

Stops, Depot, Substations: CCTV System Site Acceptance Test Procedure

Capital Metro Project

6.2 CCTV System Functional and Operational Test Procedures

6.2.1 Stops CCTV Fixed Camera Functional, Operational and Coverage Test.

Part (A) Purpose:

The purpose of the first part of this test is to ensure all CCTV cameras installed at stops are functional and operational. Control from OCC and BOCC is not in scope of that test and the cameras will be tested using a laptop, connected to a port that accesses the CCTV network.

Part (A) Test Procedure:

1. Using the laptop's web client, login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release. The IP address and network settings shall be in accordance to the IP plan. The firmware release shall be the latest one released (tested for compatibility with the Genetec CCTV Server)
2. From the main "Live" tab, check the camera resolution and fps for the live stream. Resolution shall be 1920x1080 pixels at 25 frames per second. Check for on-screen display of Camera ID, time and Date.
3. From the main "Live" tab, check the camera display. Video image shall be displayed clearly on the monitor with no interruptions.
4. With reference to the Stops' CCTV Coverage Report, check if the camera is targeted to the specified location. Should any fine adjustments to the lens are required, go to installer menu and fine tune the lens Focus and Zoom adjustments.
5. Check Time synchronisation to the central Master Clock.
6. The test shall be carried out for each Stop.

Part (B) Purpose:

The purpose of the second part of this test is to validate that the CCTV system provided supports 1920x1080 resolution (High Definition) even after encoding/decoding and holds the capacity to be used for facial identification. This test is to be executed only for a single camera.

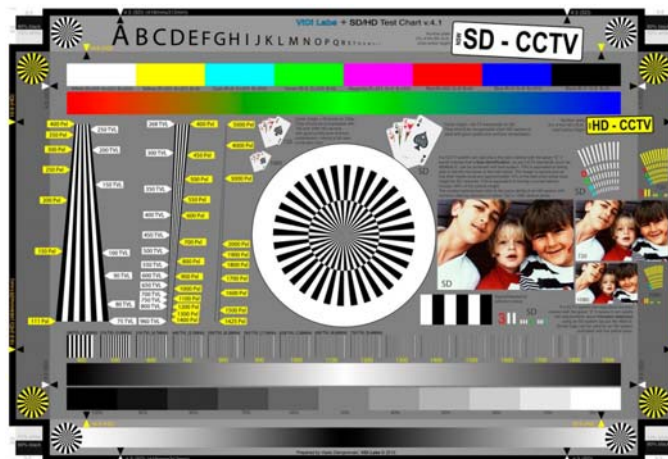


Figure 1: CCTV test board layout

Part (B) Test Procedure:

1. The CCTV test board is required to be placed on a fixed stand (tripod or similar) in such a way that it covers the full visible window of the camera, which has its lens configured. Further details on the test board usage can be found in Appendix B. Natural lighting shall be used.
2. Check the live video and confirm the necessary detail level and information can be distinguished (kids' faces and yellow vertical lines, next to letter C, on the 1080 HD demarcated board area).

Part (C) Purpose:

The purpose of the third part of this test is to ensure that the CCTV system provides the performance and level of coverage required to achieve the operational objectives set in the SPR requirements and the CCTV coverage reports. Main focus of this test is to check the coverage level and the system performance at the most critical locations which are summarized below:

- facial and body characteristics recognition for all people entering / exiting the platforms
- facial and body characteristics identification for all people using the HPs.
- facial and body characteristics recognition for all people using the ticketing machines, inside the platform boundaries.
- people monitoring for all people being inside the platform boundaries.

The standard used is the AS 4806.2, but with adjustment to suit High Definition CCTV systems (equivalent to the criteria of EN 62676-4: 2015).

Part (C) Test Procedure:

The test will require two persons: The first would be looking at the laptop (*), being able to view live CCTV image. The second person will be standing at the stop platform, at the various target locations where the CCTV coverage is subjected to test. With reference to the CCTV coverage reports (ref. documents [12], [13], [14] and [15]), it is preferable that the second person is standing to the furthest end of the target area. For example, when testing the identification zone of camera CTV01 of an island stop, with regards to figure 2 below (extracted from reference document [13]), the person would be standing at position B.

(*) Note: The laptop is required to have large screen, supporting 1920 x 1080 resolution. If that is not available, then the verification can be done by extraction of video recording and presenting them on a large monitor supporting 1920 x 1080 resolution.

