Victorian Taxi Directorate

VICTORIAN TAXI-CAB SAFETY CAMERA SYSTEM 2009

Statement of Compliance

Department of Transport
Victorian Taxi Directorate, Level 23, 80 Collins Street, Melbourne VIC 3001 GPO Box 2797, Melbourne VIC 3001 Phone: 1800 638 802 (toll-free).
www.taxi.vic.gov.au

Victoria
The Place To Be

STATEMENT OF COMPLIANCE

Instructions:

Safety Camera System Suppliers shall complete the table starting on Page 3.

The compliance and description columns need to be completed for each row of the table. Each number in the paragraph column in the table corresponds to the paragraph in the "Function and Performance Specification for a Taxi Safety Camera 2009".

For each paragraph in the Safety Camera Specification the Safety Camera System Supplier shall:

- write "Complies", "Partially Complies" or "Does Not Comply" in the Compliance column; and
- provide a description of how the component Complies in the Description column.

Where the Compliance column contains the words "Heading" or "Information" the row of the table does not need to be completed.

References, diagrams and tables referenced in the column "Paragraph Text" may be found in the "Function and Performance Specification for a Taxi Safety Camera System 2009".

Safety Camera System Suppliers may attach additional explanatory information if the information cannot be easily included in the table.

Suppliers are also advised to view the Sample Declaration of the Statement of Compliance (Appendix A).

Please ensure that this form is included in your application.

Paragraph	Paragraph Text	Compliance	Description
1		**Heading**	**Introduction**
1.1		**Heading**	**Scope**
1.1.1		Information	
2		**Heading**	**Document History**
2.1		Information	
3		**Heading**	**Definitions and Abbreviations**
3.1		**Heading**	**Definitions**
3.1.1		Information	
3.2		**Heading**	**Abbreviations**
3.2.1		Information	
4		**Heading**	**References**
4.1		Information	
5		**Heading**	**System Construction**
5.1	The Camera System shall be constructed such that the internal components including control unit and camera housing does not have any sharp edges or protrusions that may cause injury to the taxi occupants or technician.		
5.2	Any external camera fitted to the taxi shall be constructed such that the external camera housing does not have any sharp edges or protrusions that may cause injury to the general public or obstruct the field of view of the taxi driver. External cameras must be located within the outline of the vehicle.		
5.3	The Camera System shall be designed such that any adjustment in the alignment of the camera(s) requires the use of Specialised Tools.		

Paragraph	Paragraph Text	Compliance	Description
5.4	All Camera System components, including the camera housing and Recording Unit, shall be resistant to tampering, vandalism and/or degradation of the images by intentional or accidental damage. Refer to Annex A.		
5.5	The Recording Unit shall be attached to the vehicle using tamperproof attachments, such that the Recording Unit cannot be removed from the attached position when applying 2000N tensile force. This is equivalent to a large person trying to remove the device using a one (1) metre pinch bar as a lever.		
5.6	All Camera System components shall be easily interchangeable by authorised personnel in the event of failure or damage.		
5.7	The Camera System shall use non-volatile memory to store all captured images. The use of volatile memory is not permitted.		
5.8	The Camera System shall be designed and installed such that it may be easily tested by an approved agent or approved person to ensure that the system is functioning correctly and that images are being recorded as prescribed by these specifications. The testing of the camera alignment and image quality shall be through an easily accessible test point. This test point shall not allow an unauthorised person to obtain recorded material from the Camera System.		
5.9	The Camera System with all components shall have a minimum MTBF (Mean Time Between Failure) of 50,000 hours (excluding careless or wilful damage).		
5.10	The Camera System shall be designed such that it is upgradeable to incorporate future enhancements. As far as is practicable such upgrades shall not require the replacement of system components.		

Paragraph	Paragraph Text	Compliance	Description
5.11	The main housing of Camera System shall be inscribed or imprinted with a unique serial number and the year of installation. This information is expected to be used by the regulator to retire old equipment.		
6		**Heading**	**System Environmental Requirements**
6.1	The Camera System shall be capable of functioning in the normal range of operating temperatures found within the confines of a taxi. 1. Minimum Operating Range: -5°C to +60°C; and 2. Minimum Non-Operating Range -10°C to +80°C. The non-operating range specified is that where the Camera System shall resume operation when the temperature returns to the prescribed operating range. Refer to Annex B.		
6.2	The Camera System and associated components shall be capable of functioning in the normal range of operating humidity which may be found in a vehicle operating in Victoria. As a minimum this range should be 0 to 85% Relative Humidity non-condensing. Refer to Annex B.		
6.3	The Camera System construction shall be such that the level of electromagnetic emissions does not interfere with other electronic systems on board the taxi. Conversely the Camera System shall be protected from interference from sources of electromagnetic interference found in a taxi. Refer to Annex C.		
6.4	Images from the Camera System shall be capable of being recovered following submersion in fresh water or salt water to a depth of six metres for a minimum period of seventy two (72) hours. Refer to Annex D.		

