

FCC TEST REPORT

FCC ID: 2AJFC-174M

On Behalf of

Light Speed Vision (Beijing) Co.,Ltd.

Camera

Model No.: QHY174M, QHY174C, QHY178M, QHY178C, QHY163C, QHY224C, QHY163M, QHY183C, QHY290M, QHY290C

Prepared for : Light Speed Vision (Beijing) Co.,Ltd.

Address R&D Plaza, Tsinghua Science Park, Shuangqing Road, Haidian

District, Beijing, China

Prepared By : Shenzhen Alpha Product Testing Co., Ltd.

Address Building B, East Area of Nanchang Second Industrial Zone,

Gushu 2nd Road, Bao'an District, Shenzhen 518126, P.R. China

Report Number : T1861032 02 Date of Receipt : June 13, 2016

Date of Test : June 13-August 30, 2016 Date of Report : September 14, 2016

Version Number : REV0

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Report No.: T1861032 02

TEST REPORT DECLARATION

Applicant : Light Speed Vision (Beijing) Co.,Ltd. Manufacturer : Light Speed Vision (Beijing) Co.,Ltd.

EUT Description Camera

QHY174M, QHY174C, QHY178M,

QHY178C, QHY163C, QHY224C, (A) Model No.

QHY163M, QHY183C, QHY290M,

QHY290C

Trademark (B) **M** QHYCCD

DC 12V (C) **Ratings Supply**

· DC 12V from DC source Test Voltage (D)

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart B Class B 2016, ANSI C63.4:2014

The device described above is tested by Shenzhen Alpha Product Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen Alpha Product Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part15 requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen Alpha Product Testing Co., Ltd.

Reak Yang Tested by (name + signature)....: **Test Engineer**

Simple Guan Approved by (name + signature).....: Project Manager

Date of issue....: September 18, 2016

Report No.: T1861032 02

1. SUMMARY OF STANDARDS AND RESULTS

1.1.Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

EMISSION							
Description of Test Item	Standard Limits		Results				
Power Line Conducted	FCC Part 15:2016	Class P	р				
Emission Test	ANSI C63.4:2014	Class B	I				
Dadieted Essianian Tast	FCC Part 15:2016	Class D	D				
Radiated Emission Test	ANSI C63.4:2014	Class B	r				

Note: 1. P is an abbreviation for Pass.

2. F is an abbreviation for Fail.

3. N/A is an abbreviation for Not Applicable.

2. GENERAL INFORMATION

2.1.Description of Device (EUT)

Description : Camera

Model Number : QHY174M, QHY174C, QHY178M, QHY178C, QHY163C, QHY224C,

QHY163M, QHY183C, QHY290M, QHY290C

Diff

There is no difference between all the models, except the appearance

color and model name, so this report performs the model QHY174M.

Report No.: T1861032 02

Test Voltage : DC 12V from DC source

AC Adapter : N/A

Highest frequency : 200MHz

Software version : /
Hardware version : /

Applicant : Light Speed Vision (Beijing) Co.,Ltd.

Address R&D Plaza, Tsinghua Science Park, Shuangqing Road, Haidian District,

Beijing, China

Manufacturer : Light Speed Vision (Beijing) Co.,Ltd.

Address R&D Plaza, Tsinghua Science Park, Shuangqing Road, Haidian District,

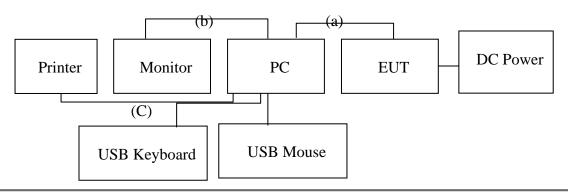
Beijing, China

Sample Type : Prototype production

2.2.Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or DOC
1	Personal Computer	DELL	D11M	CN-0LV772-C088 7-378-H8UR	DOC
2	Monitor	DELL	E2014Hf	CN-011HFV-7287 2-397-CHEM	DOC
3	USB Keyboard	ACER	SK-9625	KBUSB15805000 37E0100	DOC
4	USB Mouse	ACER	MS.11200.014	M-UAY-ACR2	DOC
5.	Printer	HP	HP1020	CNCJ410726	DOC
6.	DC Power	Longwei	TPR-12010D	/	VOC

