WHITE PAPER

Connectivity and power consumption in Axis body worn cameras

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AXIS COMMUNICATIONS

Summary

AXIS Body Worn Live enables body worn camera wearers to stream live video and audio over Wi-Fi® or mobile networks, allowing operators to view footage in real time. With live location tracking and remote stream activation, operators can also view the geographical position of cameras on a map and initiate live streaming remotely.

The operating time of the camera is more or less shortened when you use these connectivity features. It will also be shorter if you use a higher video resolution for streaming or recording, if the camera is in considerable motion while streaming, or if you use the self-hosted option, AXIS Body Worn Live Self-hosted.

Streaming over a mobile network (LTE) requires more power than streaming over a Wi-Fi network. This means that the operating time will be considerably longer if you use a Wi-Fi connection instead of LTE, under the same conditions.

We've measured the approximate operating time for AXIS W120 Body Worn Camera with varying levels of connectivity usage. The baseline operating time, without any connectivity features enabled, was 15 hours for the settings used.

Test results:

- Light use of connectivity features: 13 hours with LTE, 14 hours with Wi-Fi.
- Moderate use of connectivity features: 11 hours with LTE, 13 hours with Wi-Fi.
- Heavy use of connectivity features: 7 hours with LTE, 10 hours with Wi-Fi.

We recommend that you conduct a proof of concept to test specific use cases and operating times in your actual environment.

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1 Introduction

Body worn cameras are essential tools for law enforcement, security personnel, and other professionals who require reliable, hands-free recording capabilities. Axis has developed advanced body worn cameras with robust connectivity features to ensure seamless data transmission and real-time monitoring.

This white paper explores the connectivity features of Axis body worn cameras and their impact on power consumption. We highlight considerations and best practices to optimize connectivity and power consumption, so you can make sure your camera's battery lasts a full work shift.

2 Streaming over Wi-Fi or mobile networks

With AXIS Body Worn Live, body worn camera wearers can stream live video and audio over Wi-Fi® or mobile networks. Operators can view the live video.

Some cameras have the option for both Wi-Fi and mobile connectivity, while some are Wi-Fi only. The connectivity type and the signal strength of the network affect power consumption and operating time significantly.

Mobile networks provide reliable data transmission in areas without Wi-Fi. Streaming over a mobile network, however, requires more power than streaming over a Wi-Fi network. This is especially the case if the network signal is weak so that the camera must struggle to maintain a connection. If the signal is strong, data transmission is more efficient, and power consumption is lower.

There can also be variations in power consumption depending on the network provider. This is based on differences in network technology.

If the camera is in considerable motion while streaming, the operating time will be shorter. This is because the movement increases the streaming bandwidth.

3 Live streaming image quality

Choosing a higher video resolution for streaming or recording considerably shortens the operating time of the camera.

4 Live location tracking

With live location tracking, operators can view the geographical position of cameras on a map. You can choose to show cameras that are currently recording or streaming, or all cameras that are undocked.

This feature uses location data through Global Navigation Satellite Systems (GNSS). Live positioning takes place continuously, so this has some effect on the camera's power consumption.

5 Remote stream activation

With remote stream activation, an operator can initiate live streaming remotely. If this feature is set to "Always", operators can start live streams at any time, as soon as the camera is undocked. With this setting, the camera is continuously connected to the Wi-Fi or mobile network even in idle mode. This consumes extra power, especially on a mobile network.

6 Axis-hosted or self-hosted live streaming

When you set up AXIS Body Worn Live, you have two hosting options:

Axis-hosted – hosted in a secure Axis cloud environment. This consumes less battery power than the self-hosted version. Data is transmitted every second.

AXIS Body Worn Live Axis-hosted is based on MPEG-DASH (Dynamic Adaptive Streaming over HTTP), an adaptive bitrate streaming technique and an international standard for delivering high-quality video and audio over the internet. MPEG-DASH breaks content into small chunks and delivers them via standard HTTP, allowing smooth streaming because players can adapt the quality in real-time based on network conditions.

Self-hosted – hosted by you on your own network, integrated directly in your preferred VMS. Data is sent continuously. This achieves low latency but consumes 20% more power than the Axis-hosted option.

AXIS Body Worn Live Self-hosted is based on WebRTC. Once the connection has been established, the body worn camera uses an encrypted peer-to-peer connection to stream live video to the WebRTC client.

7 Wireless broadcast (Bluetooth)

Wireless broadcast (Bluetooth) allows cameras to activate recording on other cameras that belong to the same body worn system and that are located nearby. Extensive use has an impact on operating time.

8 Battery consumption tests

We've conducted tests on how a new camera's operating time is affected by the connectivity features.

We guarantee 85% capacity of a battery up to 500 charge cycles.

8.1 Test setup

- Camera: AXIS W120 Body Worn Camera
- Recorded image quality: 720p
- Live streaming image quality: 720p
- Power line frequency: 60 Hz
- Pre-buffer: 60 s
- Operating time (idle mode, no connectivity): approximately 15 hours

8.2 Use cases

We've defined three use cases for the testing:

- **Light use.** No live streaming, GNSS updates every 5 minutes.
- **Moderate use.** Live streaming 30 minutes per shift, remote stream activation set to "Always", GNSS updates every 5 minutes.
- **Heavy use.** Continuous live streaming, camera moving, GNSS updates every 5 seconds.

8.3 Results

General recording reduces operating time slightly.

Live streaming using the self-hosted option generally consumes more battery power than the Axis-hosted option, under comparable conditions.

Live streaming over mobile network (LTE):

An LTE connection has a significant impact on operating time, especially when combined with GNSS.

- Light use results in approximately 13 hours operating time.
- Moderate use results in approximately 11 hours operating time.
- Heavy use causes a major reduction of operating time, down to approximately 7 hours.

Live streaming over Wi-Fi:

A Wi-Fi connection consumes less battery power than LTE connection when combined with GNSS.

- Light use results in approximately 14 hours operating time.
- Moderate use results in approximately 13 hours operating time.
- Heavy use causes a major reduction of operating time, down to approximately 10 hours.

This means that the operating time is considerably longer with Wi-Fi connectivity than with LTE, under the same conditions.

9 Recommendation

We recommend conducting a proof of concept to test specific use cases in the actual environment.

About Axis Communications

Axis enables a smarter and safer world by improving security, safety, operational efficiency, and business intelligence. As a network technology company and industry leader, Axis offers video surveillance, access control, intercoms, and audio solutions. These are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 5,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden.