

## APPLICATION NOTE

# Electromagnetic Compatibility for Open Housing Alvium Cameras

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## Scope

**Open housing** Alvium cameras do not comply with standards for electromagnetic compatibility (EMC), because the open camera back enables electromagnetic interference between the camera and other electronic devices.

Allied Vision has demonstrated the fulfillment of the requirements relating to the Alvium USB **closed housing** cameras with

- Directive 2014/30/EU (Electromagnetic compatibility)
- 47 CFR Part 15 Subpart B, Class B (FCC Class B)
- CAN ICES-3 (B) / NMB-3 (B).

This document shows how EMC housings enable EMC compliance for **open housing** Alvium cameras.

## EMC best practice

For maximum effect, all requirements below should be fulfilled. You may adjust depending on your application.

- Ensure adequate grounding, especially if other electronics are included in the same housing with the camera: Chassis ground must be connected.
- Enable galvanic ground connections: Mounting plate and mounting screws must be free from paint.
- Use a closed housing made of conductive metal.
- Use only shielded cable outlets or connectors.
- Use only shielded cables.



### Ensure heat dissipation

For a proper housing design, see the Optimum Heat Dissipation for Housed Alvium Cameras application note at:

[www.alliedvision.com/en/support/technical-documentation.html](http://www.alliedvision.com/en/support/technical-documentation.html)  
under **Additional documents** for Alvium CSI-2 or USB cameras.

## Avoid large ground paths

Large ground paths can cause severe electromagnetic interference (EMI) between the camera and other electronic devices of your system. The camera and devices can even be damaged. We recommend you to:

- Connect all grounds to a common power outlet.
- Ensure a common ground level for all devices of your system.

## Presumption of conformity

We did not declare conformity for the test setup because we will not introduce it as a product to the market. However, tests were passed successfully, which proves that the test setup fulfills the requirements to comply with the following directive and standards:

### Directive 2014/30/EU

For the directive 2014/30/EU, we have tested according to the following standards:

- EN 61000-6-2:2005
- EN 61000-6-3:2007
- EN 61000-3-2:2006
- EN 61000-3-3:2008.

### FCC Class B

We have tested according to 47 CFR Part 15 Subpart B, Class B (FCC Class B) regulations.

### CAN ICES-3 (B) / NMB-3 (B)

We have tested according to CAN ICES-3 (B) / NMB-3 (B) regulations.

## Test setup with an EMC housing

For the test setup, the camera connects to an embedded board by an FPC cable, while the embedded board connects to a host PC by an Ethernet cable. The EMC housing encompasses the camera and the embedded board, the power supply cable and the Ethernet cable are fed through dedicated outlets of the housing.

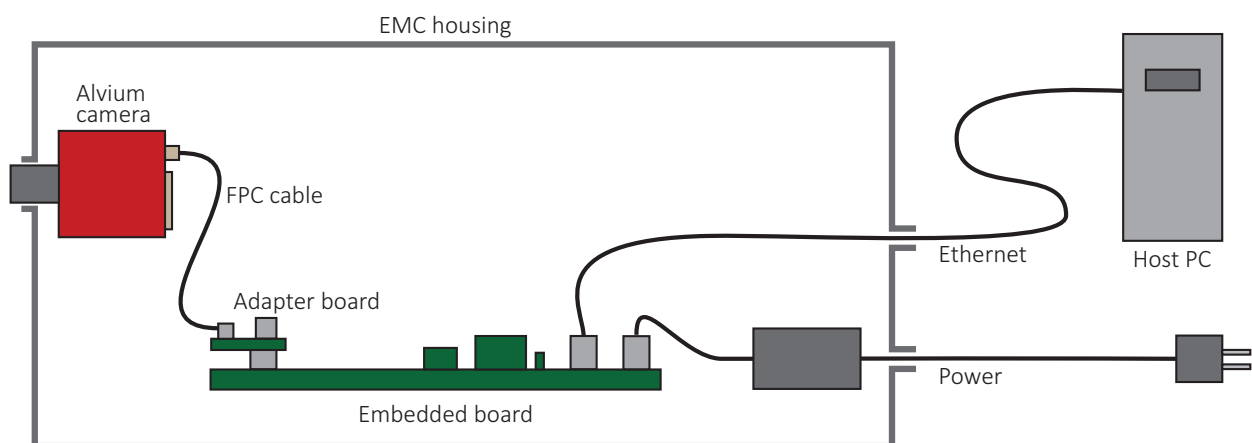


Figure 1: Testing EMC compliance for open housing Alvium CSI-2 cameras

## Bill of materials

Component	Allied Vision Product code	Product	Details
Camera	11491	Alvium 1500 C-050c   open housing   C-Mount	Model with ON Semiconductor PYTHON 480 color sensor
Embedded board	n.a.	Boundary Devices Nitrogen6_MAX Nit6Q_MAX_QCA_BRD i.MX6 Quad	Third-party product
Adapter board	12314	Nitrogen6_MAX adapter board	Allied Vision accessory
MIPI CSI-2 FPC cable	12316	MIPI CSI-2 FPC cable 120 mm	Allied Vision accessory
Power Supply	n.a.	Samsung USB charger ETA-U90EWEGSTD	Third-party product
Ethernet cable	n.a.	Ethernet CAT 6A	Third-party product
Ethernet connector	n.a.	RJ45 IK01754 inline coupler	Third-party product
Housing	n.a.	Universal enclosure 222 × 146 × 82 mm Aluminium by Hammond Electronics Product code 1550Z220	Third-party product

Table 1: EMC compliance test for open housing Alvium USB cameras | bill of materials

## Conclusion

The test setup shows that Alvium open housing cameras can be designed into applications to be EMC compliant. We recommend you to stick firmly to [EMC best practice](#) recommendations for an EMC compliant design.

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