Paragraph	Paragraph Text	Compliance	Description
6.5	The Camera System shall be constructed and installed in such a manner that following a vehicle fire, all images shall be readily recoverable. Refer to Annex E.		
6.6	The Camera System shall be impact and shock resistant, sufficient to withstand a typical car accident and withstand the regular vibration experienced by a taxi. Refer to Annex F.		
6.7	Safety camera components mounted on the exterior of a taxi shall meet or exceed the IP67 rating.		
7			
7.1	The Camera System shall be able to maintain Operating Mode, without interrupting continuous image capture, with an input voltage range of at least 8 volts DC up to at least 18 volts DC, and shall be protected against reverse voltage, short circuits, and high voltage transients likely to be encountered in the vehicle's electrical system (Reference 3).		
7.2	The Camera System shall draw a maximum current of 2 amperes for each camera when taking images. The Camera System shall draw no more than 0.5 amperes in total when in Sleep Mode.		
7.3	A Camera System in Powered Off Mode shall boot and become operational within 30 seconds after stable operating power is supplied to the system.		
7.4	Should the system voltage fall below the Camera System's minimum voltage limit then the system shall be permitted to enter Powered Off Mode. The boot-up shall be logged, see section 11.5.		
7.5	The Camera System, once in Operating Mode, shall remain operational for a minimum period of thirty (30) minutes after the ignition is turned off whereupon it will go into Sleep Mode.		

Paragraph	Paragraph Text	Compliance	Description
7.6	The Camera System shall go into Sleep Mode if a door open event has not occurred for a period of six (6) hours. This requirement is included to prevent images of a crime being overwritten in the event the vehicle is dumped with the ignition left on.		
7.7	If the Camera System is in Sleep Mode, the Camera System shall wake and go into Operating Mode when either the vehicle ignition is turned on or when a door open event occurs – whichever occurs first.		
7.8	When the Camera System is powered on or the ignition is turned on the Camera System shall perform a self test and if the self test fails go into Failed Mode.		
7.9	The time for the Camera System to attain Operating Mode from Sleep Mode shall be no more than three (3) seconds.		
7.10	With the exception of the Powered Off Mode, all other Camera System Mode changes shall be logged, see section 11.5.		
7.11	The Camera System shall not include a manual on/off switch that would allow the system to be turned off or in any way disabled during normal operation.		
7.12	The connection to the vehicle power supply shall include: 1. Fitting the power connection with non removable fusing or protection; or 2. Fitting the power connection with a sealed Circuit breaker or similar.		
7.13	In the event of a re-boot the Camera System shall preserve all images captured up to the point at which the re-boot event occurred.		

Paragraph	Paragraph Text	Compliance	Description
8			
8.1			
8.2	Camera Systems will be required to be fitted to a number of different vehicle types with many differing connection points and associated signal levels. As such the supplied system shall be capable of being programmed for these differing signals and have simple interface cabling.		
8.3	The Camera System shall be connected to the vehicle power system and shall be able to detect the voltage levels provided.		
8.4	If a duress alarm is fitted to the vehicle, the Camera System shall be provided with a physical interface to the duress alarm which shall notify the Camera System of the activation of a duress event.		
8.5	If a duress alarm is not fitted to the vehicle, a switch shall be fitted as prescribed by the Regulator and activation of the switch shall signal to the Camera System that a duress event is occurring.		
8.6	The Camera System shall be able to detect an “ignition on” and “ignition off” event.		
8.7	The Camera System shall be able to detect a door event, by detection of any “door open” or “door close” (see section 12.2.1). The door status monitor shall not be dependent on unreliable vehicle components, such as interior roof lights, which may be inoperative or defective.		
8.8	For a wheelchair accessible taxi the status of the rear door(s)/tailgate shall be included in the door event detection.		
8.9	The Camera System shall be able to detect the taximeter “Hired” status.		
8.10	The Camera System shall have an inbuilt GPS receiver.		

Paragraph	Paragraph Text	Compliance	Description
8.11	Optionally, the Camera System shall be able to detect the vehicle speed.		
8.12	The Camera System shall provide one or more external interface(s) for the connection of a laptop (or similar) to allow authorised personnel to download images, configure the Camera System and to align the Cameras.		
8.13	An optically isolated NPN open collector (NPN transistor or equivalent) output, capable of sinking a minimum of 100 mA, shall toggle at a half second rate whilst the Camera System is in Operational Mode. In Fault Mode the output shall remain on, in Power Off and Sleep Modes the output shall remain off. The purpose is to provide a "health" heartbeat to other (future) taxi technology.		
9			
9.1	Fitting and installation shall include programming of the Camera System to: 1. Correctly store the identification (registration number) of the taxi that the system is being fitted to; and 2. Correctly initialise the UTC date and time that will be used to time stamp the images that are captured.		
9.2	The camera(s) shall at all times provide a clear view of the taxi driver and all forward facing passengers when seated inside the vehicle. In addition the camera(s) shall provide a view of any person approaching (from up to 3 metres and a minimum field of view of 120° relative to the driver's window) or standing at the driver's window. To meet this requirement it may be necessary to install one or more internal cameras and one or more external cameras.		

