Test Report issued under the responsibility of:

The following sample(s) was/were submitted and identified on behalf of the client as:

TEST REPORT

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)

Report Reference No. ..... :	GZES190401537302
Tested by (name + signature) ..... :	Ben Tang
Approved by (+ signature) ..... :	Anlay Dong
Date of issue ..... :	2019-04-29
	Amendment-1 2019-6-28
Total number of pages ..... :	22
Testing Laboratory ..... :	**SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch**
Address ..... :	198 Kezhu Road, Science City, Economic & Technology Development Area, Guangzhou, Guangdong, China
Applicant's name ..... :	Hangzhou Hikvision Digital Technology Co., Ltd
Address ..... :	No.555 Qianmo Road, Binjiang District, Hangzhou 310052, China
Test specification:	
Test procedure ..... :	Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)
Non-standard test method..... :	None
Test Report Form No. ..... :	EN50155_D
Test Report Form(s) Originator ..... :	SGS-CSTC
Master TRF ..... :	2018-2-28

Test item description.....:	Network Camera
Model/Type reference .....:	DS-2XM6756G0-IS/ND, DS-2XM6756G0-IS/NDUHK, DS-2XM6756G0-IS/NDCKV, DS-2XM6736G0-IS/ND, DS-2XM6736G0-IS/NDUHK, DS-2XM6736G0-IS/NDCKV, DS-2XM6726G0-IS/ND, DS-2XM6726G0-IS/NDUHK, DS-2XM6726G0-IS/NDCKV, DS-2XM6756G0-IM/ND, DS-2XM6756G0-IM/NDUHK, DS-2XM6756G0-IM/NDCKV, DS-2XM6736G0-IM/ND, DS-2XM6736G0-IM/NDUHK, DS-2XM6736G0-IM/NDCKV, DS-2XM6726G0-IM/ND, DS-2XM6726G0-IM/NDUHK, DS-2XM6726G0-IM/NDCKV
Ratings .....:	Powered by stabilized PoE (36 – 57 Vd.c.)
Brand name.....:	HIKVISION
Manufacturer.....:	Same as applicant
Factory .....:	Hangzhou Hikvision Technology Co., Ltd. No.700, Dongliu Road, Binjiang District, Hangzhou Ctiy, Zhejiang, 310052, China Hangzhou Hikvision Electronics Co., Ltd. No.299, Qiushi Road, Tonglu Economic Development Zone, Tonglu County, Hangzhou, Zhejiang, 310052, China Chongqing Hikvision technology Co., Ltd. No. 118, Haikang Road, Area C, Jianqiao Industrial Park, Dadukou District, Chongqing.

Summary of testing:

The sample(s) in this report has considered and complied below mandatory tests and requirements according to Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017).

When determining the test conclusion, the Measurement Uncertainty of test has been considered.

Model DS-2XM6756G0-IS/ND was selected for test as representative.

Stabilized PoE power source was used for test, all the performance checks were carried out at both 36Vd.c. and 57Vd.c. input.

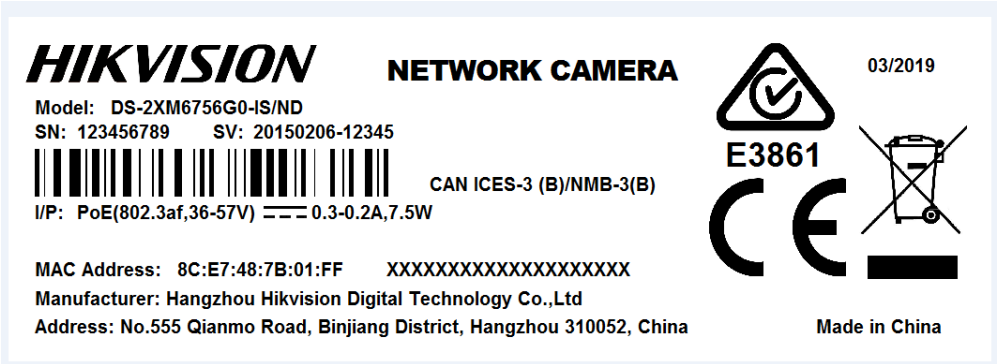
Tests performed:

Selected verdict	Sub-clause	Test name	Reference test method standard
☒	13.4.1	Visual inspection test	--
☒	13.4.2	Performance test	--
☐	13.4.3	Power supply test,	--
☒	13.4.4	Low temperature start-up test,	EN 60068-2-1:2007 (test Ad)
☒	13.4.5	Dry heat test	EN 60068-2-2: 2007 (test Be)
☐	13.4.6	Low temperature storage test*	EN 60068-2-1:2007 (test Ab)
☒	13.4.7	Cyclic damp heat test	EN 60068-2-30:2005 (test Db variant 2)
☒	13.4.9	Insulation test	
☐	13.4.10	Salt mist test*	EN 60068-2-11:1999 (test Ka)
☒	13.4.11	Vibration and shock test	EN 61373: 2010
☐	13.4.12	Enclosure protection test (IP code) *	
☐	13.4.13	Equipment stress screening test*	
☐	13.4.14	Rapid temperature variation test*	

The test item with * markings are optional test subject to contract agreement between the user and the manufacturer, and the items without marking are mandatory tests according to standard.

The report does not contain 13.4.8 EMC test.

Copy of marking plate



Remark: the above marking plate is only a draft artwork to show the product ratings and model No.

Marking for other models are the same except model number.

Possible test case verdicts:

- test case does not apply to the test object..... N (or N/A)
- test object does meet the requirement..... P (Pass)
- test object does not meet the requirement ..... F (Fail)

Testing .....

Date of receipt of test item..... 2019-04-17

Date (s) of performance of tests ..... 2019-04-17 to 2019-04-26

General remarks:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory.
"(see Enclosure #)" refers to additional information appended to the report.
"(see appended table)" refers to a table appended to the report.

Throughout this report a comma is used as the decimal separator.

