or additions to the compliant OBSVA; • Action to be taken in the event of a malfunction or failure; and • Inspection and maintenance. 	Desirable Requirement	3		Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0685	The SVA User Instructions shall contain no information on how to unset or bypass the SVA, other than by the normal un-setting control or controls.	Mandatory Requirement			Inspection		MC/SC1101A/TSP001 TP1 - Inspection		
SVA_R_0343	3.11 Supplier Compliance and Evaluation	Title2							
SVA_R_0344	The SVA shall have a Test Authority.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0345	The SVA shall go through an Evaluation Phase.	Mandatory Requirement			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		
SVA_R_0697	The SVA compliance and evaluation may be achieved through self-certification.	Allowable condition			Analysis		MC/SC1101A/TSP001 TP2 - Analysis		

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