Paragraph	Paragraph Text	Compliance	Description
9.3	The camera(s') field of view shall not be obscured, or be capable of being obscured either permanently or temporarily, by any sun visor or other fitting or equipment installed inside or outside the vehicle.		
9.4	The internal camera(s) shall be readily visible to passengers in the vehicle.		
9.5	All camera(s) shall be mounted in such a manner so as to prevent intentional or unintentional misalignment of the field of view, except in the case of a vehicle accident or other severe impact.		
9.6	Optional additional internal cameras can be fitted but shall comply with image quality requirements specified for the system and shall be fitted in an approved manner and location and shall not reduce the amount of memory for images otherwise available to the camera(s) required to satisfy clause 9.2 and 12.1.3.		
9.7	The installation of the Camera System (and, any additional optional cameras and accessories e.g. supplemental lighting on "B" pillars) shall not affect the continued compliance of the taxi with all other relevant legislative requirements including: Transport Act 1983, Road Safety Act 1986 and the Australian Design Rules.		
9.8	The Camera System shall be capable of being installed in a variety of vehicles including but not limited to sedans, station wagons, high occupancy and wheelchair accessible vehicles, that are approved for use as taxis within the operating jurisdiction.		
9.9	The internal camera housing(s) shall be positioned such that passengers or drivers do not come into contact with the housing during normal operation.		
9.10	The cameras and all system components shall be installed in a manner that does not interfere with the driver's vision or view of mirrors or otherwise normal operation of the vehicle.		

Paragraph	Paragraph Text	Compliance	Description
9.11	Apart from the camera unit, internal supplemental lighting (if required) and GPS receiver/antenna, all other components of the Camera System shall be concealed.		
9.12	All cabling associated with the Camera System shall be concealed and be, as far as practicable, tamper-proof and vandal resistant.		
9.13	Signal cabling shall have appropriate characteristic impedance, attenuation and shielding necessary to meet all performance requirements.		
9.14	All components of the Camera System shall require Specialised Tools for removal.		
9.15	Installation of the Recording Unit shall include easy access to the connection point to obtain recorded material and access to the connection point shall not require any dismantling of vehicle fittings or the recorder unit. Any connection point (e.g. USB port for download) shall be protected from contamination (e.g. dirt and moisture) which would prevent easy connection and reliable operation by authorised personnel.		
9.16	The Camera System shall be provided with comprehensive installation and set up instructions in printed or electronic format including, but not limited to, the necessary information to enable the installation, commissioning and maintenance of the system. This information shall only be made available to persons approved by the Regulator.		
9.17	The Camera System shall be provided with clear and concise operating instructions, which shall take account of the needs of operators and drivers for whom English is not the first language. These instructions shall comprise printed materials, a copy of which shall be supplied with each Camera System installed.		
9.18	The Camera System shall be provided with pre-set configuration parameters. Refer to Annex G.		

Paragraph	Paragraph Text	Compliance	Description
9.19	If the Camera System has removable memory then it shall only be able to be removed by persons authorised to do so.		
10			
10.1			
10.1.1	The system shall provide full and reliable functionality in all operational and environmental conditions encountered in the normal operation of taxis.		
10.1.2	Once in Operating Mode the Camera System shall continuously record images as specified in sections 12 and 13.		
10.1.3	If it is necessary to suspend the Camera System image recording during connection to a laptop (or similar) for the purposes of image download and/or technician access, then: 1. Image capture shall only be suspended after verifying that such access is authorised (e.g. via compliant application software and user authentication); 2. The Camera System shall resume normal recording within 10 seconds of the download session or technician access terminating; and 3. The Camera System shall terminate an authorised access session after 10 minutes of inactivity (i.e. if the laptop is left unattended).		

Paragraph	Paragraph Text	Compliance	Description
10.2			
10.2.1	In the event that the Camera System cannot accurately and reliably capture images as defined in sections 12 and 13 the Camera System shall be deemed to have a system fault and be placed into Fault Mode. Reasons that the Camera System shall be placed into Fault Mode shall include, but not be limited to, the following: 1. Images are not being recorded from any camera that is supposed to be capturing images; 2. Failure to record images as described in sections 12; 3. Failure to record images of adequate quality as defined in section 13; 4. Supplemental lighting failure (if fitted); 5. GPS receiver failure; 6. Failure to receive a valid GPS location in the last 15 minutes; 7. Local time not synchronised with GPS within the last 24 hour period; 8. Failure of an interface e.g. cannot determine "Meter Status"; and 9. Self test failure.		
10.2.2	For the purposes of 10.2.1, failures which place the Camera System continuously into Fault Mode are expected to require intervention from a camera technician to resolve.		
10.2.3	The Camera System, with the exception specified on 10.2.4, shall remain in Fault Mode until all system faults are cleared and the Camera System is continuously recording images as per section 10.1.2 whereupon the Camera System shall be placed in Operating Mode.		
10.2.4	The Camera System in Fault Mode shall be placed in Sleep Mode if no activity has occurred as specified in 7.5 and 7.6.		