General product information:

Function:	Network Camera main function is collecting real-time video signals, Power by stabilized PoE then through Ethernet port transmission to PC online surveillance
Power Source:	Stabilized Power over Ethernet
Installation:	Used on rolling stock inside railway vehicles, body mounted
Construction:	Metal enclosure fixed by screws
Accessories:	No
Altitude	☒A1 (default requirement) ; ☐A2 ☐A3 ☐AX
Operation temperature:	☐OT1 ☒OT2 ☐OT3 （default requirement） ☐OT4 ☐OT4 ☐OT5 ☐OT6
Switch-on extended operating temperature:	☐ST0 ☐ST1 (default requirement), ☒ ST2, ☐NA
Rapid temperature variation	☒H1 (default requirement), ☐ H2 ☐ N/A
Vibration and shock	☐category 1 Class A ☒ category 1 Class B (recommended requirement); ☐2 (Bogie mounted), ☐ 3 (Axle mounted)
Interruption voltage supply	☐S1 ☐S2 (default requirement), ☐S3 ☒ N/A
Supply change-over	☐C1 default requirement, ☐C2 ☒ N/A
Documentation	☐class M ☒M0 default requirement,

Model differences:

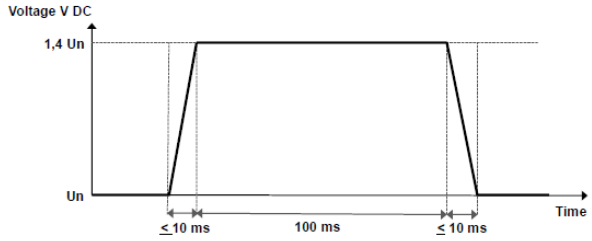
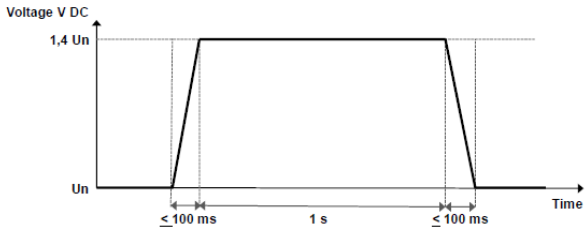
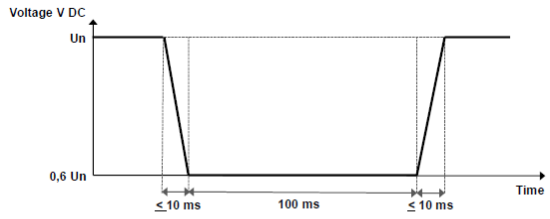
All models are identical except model name, trade name, and or appearance.

History:

Original report no. GZES190401537301 issued on 2019-4-29;

Amendment-1 report no. GZES190401537302 issued on 2019-6-28 with adding reference test method standard “Tests performed” on page 3.

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
13.4.1 Visual inspection			
13.4.1 (a)	The visual inspection test verifies the mechanical, dimensional and appearance conformance of the Electronic Equipment		P
13.4.1 (b)	A visual inspection shall be carried out before and after tests to check whether any damage or deterioration has occurred resulting from the tests.	After test, sample shows no damage and function is fine	P
13.4.2 Performance test			
13.4.2 (a)	The Performance test verifies the functional requirement of the Electronic Equipment, according to the performance test specification and procedure written by the supplier	Unit was tested with PoE power, during test unit shows no damage and function is fine.	P
13.4.2 (b)	The performance test shall be carried out at the ambient temperature, consist of a comprehensive series of measurements of the characteristics of the equipment to check the performance is in accordance with the functional requirements of the particular equipment concerned, including any special requirements of its individual specification, and general requirements of this standard.		P
13.4.3 Power supply test			
13.4.3.1	The test verifies the functionality of the electronic equipment in all the conditions foreseen for the power supply.	powered by stabilized PoE	N/A
	If the electronic equipment has a large number of similar power supply ports, which are electrically identical, then a sufficient number shall be selected to simulate actual operating conditions.	Only one power supply ports	N/A
	For each selected combination of test level and duration, with a sequence of 10 dips/interruptions and overvoltage with intervals of 10s minimum and 1 min maximum.	powered by stabilized PoE	N/A

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
13.4.3.2	Supply variations DC power supply range: Tests shall be performed to prove correct functioning for the voltage range. Temporary supply overvoltage up to 1.4Un lasting no more than 0.1s shall not cause deviation of function (performance criterion A)  Figure 6 — Temporary supply overvoltages (a)	powered by stabilized PoE	N/A
	Temporary supply overvoltage up to 1.4Un lasting no more than 1s shall fulfil performance criterion B  Figure 7 — Temporary supply overvoltages (b)	powered by stabilized PoE	N/A
13.4.3.3	Temporary supply dips Temporary supply dips down to 0.6Un not exceeding 0.1s shall not cause deviation of function (performance criterion A)  Figure 8 — Temporary supply dips	powered by stabilized PoE	N/A

<table>
<tr><td colspan="4">Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)</td></tr>
<tr><td>Cl.</td><td>Requirement-Test</td><td>Result-Remark</td><td>Verdict</td></tr>
<tr><td>13.4.3.4</td><td>Interruptions of voltage supply

Regarding interruptions on supply voltage, there are three classes of equipment:

Table 13 — Interruptions of voltage supply classes
<table><tr><th>Class</th><th>Requirements</th><th>Duration of the interruption time Tint (See Figure 9)</th></tr><tr><td>S1</td><td>No performance criterion is requested but the equipment shall continue to operate as specified after the voltage interruption.</td><td>NOTE As defined in 5.1.1.4, this test is not required.</td></tr><tr><td>S2</td><td>The equipment shall behave according performance criterion A.</td><td>10 ms</td></tr><tr><td>S3</td><td>The equipment shall behave according performance criterion A.</td><td>20 ms</td></tr></table></td><td>powered by stabilized PoE</td><td>N/A</td></tr>
<tr><td></td><td>Test shall be carried out at norminal voltage.

For voltage interruption longer than specified within the class, equipment shall behave at minimum according performance criterion C.

