



Taxi-cab security camera specifications and approval process

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1 Introduction

In late 2001, the Victorian Government mandated the installation of taxi-cab security camera systems (camera system) in all taxis which operate in the Metropolitan and Urban and Large Regional zones to improve safety for taxi-cab drivers and members of the public and for law enforcement purposes.

On 23 December 2016, the Taxi Service Commission published Taxi-Cab Security Camera Specifications (the Specifications) in the Government Gazette. All security cameras fitted in taxis operating in the Metropolitan and Urban and Large Regional zones must comply with the Specifications.

This is the *Taxi-Cab Security Camera Specifications and Approval Process 2016*.

This document:

- identifies the minimum requirements that, if met, will result in approval for that camera system to be installed in Victorian taxis
- outlines the process for a camera system supplier to seek approval from the Taxi Services Commission (TSC).

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2 Purpose of the Specifications

The philosophy guiding the *Taxi-Cab Security Camera Specifications 2016* is to focus on required outcomes, without being overly prescriptive or solution oriented. The camera specifications outline the minimum requirements for approval of a taxi-cab security camera system.

Applicants are encouraged to develop innovative ways of meeting (or exceeding) the functional and technical requirements of the camera specifications, and to submit them to the TSC for consideration.

Additional functionality may be accommodated within the camera system, subject to approval by the TSC.

Approval will not be granted if the additional functionality could degrade the integrity and operation of the camera system.

3 Authorising environment

Transport (Buses, Taxi-Cabs, and Other Commercial Passenger Vehicles) (Industry Accreditation and Other Matters) Regulations 2017:

Regulation 19 Taxi-cab specifications

- (1) The licensing authority may determine and publish in the Government Gazette specifications with which a taxi-cab, or a taxi-cab or a particular class, must comply in relation to the following –
 - (a) fare calculation devices;
 - (b) accessibility and safety in respect of wheelchair accessible taxi-cabs;
 - (c) security cameras.



4 Taxi-cab security camera specifications

1	Definitions
	Camera means the component of the camera system that captures images of the driver, passengers, etc. and will be separate from the control unit which contains the security camera logic and stores the images collected by the camera.
	Camera System means all the security camera components as a whole including but not limited to: control unit, recording unit, camera heads, cables and any other components required to make the system operate correctly.
2	Camera system environmental requirements
2.1	The camera system must be operational in an environment over: <ul style="list-style-type: none"> a. a temperature range of -5°C to +60°C, b. a humidity range of 0 to 85 per cent relative humidity, non-condensing.
2.2	The camera system must be impact and shock resistant, sufficient to withstand the vibration experienced during the normal operation of a taxi-cab.
2.3	Images must be capable of being recovered following loss of power to the camera system.
2.4	Any camera system connection points and components mounted to the exterior of a taxi-cab must meet or exceed the IP67 rating.
3	Camera system operation
3.1	The camera system must be powered and fully operational when the vehicle ignition is on.
3.2	The boot time for the camera system from 'power on' to recording images must be less than 30 seconds.
3.3	The camera system must not allow any person to turn off or in any way disable the camera system.
3.4	The camera system must have a visual indicator showing when the system is operational and when there is a malfunction. The visual indicator must be visible to the driver when seated in the normal driver position.
3.5	When 'powered on' the camera system must employ a self-test methodology to automatically detect and report functional faults.
3.6	The camera(s) (other than a camera fitted to the exterior of a vehicle) must be visible to passengers in the vehicle.