2.3.Block Diagram of connection between EUT and simulators



	Signal Cable Description of the above Support Units										
No.	Port Name	Cable Length		Shielded (Yes or No)	Detachable (Yes or No)						
(a)	USB Port	USB Cable	150CM	Yes(Shielding and foil shields)	Yes						
(b)	VGA Port	VGA Cable	120CM	Yes(Shielding)	Yes						
(C)	Serial Port	Serial Cable	150CM	Yes(Shielding)	Yes						

EUT: Camera

2.4.Test mode Description

	No.	Test Mode						
	※ 1.	Take Photo						
	2.	Standby						
	Note: * is worst case mode for, so this report only reflected the							
worst mode.								

2.5.Test Facility

Shenzhen Alpha Product Testing Co., Ltd.
Building B, East Area of Nanchang Second, Industrial Zone, Gushu 2nd Road, Bao'an, Shenzhen, China

March 25, 2015 File on Federal Communication Commission

Registration Number: 203110

July 18, 2014 Certificated by IC Registration Number: 12135A

2.6. Measurement Uncertainty

(95% confidence levels, k=2)

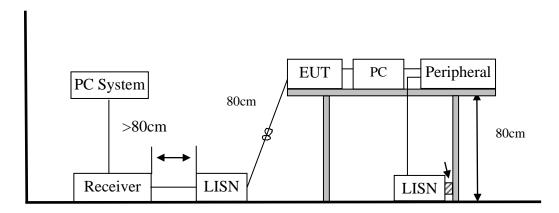
Test Item	Uncertainty
Uncertainty for Conduction emission	2.71dB
test	2.7 TuD
	3.90 dB (Distance:
Uncertainty for Radiation Emission test	3m Polarize: V)
(<1G)	3.92 dB (Distance:
	3m Polarize: H)
	4.26 dB (Distance:
Uncertainty for Radiation Emission test	3m Polarize: V)
(>1G)	4.28 dB (Distance:
	3m Polarize: H)

3. POWER LINE CONDUCTED EMISSION TEST

3.1.Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	101165	2016.01.17	1 Year
2.	L.I.S.N.#1	Schwarzbeck	NSLK8126	8126466	2016.01.17	1 Year
3.	L.I.S.N.#2	ROHDE&SCH WARZ	ENV216	101043	2016.01.17	1 Year
4.	Pulse Limiter	Schwarzbeck	9516F	9618	2016.01.17	1 Year
5	Cable	Resenberger	SUCOFLEX 104	MY6562/4	2016.01.17	1 Year

3.2.Block Diagram of Test Setup



3.3. Power Line Conducted Emission Test Limits

	Maximum RF Line Voltage				
Frequency	Quasi-Peak Level	Average Level			
	$dB(\mu V)$	$dB(\mu V)$			
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*			
500kHz ~ 5MHz	56	46			
5MHz ~ 30MHz	60	50			

Notes:

- 1. Emission level=Read level + LISN factor-Preamp factor + Cable loss
- 2. * Decreasing linearly with logarithm of frequency.
- 3. The lower limit shall apply at the transition frequencies.

3.4. Configuration of EUT on Test

The following equipment are installed on Power Line Conducted Emission Test to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

3.5. Operating Condition of EUT

- (1) Setup the EUT as shown as Section 3.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

3.6.Test Procedure

- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT Power connected to the power mains through a line impedance stabilization network (L.I.S.N. 1#). This provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on conducted Emission test.
- (2) The frequency range from 150kHz to 30MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 9kHz.
- (3) The frequency range from 30MHz to 1000MHz was pre-scanned with a Peak detector and all final readings of measurement from Test Receiver are Quasi-Peak and Average values.
- (4) The test results are reported on Section 3.7.