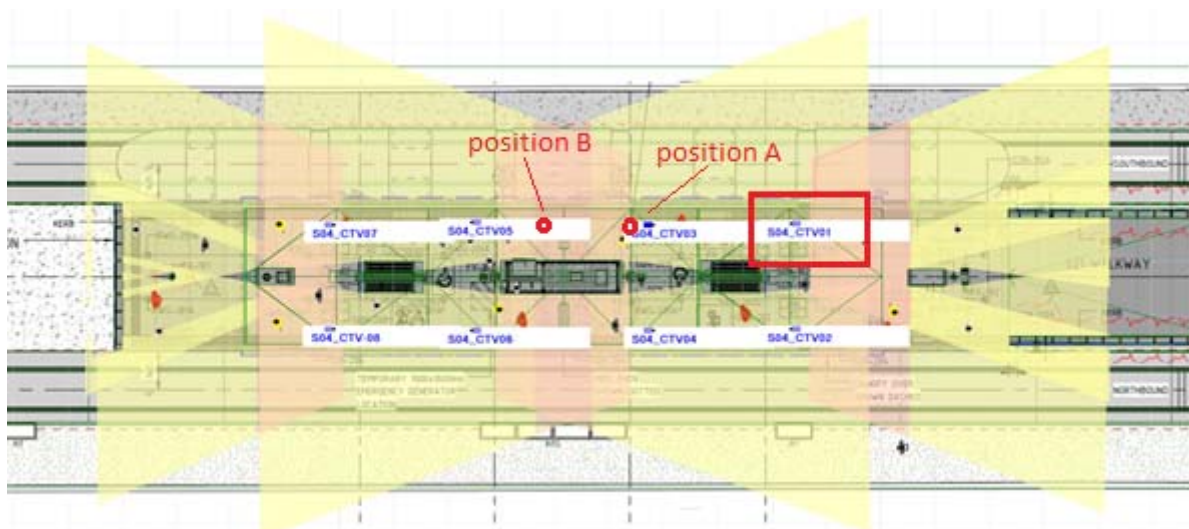


Figure 2: CCTV Coverage layout of an island stop

1. Person to stand at position B.
2. Take a snapshot of the camera view with its final configuration (camera position, lens settings etc). Snapshot of camera view is successfully captured and a printout will be also attached to the SAT Report.
3. View the snapshot taken and compare it to the predicted camera view of the relevant CCTV coverage report (ref. documents [12], [13], [14] and [15]). The views shall look similar.