3.7	The camera(s) (other than a camera fitted to the exterior of a vehicle) must at all times provide a clear view of the taxi-cab driver and all passengers when seated in the vehicle, including their entire upper body from the waist to the top of the head.
3.8	The external camera(s) must provide a view of any person approaching (from 2.4 metres and a minimum field of view of 70 degrees relative to the driver's window) or standing at the driver's window).
3.9	A camera system must be capable of one of the following: <ul style="list-style-type: none"> a. record a minimum of 5 frames per second for each camera head connected to the camera system b. continuously record images if it is a video recorder.
3.10	The camera system must record continuously and store images for at least 72 hours.
3.11	The camera system must use non-volatile memory to store all captured images. If the camera system has removable memory then it must only be able to be removed by authorised persons.
3.12	The recording system must be configured so that the recording medium automatically commences re-recording when the medium has reached its recording capacity. The oldest images or footage must be overwritten first.
3.13	The camera system must continue to record for a period of 30 minutes after the ignition has been turned off.
3.14	The camera system must log all: <ul style="list-style-type: none"> a. faults b. times the camera system has been accessed c. software updates d. image downloads.
4	Images
4.1	Images from camera systems must comply with section 3.7 (Recommended object sizes) of Australian Standard AS 4806.2—2006 for closed circuit television (Part 2; Application guidelines) in relation to face identification of the driver and all passengers in the taxi under all lighting conditions.
4.2	Images from the internal camera system must have a minimum resolution of 400 TV lines at 1.5 metres.
4.3	Images from the external camera must have a minimum resolution of 250 TV lines at 2.4 metres.



4.4	The resolution and clarity of the recorded images from a camera must be maintained under all lighting conditions from darkness (0 lux) through to bright sunlight (100,000 lux).
4.5	All images (either displayed on a computer device or printed) must have imprinted on them the following metadata (without obstructing the view of any occupant in a seated position in the vehicle): <ul style="list-style-type: none"> a. the vehicle registration number b. date and time in UTC within one second c. location in coordinates of latitude and longitude accurate to within 25 metres 95 per cent of the time.
5	Accessing images
5.1	Access to camera system images must be restricted to: <ul style="list-style-type: none"> a. the supplier / agents of the supplier (for installation and maintenance purposes only) b. persons authorised under section 158B of the Transport (Compliance and Miscellaneous) Act 1983.
5.2	A person who supplies a camera system must provide software and operating instructions to the TSC that enables its authorised officers to access and download images from the camera system.
5.3	The software provided by the supplier must be able to operate on a commercial off-the-shelf computer device or the supplier must provide a download system to the TSC.
5.4	The download software must be password protected to prevent unauthorised viewing, recovery or reproduction of images.
5.5	If an image is stored on the hard drive of a computer, access to the image must be password protected so that it cannot be viewed, copied, deleted, printed or otherwise reproduced by an unauthorised person.



5 Camera system approval process

The camera system supplier is required to provide a comprehensive written submission to the TSC that includes the following:

- a completed *Taxi-cab Security Camera System Approval Application Form* (Appendix A)
- technical specifications of the proposed camera system
- a *Statement of Compliance* (Appendix B), certified by an independent third party who is suitably qualified to assess the system and test it 'as fit for purpose' being compliant with the specification. The third party must not be affiliated with or otherwise connected to the supplier
- results from image verification tests
- evidence the supplier can provide reliable installation and maintenance services
- evidence that the supplier is appropriately licensed under the *Private Security Act 2004* (Vic).

5.1 Statement of Compliance

The supplier is required to provide the TSC with a completed statement of compliance, which details the camera system's compliance with each of the specification requirements.

The completed statement of compliance must include a description of *how* the camera system meets each requirement, rather than merely stating that it 'complies' with the requirement. An example is provided below:

Specification 2.1.5: Any camera system connection points and components mounted to the exterior of a taxi-cab must meet or exceed the IP67 rating.

The camera system XYZ is compliant with specification 4. The camera system uses external camera head ABC which has an IP67 rating. Attached is camera head ABC's technical information sheet.

The statement of compliance must be certified by a relevant independent third party.

The TSC may have applications reviewed by external technical consultants.

The TSC reserves the right to request additional information or testing to validate claims made in the statement of compliance.

5.2 Camera system suppliers

The TSC must be satisfied that the person or company is of good repute and meets the 'fit and proper' requirements to supply camera systems.

All persons seeking approval must provide evidence that the supplier is appropriately licensed under the *Private Security Act 2004* (Vic).