3.7. Conducted Disturbance at Mains Terminals Test Results

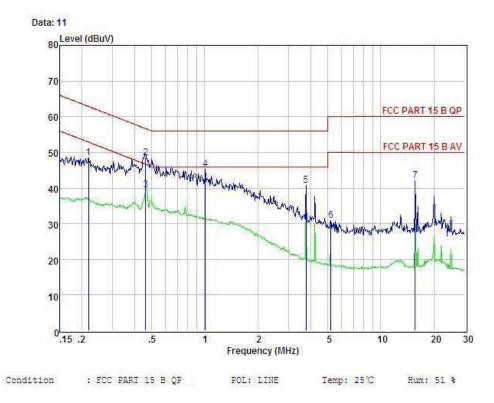
EUT	:	Camera	Test Date	:	2016.08.29
M/N	:	QHY174M	Temperature	:	25℃
Test Engineer	:	Reak Yang	Humidity	:	51%
Test Mode	:	Communicate with PC			
Test Results	:	PASS			

Test Results . TASS

Note: 1. The test results are listed in next pages.

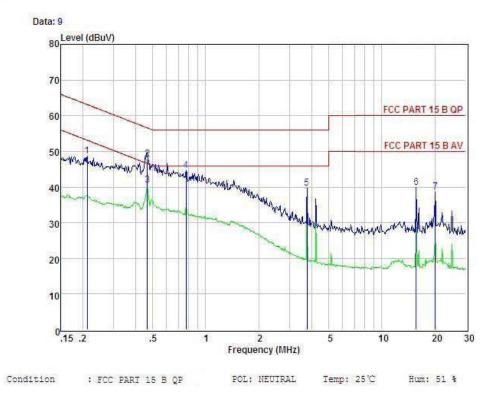
- 2. This mode is worst case mode, so this report only reflected the worst mode.
- 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.
- 4. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.





Item	Freq	Read Level	LISN Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
					100000	10.10			
1		29.23	9.61	-9.52	0.10	48.46	62.88	-14.42	Peak
2	0.46	29.19	9.62	-9.58	0.10	48.49	56.67	-8.18	QP
3	0.46	20.20	9.62	-9.58	0.10	39.50	46.67	-7.17	Average
4	1.01	25,88	9.54	-9.63	0.10	45.15	56.00	-10.85	Peak
5	3.76	20.99	9.67	-9.87	0.12	40.65	56.00	-15.35	Peak
6	5.22	11.16	9.67	-9.94	0.12	30.89	60.00	-29.11	Peak
7	15.72	22.18	9.72	-9.83	0.26	41.99	60.00	-18.01	Peak





Item	Freq	Read Level	LISN Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
		2010 1000			To Wind		machine a		
1	0.21	29.40	9.60	-9.52	0,10	48.62	63.10	-14.48	Peak
2	6.47	28,52	9.61	-9.58	0.10	47.81	56.58	-8.77	QP
3	0.47	21.30	9.61	-9.58	0.10	40.59	46.58	-5.99	Average
4	0.78	25.32	9.60	-9.60	0.10	44.62	56.00	-11.38	Peak
5	3.76	20.06	9.62	-9.87	0.12	39.67	56.00	-16.33	Peak
6	15.72	19.97	9.76	-9.83	0.26	39.82	60.00	-20.18	Peak
7	20.16	18.71	9.68	-9.80	0.35	38.54	60.00	-21.46	Peak