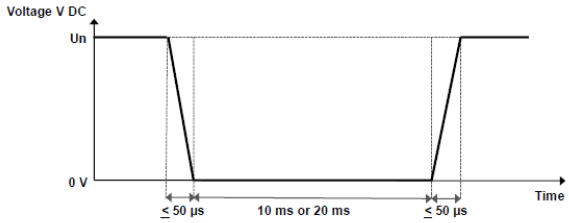
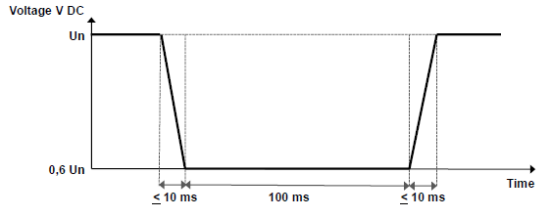
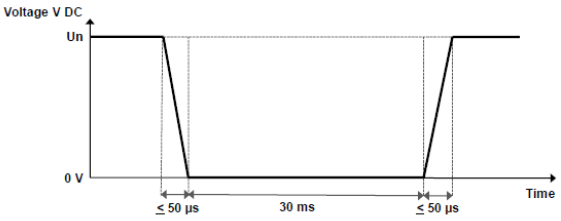
 

Figure 9 — Interruption of supply voltage</td><td>powered by stabilized PoE</td><td>N/A</td></tr>
</table>

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
13.4.3.5	Supply change-over The equipment shall operate satisfactorily under conditions: - Class C1: at 0.6Un during 100ms (without interruptions) Performance criterion A; - Class C2: during a supply break of 30 ms starting at Un. Performance criterion B  Figure 10 — Supply change-over Class C1  Figure 11 — Supply change-over Class C2	powered by stabilized PoE	N/A
13.4.4 Low temperature start-up test			
	This test is carried out in accordance with EN 60068-2-1, test Ad.		P
	Equipment is placed, without any voltage applied, in a test chamber.		P
	Equipment shall be tested according to its operating temperature class, low operating temperature (T_{TEST})shall be taken from Table 1. **Table 1 — Operating temperature classes** Class / Equipment operating temperature range (°C): OT1: –25 to +55 OT2: –40 to +55 OT3: –25 to +70 OT4: –40 to +70 OT5: –25 to +85 OT6: –40 to +85	Class OT2 used according to manufacturer: - 40 °C	P

<table>
<tr><td colspan="4">Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)</td></tr>
<tr><td>Cl.</td><td>Requirement-Test</td><td>Result-Remark</td><td>Verdict</td></tr>
<tr><td></td><td>The equipment shall be first conditioned by leaving it, after thermal stabilization of the chamber, for a sufficient period of time in which to achieve thermal stabilization. In any case, this period shall not be less than 2 h.</td><td></td><td>P</td></tr>
<tr><td></td><td>At the end of this period the equipment shall be switched on and a performance check is carried out, keeping the equipment at the low temperature. After recovery, this performance check is repeated at normal room temperature.

Test acceptance requirements: during and after the test, the equipment shall work as intended and within its specified limits (Performance criterion A)</td><td>Performance check was passed under low temperature condition and normal room temperature condition.</td><td>P</td></tr>
<tr><td colspan="4">13.4.5 Dry heat test</td></tr>
<tr><td></td><td>This test is carried out in accordance with EN 60068-2-2, test Be</td><td></td><td>P</td></tr>
<tr><td></td><td>The temperature value for this test is dependent of the temperature class and the switch-on extended operating temperature class of equipment under test (table 1 and table 2)

Table 2 — Switch-on extended Operating temperature classes
<table><tr><th>Class</th><th>Switch-on extended operating temperature (duration: 10 min)</th><th>Thermal test cycle See 13.4.5</th></tr><tr><td>ST0</td><td>No switch-on extended operating temperature</td><td>Test cycle A</td></tr><tr><td>ST1</td><td>OTx +15 °C</td><td>Test cycle B</td></tr><tr><td>ST2</td><td>OTx +15 °C</td><td>Test cycle C</td></tr></table></td><td>Class OT2 and ST2 used according to manufacturer: 55 °C, Test cycle C,</td><td>P</td></tr>
<tr><td>13.4.5.2 - Cycle A</td><td>the switched off equipment is placed in a chamber where the temperature is progressively raised to the maximum operating temperature (T_{TEST})

Once the temperature has stabilised, In any case, this period shall not be less than 2 h, then the equipment is switched on and left for a time period of 6 h with continuous operational check carried out at max. operating temperature T_{TEST}

The equipment is then allowed to cool to ambient temperature and a further performance test is carried out after the stabilization time.

Test acceptance requirements: during and after the test, the equipment shall work as intended and within its specified limits (Performance criterion A)</td><td>Class ST2</td><td>N/A</td></tr>
</table>

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
13.4.5.3- Cycle B	the switched off equipment is placed in a chamber where the temperature is progressively raised to the maximum operating temperature (T_{TEST}) Once the temperature has stabilised, In any case, this period shall not be less than 2 h, then the equipment is switched on and left for a time period of 6 h with continuous operational check carried out at max. operating temperature (T_{TEST}). once this test is complete, a continuous operation check is carried out with the 10 min over-temperature value. The equipment is then allowed to cool to ambient temperature and a further performance test is carried out after the stabilization time. Test acceptance requirements: during and after the test, the equipment shall work as intended and within its specified limits (Performance criterion A)	Class ST2	N/A
13.4.5.4- cycle C	The switched off equipment is placed in a chamber where the temperature is progressively raised to the extended operating temperature (T_{TEST}+15°C) according to the selected temperature class. Once the temperature has stabilised, In any case, this period shall not be less than 2 h, then the equipment is switched on and continuous operation check are carried out at this extended operating temperature value for 10 min. Equipment is then allowed to cool to the max. operating temperature ($T_{TEST)}$ and continuous operation check last or a time period of 6 h. The equipment is then allowed to cool to ambient temperature and a further performance test is carried out after the stabilization time. Test acceptance requirements: during and after the test, the equipment shall work as intended and within its specified limits (Performance criterion A)	70 °C, 10 min. and 55 °C, 6 h; Performance check was passed under dry heat condition and normal room temperature condition.	P
13.4.6 Low temperature storage test			
	Where the equipment is to be subjected to temperatures less than its minimum operating temperature, then a low temperature storage test may be carried out. This test shall be carried out in accordance with EN 60068-2-1 (test Ab)		N/A