Paragraph	Paragraph Text	Compliance	Description
10.2.5	In Fault Mode the Camera System shall capture images if it is able to do so. For example, failure of a single camera should not stop the recording of images from other cameras or failure of supplemental lighting shall not stop the recording of images albeit with poor contrast.		
10.2.6	The Camera System shall include a "Hardware Watchdog" or similar mechanism. The watchdog shall monitor the Camera System image collection and recording. In the event that the watchdog determines the Camera System is not recording images in the prescribed manner, the watchdog shall place the Camera System into Powered Off Mode whereupon it can "re-boot" in an attempt to clear the error.		
10.3			
10.3.1	The driver and passenger(s) shall have a visual indicator showing when the system is operational and when there is a malfunction. This indicator shall be in a form approved by the Regulator. The Camera System shall incorporate the following minimum features: 1. In Sleep Mode shall have no LED display; 2. In Operating Mode shall display a Green LED, static display. In addition, when in Operating Mode the following LED displays shall occur: a. Upon entering Operating Mode the Red LED shall flash twice, b. If the Camera System is not collecting images due to image download or technician service the green light shall not be displayed; 3. In Fault Mode shall display a Red LED, oscillating flash of not less than 250 ms and not greater than 500 ms; and 4. In Powered Off Mode shall have no LED display.		

Paragraph	Paragraph Text	Compliance	Description
10.3.2	Figure 2 shows a state machine identifying Camera System mode changes and associated indicator light status.		
10.3.3	Where the Camera System is fitted with an indicator to show that it is powered on, this indicator shall be separate to those described in requirement 10.3.1, and/or of a different colour to avoid any possible confusion on the part of drivers using the system.		
10.3.4	Optionally, additional indicators may be provided but these should be designed so as to avoid confusion with the two mandatory indicators nominated in this requirement. Where optional indicators are proposed, the colour, purpose and location of each indicator shall be identified in the operating instructions.		
11			
11.1	The Camera System shall retain three logs of events which influence the camera operation and access made by an external computer or similar. These logs shall be called the “access log”, the “technician log” and the “diagnostic log”.		
11.2	The access log shall record the following events: 1. Downloading of images stored in the Camera System storage to an external computer.		
11.3	The technician log shall record the following events: 1. Setting or changing of system parameters, including the old and new values of the changed parameters; and 2. Viewing test images for installation and alignment purposes.		
11.4	The access log and the technician log shall be able to record a minimum of 100 accesses to the Camera System. If more events need to be recorded than space permits in the log, the oldest events shall be overwritten by new events.		

Paragraph	Paragraph Text	Compliance	Description
11.5	The diagnostic log shall record , as a minimum, the following events: 1. All events logged in the access log and technician log; 2. System mode changes and reason; 3. Any failure or event that prevents images from being recorded as described in sections 12 and 13.		
11.6	For each event in requirement 11.2, 11.3 and 11.5 the log file shall include, but not be limited to: 1. For Camera System access events, identification of person(s) and external computer accessing the Camera System the time and date that the access occurred and the action(s) undertaken during the entire period of t he access. 2. Identification of event start date and time and if appropriate the duration or end date and time of the event.		
11.7	The size of the diagnostic log file (one or more files) referred to in section 11.5 shall be such that any logged event shall be retained for a minimum period of ninety (90) days.		
11.8	The log files shall only be able to be modified by the Camera System.		
11.9	Suitable security measures shall be implemented to restrict viewing of the log files to only those persons authorised to view them. The log files may only be viewed by a person authorised to perform downloads or an authorised Safety Camera technician. Only these users shall only be able to read or extract the log files.		

Paragraph	Paragraph Text	Compliance	Description
12	**Heading**		
12.1	**Heading**		
12.1.1	The Camera System shall capture and store images that meet the image appearance requirements detailed in section 13.		
12.1.2	The Camera System must operate in a continuous recording mode. A continuous recording Camera System is one that records images on a fixed periodic basis independently of any external trigger. However, the Camera System is required to monitor specific tag events by means of connections to appropriate status points in the vehicle electrical system.		
12.1.3	The system shall be capable of continuously recording images for a minimum of seventy-two (72) hours).		
12.1.4	The minimum recording capacity includes all times that the camera is in Operating Mode.		
12.1.5	The maximum time interval between recording any two images per Camera is one (1) second. There is no specified minimum time interval between recording any two images. Optionally, any Camera used to provide a view of the driver's exterior door area only needs to capture images while the vehicle is stationary or near stationary.		
12.1.6	For the avoidance of doubt any reference to image tagging shall be interpreted as recording information concerning the status of the tag at the time the image is captured. When downloading or viewing any image it shall be possible to also see the associated tag event information.		
12.1.7	The Cameras shall have a maximum (time duration) effective shutter speed of 1/25 second.		