4. RADIATED EMISSION TEST

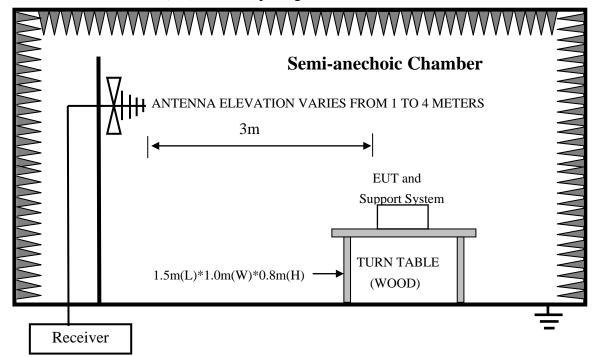
4.1.Test Equipment

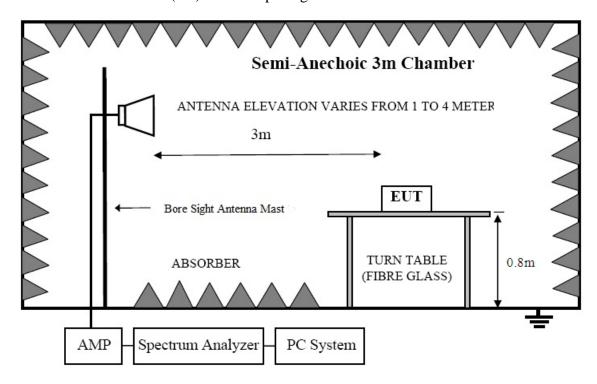
For frequency range 30MHz~1GHz (At Semi Anechoic Chamber)										
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval				
1	Test Receiver	Rohde&Schwarz	ESCI	101165	2016.01.17	1 Year				
2	Amplifier	HP	HP8347A	2834A00455	2016.01.19	1 Year				
3	Bilog Antenna	Schwarzbeck	VULB 9168	9168-438	2016.01.19	2 Year				
4	Cable	Resenberger	SUCOFLEX 104	309972/4	2016.01.17	1 Year				

For fr	For frequency range above 1GHz (At Semi Anechoic Chamber (3m))										
Item	Equipment	Manufacturer	Last Cal.	Cal. Interval							
1	Spectrum Analyzer	Agilent	E4407B	MY49510055	2016.01.17	1 Year					
2	Horn Antenna	Schwarzbeck	BBHA 9120 D	BBHA 9120 D(1201)	2016.01.21	1 Year					
3	Amplifier	Agilent	8449B	3008A02664	2016.01.19	1 Year					
4	Cable	Resenberger	SUCOFLEX 104	329112/4	2016.01.17	1 Year					

4.2.Block Diagram of Test Setup

In Semi Anechoic Chamber (3m) Test Setup Diagram for 30MHz~1000MHz





4.3. Radiated Emission Limit

Frequency	Distance	Field Strengths Limits	
MHz	(Meters)	$dB(\mu V)/m$	
30 ~ 88	3	40.0	
88 ~ 216	3	43.5	
216 ~ 960	3	46.0	
960 ~ 1000	3	54.0	
Above 1GHz	3	74(Peak) 54(Average)	

Notes:

- 1. Emission level = Read level + Antenna Factor Preamp Factor + Cable Loss
- 2. The smaller limit shall apply at the cross point between two frequency bands.
- 3. Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.
- 4. Frequency range of radiated measurements:

Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705-108	1000
108-500	2000
500-1000	5000
Above 1000	5th harmonic of the highest frequency or 40 GHz, whichever is lower.

4.4. Configuration of EUT on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner that tends to maximize its emission characteristics in normal application.

4.5. Operating Condition of EUT

- (1) Setup the EUT as shown as Section 4.2.
- (2) Turn on the power of all equipment.
- (3) Let the EUT work in test mode and 15 minutes before taking the test.

4.6.Test Procedure

- (1) The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. An antenna was located 3m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.4:2014 on Radiated Emission test.
- (2) For the radiated emission test above 1GHz:
 - Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.
- (3) The frequency range from 30MHz to 1000MHz is checked, the bandwidth of test receiver (R&S TEST RECEIVER ESCI) is set at 120kHz.
- (4) The frequency range from above 1GHz is checked, the bandwidth of spectrum analyzer (Analyzer Spectrum Analyzer E4407B) is set at 1MHz.
- (5) The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector and all final readings of measurement from Test Receiver are Quasi-Peak values, the frequency range from 1GHz to 6GHz was pre-scanned with a peak detector and all final readings of measurement from Spectrum Analyzer are peak and average values checked, all measurement distance is 3m in 3m semi anechoic chamber.
- (6) The test results are reported on Section 4.7.