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
	Equipment without packaging is placed, without any voltage applied, in a test chamber. The temperature value for the test shall be -40℃ and the time period after stabilization shall be 16 h minimum. After recovery, a performance test shall be carried out at the ambient reference temperature.		N/A
	Test acceptance requirements: After recovery, the equipment shall work as intended and within its specified limits (performance criterion A)		N/A
13.4.7 Cyclic damp heat test			
	This test is carried out in accordance with EN 60068-2-30, test Db variant 2. The equipment under test shall not be powered except during operational check. Temperatures: + 55°C and +25°C Number of cycles: 2 Time: (2 x24)h		P
	Test acceptance requirements: The results of all insulation and performance test (result after the first and second cycles) shall be within the specified tolerances and operation performance respectively. Before and after the test (initial and final voltage withstand and insulation), the equipment shall work as intended and within its specified limits (Performance criterion A)	Performance check was passed under Before and after the test. Operation check was passed under the rise in temperature during the beginning of the second cycles at 35°C insulation was passed under Before and after the test	P
13.4.9 Insulation test			
13.4.9.1	The test shall be carried out on fully assembled parts of equipment, and/or complete equipments dependent upon the scope of supply. The test comprises two parts, an insulation measurement test (carried out before and after the voltage withstand test), and the voltage withstand test.		P
	Insulation measurement shall be carried out at the integration level of equipment under test.		P
	Voltage withstand test shall be performed on concerned electronic equipment. Each equipotential area shall be defined and test against mechanical earth and against all surrounding equipotential areas.		P

<table>
<tr><td colspan="4">Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)</td></tr>
<tr><td>Cl.</td><td>Requirement-Test</td><td>Result-Remark</td><td>Verdict</td></tr>
<tr><td></td><td>Insulation test against mechanical earth is not required for equipotential area formed by ELV circuits that have internal electronic 0V potential electrically connected to the mechanical earth.</td><td>Insulation test against mechanical earth is not required for ALARM Port internal electronic 0V potential electrically connected to the mechanical earth.</td><td>P</td></tr>
<tr><td>13.4.9.2</td><td colspan="3">Insulation measurement test</td></tr>
<tr><td></td><td>The insulation resistance test shall be carried out at 500 V d.c. and the values recorded.

The test shall then be repeated after the voltage withstand test

Test acceptance requirements:

The minimum value of the insulation resistance after the withstand test shall be higher than 20MOhm. The equipment shall work as intended and within its specified limits after the insulation test.</td><td>See appended table</td><td>P</td></tr>
<tr><td>13.4.9.3</td><td colspan="3">Voltage withstand test</td></tr>
<tr><td></td><td>The test shall be performed with AC (50 Hz or 60 Hz) or DC test voltage according to table 14.

Table 14 — Test voltages of voltage withstand test
<table><tr><th>Nominal battery voltage and/or I/O voltage</th><th>Test voltage</th></tr><tr><td>< 72 V DC
or 50 V AC rms</td><td>500 V AC or 750 V DC</td></tr><tr><td>72 V DC ≤ V DC < 125 V DC
or from 50 to 90 V AC rms</td><td>1 000 V AC or 1 500 V DC</td></tr><tr><td>125 V DC ≤ V DC < 315 V DC
or from 90 to 225 V AC rms</td><td>1 500 V AC or 2 200 V DC</td></tr></table>
The test voltage shall be applied by gradually increasing the voltage amplitude to the test voltage, and maintained at the specified level for 1 min.

Where part of the electronic equipment is galvanically connected to a power circuit, then this part of the equipment shall be subject to the same dielectric tests as that circuit.

Test acceptance requirements:

Neither disruptive discharge nor flashover shall occur. The equipment shall work as intended and within its specified limits after the withstand test.</td><td>See appended table</td><td>P</td></tr>
<tr><td colspan="4">13.4.10 Salt mist test</td></tr>
<tr><td></td><td>This test is carried out in accordance with EN 60068-2-11, test Ka.</td><td></td><td>N/A</td></tr>
<tr><td></td><td>Equipment is placed, without any voltage applied, in a test camber.</td><td></td><td>N/A</td></tr>
</table>

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
	The equipment should be tested in the manner in which they are expected to be used, i.e. protective covers should be in position and the equipment arranged, as nearly as possible, in the position it will occupy in actual use.		N/A
	The test chamber shall be kept closed and spraying of the salt solution shall continue without interruption during the whole conditioning period of 48 h. After recovery, operational check is carried out. Test acceptance requirements: — visual inspection; — an operational check shall not show any failure or damage. The equipment shall work as intended and within its specified limit.		N/A
13.4.11 Vibration and Shock test			
13.4.11.1	The complete cubicle or rack together with its auxiliaries and mounting arrangements (including its shock-absorbing devices if the equipment is designed for mounting on such devices) shall be subjected to the tests indicated in EN 61373. During the simulated long life testing the equipment shall not be operating; during the other tests the equipment shall be functional and its performance shall be monitored.		P
13.4.11.2	Simulated long life testing Test shall be carried out according to EN 61373: 2010, clause 9. Test acceptance requirements: - no damage shall be visible after the test - after the test, the equipment shall work as intended and within its specified limits.	according to manufacturer Category 1, Class B. X axis, Y axis, Z axis RMS= 5,72 (m/s2) After test, the unit shows no visible damage. Function check Pass.	P
13.4.11.3	Shocking test Test shall be carried out according to EN 61373: 2010, clause 10. Half-sinusoidal shocks test shall be carried out on a powered functional equipment. Test acceptance requirements: - no damage shall be visible after the test - during the test, the equipment is monitored and shall work as intended and within its specified limits. (Performance criterion A)	according to manufacturer Category 1, Class B. Vertical: ±50 m/s2 Transverse: ±50 m/s2 Longitudinal: ±50 m/s2 During and after test, the unit shows no visible damage. Function check Pass.	P