Applicants are required to provide a business address where the core business activities are conducted (camera system records are stored and where the manager can be contacted). A post office box is not acceptable, other than for the receipt of correspondence.



5.3 Image verification test

The purpose of the image verification test (Appendix C) is to provide a minimum test for the quality of images produced by the camera system. The image quality test has two parts:

- a set of tests under static conditions with objective measurement criteria
- dynamic tests under mobile conditions with subjective assessment of the results.

The TSC will provide two test charts to determine whether an image is deemed to meet the person identification and dynamic range requirements (Appendix D).

5.4 Installation and maintenance

The TSC must be satisfied that the person or company is able to provide appropriate and reliable services and facilities (either directly or through agents) to support camera system installation and maintenance in taxis and provide ongoing training and technical support for TSC authorised officers.

The supplier will be required to:

- provide and maintain reasonable stocks of replacement components across Victoria
- provide technical support for the camera system and the TSC.

The following information must be provided as part of the supplier's submission:

- details on the arrangements and documented procedures to install, maintain, service and test the camera system
- schedule of fees to install and support the camera system.

5.5 Assessment process

The TSC's Operational Policy team will receive submissions from suppliers and assess if they meet the specifications.

Applications may be independently reviewed by an external technical consultant engaged by the TSC. The technical consultant will provide advice to the TSC about the compliance status of the application against the specifications. The TSC may request further information and a product demonstration as part of the assessment process. After due consideration of the application, the Operational Policy Team will make a recommendation to the Director, Strategy and Innovation Division.

The Director, Strategy and Innovation Division will decide whether or not to grant approval based on the camera system's ability to perform as required by the specifications and the supplier's ability to provide ongoing support for the camera system and TSC download officers.

If approved, the camera system supplier will be notified in writing of the decision and the camera system will be listed on the TSC website as an approved camera system.

If the camera system is not approved, the supplier will be notified in writing of the reasons the camera system was not approved. The supplier will be given 20 business days to provide additional supporting evidence. The TSC will consider any additional supporting evidence provided by the supplier before it finalises its determination of the application.

5.6 Conditions of approval

The following are standard conditions of approval for any supplier. The TSC reserves the right to amend or include further conditions of approval.



- The camera system supplier agrees to supply, install and maintain their camera system for any taxi in Victoria, regardless of location.
- The camera system supplier will provide reasonable stocks of replacement components for the camera system in Victoria commensurate with the number of taxis that the camera system is installed in.
- An approved supplier must inform the TSC within five business days if any of the following circumstances occurs:
 - change to the approved camera system supplier's name or address
 - change to the approved camera system supplier's business or trading name
 - change to the information provided to the TSC for the purposes of gaining approval of the camera system or affecting the accuracy of the particulars provided in the approval.
- The camera system supplier will provide technical support in Victoria for the camera system, including training and support for taxi operators, drivers, and TSC authorised officers.
- Each camera system must be provided with clear and concise printed operating instructions. These instructions must be provided when a camera system is installed.
- The camera system supplier will train TSC authorised officers in the use of camera system downloading processes and supply supporting documentation on how to perform a camera system download. This will be free of charge for the initial implementation of a camera system.
- The camera system supplier will provide camera system download software and any subsequent software updates free of charge to the TSC.
- The camera system supplier must keep and maintain a register of all vehicles in which they have installed their camera system. This register must include the:
 - operator name and accreditation number
 - vehicle registration
 - software version number.
- The camera system supplier must keep a register of the people that have been provided with access codes to the camera system. This register must include:
 - their name, address and phone number
 - the reason why the person was given the access codes (i.e. installation and maintenance).
- The approval of the camera system is limited only to the camera system provided in the submission. Any material changes to the camera system will require the camera system supplier to provide a statement of compliance certified by a relevant independent third party for consideration by the TSC to issue a new or amended approval.
- The TSC may revoke the approval if it reasonably believes:
 - the camera system no longer complies with approved specifications
 - the camera system no longer complies with the approval given
 - the supplier of the camera system has breached a condition of its approval.