4.7. Radiated Disturbance Test Results

Frequency Range : 30MHz~1000MHz	
EUT : Camera	Test Date : 2016.08.30
M/N: QHY174M Test Engineer: Reak Yang	Temperature : 24.5℃
Test Mode : Communicate with PC	Humidity : 56%

Test Results : **PASS**

Note: 1. The test results are listed in next pages.

- 2. This mode is worst case mode, so this report only reflected the worst mode.
- 3. If the limits for the measurement with the quasi-peak detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the quasi-peak detector need not be carried out.

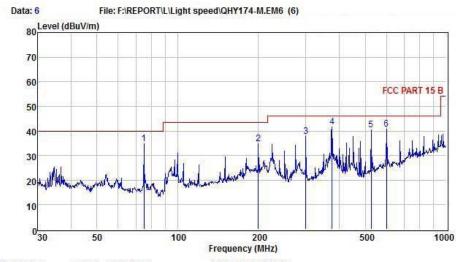
Frequency Range : Above 1GHz	
EUT : Camera	Test Date : 2016.08.30
M/N: QHY174M Test Engineer: Reak Yang	Temperature : 24.5℃
Test Mode : Communicate with PC	Humidity : 56%

Test Results : PASS

Note: 1. The test results are listed in next pages.

- 2. This mode is worst case mode, so this report only reflected the worst mode.
- 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.



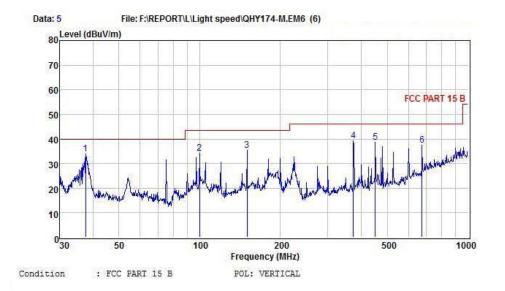


Condition : FCC PART 15 B POL: HORIZONTAL

Temp : 24.5c Hum : 56%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable Loss	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
						HELLEY DESCRIPTION			
1	74.92	54.74	9.90	30.09	0.25	34.80	40.00	-5.20	Peak
2	199.99	53.30	9.90	28.84	0.43	34.79	43.50	-8.71	Peak
3	300.37	52.20	12.85	28.02	0.64	37.67	46.00	-8.33	Peak
4	375.94	53.68	14.35	27.42	0.96	41.57	46.00	-4.43	Peak
5	526.40	49.72	16.99	27.22	1.00	40.49	46.00	-5.51	Peak
6	601.43	47.23	18.36	25.89	1.07	40.77	46.00	-5.23	Peak

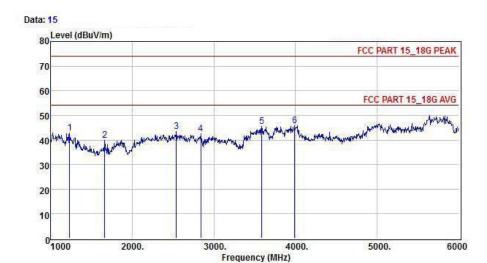




Temp	95	24.5c
Hum		56%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable	Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
		25.0			21000				
1	37.55	50.84	13.73	30.83	0.08	33.82	40.00	-6.18	Peak
2	99.88	53.75	10.15	30.15	0.46	34.21	43.50	-9.29	Peak
3	150.01	50.31	14.16	29.45	0.39	35.41	43.50	-8.09	Peak
4	374.62	51.41	14.32	27.43	1.07	39.37	46.00	-6.63	Peak
5	451.14	49.03	15.99	27.54	1.08	38.56	46.00	-7.44	Peak
6	675.21	42.70	19.40	25.76	1.22	37.56	46.00	-8.44	Peak