Railway applications – Electronic equipment used on rolling stock (EN: 50155:2017)			
Cl.	Requirement-Test	Result-Remark	Verdict
13.4.11.4	Functional random vibration test Test shall be carried out according to EN 61373: 2010, clause 8. Test acceptance requirements: - no damage shall be visible after the test - during the test, the equipment is monitored and shall work as intended and within its specified limits. (Performance criterion A)	according to manufacturer Category 1, Class B. X axis, Y axis, Z axis RMS= 1,01 (m/s2) During and after test, the unit shows no visible damage. Function check Pass.	P
13.4.12 Enclosure protection test (IP code)			
	As electronic equipment is generally mounted either inside the body of the vehicle or in boxes outside (e.g. Locations 1, 2 and 3 according to Table C.1), there is no need to carry out enclosure protection tests, apart form exceptional cases;this has to be defined between the user and the supplier (EN 60529 may be used as a guide).		N/A
13.4.13 Stress screening test			
	The user may require an equipment stress screening test procedure to be applied to completed equipment or a part of it, for the purpose of eliminating dormant manufacturing or component defects. The procedure may include: —operation at elevated temperature; —thermal cycling; —vibration. As appropriate to the equipment under consideration, the process, and the tests to be applied to the equipment, shall be agreed at the time of tender between involved parties. To carry out this stress screening test, EN 61163-1:2016, B.2 may be used as a guide.		N/A
13.4.14 Rapid Temperature variation test			
	The test specification and the test procedure shall be agreed between the involved parties.		N/A

Appended table (Test Results):

Table 13.4.3					N/A
13.4.3.2 Supply variations test:					
Input voltage	Test condition		Duration	Performance criterion	Test result
13.4.3.3 Temporary supply overvoltage/dips					
Input voltage	Intervals	Test times	Test condition	Performance criterion	Test result

13.4.3.4 interruption of voltage Supply test**:**						N/A
Input voltage	Intervals	Test times	Test condition	Class	Performance criterion	Test result
13.4.3.5 Supply change over test:						N/A
Input voltage	Intervals	Test times	Test condition	Class	Performance criterion	Test result

Table 13.4.9.2	**Insulation test**	P
Insulation resistance R between:	R (MΩ)	Required R (MΩ)
POE terminal to metal enclosure	>100	20
POE terminal to output terminal	>100	20

Table 13.4.9.3	**Voltage withstand test**	P
Test voltage applied between:	Test voltage (V)	Breakdown
POE terminal to metal enclosure	500 VAC	No
POE terminal to output terminal	500 VAC	No

Table 13.4.9.2	**Insulation test after Voltage withstand test**	P
Insulation resistance R between:	R (MΩ)	Required R (MΩ)
POE terminal to metal enclosure	>100	20
POE terminal to output terminal	>100	20

Photo documents:

Details of:

View:

[x] general

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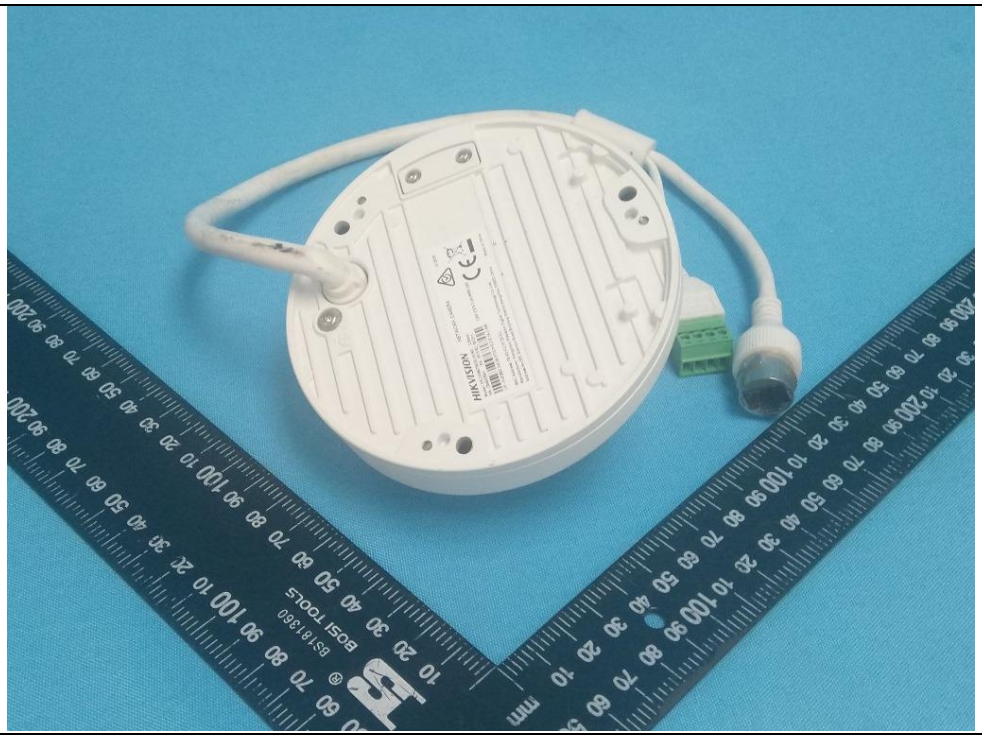