- If the specifications are amended, the camera system supplier must (at its own cost):
 - ensure the camera system complies with the amended specifications
 - ensure that any camera system already supplied by the camera system supplier is modified or updated as appropriate to comply with the amended specifications
 - if required, provide the TSC with evidence that the camera system is compliant with the amended specifications.



6 Glossary / Definitions

Table 1 - Definitions and abbreviations

Term	Meaning
Camera system	Taxi-Cab Security Camera System
IP67	An IP (Ingress Protection) rating is an international standard that shows you the level of ingress protection. IP67 Rating means that the device is resistant against water ingress to a maximum of 1 metre of water for up to 30 minutes, as well as protected against dust ingress.
Licensing authority	Taxi Services Commission
Relevant independent third party	<p>A person with an engineering qualification in one of the following fields:</p> <ul style="list-style-type: none"> • electrical • information • telecommunications • electronics engineering.
Specifications	Requirements set out in section 4 of this document.
TSC	Taxi Services Commission
TV lines	Television lines (TVL) is a specification of an analog camera's or monitors' horizontal resolution power. It is alternatively known as Lines of Horizontal Resolution (LoHR) or lines of resolution.
UTC	Coordinated Universal Time
Visual indicator	A visual display inside the taxi that indicates the operational status of the camera system that can be seen from the normal driver position.



7 Related information

AS 4806.1-2006 - Australian Standard Closed Circuit Television (CCTV) Part 1 Management and Operation -2015

Australian and New Zealand Police Recommendations for CCTV Systems – Australian and New Zealand Policing Advisor Agency

International Protection Marking, IEC standard 60529

Private Security Act 2004 (Vic)

Transport (Miscellaneous and Compliance) Act 1983

Transport (Buses, Taxi-Cabs, and Other Commercial Passenger Vehicles) (Industry Accreditation and Other Matters) Regulations 2017



8 Appendix A – TSC Taxi-Cab Security Camera Approval Application Form



9 Appendix B – TSC Taxi-Cab Security Camera Statement of Compliance



10 Appendix C – Image verification test

Static test

The static test needs to be conducted with test cards provided by the Taxi Services Commission (TSC).

The static test 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(s) on a stand perpendicular to the camera field of view to be used in an actual vehicle installation
5. set the laboratory room to the prescribed lighting level
6. turn the camera system on
7. once the camera system has reached a stable state, take two photos in the following light levels and distances.

The static test shall use the following lighting levels which are to be verified by measurement with a calibrated lux meter at the target test card:

1. near total darkness <0.2 lux
2. suburban side street lighting 0.5 — 1.5 lux
3. office lighting 500 — 1,500 lux
4. bright daylight on a clear day 50,000 — 100,000 lux.

The static test must use the following distances:

1. for the internal camera with a front and back seat view of the sedan type of vehicle – 1,500 mm
2. for the external camera – 1,000 mm.

The captured images shall be recovered using the image download software and printed to a laser printer of at least 600 dpi resolution.

Each of the images captured during the test must:

1. provide an image resolution of at least 360 pixels per metre vertically and horizontally
2. use the TSC supplied test cards to clearly identify the four distinct lines at the 400 TVL mark both vertically and horizontally
3. use the TSC supplied test card to clearly identify the 10 large shaded patches.



Dynamic (mobile) test

The dynamic test must be conducted on a camera system installed in a standard sedan commonly used as a taxi¹ to reflect the normal operating conditions of a taxi.

Three test drives must be undertaken in a suburban area:

- one in the middle of the day
- one at evening twilight
- one at night.

Each test drive must include:

- an approach to the driver's window by at least two people abreast
- passengers entering and leaving the vehicle
- thirty minutes of driving while passengers move around such as looking at each other and out various windows randomly while the vehicle is driven 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 must 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 must:

- 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
- show that the images of the faces must 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 the static and dynamic (mobile) test requirements outlined above, as well as the test results.

¹ The camera system is not to be installed in a taxi for testing purposes.



11 Appendix D – Image verification test charts