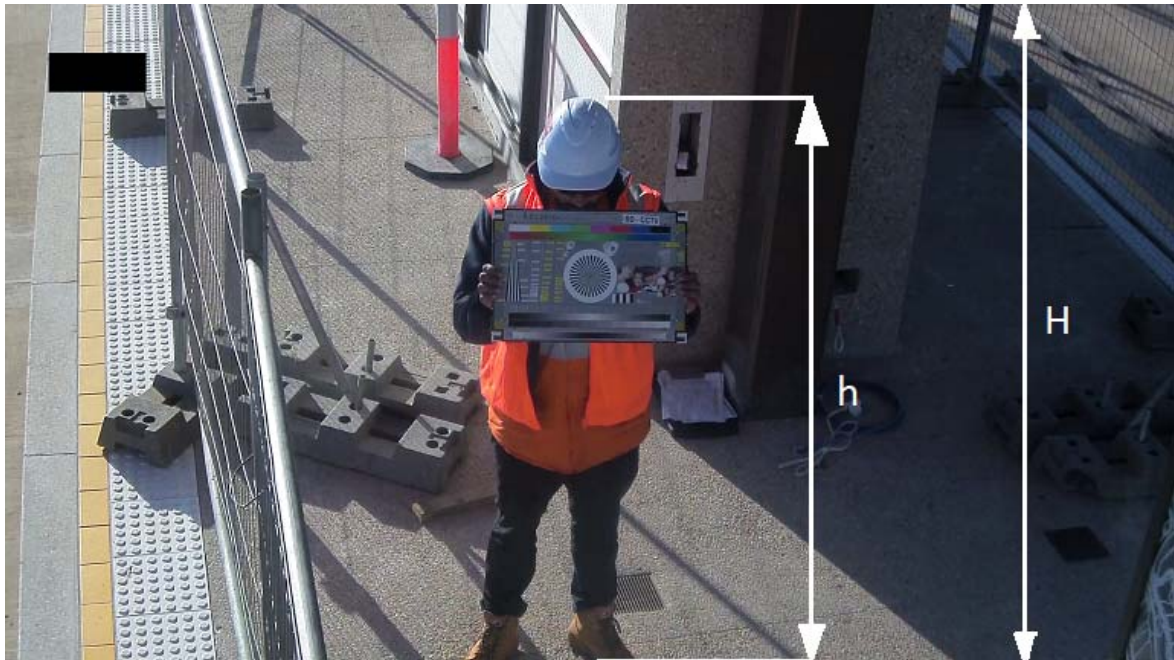


Figure 3: CCTV camera view snapshot

4. Analyse the snapshot taken. On the printed snapshot, measure the distance of heights **h** (height of the person, as presented on the screen) and **H** (height of the total camera view). Then, calculate the **h / H** ratio. For the figure 3 example, the **h / H** ratio is about **0.85**. Total number of vertical pixels on the used resolution (1920x1080) is 1080. The vertical pixels that are allocated to the height of the person are: $0.85 \times 1080 = 918$.
5. The height of the person shall be known. Assuming that the real person's height (including boots and hard hat) is 1.90m, then, the pixel density equals: $918 / 1.90\text{m} = 483 \text{ ppm}$ (pixels per meter).

NO	ZONE	DESCRIPTION	PPM (rounded)
1	Identification	To enable identification of an individual or object beyond reasonable doubt and record high quality facial image.	242 / (250)
2	Recognition	To enable the operator to determine with a high degree of certainty whether or not an individual/object shown is the same as someone they have seen before.	121/ (125)
4	Detection	To enable the operator to reliably and easily determine whether or not any target is present.	24/ (25)
5	Monitoring	To enable viewing of the number, direction and speed of movement across a wide area, providing presence is known to the operator.	12/ (12)

6. For each Operational Objective (Identification to Monitoring), the value of the calculated ppm shall be greater or equal to the ones on the table above. In the given example, the 483 ppm allows for very strong identification, which is expected, as the man is standing about one meter in front of the Help point area and the identification zone extends about 4m beyond that position.
7. The test shall be carried out for each camera /Stop.
8. The Test Record Sheet below is to be completed.

	Using the snapshot, calculate the ppm for the person standing inside the <u>recognition</u> zone near the <u>FLRs</u> position.	the calculated value is _____ ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the <u>recognition</u> zone near the <u>entry/exit</u> platform zone	the calculated value is _____ ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input type="checkbox"/>
S01_CTV05	Login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release.	Camera IP address is in accordance to the IP plan. Firmware installed is the latest release.	<input type="checkbox"/>
	From the main "Live" tab, check the camera resolution and fps for the live stream.	Resolution is 1920x1080 pixels at 25 frames per second.	<input type="checkbox"/>
	From the main "Live" tab, check the camera display. If the camera needs adjustment, go to installer menu and fine tune the lens Focus and Zoom adjustments.	Camera is targeted to the specified location and live video image is displayed clearly on the monitor.	<input type="checkbox"/>
	Check Time synchronisation.	Time and Date is synchronised to Master Clock.	<input type="checkbox"/>
	Take a snapshot of the camera view (to be attached to the test report).	Snapshot of camera view is successfully captured. Camera view shall look similar to the predicted one from the coverage report.	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the <u>recognition</u> zone near the <u>FLRs</u> position.	the calculated value is _____ ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the <u>recognition</u> zone near the <u>entry/exit</u> platform zone	the calculated value is _____ ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
S01_CTV06	Login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release.	Camera IP address is in accordance to the IP plan. Firmware installed is the latest release.	<input type="checkbox"/>
	From the main "Live" tab, check the camera resolution and fps for the live stream.	Resolution is 1920x1080 pixels at 25 frames per second.	<input type="checkbox"/>
	From the main "Live" tab, check the camera display. If the camera needs adjustment, go to installer menu and fine tune the lens Focus and Zoom adjustments.	Camera is targeted to the specified location and live video image is displayed clearly on the monitor.	<input type="checkbox"/>
	Check Time synchronisation.	Time and Date is synchronised to Master Clock.	<input type="checkbox"/>
	Take a snapshot of the camera view (to be attached to the test report).	Snapshot of camera view is successfully captured. Camera view shall look similar to the predicted one from the coverage report.	<input type="checkbox"/>

Defect: CCTV SAT - S01_CTV05 needs to be rotated left to correct view.