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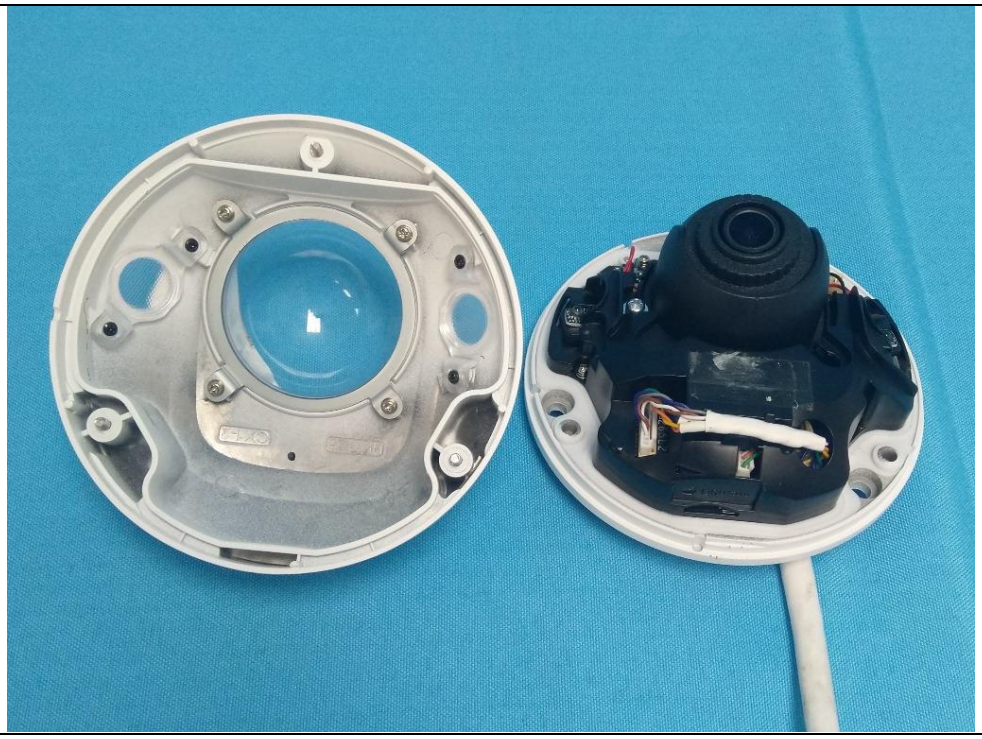

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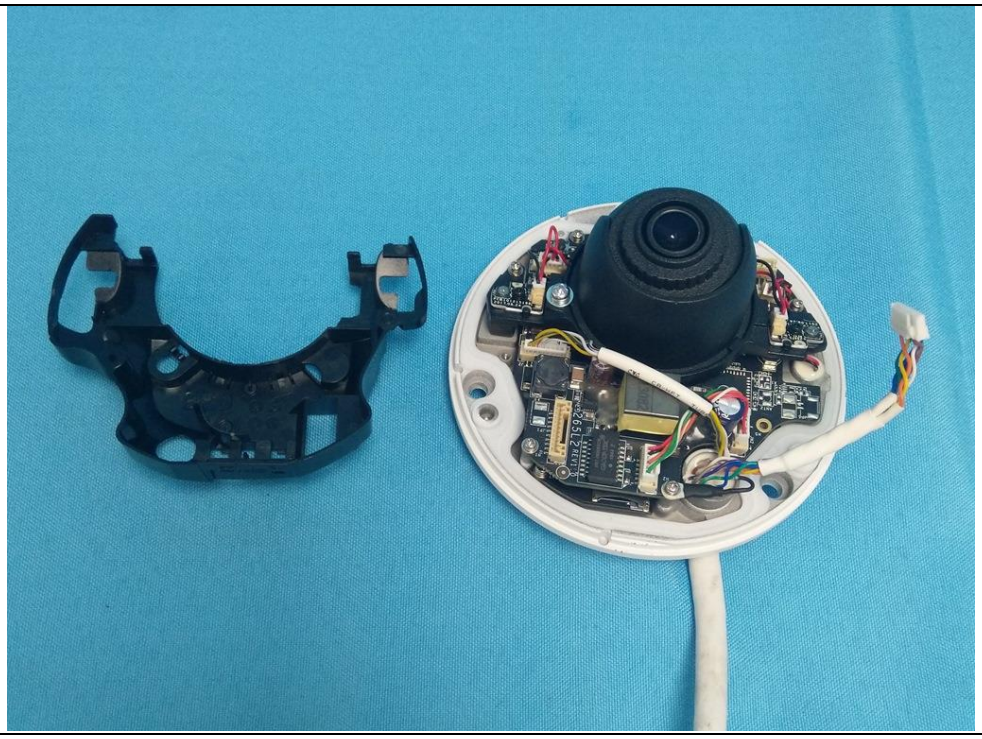

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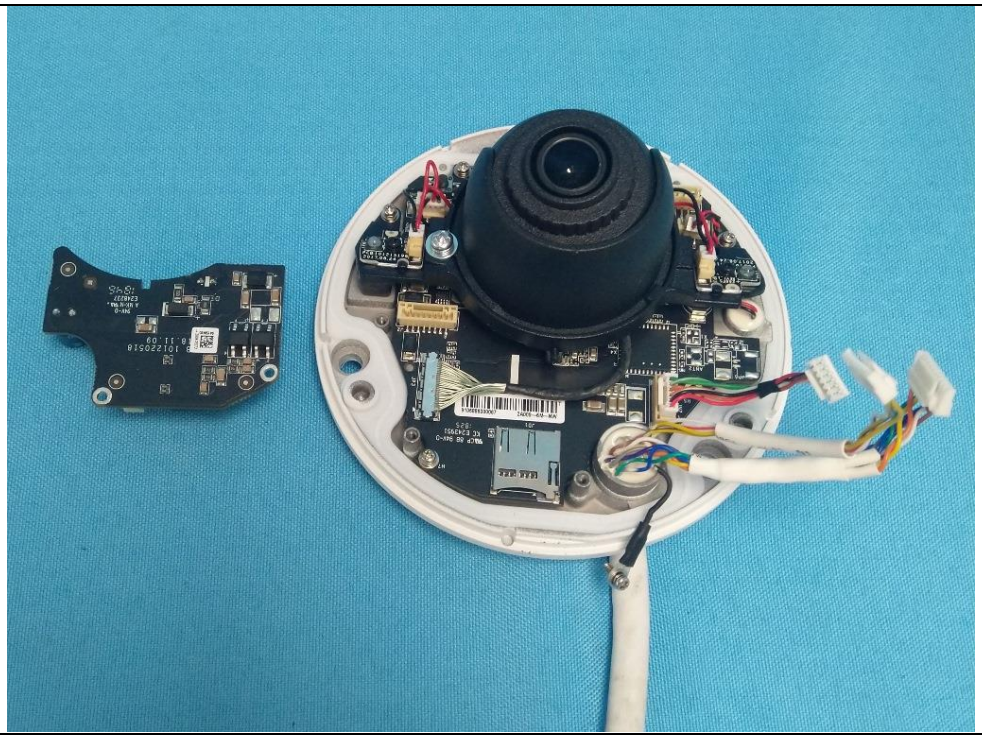