Paragraph	Paragraph Text	Compliance	Description
12.1.8	In accordance with Australian Standard AS 4806.2 (Reference 6) for facial identification, the stored image shall record a minimum of 360 pixels per metre both horizontally and vertically at the target. Where the target is a normally seated passenger, a normally seated driver, or a person outside the taxi standing up to one (1) metre away from the drivers window.		
12.1.9	The Camera System shall store images with a minimum of 256 greyscale levels.		
12.1.10	The camera shall capture monochrome images. The use of colour images is permitted, subject to the camera providing an equivalent image resolution and quality to that of a monochrome camera in normal lighting conditions and the camera reverting to monochrome operation in low light conditions.		
12.1.11	The recording system shall be configured such that the recording medium shall automatically commence re-recording once the medium has reached its recording capacity. The oldest image(s) shall be overwritten first.		
12.1.12	The captured images and any associated metadata shall be authenticated using an authentication coding scheme suitable for evidentiary substantiation. An internationally recognised authentication scheme is preferred.		
12.1.13	The images, including the authentication coding created in 12.1.12, shall be stored as encrypted data which is not readily decrypted into a clear image without using the Download Program. Images shall not be stored in non-volatile memory without being encrypted. An internationally recognised encryption algorithm is preferred.		

Paragraph	Paragraph Text	Compliance	Description
12.1.14	The supplier shall take reasonable steps to ensure that any encryption keys or proprietary algorithms, used to satisfy clause 12.1.13, are protected from unauthorised use. The supplier shall use recognised industry standard key management practices to prevent unauthorised persons obtaining the keys or algorithms for the purpose of viewing images.		
12.2	**Heading**		
12.2.1	The system shall be capable of monitoring the status of any door in the taxi. When the first of any door, including the driver's door, is opened, the system shall tag all images immediately following the door opening with a suitable status message such as "Door Open". Tagging shall continue until such time as the last door is closed.		
12.2.2	The system shall be capable of monitoring the taxi duress alarm. Activation of the taxi duress alarm shall tag all images immediately following the activation of the duress alarm for the next 5 minutes with a suitable status message such as "Duress".		
12.2.3	The system shall be capable of monitoring the taximeter. The Camera System shall tag all images from Flagfall to Meter Cleared with a suitable status message such as "Meter On" and all images from Meter Cleared to Flagfall with a suitable message such as "Meter Off".		
12.3	**Heading**		
12.3.1	Each image shall be tagged with the location (latitude and longitude) and time that the image was captured.		
12.3.2	The location tag of latitude and longitude referred to in 12.3.1 shall be provided by the inbuilt GPS receiver in the Camera System.		

Paragraph	Paragraph Text	Compliance	Description
12.3.3	If a valid location tag of latitude and longitude referred to in 13.7 cannot be temporarily ascertained (e.g. in an underground car park or tunnel) the location tag shall be deemed to be uncertain.		
12.3.4	For the purpose of 12.3.3, valid shall mean when the 2D 2DRMS of the position message is less than 25 (a HDOP of approximately 12 metre). This means a 95% confidence that the actual location will be within a circle of 25 metre radius from the reported position.		
12.3.5	The time tag referred to in 12.3.1 shall be provided by the Camera Systems internal time reference and shall indicate whether the time is valid.		
12.3.6	The Camera System's internal time reference which is used to time stamp images shall be corrected for local drift by regular synchronisation to the UTC time stamp of the GPS source. If the internal time reference has not been corrected within the last 24 hours it is deemed to be uncertain.		
12.3.7	The time reference shall not exhibit local drift of more than ten (10) seconds in a 24 hour period.		
12.4	**Heading**		
12.4.1	The Camera System shall be able to record audio within the interior of the taxi. Camera Systems supplied to the Victorian Taxi Market shall have the audio recording system disabled.		
13	**Heading**		
13.1	The resolution and clarity of the recorded image from the camera(s) shall be maintained under all lighting conditions from darkness (no light in the visible spectrum) through to bright sunlight.		

Paragraph	Paragraph Text	Compliance	Description
13.2	All forward facing occupants of the vehicle are to be clearly visible in the captured images taken from the internal camera(s). For the purposes of clarification, clearly visible means that any normally seated forward facing person occupying any seat in the taxi must be clearly identifiable, in the captured image. For each occupant the captured image shall include their entire upper body from the waist to the head.		
13.3	The stored image, (after accounting for lens optical degradation, filtering, compression and quantisation effects) shall provide high quality images when printed on a laser printer. These images shall allow the identification of people in the taxi or approaching the driver's window, in ambient lighting ranging from darkness (0 lux – expected to require supplemental lighting) through to bright sun-light (100,000 lux). Refer to Annex H.		
13.4	The camera lenses shall have an auto iris or electronic auto-exposure adjustment facility such that image clarity is not adversely affected by light fluctuations.		
13.5	Supplementary lighting, if fitted, may be used to enhance the resolution of persons which are being silhouetted by an external light source being directed into the camera lens.		
13.6	The lenses fitted to both internal and external cameras shall be capable of maintaining images in focus at any distance between 300 mm and 3 metres from the lens.		