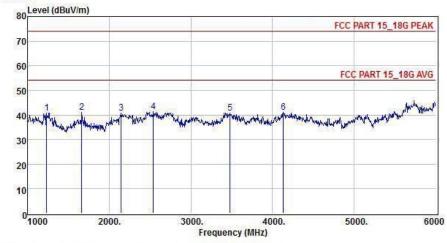
Condition : FCC PART 15_18G PEAK POL: VERTICAL

Temp : 24.5c Hum : 56%

Item	Freq	Read Level	Antenna Factor	Preamp Factor	Cable	Level	Limit	Margin	n Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
111	235.00	50.74	24.58	34.90	2.38	42.80	74.00	-31,20	Peak
	665.00		24.75	34.77	3.18	39.98	74.00	-34.02	Peak
32	540.00	46.73	27.67	34.98	4.06	43.48	74.00	-30.52	Peak
42	840.00	45.22	27.94	34.98	4.29	42.47	74.00	-31.53	Peak
53	585.00	46.65	28.74	34.89	4.92	45.42	74.00	-28.58	Peak
63	990.00	45.63	29.66	34.71	5.17	45.75	74.00	-28.25	Peak







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Condition : FCC PART 15_18G PEAK POL: HORIZONTAL

Temp : 24.5c Hum : 56%

Item	Freq	Read Level	Antenna Factor	Preamp Factor		Level	Limit	Margin	Remark
	MHz	dBuV	dB	dB	dB	dBuV	dBuV	dBuV	
11:	235.00	48.74	24.58	34.90	2.38	40.80	74.00	-33.20	Peak
21	665.00	47.82	24.75	34.77	3.18	40.98	74.00	-33.02	Peak
32:	145.00	44.72	27.37	34.95	3.73	40.87	74.00	-33.13	Peak
425	540.00	44.73	27.67	34.98	4.06	41.48	74.00	-32.52	Peak
534	180.00	42.55	28.40	34.91	4.83	40.87	74.00	-33.13	Peak
643	135.00	40.51	29.89	34.64	5.26	41.02	74.00	-32.98	Peak

5. PHOTOGRAPH

5.1.Photos of Radiated Emission Test (In Semi Anechoic Chamber)