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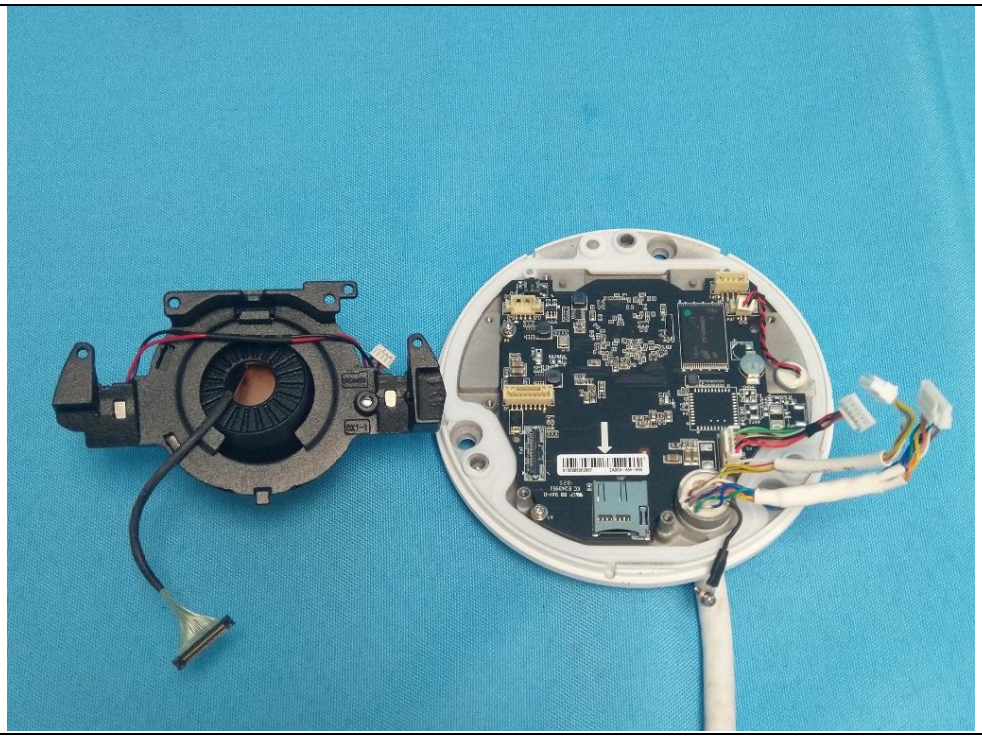

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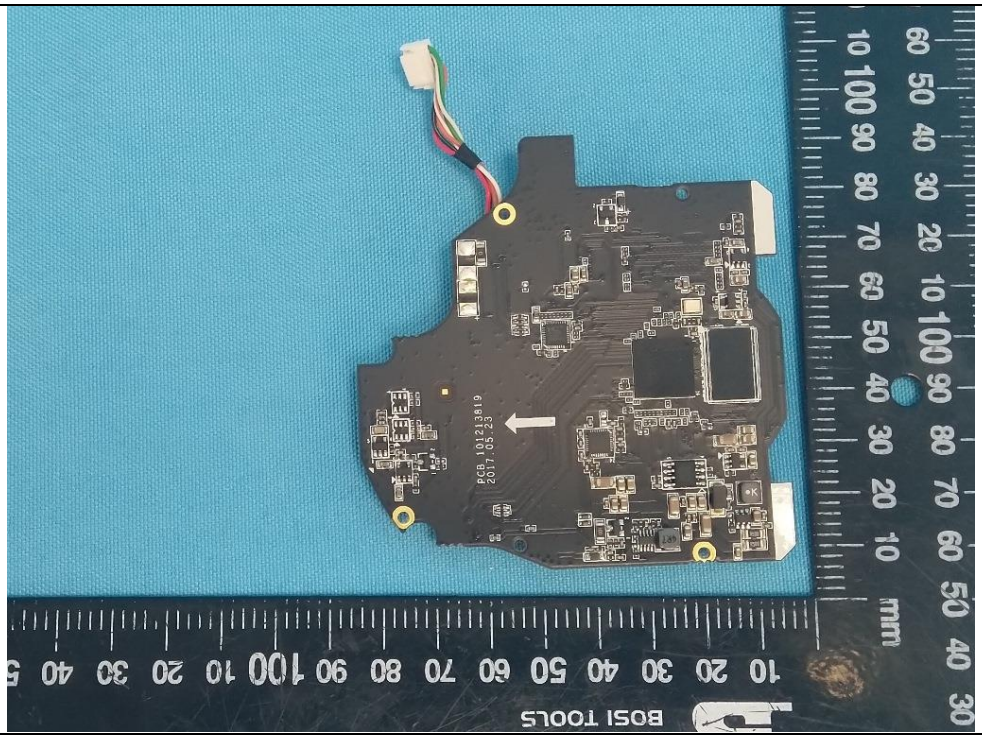