Paragraph	Paragraph Text	Compliance	Description
13.7	All downloaded images (either displayed on a computer terminal or printed) shall include in their rendering the following information: 1. Location, both the latitude and longitude to a precision of better than five (5) metres determined from the GPS tag, or "No Fix" if the GPS location is uncertain; 2. Timestamp, the date and time determined from the timestamp tag, to a precision of 1/100 second, appended with an "*" (asterisk) or similar symbol if the Camera System is uncertain; 3. Duress tag value; 4. Meter tag value; and 5. Door open tag value.		
13.8	For the purposes of clarification the information referred to in this requirement should be positioned within the image such that it does not obstruct the view of any occupant in a seated position within the vehicle or a person standing outside the driver's window.		
13.9	For the avoidance of doubt, the information specified in requirement 13.7 shall be clearly visible when viewing the image in its electronic format using the Download Software. In addition the information shall be clearly visible on any images that are printed or exported to external media. In the case of external media it shall be possible to view the image plus related information concerning the taxi, date time and location using industry standard image viewing software. Refer to item 14.4 for details of the types of file format to be supported.		

Paragraph	Paragraph Text	Compliance	Description
14	**Heading**		
14.1	The supplier of the Camera System shall provide Download Software, to the Regulator, for the secure download and viewing of images from the Camera System. Use of this software shall be the only method of downloading images from the Camera System. Download Software shall not be provided to any unauthorised persons.		
14.2	The time taken for the download of images stored in the Camera System memory shall not exceed fifteen (15) minutes per camera for 24 hours of images. For the purposes of clarification the 15 minutes includes the time required to download the encrypted image files for a specific Camera System to the download (laptop) computer and the time taken to decrypt them into a clear format for image viewing purposes.		
14.3	The Download Software shall download encrypted images from the Camera System to the download computer. Any downloaded images required for evidentiary purposes need to be saved to external disk media in both encrypted and unencrypted form.		
14.4	It shall be possible to export images recovered from the Camera System to an external media in both encrypted and unencrypted format. The unencrypted images shall be formatted using formats including, but not limited to industry standards JPEG and BMP.		
14.5	Download of images shall be able to be specified with a starting time granularity in one (1) hour increments and a download time period in one (1) hour increments. For example, by specifying "2008-06-01, 4am, 4 hours"; all images acquired during the period 2008-06-01 from 4am-8am will be downloaded.		

Paragraph	Paragraph Text	Compliance	Description
14.6	The software referred to in clause 14.1 shall be able to operate on a COTS (Commercial Off The Shelf) laptop computer.		
14.7	The image downloading software shall provide a log of all access to the software by users. Events to be logged, with a date and timestamp to a precision of one (1) second, shall include: 1. Logon of each user; 2. Connecting to a Camera System; 3. Downloading images stored in the Camera System memory; 4. Attempted modification or manipulation of image files stored on the downloading computer; 5. Printing images stored on the downloading computer; and 6. Exporting images stored on the downloading computer to an external media file.		
14.8	For each event in requirement 14.7 the image software download log file(s) shall include, but not be limited to, identification of persons accessing the downloading software, the time and date that the access occurred and the action(s) undertaken during the entire period of the access. The size of the software download log file shall be such that the any logged event shall be retained for a minimum period of twelve (12) months.		
14.9	The log file referred to in requirement 14.7 and 14.8 shall be stored in non-volatile memory on the downloading computer and shall be protected against unauthorised access. The supplier shall take reasonable steps to prevent deletion of the log file(s) or any individual entry in the log using the downloading software or any other software provided by the manufacturer to authorised persons.		

Paragraph	Paragraph Text	Compliance	Description
14.10	It shall not be possible to download images using Download Software from a Camera System in another Jurisdiction (for example: a Victorian authorised download officer shall not be able to download images from a NSW taxi camera. This requirement extends to prevent downloading images taken by a Camera System installed in a Victorian taxi on supplier's downloading software in another State or Territory).		
14.11	The supplier's Download Software shall be password protected to prevent the unauthorised viewing, recovery or reproduction of images. Where an image is stored on the hard drive of a computer, access to the image shall be protected by password so that it cannot be viewed, copied, printed or otherwise reproduced by an unauthorised person.		
14.12	The Download Software shall be able to determine if an image has been manipulated in any way whilst held on the Camera System or on another external storage medium by reference to the authentication coding held with the image.		
14.13	It shall be possible to print images recovered from the Camera System on a standard laser printer using the Download Software.		
14.14	The use of image compression techniques is permitted subject to the image resulting from the application of image compression meeting the relevant evidentiary requirements for legal action.		
14.15	The Download Software shall provide the authorised download officer with the ability to easily locate the images required. A sample list of facilities expected to be available are: 1. Display images from a camera in time order; 2. Single image step forwards or backwards); 3. Fast play forwards (multiple images per second);		

Paragraph	Paragraph Text	Compliance	Description
	4. Display of filtered tagged event data by time and date; 5. Jump to start, end, time of day or specific tagged images; 6. Jump by preset increments (typically one minute and 10 minutes); 7. Pause; 8. Synchronous display of images of all cameras on a split screen; 9. Image zoom; 10. Selection of appropriate images for exporting and printing; and 11. Display timestamps in Australian Eastern Standard Time or Australian Eastern Daylight Savings Time.		
ANNEX A **Resistance to Vandalism**	The purpose of requirement 5.4 is to ensure that the construction of the Camera System is such that it will provide reasonable protection to the images that are stored in the memory. The Regulator does not specify particular tests that need to be successfully undertaken in order to meet this requirement. The supplier may optionally provide details of any testing that has been undertaken to provide resistance to vandalism.		
ANNEX B **Range of Operating Temperatures**	The purpose of requirements 6.1 and 6.2 is to ensure that the complete Camera System has been tested to ensure that it will operate reliably in a range of temperatures and humidity that will be experienced in a taxi. It is expected that Camera Systems that are being nominated for approval in Victoria will have been tested to ensure that they will be meet this requirement. The supplier is to provide details of the testing that has been undertaken to meet this requirement together with test results.		