5.2.Photos of Power Line Conducted Emission Test



6. PHOTOS OF THE EUT



Full Load



Front View



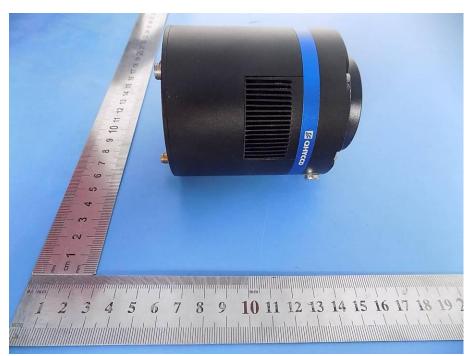
Rear View



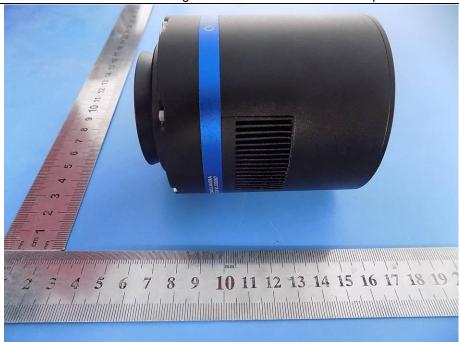
Top View



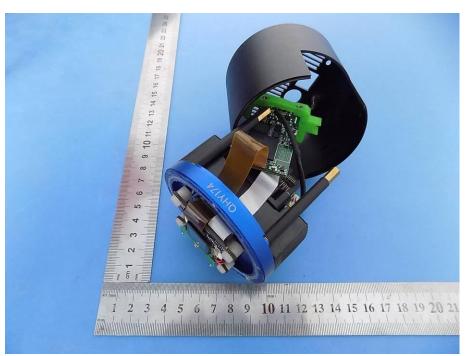
Bottom View



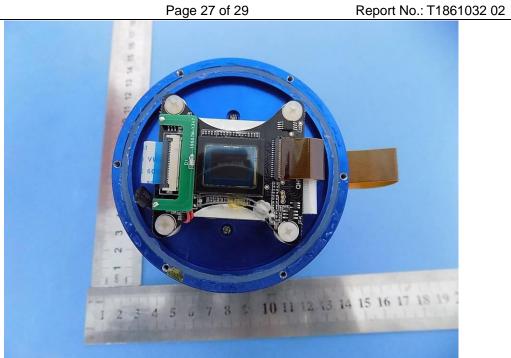
Left View



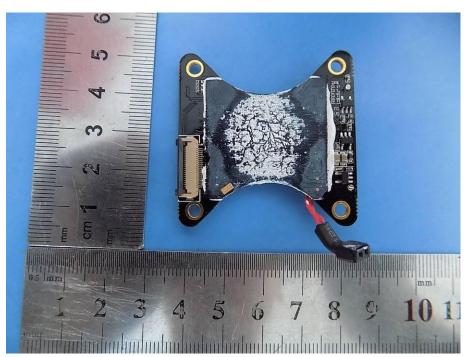
Right View



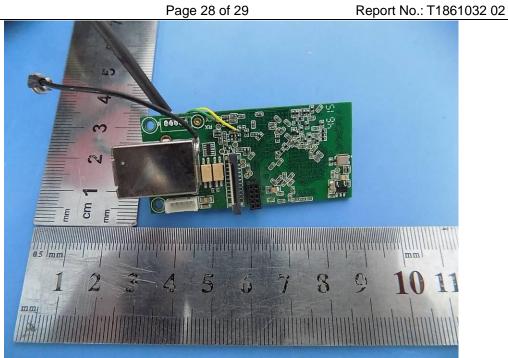
Inside View



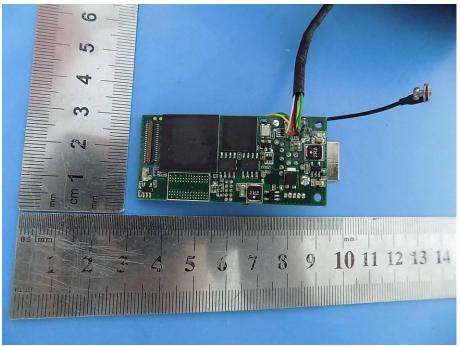
Inside View



Inside View

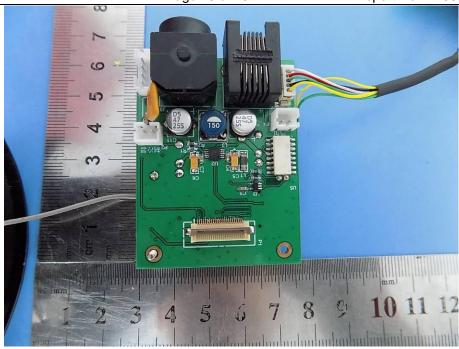


Inside View

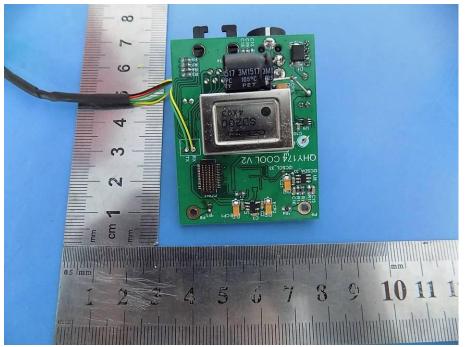


Inside View

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Inside View



Inside View

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