Details of: PWB

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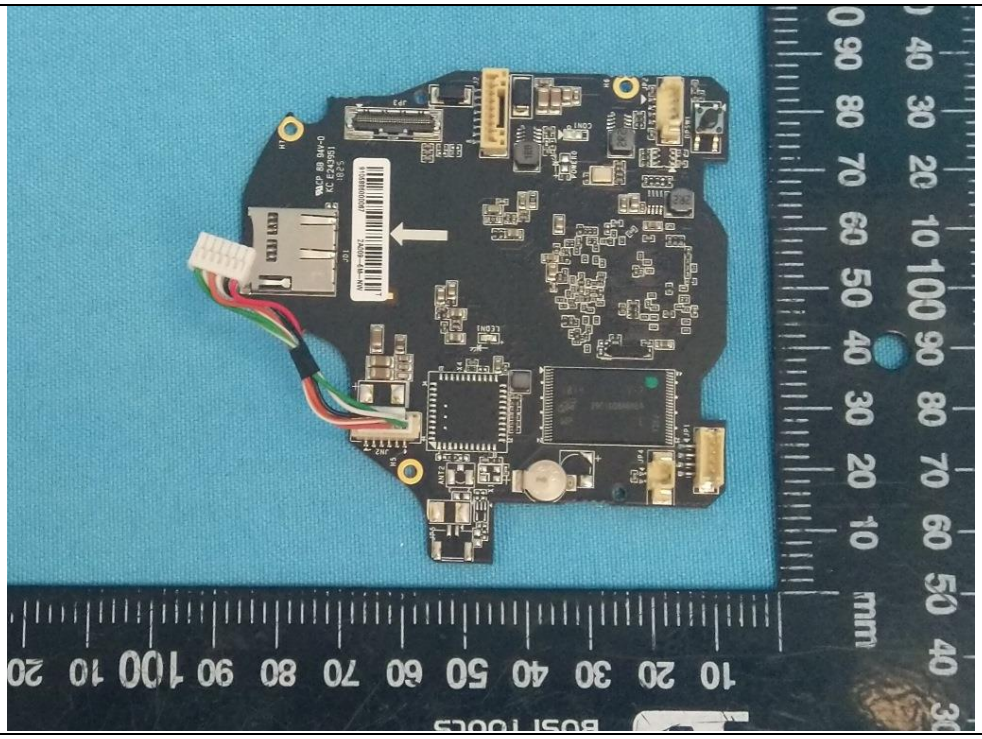

Details of: PWB

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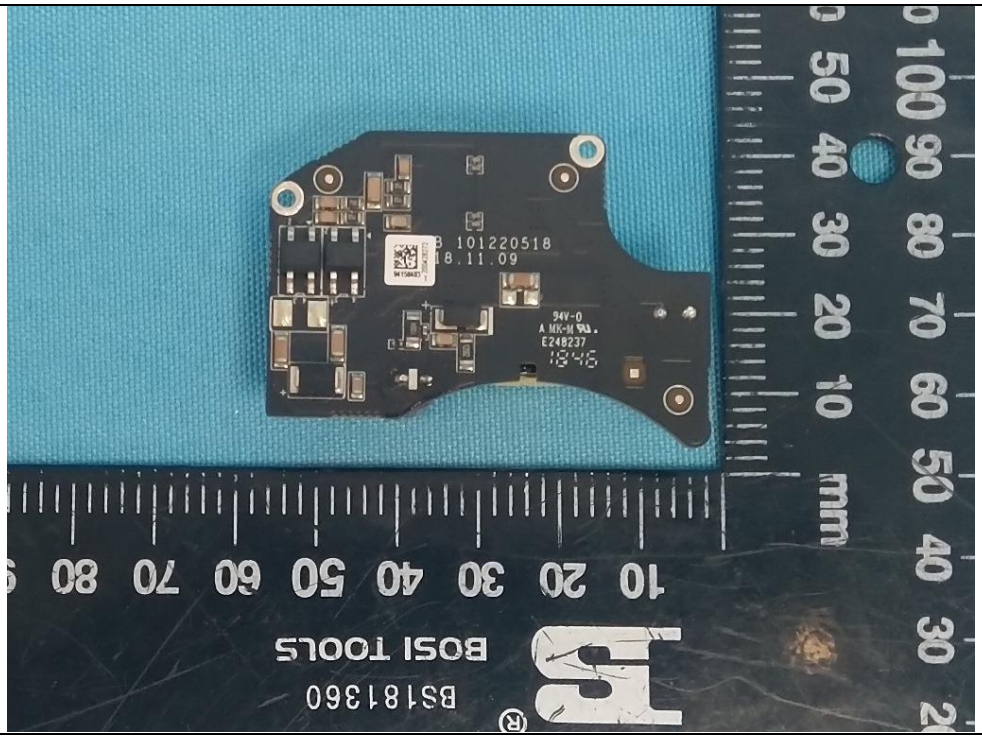

Details of: PWB

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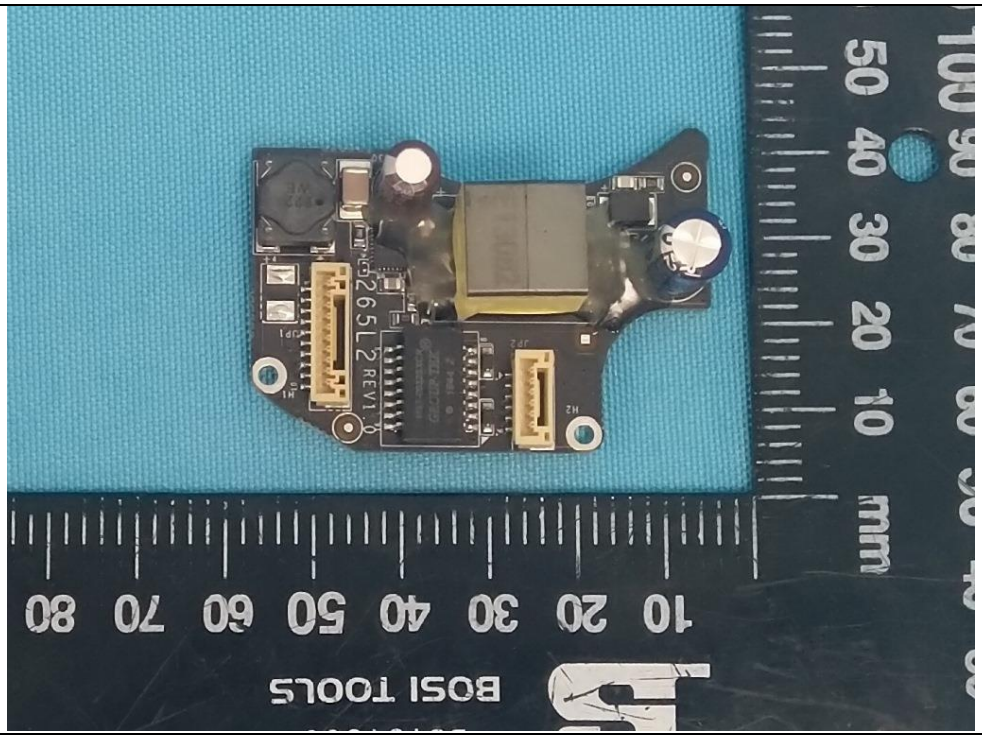

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