S03_CTV03	From the main "Live" tab, check the camera display. If the camera needs adjustment, go to installer menu and fine tune the lens Focus and Zoom adjustments.	Camera is targeted to the specified location and live video image is displayed clearly on the monitor.	<input type="checkbox"/>
	Check Time synchronisation.	Time and Date is synchronised to Master Clock.	<input type="checkbox"/>
	Take a snapshot of the camera view (to be attached to the test report).	Snapshot of camera view is successfully captured. Camera view shall look similar to the predicted one from the coverage report.	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the recognition zone near the FLRs position.	the calculated value is 160 ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the recognition zone near the entry/exit platform zone	the calculated value is 147 (150) ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
S03_CTV04	Login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release.	Camera IP address is in accordance to the IP plan. Firmware installed is the latest release.	<input type="checkbox"/>
	From the main "Live" tab, check the camera resolution and fps for the live stream.	Resolution is 1920x1080 pixels at 25 frames per second.	<input type="checkbox"/>
	From the main "Live" tab, check the camera display. If the camera needs adjustment, go to installer menu and fine tune the lens Focus and Zoom adjustments.	Camera is targeted to the specified location and live video image is displayed clearly on the monitor.	<input type="checkbox"/>
	Check Time synchronisation.	Time and Date is synchronised to Master Clock.	<input type="checkbox"/>
	Take a snapshot of the camera view (to be attached to the test report).	Snapshot of camera view is successfully captured. Camera view shall look similar to the predicted one from the coverage report.	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the recognition zone near the FLRs position.	the calculated value is 147 (150) ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the recognition zone near the entry/exit platform zone	the calculated value is 130 ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
S03_CTV05	Login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release.	Camera IP address is in accordance to the IP plan. Firmware installed is the latest release.	<input type="checkbox"/>
	From the main "Live" tab, check the camera resolution and fps for the live stream.	Resolution is 1920x1080 pixels at 25 frames per second.	<input type="checkbox"/>

	Take a snapshot of the camera view (to be attached to the test report).	Snapshot of camera view is successfully captured. Camera view shall look similar to the predicted one from the coverage report.	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the identification zone near the Help Point position.	the calculated value is _____ ppm, which is equal or better to 250ppm . The operational objective to identify facial and body characteristics is met	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the recognition zone near the ISC Ticket Vending Machine position.	the calculated value is _____ ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input type="checkbox"/>
S13_CTV02	Login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release.	Camera IP address is in accordance to the IP plan. Firmware installed is the latest release.	<input type="checkbox"/>
	From the main "Live" tab, check the camera resolution and fps for the live stream.	Resolution is 1920x1080 pixels at 25 frames per second.	<input type="checkbox"/>
	From the main "Live" tab, check the camera display. If the camera needs adjustment, go to installer menu and fine tune the lens Focus and Zoom adjustments.	Camera is targeted to the specified location and live video image is displayed clearly on the monitor.	<input type="checkbox"/>
	Check Time synchronisation.	Time and Date is synchronised to Master Clock.	<input type="checkbox"/>
	Take a snapshot of the camera view (to be attached to the test report).	Snapshot of camera view is successfully captured. Camera view shall look similar to the predicted one from the coverage report.	<input type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the identification zone near the Help Point position.	the calculated value is 200 ppm, which is equal or better to 250ppm . The operational objective to identify facial and body characteristics is met	<input checked="" type="checkbox"/>
	Using the snapshot, calculate the ppm for the person standing inside the recognition zone near the ISC Ticket Vending Machine position.	the calculated value is _____ ppm, which is equal or better to 125ppm . The operational objective to recognize facial and body characteristics is met	<input checked="" type="checkbox"/>
S13_CTV09	Login to the webpage of the camera. Check the Camera name and ID, the network settings and the firmware release.	Camera IP address is in accordance to the IP plan. Firmware installed is the latest release.	<input type="checkbox"/>
	From the main "Live" tab, check the camera resolution and fps for the live stream.	Resolution is 1920x1080 pixels at 25 frames per second.	<input type="checkbox"/>
	From the main "Live" tab, check the camera display. If the camera needs adjustment, go to installer menu and fine tune the lens Focus and Zoom adjustments.	Camera is targeted to the specified location and live video image is displayed clearly on the monitor.	<input type="checkbox"/>
	Check Time synchronisation.	Time and Date is synchronised to Master Clock.	<input type="checkbox"/>

Defect: CCTV SAT - S13_CTV02 needs to be mounted lower and the CCTV tilted up to get the face in the camera view and zoomed in to get 250ppm for Help Point view.