<table>
<tr>
<td>ANNEX C
Electromagnetic Compatibility</td>
<td>
The purpose of requirement 6.3 is to ensure that the complete Camera System has been tested to ensure that it will not interfere with other electronic systems found in a taxi or that other electronic systems will not cause the system to operate unreliably. It is required that the supplied equipment conform to applicable Australian Electromagnetic Compatibility standards current at the time of supply of the Camera System.
The current applicable standards are AS/NZS CISPR 25:2008, ISO 10605:2001 and ISO 7637-2:2004 (References 1–3).
The Camera System shall meet the following acceptance levels:
1. Reference 1, AS/NZS CISPR 25:2008: Level 3, ISO Class A;
2. Reference, ISO 10605:2001: Level IV, ISO Class A; and
3. Reference 3, ISO 7637-2:2004:
<table>
<tr><th>Camera System</th><th>Discharge</th><th>Network</th><th>Level</th></tr>
<tr><td>Unpowered</td><td>Contact</td><td>150pF/2kΩ</td><td>±8kV</td></tr>
<tr><td></td><td>Air</td><td>330pF/2kΩ</td><td>±15kV</td></tr>
<tr><td>Powered</td><td>Contact</td><td>150pF/2kΩ</td><td>±8kV</td></tr>
<tr><td></td><td>Air</td><td>330pF/2kΩ</td><td>±25kV</td></tr>
</table>
Recording Unit, ISO Class B;
Camera, ISO Class C; and
Supplementary Lighting (if fitted), ISO Class C
The ISO Failure Mode Severity Classifications are:
(A) All functions of the device or system perform as specified during and after exposure to interference.
(B) All functions of the device or system continue to functionally perform during exposure; however some functions may go beyond specified tolerance. All functions return automatically to within specification after exposure is removed. Memory function shall remain class A.
</td>
<td></td>
<td></td>
</tr>
</table>

	(C) Device or system may not perform correctly during exposure but will return automatically to within specification after exposure is removed. The supplier is to provide details of the testing that has been undertaken to meet this requirement together with test results.		
ANNEX D **Submersion Protection**	The purpose of requirement 6.4 is to ensure that the image storage unit can withstand immersion in saline or fresh water for a minimum period of three days. This simulates the potential effect of a taxi being accidentally or deliberately submersed in water. A specific test methodology to prove compliance is not prescribed but the following is provided for guidance: 1. A test duration of 72 hours should be seen as a minimum requirement, longer test periods are encouraged; 2. A 5% saline solution should be used for the test; and 3. The test may be executed by completely immersing the Recording Unit in a 6m column of saline water; or 4. The test may be executed by completely immersing the Recording Unit in a small volume of water and using an external pressure source to raise the water pressure to the required level (approximately 59 kPa). The testing should ensure that images stored in the Recording Unit prior to immersion are successfully recovered at the end of the test period. It is preferred that the test should be made on the image store in-situ within the Recording Unit rather than stand-alone. The supplier is to provide details of the testing that has been undertaken to meet this requirement together with test results.		
ANNEX E **Resistance to a**	The following minimal standards/tests are defined in the interests of setting an objective specification		

Vehicle Fire	for the Recording Unit to be deemed as being able to provide "Resistance to Vehicle Fire". This specification is based on the lowest temperature tests defined in ASTM E119 and UL 72. The Storage Component (optionally including the Camera System and/or the Recording Unit) may be certified as fire resistant to 538^{0}C (1000^{0}F) as per ASTM E119 methodology or equivalent certification . Alternatively the Camera System can be tested using the Basic Fire Test as described below. The Basic Fire Test comprises the following steps: 1. A furnace is to be heated to 538^{0}C (1000^{0}F); 2. The Storage Component (either by itself or housed in the Camera System or Recording Unit) is to be placed in the furnace; 3. After five (5) minutes at 538^{0}C (1000^{0}F) the furnace is switched off; and 4. The equipment is immediately removed from the furnace. Once the storage unit is removed from the furnace (and allowed to cool to room temperature) the information that was contained on the storage unit prior to it being placed in the furnace must be recovered. The supplier is to provide details of the testing that has been undertaken to meet this requirement together with test results.		
ANNEX F **Impact and Shock Resistance**	The purpose of requirement 6.6 is to ensure that the Camera System image storage can withstand the vibration that will be experienced during the normal operation of a taxi. In addition the image storage components of the Camera System are expected to survive the shock waves that are experienced during a vehicle impact event, such as a moving traffic accident. The current applicable standards are IEC 68-2-6 method 514.5 and IEC 68-2-27 method 516.5 (Reference 7).		

	The supplier is to provide details of the testing that has been undertaken to meet this requirement together with test results.		
ANNEX G **System Parameter Setting**	The purpose of this requirement is to ensure that Camera Systems are not installed incorrectly. The Camera System should be supplied so that minimal configuration by the installation technician is required. The installation technician should only be required to physically install the Camera System, connect to the appropriate tag points, initialise the vehicle number, install the GPS antenna, connect to the battery, confirm that the cameras are aligned and verify the Camera System is operating correctly. The supplier is to provide details of the installation procedures to the Regulator.		
ANNEX H **Image Verification**	The purpose of this test is to provide a minimum test for the quality of image produced by the Camera System. The image quality test has two parts: a test under static conditions with objective measurement of the results and dynamic a test under mobile conditions with subjective measurement of the results. **Static Test** The static test needs to be conducted with a CCTV test card that supports AS 4806.2 requirements with at least 10 linear greyscale gradations and a DoT supplied test card. The static tests shall be conducted in a controlled environment (a laboratory) by following the steps detailed below: 1. Set the laboratory temperature in the range of 25°C to 30°C; 2. Set up a Camera System with its supplemental lighting in the laboratory – but do not turn it on; 3. The camera shall be set for the standard fixed focal length and field of view to be used in an actual vehicle installation; 4. Locate the test chart on a stand perpendicular		

	to the camera field of view centre line at the prescribed distance; 5. Set the laboratory room to the prescribed lighting level; 6. Turn the Camera System on; and 7. Once the Camera System has reached a stable state, record some images. The test should be performed for the combination of each lighting level and each distance specified below. The static test shall use the following lighting levels (to be verified by measurement with a calibrated lux meter at the target test card): 1. Near total darkness <0.1 lux; 2. Suburban side street lighting approximately 1 lux; 3. City street lighting – approximately 10 lux; 4. Fading light -approximately 100 lux; 5. Office Lighting – approximately 1,000 lux; 6. Shade in bright sunlight – approximately 10,000 lux; and 7. Bright daylight on a clear day – approximately 100,000 lux. The static test shall use the following distances: 1. View of front passenger – 500 mm; 2. View between front passenger and rear passenger – 1000 mm; and 3. Rear seat passenger – 1500 mm. 4. The captured images shall be recovered using the image Download Software and printed to a laser printer at least 600 dpi resolution. Each of the images captured during the tests shall: 1. Provide an image resolution of at least 360 pixels per metre vertically and horizontally; 2. Using the DoT supplied test card be able to clearly identify the four (4) distinct lines at the 400 TVL mark both vertically and horizontally. 3. Provide a dynamic range for the greyscale		

	blocks of at least 200 out of 256. Or 80% of the greyscale range if more than 256 greyscales are used. Dynamic range is defined by: average block value of maximum block – average block value of minimum block; 4. Be able to clearly identify each of the grey scale blocks on the AS4806.2 compliant test card. **Dynamic (Mobile) Test** The dynamic tests shall be conducted on a system installed in a standard sedan commonly used as a taxi to closely reflect real life day and night conditions and allow a mobile test. With the system installed in a vehicle, three test drives shall be undertaken in a suburban area: 1. Once in the middle of the day; 2. Once at evening twilight; and 3. Once at night. Each test drive shall include: 1. An approach to the driver window by at least two people abreast; 2. Passengers entering and leaving the taxi; and 3. Ten (10) minutes of driving whilst passengers move around and look at each other and out various windows in a random manner whilst the taxi drives at 50 km/h or as driving conditions allow. The drive route shall comprise a circuit to ensure all sun or lighting angles are captured. At the start of the circuit the lighting levels should be measured with the lux meter. The captured images shall be recovered using the image Download Software and a selection of images printed to a laser printer of at least 600 dpi resolution. The images captured during each test shall: 1. Show that all persons remain in focus during the trip. There should be no significant degradation caused by the movement of the vehicle and the changing lighting conditions;		

	2. Show that the images of the faces shall not be significantly degraded or rendered unidentifiable by flaring, image darkening or wash out caused by changing lighting conditions. The supplier is to provide details of the testing that has been undertaken to meet this requirement together with test results.		
ANNEX I	Information		

Appendix A: Sample Declaration

STATEMENT OF COMPLIANCE

SECURITY CAMERA SYSTEM

I, ……

(PLEASE PRINT NAME)

being an authorised representative of:

……

(NAME OF COMPANY)

……

(ADDRESS OF COMPANY)

……POSTCODE……

hereby state that my/the company's Safety Camera System conforms to the Function and Performance Specification for a Taxi Safety Camera System 2009 as stated in the attached Statement of Compliance.

This Safety Camera System is, subject to receiving the approval of the Victorian Taxi Directorate, proposed to be available for supply to the Victorian taxi market. The make and model of this Safety Camera System is listed below:

Make/Model ……..

I certify the above information to be true and correct.

Dated this ……day of ……..2009

Signature

……